

3.2.2  Q <sub>n</sub> M	Grants for research projects sponsored by government agencies during the last five years (INR in Lakhs)					10	
	3.2.2.1: Total Grants for research projects sponsored by government agencies year-wise during the last five years (INR in Lakhs)						
	Year	2016-17	2017-18	2018-19	2019-20		2020-21
	INR in Lakhs	164.15	302.82	248.40	99.58		252.52
	Data to be provided for the last five years:(As per Data Template)						
	<ul style="list-style-type: none"><li>• Name of the Project</li><li>• Name of the Principal Investigator</li><li>• Department of Principal Investigator</li><li>• Year of Award</li><li>• Funds provided</li><li>• Duration of the project</li><li>• Funding Agency</li><li>• Total amount of funds received</li></ul>						
	File Description (Upload)						
<ul style="list-style-type: none"><li>• Any additional information</li><li>• e-copies of the grant award letters for research projects sponsored by government agencies</li><li>• Provide the List of project and grant details (Data Template as of 3.1.6)</li></ul>							

#### Data Template

S. No.	Name of the Project/ Endowments, Chairs	Name of the PI	Name of the Funding agency	Type (Govt/ Non- Govt)	Department of PI	Year of Award	Funds Provided	Duration of the Project
G1	Sustainable livelihood activities on reclaimed open cast coal mines: a technology enabled integrated approach in Indian Coal sector	Arabinda Mishra & Sudipto Chatterjee	Ministry of Coal	Government	Department of Natural Resources	2016-2017	1,00,00,000	2015-2018
G2	Impact Analysis pf the Arunachal Pradesh Panchayati Raj Act 1997 on Traditional Institution in the State	MP Ram Mohan & MV Shiju	Indian Council of Social Science Research	Government	Department of Policy Studies	2016-2017	6,00,000	2016-2018
G3	Implementation of Possible Improvement Measures Covering Energy Varanasi Cluster	Girish Sethi	Small Industries Development Bank of India (SIDBI)	Government	Department of Energy and Enviroment	2016-2017	23,40,000	2015-2018
G4	Structural studies on proteins involved in synthesis and processing of mycolic acids in Mycobacterium tuberculosis	Chaithanya Madhurantakam	Department of Biotechnology, Government of India	Government	Department of Biotechnology	2016-2017	21,10,000	2016-2017
G5	National Post-Doctoral Fellowship to Dr Anil Kumar Verma, under the	Ramakrishnan Sitaraman	Department of Science & Technology	Government	Department of Biotechnology	2016-2017	8,20,650	2016-2018

	mentorship of Ramakrishnan Sitaraman							
G6	Design, development and testing of a down draft gasifier system completed by hydrogen enrichment through air steam gasification	Piyanka Kaushal & Atul Kumar	Petroleum Conservation Research Association	Government	Department of Energy and Environment	2016-2017	5,44,500	2017-2019
G7	Development of Knowledge Based Decision Tool to Stimulate Mechanism of Vegetation Change Due to Climate Change in Western Himalayan Ecoregion	Pawan Kumar Joshi & Kamna Sachdeva	Ministry of Environment, Forest and Climate Change (MoEF)	Government	Department of Energy & Environment	2017-2018	20,00,000	2013-2016
G8	Supporting, Conolidation, replication and upscaling of sustainable waste water treatment and reuse technologies for India	Sukanya Das	Department of Science and Technology (DST)	Government	Department of Policy Studies	2017-2018	4,40,000	2014-2017
G9	Implementation of Possible Improvement Measures Covering Energy Varanasi Cluster	Girish Sethi	Small Industries Development Bank of India (SIDBI)	Government	Department of Energy & Environment	2017-2018	8,27,250	2015-2016
G10	Structural studies on proteins involved in synthesis and processing of mycolic acids in Mycobacterium tuberculosis	Chaithanya Madhurantakam	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2017-2018	18,38,000	2016-2021
G11	Design, development and testing of a down draft gasifier system completed by hydrogen enrichment through air steam gasification	Priyanka Kaushal & Atul Kumar	Ministry of Petroleum and Natural Gas	Government	Department of Energy & Environment	2017-2018	9,07,500	2017-2019
G12	Preparation of the State Specific Action Plan for Water Sector	Vinay Kumar Sinha	Government of Arunachal Pradesh	Government	Department of Natural Resources	2017-2018	10,43,478	2017-2018
G13	Financial Sanction under National Post Doctoral Fellowship to Ms. Aditi Jain	Anandita Singh	Science and Engineering Research Board (SERB)	Government	Department of Biotechnology	2017-2018	9,65,192	2017-2019
G14	Department of CMS /RF System in Bhut Jolokia using marker assisted selection	Shashi Bhushan Tripathi	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2017-2018	25,63,800	2018-2020



G15	Urban Transition beyond Municipal Boundaries : A Comparative Spatial Analysis of the PERI-Urban Areas of Gurugram and Noida	Bhawna Bali	Indian Council of Social Science Research (ICSSR)	Government	Department of Energy & Environment	2017-2018	3,20,000	2017-2019
G16	Spatial Distribution of Uranium and associated water quality parameters in five districts of UP	Chander Kumar Singh	Department of Atomic Energy (BRNS)	Government	Department of Energy & Environment	2017-2018	18,52,825	2017-2019
G17	Conducting Third Party Evaluation of the States/Union Territories regarding Implementation of Reforms under AMRUT	Abhijit Datey	The National Institute of Urban Affairs (NIUA)	Government	Department of Energy & Environment	2017-2018	2,32,254	2018-2019
G18	Air Quality Management - Plans using decision support system UrbAir India	Kamna Sachdeva	Central Pollution Control Board (CPCB)	Government	Department of Energy & Environment	2017-2018	2,80,800	2017-2018
G19	Modelling for Enhancing Water Quality in Uttarakhand using Geospatial Technology	Vinay Kumar Sinha	Uttarakhand State Council for Science and Technology	Government	Department of Natural Resources	2017-2018	20,60,000	2017-2020
G20	Collection, evaluation, documentation and conservation of banana genetic resources from north eastern region	Shashi Bhushan Tripathi	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2017-2018	9,04,000	2018-2021
G21	Analyzing the Implementation of Forest Right Act (2006) - Community Right in Southern Rajasthan	Smriti Das	Indian Council of Social Science Research (ICSSR)	Government	Department of Policy Studies	2017-2018	46,650	2012-2014
G22	Sustainable livelihood activities on reclaimed open cast coal mines: a technology enabled integrated approach in Indian Coal sector	Arabindra Mishra & Sudipta Chatterjee	Ministry of Coal	Government	Department of Policy Studies	2017-2018	1,40,00,000	2015-2018
G23	Energy Storage - Centre of Excellence	Basudev Prasad	Ministry of Human Resource Development (MHRD)	Government	Department of Energy & Environment	2018-2019	70,00,000	2014-2020
G24	Structural studies on proteins involved in synthesis and processing of mycolic acids in Mycobacterium	Chaithanya Madhurantakam	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2018-2019	19,22,600	2016-2021

	tuberculosis							
G25	Developing advanced models for climate studies	Nithiyanandam Yogeswaran	National Security Council Secretariat (NSCS)	Government	Department of Natural Resources	2018-2019	3,97,900	2016-2019
G26	Design, development and testing of a down draft gasifier system completed by hydrogen enrichment through air steam gasification	Priyanka Kaushal & Atul Kumar	Ministry of Petroleum and Natural Gas	Government	Department of Energy & Environment	2018-2019	2,00,000	2017-2019
G27	Understanding the role of MIR160 and AUXIN RESPONSE FACTORS in establishment of root system architecture for improvement of crop Brassicas	Anandita Singh	Science and Engineering Research Board (SERB)	Government	Department of Biotechnology	2018-2019	12,16,160	2018-2021
G28	Urban Transition beyond Municipal Boundaries : A Comparative Spatial Analysis of the PERI-Urban Areas of Gurugram and Noida	Bhawna Bali	Indian Council of Social Science Research (ICSSR)	Government	Department of Energy & Environment	2018-2019	3,20,000	2017-2019
G29	Modelling for Enhancing Water Quality in Uttarakhand using Geospatial Technology	Vinay Kumar Sinha	Uttarakhand State Council for Science and Technology	Government	Department of Natural Resources	2018-2019	5,35,000	2017-2020
G30	Genotyping by sequencing of 72 samples/genotypes of Polygonatum with Bioinformatics Analysis	Shashi Bhushan Tripathi	Indian Council of Forestry Research and Education Forest Research Institute	Government	Department of Biotechnology	2018-2019	2,80,368	2017-2018
G31	Isolation and comparative analysis of promoter homeologs of flowering time gene SOC 1 : Discovering novel promoters involved in floral transition in Indian Brassicas	Anandita Singh	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2018-2019	22,55,000	2018-2021
G32	Gene regulation by DNA methylation in Bacillus anthracis (Sterne)	Ramakrishna Sitaraman	Science and Engineering Research Board (SERB)	Government	Department of Biotechnology	2018-2019	14,90,000	2018-2021
G33	Structural characterization of a	Chaithanya Madhurantakam	Indian Council of Medical	Government	Department of Biotechnology	2018-2019	18,40,625	2018-2021

	non-specific acid phosphatase HppA from <i>Helicobacter pylori</i>		Research (ICMR)					
G34	Towards an Integrated Global Transport and Health Assessment Tool (TIGTHAT)	Deepty Jain	Indian Institute of Technology (IIT)	Government	Department of Energy & Environment	2018-2019	50,000	2018-2019
G35	Paddy Growing Culture of the Ao-Naga Tribe and Climate Change	Chubamenla Jamir	Indira Gandhi National Centre for the Arts (IGNCA)	Government	Department of Energy & Environment	2018-2019	1,33,710	2018-2020
G36	Water Resources Management through Spring and Catchment Rejuvenation in Uttarakhand for Improving Water Security	Vinay Kumar Sinha	National Mission on Himalayan Studies (NMHS)	Government	Department of Natural Resources	2018-2019	39,72,707	2019-2021
G37	Development of Knowledge Based Decision Tool to Stimulate Mechanism of Vegetation Change Due to Climate Change in Western Himalayan Ecoregion	Pawan Kumar Joshi & Kamna Sachdeva	Ministry of Environment, Forest and Climate Change (MoEF)	Government	Department of Energy & Environment	2018-2019	1,01,000	2013-2016
G38	HUDCO Chair	Shaleen Singhal	The Housing and Urban Development Corporation Limited (HUDCO)	Government	Department of Energy & Environment	2018-2019	3,73,517	2015-2018
G39	Customized algorithms for climate studies	Nithiyanandam Yogeswaran	National Security Council Secretariat (NSCS)	Government	Department of Natural Resources	2018-2019	1,32,000	2015-2019
G40	Implementation of Possible Improvement Measures Covering Energy Varanasi Cluster	Girish Sethi	Small Industries Development Bank of India (SIDBI)	Government	Department of Energy & Environment	2018-2019	4,32,750	2015-2016
G41	Financial Sanction under National Post Doctoral Fellowship to Ms. Aditi Jain	Anandita Singh	Science and Engineering Research Board (SERB)	Government	Department of Biotechnology	2018-2019	9,04,808	2017-2019
G42	Conducting Third Party Evaluation of the States/Union Territories regarding Implementation of Reforms under AMRUT	Abhijit Datey	The National Institute of Urban Affairs (NIUA)	Government	Department of Energy & Environment	2018-2019	5,18,096	2018-2019
G43	Capacity Building for Urban Development	Bhawna Bali	Ministry of Urban	Government	Department of Energy &	2018-2019	1,52,075	2017-2018

			Development (MoUD)		Environment			
G44	Scalable synthesis of strach nanoparticles based adhesive/consolidants for conservation of cellulose based hertiage objects	Udit Soni	Department of Science and Technology (DST)	Government	Department of Biotechnology	2018-2019	6,11,280	2019-2022
G45	Scalable synthesis of strach nanoparticles based adhesive/consolidants for conservation of cellulose based hertiage objects	Udit Soni	Department of Science and Technology	Government	Department of Biotechnology	2019-2020	25,00,000	2019-2022
G46	Impact of Urban Infrastructure Schemes on Mitigation of Greenhouse Gas Emissions	Atul Kumar	Ministry Of Housing and Urban Affairs	Government	Department of Energy & Environment	2019-2020	6,00,000	2019-2020
G47	Residential Training Programmes on Global Warming, Climate Change and Disaster Management - Future Perspective	Kamna Sachdeva	Central Pollution Control Board	Government	Department of Energy & Environment	2019-2020	2,80,800	2019-2019
G48	Research Study on 'Dark Ship' Detection Using Precision Algorithm Leveraging Logical Analysis Of Varied Inputs (Pallavi)	Nithiyanandham Yogeswaran	Directorate of Network Centric Operations Integrated Headquarters Ministry of Defence (N)	Government	Department of Natural Resources	2019-2020	2,78,300	2019-2020
G49	Space Technology Utilisation for Food Security, Agricultural Assessment and Monitoring (SUFALAM)	Neeti Sinha	Space Application Centre, ISRO	Government	Department of Natural Resources	2019-2020	6,50,000	2019-2021
G50	Meta-analysis for Environmental Damage Assessment	Kavita Sardana & Sukanya Das	Central Pollution Control Board	Government	Department of Policy Studies	2019-2020	5,01,975	2019-2019
G51	Prevalence, Procreation, Persecution and Prevention regarding Caesarean-Section Deliveries/Birth in South Asia : A Systematic Review and Meta Analysis	Chandan Kumar	Indian Council Of Medical Research	Government	Department of Policy Studies	2019-2020	18,14,308	2019-2021
G52	Design Development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam	Priyanka Kaushal & Atul Kumar	Ministry Of Petroleum and Natural Gas	Government	Department of Energy & Environment	2019-2020	3,08,200	2017-2019

	gasification							
G53	Spatial Distribution of Uranium and associated water quality parameters in five districts of UP	Chander Kumar Singh	Department Of Atomic Energy	Government	Department of Energy & Environment	2019-2020	3,72,815	2017-2019
G54	Modelling for Enhancing Water Quality in Uttarakhand using Geospatial Technology	Vinay Kumar Sinha	Uttarakhand State Council for Science & Technology	Government	Department of Natural Resources	2019-2020	4,90,000	2017-2020
G55	Isolation and comparative analysis of promoter homeologs of flowering time gene SOC 1 : Discovering novel promoters involved in floral transition in Indian Brassicas	Anandita Singh	Department Of Biotechnology	Government	Department of Biotechnology	2019-2020	13,04,500	2018-2021
G56	Gene regulation by DNA methylation in Bacillus anthracis (Sterne)	Ramakrishna Sitaraman	Science and Engineering Research Board	Government	Department of Biotechnology	2019-2020	8,57,000	2018-2021
G57	Preparation of the State Specific Action Plan for Water Sector	Vinay Shankar Prasad Sinha	Government of Arunachal Pradesh	Government	Department of Natural Resources	2020-2021	8,90,986	2017-2022
G58	Water Resources Management through Spring and Catchment Rejuvenation in Uttarakhand for Improving Water Security	Vinay Shankar Prasad Sinha	National Mission on Himalayan Studies (NMHS)	Government	Department of Natural Resources	2020-2021	51,55,412	2019-2021
G59	Space Technology Utilisation for Food Security, Agricultural Assessment and Monitoring (SUFALAM)	Neeti Sinha	Space Application Centre, ISRO	Government	Department of Natural Resources	2020-2021	5,30,000	2019-2021
G60	Structural studies on proteins involved in synthesis and processing of mycolic acids in Mycobacterium tuberculosis	Chaithanya Madhurantakam	Department of Biotechnology, Government of India	Government	Department of Biotechnology	2020-2021	38,44,000	2016-2021
G61	Understanding the role of MIR160 and AUXIN RESPONSE FACTORS in establishment of root system architecture for improvement of crop Brassicas.	Anandita Singh	Science and Engineering Research Board (SERB)	Government	Department of Biotechnology	2020-2021	12,00,000	2018-2021
G62	Department of CMS	Shashi Bhushan	Department of	Government	Department of	2020-		2018-

	/RF System in Bhut Jolokia using marker assisted selection	Tripathi	Biotechnology (DBT)		Biotechnology	2021	42,84,977	2021
G63	Collection, evaluation, documentation and conservation of banana genetic resources from north eastern region	Shashi Bhushan Tripathi	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2020-2021	8,06,000	2018-2021
G64	Isolation and comparative analysis of promoter homeologs of flowering time gene SOC 1 : Discovering novel promoters involved in floral transition in Indian Brassicas	Anandita Singh	Department of Biotechnology (DBT)	Government	Department of Biotechnology	2020-2021	15,48,600	2018-2021
G65	Gene regulation by DNA methylation in Bacillus anthracis (Sterne)	Ramakrishnan Sitaraman	Science and Engineering Research Board (SERB)	Government	Department of Biotechnology	2020-2021	10,00,000	2018-2021
G66	Structural characterization of a non-specific acid phosphatase HppA from Helicobacter pylori	Chaitanya Madhurantakam	Indian Council of Medical Research (ICMR)	Government	Department of Biotechnology	2020-2021	4,71,250	2018-2021
G67	Scalable synthesis of strach nanoparticles based adhesive/consolidants for conservation of cellulose based hertiage objects	Udit Soni	Department of Science and Technology (DST)	Government	Department of Biotechnology	2020-2021	5,09,410	2019-2022
G68	Water Energy Food Nexus (WEFN) Through Solar-Green House Based Hydroponic Solutions with Android Mobile Application of Vegetable Market for Rural farmers and Urban Users	Shashi Bhushan Tripathi, Vinay Sinha and Som Mondal	Department of Science and Technology & Utrkhand State Councilfor Science and Technology	Government	Department of Biotechnology	2020-2021	15,16,560	2020-2022
G69	Solutions for Indoor Tracking and Navigation for Urban Governance	Abhijit Datey	Department of Science and Technology (NGP) Division, Government of India	Government	Department of Energy and Environment	2020-2021	2,50,000	2020-2022
G70	Demonstration of sustainable mitigation of groundwater arsenic in arsenic-polluted Gangetic River	Chander Kumar Singh	Department of Science and Technology & IIT, Kharagpur	Government	Department of Energy and Environment	2020-2021	25,80,222	2020-2022

	aquifers of Bihar, Uttar Pradesh and West Bengal, India-Tribute Ganga							
G71	Impact of Urban Infrastructure Schemes on Mitigation of Greenhouse Gas Emissions	Atul Kumar	Ministry Of Housing and Urban Affairs	Government	Department of Energy and Environment	2020-2021	3,60,000	2019-2020
G72	SARASWATI 2.0 - Identifying best available technologies for decentralized wastewater treatment and resource recovery for India	Sukanya Das	Department of Science and Technology	Government	Department of Policy Studies	2020-2021	3,05,000	2020-2024

#### **DVV requirement**

#### **Documents Needed**

- List of project titles with details of Principal Invigilator, amount sanctioned and sanctioning agency etc.
- E-copies of the grant award letters for research projects sponsored by government agencies.

#### **Specific instruction to HEI**

Sanction letter of grants by the funding agency is mandatory to support the claim.  
The duration of the grant period should align with last five-years.

#### **Avoid the following while uploading data**

Grants in the form of Equipment's/software's/skill development centers will not be considered.



**R&D PROJECT PROPOSAL FOR FUNDING  
UNDER MINISTRY OF COAL**

Submitted 15 October 2014

(Revised after presentation before Technical Sub-Committee of SSRC in its 11<sup>th</sup> meeting held at New Delhi on 28<sup>th</sup> July 2014)

1. Project Title: Sustainable livelihood activities on reclaimed open cast coal mines: a technology enabled integrated approach in Indian coal sector
2. Name and address of principal implementing agency: TERI / TERI University, 10 Institutional Area, Vasant Kunj, New Delhi – 110 070

Name of Project Leader / Co-ordinator: Professor Arabinda Mishra

Name of Co-investigators: Dr Parimita Mohanty (Fellow), Dr Manab Das (Fellow)

Team Members: Dr Sudipta Chatterji (Associate Professor), Dr Priyanka Kaushal (Assistant Professor), Dr Sapna Narula, Mr Gopal K Sarangi (Research Associate)

3. a. Name and address of Sub-Implementing agencies: Environment Division, CMPDI, Ranchi
- b. Mahanadi Coalfields Ltd., Burla

Name of Project Co-ordinator from CMPDI: Shri D. Basu, General Manager (Env)

Team Members: Shri V. K. Pandey, Senior Manager (Env), Shri P.C. Jha, Senior Manager (Env), Shri Abhishek Kumar, Assistant Manager (Env)



Definition of the problem:

- a. The concept of creating sustainable post mine land use has gained prominence after Ministry of Coal issued mine closure guidelines in the year 2009 with greater stress to plan land use pattern in the post mining period in a manner that does not become liability for the community and becomes a source of livelihood for the community in and around the mining area. At present there are no clear answers to questions about the long-term land use in the mined out area and the livelihoods that need to be created<sup>1</sup>; the kind of forest that is to be planted and the arrangement for sharing of benefits<sup>2</sup>; and, how to productively use the water bodies that form in the voids.
- b. The above challenge can be viewed through the lens of sustainable development. There are three dimensions to this perspective – environment, economy and society. Any project intervention would be successful only if it encompasses all three dimensions and there is an integrated and mutually reinforcing set of activities primarily focused on generating sustainable livelihoods in and around the project-affected region.
- c. In order to move further in this direction there is a need to undertake some demonstration projects that can be offered as model projects for possible replication at larger scales. This project proposal envisages all round work activities in the field of eco-friendly mine reclamation, utilization of reclaimed land to develop entrepreneurship and vocational skills among local communities for community empowerment.

It is proposed to undertake the proposed R&D activities in one of the reclaimed OCM areas of Mahanadi Coalfields Limited (MCL) in the State of Odisha, preferably in Talcher Coalfields. The present status of reclamation (for 50 open cast mines producing more than 5 million m<sup>3</sup> of coal & OB combined together is available in CMPDI Report<sup>3</sup> and will be useful as baseline data.

<sup>1</sup> Oskarsson, P. 2011.

<sup>2</sup> When a mine is closed, the land is usually handed over to the forest department for compensatory afforestation activities. Legally, the two main requirements of mine closure are to plant new forest to the same extent of land that was taken away during mining, and to pay compensation for the land to the State government, based on the Forest Conservation Act (1980 with amendments).

<sup>3</sup> CMPDI, March 2013. *Land restoration/ reclamation monitoring of 50 open cast coal mines of CIL producing more than 5 mcm (coal + OB) based on satellite data for the year 2012-13*. Ranchi.



#### 4. Objectives:

The primary objectives of this project proposal are as follows:

- a. To assess, through the application of a systematic multi-criteria evaluation framework, the suitability potential of post-mining land use for ecologically beneficial and socio-economically productive outcomes.
- b. To develop permanent green cover on overburden dumps/backfilled mined land area using mycorrhiza and various plant species of economic importance.
- c. To develop entrepreneurship and vocational skills among members of local Self Help Groups (SHGs) for community (with a focus on women and other weaker sections of the society) empowerment through access to new economic opportunities.

In addition to the above, the proposal also aims to build capacity among University students for conducting research in the coal sector through their involvement in the project activities for bringing in social and environmental upgradation in the mining areas.

#### 5. Justification for subject area:

- a. The proposed project with its focus on post mining land use and livelihood generation of the affected communities is expected to enhance the image of Coal India Limited (CIL) as an environmentally and socially responsible organization. The proposed project with its emphasis on creating permanent green cover and livelihood creation is very much consistent with the existing sustainable development policy of CIL.
- b. There are few studies on post-mining land use and livelihood activities in the Indian context. At the international level, 21 feasible post-mining land-uses have been identified from literature and ordered under 8 categories<sup>4</sup>. It is likely that reclaimed OCM sites have a wide range of potential functions and the present study will identify these for the first time in the Indian context using the MLSA framework and engaging stakeholders in the process. Our review of literature

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<sup>4</sup> Soltanmohammadi, H., M. Oshanloo and A.A. Bazzazi (2010), "An analytical approach with a reliable logic and a ranking policy for post-mining land-use determination", *Land Use Policy* 27: 364-72.



suggests that there are no studies till date that apply an integrated approach consistent with the sustainable development concept for the demonstration of post-mining livelihoods generation.

- c. The project has the potential to be showcased as a model project for other CIL subsidiaries and can possibly be adopted for replication in the Indian coal sector.
- d. This proposal has the unique strength of linking R&D with university education by involving post graduate-level students. This is expected to contribute towards long-term capacity building for conducting research in the Indian coal sector.

## 6. Work plan:

### 7.1 Methodology:

**Objective (a):** To assess, through the application of a systematic multi-criteria evaluation framework, the suitability potential of post-mining land use for ecologically beneficial and socio-economically productive outcomes.

A useful methodological approach<sup>5</sup> for identifying the potential of mined lands for environmental and socioeconomic productive uses is called Land Suitability Analysis (LSA). In a recent research paper<sup>6</sup>, a Mined Land Suitability Analysis (MLSA) framework for post-mining land-use determination is presented that is composed of fifty most significant attributes in the post-mining land-use decision making. Drawing from this list of attributes as relevant for the OCM site chosen for this intervention in the Indian context, we propose to conduct a multi-attribute evaluation based on Analytical Hierarchy Process method and using the Expert Choice software. A stakeholder's workshop will be conducted to generate the necessary pair-wise rankings among feasible alternative land uses for the site, along with weights for the attributes.

The final output will be a score-based prioritization of the feasible alternative land uses (linked to livelihood activities) for the site. (Detailed methodological process and input requirements are presented in the Annexure – I).

<sup>5</sup> Mu, Y., 2006. Developing a suitability index for residential land use: a case study in Dianchi Drainage Area. A Thesis Submitted in Fulfillment of the Requirements for the Degree of Master of Science in Environmental Studies in Geography. Waterloo, Ontario, Canada.

<sup>6</sup> Soltanmohammadi, H., M. Osanloo and A.A. Bazzazi (2010), "An analytical approach with a reliable logic and a ranking policy for post-mining land-use determination". *Land Use Policy* 27: 364-72.



### 3.2.1.G.1.

**Objective (b): To develop permanent green cover on overburden dumps/backfilled mined land area using mycorrhiza and various plant species of economic importance.**

Technically, the role of vegetation cover on overburden dump slope can be described as hydrogeological and mechanical actions. Roots of vegetation play an important role to enhance dump stability by controlling interception of rainwater and evapotranspiration, and the resulting pore pressure reduction, whereas mechanical action in turn, reinforces the dump material by roots and enhances the shear strength of dump material. The action is closely related to root density, depth and strength.

Use of "mycorrhiza" with selected plant species can prove to be beneficial in the afforestation effort. Mycorrhizal fungi are a beneficial group of microorganisms that form a mutualistic relationship with living roots of higher plants. They expand the interface between plants and soil environment through extraradical fungal mycelium radiating from the colonized root cortex far into the surrounding soil and contribute to plant uptake of macronutrients such as phosphorus, nitrogen as well as micronutrients copper, and zinc. Arbuscular mycorrhizal fungi (AMF) also produce "glomalin" with a strong cementing capacity of soil particles and hence help in aggregation loose soil particles. Mycorrhiza also influence the physiology of their host plants making them less vulnerable to pathogens, soil pollution, salinity, drought and a number of other environmental stress factors. Such plant-AMF restoration mechanism is also supported by secreting plant exudates, e.g. short chain organic acids, phenolics, and small concentrations of high molecular weight compounds (enzymes and proteins) to stimulate bacterial transformations (enzyme induction); by building up of organic carbon to increase microbial mineralization rates (substrate enhancement) or by providing habitat for increased microbial populations and activity.

The proposal will demonstrate a mechanism to carry out effective reclamation of the overburdened sites, which at present occupy large area of land would in due course allow establishment of forest cover that could trap various benefits and improve the local environment. Appropriate tree species planted at site would provide following benefits:

- i. Ability to survive in environments as hostile as that of overburden
- ii. Ability to colonize mycorrhizal fungi and consequently other beneficial soil microorganisms
- iii. Green canopy to combat air discharge of dust from overburdened to a maximum extent
- iv. Huge network of plant roots to control soil erosion and stabilize dump slope
- v. Reduction in fugitive dust emission would improve living quality of nearby areas and reduce health hazards associated with it.



### 3.2.1.G.1.

- vi. Plants of economic importance to give forest product such as fuel, wood, timber and pulp that would improve livelihood of local peoples.

**Objective (c): To develop entrepreneurship and vocational skills among members of local Self Help Groups (SHGs) for community (with a focus on women) empowerment through access to new economic opportunities.**

Self-help groups (SHGs) have emerged as a promising tool for the socio-economic and political empowerment of rural communities in many developing countries of the world (Steiner, 2008<sup>7</sup>). It is a process of empowerment of rural communities (Alene, 2011). The process is often reckoned as "do-it-themselves" (Benedict<sup>8</sup>, 2010). In India, SHGs have been well accepted as a development strategy for poverty reduction in rural areas (Chen et al, 2007<sup>9</sup>). Though, the early focus of SHGs was to act as an alternative credit source for the poor, of late SHGs are viewed as an integral component for delivering financial services, livelihood promotion and overall community development (Das and Bhowal, 2013<sup>10</sup>). The success of SHGs hinges on providing them adequate local institutional support, building their capacities and guiding them on a continuous manner (Tesoriero, 2006<sup>11</sup>).

This project will aim to develop entrepreneurship and vocational skills among the local SHGs. In the first year the emphasis will be on formation of a number of SHGs from the project affected people (PAP) and local settlements. Capacity building workshops, exposure visits, demonstration activities, etc will be gradually scaled up as the project progresses. A unique aspect of the livelihood component will be the training of local trainers from the PAP over the project period.

#### Objective D:

TERI University follows a four semester curriculum design for all its Master's programmes. An attempt is made to build in research into all the master's programmes and this is done through research projects being undertaken by the students at two stages.

<sup>7</sup> Steiner, G (2008) "The Self Help Group Approach", Published by kindernothife, Germany.

<sup>8</sup> Benedict, A (2010) "Self-Help as a Strategy for Rural Development in Nigeria: A Bottom Up Approach", *Journal of Alternative Perspectives in the Social Sciences*, Vol. 2, No.1, pp.88-111.

<sup>9</sup> Chen, M., R. Jhabvala, R. Kanbur, and C Richards (2007) 'Membership based Organisations of the Poor: Concepts, Experience and Policy', Routledge Publications, London and New York

<sup>10</sup> Das, S K, and A Bhowal (2013) "Self Help Groups: An Empowerment Model or Financial Model: Perceptions of ZStakeholders", *European Journal of Business and Management*, Vol.5, No.29, pp.170-190.

<sup>11</sup> Tesoriero, F (2006) "Strengthening Communities through Women's Self Help Groups in South India", *Community Development Journal*, Issue 41, No.3, pp.321-333.



### 3.2.1.G.1.

TERI University students could work on their major projects in the proposed R&D project. TERI University will collaborate with CMPDI to identify the themes of mutual interest, and formulate them as research topics that could be floated to the students in their third semester.

The student projects can possibly aim at generating baseline data on environmental parameters, conducting needs assessment of the villages near the project area, impact assessment of the clean energy intervention on local livelihoods, and so on. An emphasis will be on producing several case studies of the R&D project through the engagement of students.

## 7.2 Organization of work elements:

For Objective (a), the proposed work elements are as follows:

- a. Finalization of site choice from MCL's OCM areas (in consultation with CMPDI)
- b. Conceptualization of MLSA framework (expert validation of proposed land-use and livelihood activities; identification of decision attributes in consultation with CMPDI)
- c. Purchase of Expert Choice software
- d. Conduct of stakeholders workshop (in association with CMPDI)
- e. Data analysis using Expert Choice & paper presentation on results (in association with CMPDI)

For Objective (b), the proposed work elements are as follows:

- a. Arrangement of resources (store room, seed, compost etc.) at site
- b. Preparation of saplings at nursery
- c. Installation of drip irrigation system at site
- d. Plantation on 5 acres land (L1)
- e. Development of grasses on L1
- f. Plantation on another 5 acres land (L2)
- g. Development of grasses on L2
- h. Plantation on another 5 acres land (L3)
- i. Development of grasses on L3
- j. Maintenance of plants and grasses at site (L1+L2+L3)



For Objective (c), the proposed work elements are as follows:

- a. Socio-economic needs and capabilities assessment of local communities; assessment of market linkages, local value chains, micro-credit requirements, etc
- b. Liaison with forest department and other government agencies
- c. Community mobilization; formation of SHGs (if not existing at present); sensitization and exposure visits for SHG members
- d. Launch of vocational training programme (monthly once, 3 to 5 days) including training of trainers.
- e. Training (yearly once) on entrepreneurship development for SHGs (marketing, book-keeping, banking, etc)
- f. Refresher trainings (yearly once) on livelihood activities, experience sharing workshops, and exposure visits for SHG members
- g. Participatory monitoring and reporting

For Objective (d), the proposed work elements are as follows:

- a. Selection of themes for student projects (in collaboration with CMPDI)
- b. Project work by students (January to June, every year beginning 2015)
- c. Case study preparation by student team in last year of intervention



7.3 Time schedule of activities with milestones (shown in the shaded cells as "M"):

Activity Track #1	Time line (months/total required months)						Responsibility
	6/36	12/36	18/36	24/36	30/36	36/36	
Finalization of site choice							TU+ CMPDI
Conceptualization of MLSA framework							
Purchase of Expert Choice software							
Conduct of stakeholders workshop	M <sub>1</sub>						
Data analysis							
MLSA results presentation		M <sub>2</sub>					TU
Activity Track #2	6/36	12/36	18/36	24/36	30/36	36/36	
Arrangement of resources (store room, seed, compost etc.) at site							
Preparation of saplings at nursery							
Installation of drip irrigation system at site							
Plantation on 5 acres land (L1)		M <sub>4</sub>					
Development of grasses on L1							
Plantation on another 5 acres land (L2)			M <sub>6</sub>				
Development of grasses on L2							
Plantation on another 5 acres land (L3)					M <sub>8</sub>		
Development of grasses on L3							
Activity Track #3	6/36	12/36	18/36	24/36	30/36	36/36	TU
Socio-economic needs and capabilities assessment							
Liaison with forest dept. and other govt. agencies							
Community mobilization; formation of SHGs							
Launch of vocational training programme	M <sub>5</sub>						
Annual assessment and reporting of livelihood programme outputs and outcomes		M <sub>5</sub>		M <sub>7</sub>		M <sub>9</sub>	TU + CMPDI
Activity Track #4	6/36	12/36	18/36	24/36	30/36	36/36	
Student projects							
Case study preparation						M <sub>10</sub>	TU + CMPDI



## 8. Details of proposed outlay:

Sl No	Items	Total cost estimated in Rupees	Year-wise phasing of the cost		
			1st year	2nd year	3rd year
	<b>Capital expenditure</b>				
8.1	Land and building	2,00,000	2,00,000	0	0
8.2	Equipment	36,90,000	14,90,000	11,00,000	11,00,000
8.3a	Total capital (for TERI University)	38,90,000	16,90,000	11,00,000	11,00,000
8.3b	Total capital (for CMPDI)	NIL	NIL	NIL	NIL
	<b>Revenue expenditure</b>				
8.4a	Salaries and allowance (for TERI University)	44,92,800	14,97,600	14,97,600	14,97,600
8.4b	Salaries and allowance (for CMPDI)	81,00,000	31,50,000	27,00,000	22,50,000
8.5	Consumables	33,99,866	10,77,850	11,62,270	11,59,746
8.6	Travel	34,59,825	11,53,275	11,53,275	11,53,275
8.7	Others	1,00,36,034	37,37,667	28,44,278	34,54,089
8.8a	Total recurring (for TERI University)	2,13,88,525	74,66,392	66,57,423	72,64,710
8.8b	Total recurring (for CMPDI)	81,00,000	31,50,000	27,00,000	22,50,000
8.9a	Sub-Total (for TERI University)	2,52,78,525	91,56,392	77,57,423	83,64,710
8.9b	Sub-Total (for CMPDI)	81,00,000	31,50,000	27,00,000	22,50,000
8.10	Institute overheads (for TERI University = 15% of 8.9a)	37,91,779	13,73,459	11,63,613	12,54,707
8.11a	Total (for TERI University = 8.9a+8.10)	2,90,70,304	1,05,29,851	89,21,036	96,19,417
8.11b	Grand Total (for TERI University and CMPDI = 8.9b+8.11a)	3,71,70,304	1,36,79,851	1,16,21,036	1,18,69,417

Page 3 of 4

Foreign Exchange Component US \$ : 5000 (Exchange Rate : Rs 62 per 1 US\$)



Revathy Vishwanath  
Assistant Director, RPS incharge  
Tel # 011-26742351  
E-mail: rpsicssr@gmail.com

भारतीय सामाजिक विज्ञान अनुसंधान परिषद्  
(मानव संसाधन विकास मंत्रालय)  
पोस्ट बॉक्स - 10528, अरुणा आसफ अली मार्ग,  
नई दिल्ली - 110 067  
INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH  
(Ministry of Human Resource Development)  
Post Box No. 10528, Aruna Asaf Ali Marg,  
New Delhi - 110 067  
EPABX : 26741849-51 Fax : 91-11-26741836  
E-mail : info@icssr.org Website : www.icssr.org

F.No. G-13/2015-16/ICSSR/RPS

Dated: 30<sup>th</sup> November 2015

20.150906

**Subject: Award of Sponsored Research Project**

Dear Dr. Ram Mohan,

This is with reference to your application for project grant under the Sponsored Research Project programme of the ICSSR entitled "Impact Analysis of the Arunachal Pradesh Panchayati Raj Act, 1997 on Traditional Institutions in the State; A Case Study of Two Districts of Papum Pare and East Kamang".

On the recommendations of the Expert Committee duly approved by the Competent Authorities, we are happy to inform you that ICSSR has approved a grant-in-aid of Rs. 15,00,000/- with duration of 24 Months for the study.

Before we issue a formal sanction order, you are requested to communicate the **probable date of commencement of the project** and also enter into an **agreement with the ICSSR** on a non-judicial stamp paper of Rs. 100/- (copy attached) and Grant-in-aid bill (copy attached) of 40% of the awarded grant, i.e. **Rs. 6,00,000/-** as first instalment of the total grant of **Rs. 15,00,000/-**. Kindly send all the desired documents to the undersigned to enable us to issue the formal sanction order as per the checklist enclosed. Further, you are requested to send us five to six names of Social Scientists in your discipline to be the members of the Advisory Committee to monitor and guide your study.

With regards,

Yours sincerely,

*Revathy V*  
(Revathy Vishwanath)

Encl: as above

✓ Dr.M.P.Ram Mohan  
Associate Professor  
TERI University  
10, Institutional Area  
Vasant Kunj, New Delhi-110070

Copy to:  
The Registrar  
TERI University  
10, Institutional Area  
Vasant Kunj, New Delhi-110070





Checklist:

1. Tentative date of commencement of the study (generally after issuing award letter, i.e. Any working date after 30<sup>th</sup> November 2015).
2. Signed Agreement in stamp paper giving details of Project Team-Main Project Director, Co-Project Director, etc
3. GIB towards first instalment.
4. List of Senior Social Scientists, in Professor Level, to serve as Members of the Advisory Committee to monitor and guide the study (in case of approval, consent letter to the experts will be sent by ICSSR to the expert. PD is expected to send the list without taking consent from the concerned experts).
5. Budget break-up of the approved budget as per our guidelines. Kindly note that the main Project Director's position is honorary.

S.No.	Expenditure Head	Percentage allocation to the total budget of the study
1	Full time Research Staff/Part-time Assistance/Hiring Charges	Not exceeding 50%
2	Field work cost Travel/Logistics/ Boarding/ Source Materials/Software/Data Base etc.	Not less than 37.5%
3	Contingency	5%
4	Institutional Overheads	7.5%
	Total	100%

*Revathy*  
(Revathy Vishwanath)  
Assistant Director, RPS In charge

3.2.1.G.2.





Established under Section 3 of the UGC Act, 1956,  
Accredited with grade 'A' by NAAC

TERI University  
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New Delhi - 110 070

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Web www.teriuniversity.ac.in

**M P Ram Mohan**

Associate Professor

Email: [mpmohan@teri.res.in](mailto:mpmohan@teri.res.in)

Tel: +9212763410

**Revathy Vishwanath**

Assistant Director, RPS in charge

ICSSR

Aruna Asaf Ali Marg

New Delhi-110067

09 December 2015

Ref: F.No.G-13/2015-16/ICSSR/RPS  
Award of Sponsored Research Project

Dear Madam,

Kindly refer to your letter dated 30th Nov 2015 awarding us project grant under the sponsored research project programme for the study "Impact Analysis of the Arunachal Pradesh Panchayati Raj Act 1997 on Traditional Institutions in the State; A Case Study of Two Districts of Papum Pare and East Kamang".

As per the requirements of the letter, we are herewith enclosing all the necessary details.

We plan to start the project by 1<sup>st</sup> January 2016.

Kindly acknowledge the receipt of the letter.

With regards

Yours sincerely

Ram Mohan

Enclosures

1. Signed agreement in stamp paper
2. GIB towards first instalment
3. List of five professors
4. Budget Breakup





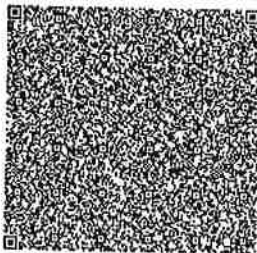
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## INDIA NON JUDICIAL

Government of National Capital Territory of Delhi

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Certificate No.	: IN-DL90439317860028N
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Purchased by	: TERI UNIVERSITY
Description of Document	: Article Others
Property Description	: Not Applicable
Consideration Price (Rs.)	: 0 (Zero)
First Party	: TERI UNIVERSITY
Second Party	: Not Applicable
Stamp Duty Paid By	: TERI UNIVERSITY
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



Please write or type below this line

I, Dr. MP Ram Mohan hereby agree to undertake the project entitled "Impact Analysis of the Arunachal Pradesh Panchayati Raj Act, 1997 on Traditional Institutions in the State; A case Study of two Districts of Papum Pare and East Kemang" sanctioned to me by the Indian Council of Social Science Research (herein after referred to as Council), Aruna Asaf Ali Marg, New Delhi-110067 vide letter No. **F.No.G-13/2015-16/ICSSR/RPS** dated **30.11.2015**.

## Statutory Alert:

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2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.



1. I have read and fully understood all the rules and regulations of the Council governing research project schemes as contained in the ICSSR website ([www.icssr.org](http://www.icssr.org)). I hereby agree to follow all these rules and regulations and such other rules framed by the Council at the time of the sanctioning of the support by ICSSR.
2. I agree to attend the Mid-Term Appraisal to be conducted by ICSSR after half the project work is completed and shall make presentation on the progress of the research project.
3. I agree to submit three copies of the final report to be prepared by me to the Council within six months of the date of expiry of the period of the project.
4. I agree to submit the raw data in the form of schedules or notes or processed on electronic devices such as CDs, floppies, tapes etc. to the Council at the end of the project, if so required.
5. I agree that all the assets created out of the project funds shall be the property of ICSSR and after completion of the project, the same will be donated to the affiliating institute/university/college.
6. I agree to submit to the Council three copies of all research papers/articles/, which may be brought out from the project data and to acknowledge in such papers/articles, the financial support provided to me by the Council.
7. I agree to refund to the Council the money released to me by the Council if I fail to complete the project within the time allowed by the Council or any of the terms of this agreement are contravened by me except for any unforeseen/extraordinary circumstances brought to the notice of the ICSSR in writing.



Signature of the Project Director

Place NEW DELHIDate 10 DEC 2015



## Project Team- Main Members

---

**1. Dr M P Ram Mohan**

Associate Professor  
Centre for Post Graduate Legal Studies  
Department of Policy Studies  
TERI University  
Plant No: 10, Institutional Area  
Vasant Kunj-110070, New Delhi  
Tel: + 011 71800222  
Mobile: +9212763410  
Email: [mpmohan@teri.res.in](mailto:mpmohan@teri.res.in)

**2. M V Shiju**

Adjunct Associate Professor  
Centre for Post Graduate Legal Studies  
Department of Policy Studies  
TERI University  
Plant No: 10, Institutional Area  
Vasant Kunj-110070, New Delhi  
Tel: + 011 71800222  
Email: [mvshiju@teri.res.in](mailto:mvshiju@teri.res.in)

**3. Dr G Mini**

Fellow  
The Energy and Resources Institute (TERI)  
India Habitat Centre, Lodhi Road  
New Delhi  
Tel: 011 24682100  
Email: [gmini@teri.res.in](mailto:gmini@teri.res.in)

Two students will be part of the project through out



3.2.1.G.2.

3.2.2.31



(Established under Section 3 of the UGC Act, 1956)  
Accredited with grade 'A' by NAAC

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India +91 • Delhi (0) 11  
Web www.teriuniversity.ac.in

## INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH

### Grant-in-Aid Bill

Received a sum of Rs.600000/- (Rupees Six Lakh Only) by cheque/demand draft No. \_\_\_\_\_ dated \_\_\_\_\_ in favour of TERI University drawn on Canara Bank, Jit Singh Marg, New Delhi-110067 being the grant-in-aid of the project entitled "**Impact Analysis of the Arunachal Pradesh Panchayati Raj Act 1997 on Traditional Institution in the state; A case study of two Districts of Papum Pare and East Kamang**" towards the 1st instalment of the total grant-in-aid of Rs.1500000/- (Rupees Fifteen Lakh Only) sanctioned vide letter No. F.No. G-13/2015-16/ICSSR/RPS dated 30.11.2015 of the Indian Council of Social Science Research, New Delhi.

  
Signature  
Project Director

- Certified that the Institution accepts all the terms and conditions governing the above grant and that it lends itself to abide by these.
- Certified that the Institution/Organization was/has not been sanctioned any grant-in-aid for the same purpose by any other source of the Central Government during the period to which the grant relates.
- It should be countersigned by the Administrative Head of the Institution / University.

  
Signature of the Head  
(Affiliating Institute/University)  
Designation with Seal

Gp Capt. Rajiv Seth (Retd.), Ph.D  
Actg Vice-Chancellor  
TERI University  
10, Institutional Area  
Vasant Kunj, New Delhi - 110 070

3.2.1.G.2.

3.2.2.33



## List of Senior Social Scientists

---

1. **Prof.(Dr.) N.R. Madhava Menon**  
IBA-CLE Chair on Continuing Legal Education, NLSIU, Bangalore  
Devi Priya, TC 17/2166, Sairam Road  
Poojapura, Trivandrum - 695 012, Kerala  
Tel/Fax : 0091-471-234 1762  
e-mail : [profmenon.milat@gmail.com](mailto:profmenon.milat@gmail.com)
2. **Professor B.S. Chimni**  
Centre for International Legal Studies  
School of International Studies  
Room No: 39  
New Mehrauli Road, Near Munirka, New Delhi, Delhi 110067  
Off. Phone: 26704375  
Email: [bschimni@mail.jnu.ac.in](mailto:bschimni@mail.jnu.ac.in)
3. **Professor N R Bhanumurthy**  
National Institute of Public Finance and Policy  
18/2, Satsang Vihar Marg  
Special Institutional Area  
New Delhi – 110 067  
E-mail: [nrbmurthy@gmail.com](mailto:nrbmurthy@gmail.com)  
Phone: Mobile: +91-9810794738
4. **Prof Manoj Kumar Sinha**  
Director  
The Indian Law Institute  
Opp. Supreme Court of India  
Bhagwan Das Road  
New Delhi-110001  
TeleFax :011-23386321  
Email: [manoj\\_kumarsinha@yahoo.com](mailto:manoj_kumarsinha@yahoo.com)
5. **Prof. (Dr.) M.P. Singh**  
Former Vice Chancellor, National University of Juridical Sciences, Kolkata  
Phone: 09711921492  
Email: [mpjitholi@gmail.com](mailto:mpjitholi@gmail.com)



### Budget

Budget							
A	Expenditure of Staff/Advisory Committee		No of people	Amount	Months	Total	Remarks
	Research Staff- Student Research Assistance (Full time)		2	₹ 14,000	24	₹ 6,72,000	Two students will be associated with the project for 2 years
	Total					₹ 6,72,000	
B	Two Advisory Committee Meetings (Honorarium + Travel Reimbursement + Refreshments)		5	₹ 6,000	2	₹ 60,000	Expenses related to convening 2 Advisory Committee meetings in Delhi inviting 5 Professors
	Total					₹ 60,000	
C	Field work/project expenses	Activity	Cost per head	No. of people	No of trips/days	Total	Remark
	Travel	Air (to and fro)	₹ 15,000.00	3	4	₹ 1,80,000.00	Flight from Delhi to Guwahati/ Dibrugarh by low cost airline
		Train (Rajdhani) (return)	₹ 5,500.00	2	4	₹ 44,000.00	Train from Delhi to Guwahati/Dibrugarh
		Taxi	₹ 16,000.00	Group travel	4	₹ 64,000.00	Taxi from Guwahati to Itanagar and back
		Local taxi In AP	₹ 2,500.00	Group travel	30	₹ 75,000.00	Visit to Itanagar, field Visit to Papum Pare & East Kameng for total 20 days
		Local taxi travel In Delhi	₹ 1,200.00		15	₹ 18,000.00	For local meetings and data collection
	Boarding & Lodging	Rooms	₹ 5,000.00	double room	20	₹ 1,00,000.00	2 double rooms accommodating 4 people in all for maximum of 30 days in Arunachal
		Food	₹ 600.00	4	30	₹ 72,000.00	Field Visit to, Itanagar, Papum Pare & East Kameng for maximum of 30 days
	Focus group discussions/key person interview/Participatory Rural Appraisal					₹ 18,000.00	Several stakeholder meetings are planned in two districts
	Books, Journals & Printing		access to journals, purchase of books, maps			₹ 10,000.00	
	Total					₹ 5,81,000.00	
D	Contingency					75,000	
E	Institutional Overheads					₹ 1,12,500	
	Grand Total (A+B+C+D+E)					₹ 15,00,500.00	

In words: Fifteen lakhs only







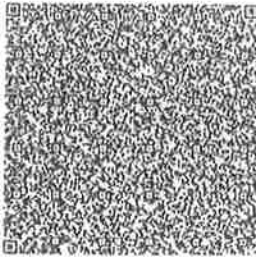
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## INDIA NON JUDICIAL

## Government of National Capital Territory of Delhi

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Certificate No.	: IN-DL34202951971116N
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Account Reference	: IMPACC (IV)/ dl900003/ DELHI/ DL-DLH
Unique Doc. Reference	: SUBIN-DL90000365906036803410N
Purchased by	: SIDBI
Description of Document	: Article Others
Property Description	: Not Applicable
Consideration Price (Rs.)	: 0 (Zero)
First Party	: SIDBI
Second Party	: Not Applicable
Stamp Duty Paid By	: SIDBI
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



Please write or type below this line.....

**India: Financing Energy efficiency at MSMEs Project**  
**CONTRACT FOR CONSULTING SERVICES**  
**(IBRD/IDA FINANCED)**  
**CONTRACT TITLE: PROJECT DEVELOPMENT SUPPORT FOR**  
**ENHANCEMENT OF ENERGY EFFICIENCY INVESTMENT IN VARANASI**  
**CLUSTER**  
**CONTRACT No. SIDBI/EEC/2015-16/CS-23**

THIS CONTRACT ("Contract") is entered into this Twenty Eighth day of July  
Two Thousand Fifteen, by and between **Small Industries Development Bank**



## Statutory Alert:

1. The authenticity of this Stamp Certificate should be verified at "www.sidbi.org.in". Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
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3. In case of any discrepancy please inform the Competent Authority.

of India (SIDBI) (hereinafter referred to as "the client"), a Corporation established under the Small Industries Development Bank of India Act, 1989 and having its Head Office at SIDBI Tower, 15, Ashok Marg, Lucknow - 226 001 and an office at Ground Floor, Videocon Tower, E-1 Rani Jhansi Road, Jhandewalan Extension, New Delhi - 110055 (hereinafter referred to as the "the Client") and **M/s TERI University**, (hereinafter referred to as "the consultant") having its office at 10, Institutional Area, Vasant Kunj, New Delhi - 110070 (hereinafter referred to as "the Consultant").

WHEREAS, the Client wishes to have the Consultant perform the services hereinafter referred to, and

WHEREAS, the Consultant is willing to perform these services,

NOW THEREFORE THE PARTIES hereby agree as follows:

**1. Services**

- (i) The Consultant shall perform the services specified in Annex A, "Terms of Reference and Scope of Services," which is made an integral part of this Contract ("the Services").
- (ii) The Consultant shall provide the personnel listed in Annex B, "Consultant's Personnel," to perform the Services.
- (iii) The Consultant shall submit to the Client the reports in the form and within the time periods specified in Annex C, "Consultant's Reporting Obligations."

**2. Term**

The Consultant shall perform the Services during the period commencing **July 28, 2015** and continuing through **April 30, 2016** or any other period as may be subsequently agreed by the parties in writing.

**3. Payment**

**A. Ceiling**

For Services rendered pursuant to Annex A, the Client shall pay the Consultant an amount not to exceed a ceiling of **Rupees Thirty Six Lakh only (₹ 36,00,000/-) plus applicable service tax**. This amount has been established based on the understanding that it includes all of the Consultant's costs and profits that may be imposed on the Consultant. Tax will be deducted at source (TDS) by the Client as per the guidelines.

**B. Schedule of Payments**

The schedule of payments is specified below:



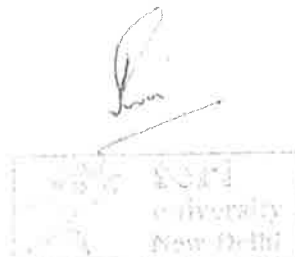


activities under the Contract, for receiving and approving invoices for payment, and for acceptance of the deliverables by the Client.

B. Reports.

The reports listed in Annex C, "Consultant's Reporting Obligations," shall be submitted in the course of the assignment, and will constitute the basis for the payments to be made under paragraph 3.

5. **Performance Standards** The Consultant undertakes to perform the Services with the highest standards of professional and ethical competence and integrity. The Consultant shall promptly replace any employees assigned under this Contract that the Client considers unsatisfactory.
6. **Inspections and Auditing** The Consultant shall permit, and shall cause its Sub-Consultants to permit, the Bank and/or persons or auditors appointed by the Bank to inspect and/or audit its accounts and records and other documents relating to the submission of the Proposal to provide the Services and performance of the Contract. Any failure to comply with this obligation may constitute a prohibited practice subject to contract termination and/or the imposition of sanctions by the Bank (including without limitation s determination of ineligibility) in accordance with prevailing Bank's sanctions procedures.
7. **Confidentiality** The Consultants shall not, during the term of this Contract and within two years after its expiration, disclose any proprietary or confidential information relating to the Services, this Contract or the Client's business or operations without the prior written consent of the Client.
8. **Ownership of Material** Any studies reports or other material, graphic, software or otherwise, prepared by the Consultant for the Client under the Contract shall belong to and remain the property of the Client. The Consultant may retain a copy of such documents and software
9. **Consultant Not to be Engaged in Certain Activities** The Consultant agrees that, during the term of this Contract and after its termination, the Consultants and any entity affiliated with the Consultant, shall be disqualified from providing goods, works or services (other than consulting services that would not give rise to a conflict of interest) resulting from or closely related to the Consulting Services for the preparation or implementation of the Project
10. **Insurance** The Consultant will be responsible for taking out any appropriate insurance coverage.



LIST OF ANNEXES

Annex A: Terms of Reference (ToR)

Annex B: Consultant's Personnel

Annex C: Consultant's Reporting Obligations

  
A circular official stamp of the Ministry of Health and Family Welfare, Government of India, is placed over the signature. The stamp contains the text "Ministry of Health and Family Welfare", "Government of India", and "New Delhi".

  
  
A rectangular stamp of LOTI University, New Delhi, is placed below the signature. The stamp contains the text "LOTI University" and "New Delhi".

The detailed scope of work for conducting detailed energy audit in the identified MSME units would include but not limited to the following:

- To correlate monthly production data with the electricity, fuel consumption for a period of about 12 months of normal operation for individual section and overall system.
- To measure the present efficiency levels, specific energy consumption and identify the energy saving opportunities in all major energy consuming equipments and other process related utilities.
- To study monthly power factor, maximum demand, working hours, load factor, Harmonics level, capacitor's health checkup etc. and also to study monthly electricity consumption and establish scope for possible optimization.
- To study the current lighting load and the recommend possible energy saving opportunities.
- To undertake renewable energy application assessment study
- Development of overall energy flow diagram
- Development of process flow diagram
- Study of Single Line Diagram
- Review the present metering & monitoring
- Review the present energy management system and recommend improvement measures for better monitoring and consequent energy savings

**B. Study on Lean Manufacturing, possible improvement areas with cost benefit analysis and Implementation Support,**

The basic rationale for undertaking lean manufacturing (LM) is to enhance productivity and competitiveness of MSMEs by reduction of wastages in manufacturing processes, inventory management, space management, energy consumption, etc. The LM techniques may also result in reduction in rejection, standardization of processes, better layout of machines resulting in reduced transportation of products during manufacturing, etc. The implementation of LM techniques may lead to cost reduction for MSMEs.

The consultant shall undertake a detailed assessment of the plant layout and processes to identify possible improvement areas through suitable LM techniques. The consultant shall also provide support to the unit for implementation of the identified LM techniques to the extent feasible within the scope of the project and given timelines.

**C. Study on Cleaner Production, possible improvement areas with cost benefit analysis, and Implementation Support,**

- Based on the data collected like site layouts & plans, environmental data, inventories of raw materials & products, and the site visit: define the sources, quantities and types of waste generated through material and energy balances.
- A general flow diagram showing all process steps that are carried out and flow diagram for each key process should be constructed. This should identify all main steps that are carried out, list all of the inputs (including raw materials, process chemicals, steam, water and energy, etc.), outputs (products, byproducts, solid, liquid and gaseous emissions), and any recycling steps.
- The values derived for resource consumption and wastes generation should be compared to national (where they exist) and international benchmarks for each specific industry.
- Identify cleaner production opportunities and assess costs & benefits of each recommended measure. This assessment should cover technical feasibility (effect on production, availability of technology & suppliers, any perceived risks, etc), financial viability (investment required, operation & maintenance costs, economic savings, etc), and expected environmental benefits (GHGs emissions reductions, water savings, etc).



- c. Respond to queries as may be raised by the consultant and / or any related agency during the course of execution of the tasks.
- d. Participate in project meetings as and when required.
- 3) The consultant shall coordinate with other consultants (to be hired by SIDBI / BEE under the overall project) and extend cooperation to them as may be required from time to time.
- 4) All the tasks as outlined above shall be completed within 09 months from date of award of the contract.
- 5) The cumulative target for achieving EE investment potential and corresponding emission reduction (in tCO<sub>2</sub>) shall be decided by the client from time to time considering the need of the project / assignment.

### DELIVERABLES & EXPECTED TIMELINES

S. No.	Deliverables	Expected Timelines*
1	Meeting with SIDBI to discuss and finalize the work plan for implementation of the project for next 03 months and Submission of the same	2 Weeks
2	Conducting Detailed Energy Audits	From 1 <sup>st</sup> month to 6 <sup>th</sup> month
3	Submission of atleast 25 Investment Grade Detailed Project Reports (IGDPRs) to SIDBI.	
4	Providing Implementation support for implementation of the Possible improvement measures recommended in the IGDPRs and submission of Implementation Completion Reports for atleast 20 MSME units and also facilitate to arrange loans for MSME units from SIDBI / any other local banks, if so required and desired by the MSME units	From 3 <sup>rd</sup> month to 9 <sup>th</sup> month
5	Progress Reports	Monthly
6	Project Completion Report	Within 2 week upon completion of contract

\*From the date of award of contract.

### COUNTERPART FACILITIES

The project would help the consultant with introduction to the local IA. The project shall arrange to send the introductory letter to the IAs explaining the role of the consultant to facilitate the whole project and shall participate in initial project launch activities.


### SCHEDULE

The assignment will be for 09 months (starting on **July 28, 2015** and ending on **April 30, 2016**) and shall be subject to annual review.


### REPORTING ARRANGEMENTS

- The consultant shall report to the Deputy General Manager, SIDBI.
- The consultant shall be responsible for providing periodic reports, including but not limited to the achievements/shortfalls, revised schedules and lessons learnt to SIDBI to the satisfaction of SIDBI. SIDBI shall periodically assess the execution of the assignment. On being found

*Rajiv Kumar*



*Rajiv Kumar*



**ANNEXURE B****Consultant's Personnel**

<b>Name</b>	<b>Educational Qualification</b>	<b>Experience (No. of Years)</b>	<b>Area of Expertise</b>
Pawan Kumar Tiwari, Team Leader	B.E (E&C), RGPV Bhopal, 2002  M. Tech (Energy Management), School of Energy and Environment Study, DAVV Indore, 2006  Certification on "Small Group Activities (SGA) and Total Energy Management (TEM) in SMEs" by ECCJ, Tokyo (Japan), 2010  Certification on Energy Efficiency Techniques in Indian SMEs, JICA Japan, 2011  Certification on Emission Trading System: Using Market to Promote Low Emission Development, 2014	11 Years	Have lead the various national & international projects in the field of Energy Efficiency/Power/Clea ner Production/Lean Manufacturing.
Ayan Shubhro Ganguly, Energy Auditor	B.Tech (Electrical) – Nagpur University, 2008  M. Tech (Energy Management), School of Energy and Environment Study, DAVV Indore, 2011	7 Years	Conducting Walk- through audits, detailed energy audits, preparation of DPR, Vendor identification document, Energy Assessment Studies, for various EE projects
Sumit Sharma, Lean Manufacturing and Cleaner Production Expert	B.E. (Environment), Delhi College of Engineering, 2002  M. Tech. (Energy & Environmental Management), IIT, Delhi, 2006	11 Years	Conducting Lean Manufacturing & Cleaner Production assessment study and implementation support
Upinder Singh Dhingra, Finance Specialist	B.Com (Honors in Business Finance & Accounting), Punjab University, Chandigarh, 2007  MBA (Finance & Marketing) - Punjab Technical University, 2009	6 Years	Project Structuring, Project Financing

**All the team members proposed for the assignment need to be available for the entire duration of the assignment and substitutions shall be allowed only with prior approval of SIDBI**

*Pawan Kumar*



*[Signature]*



No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi – 110 003.

Dated: 20<sup>th</sup> May, 2016.

### ORDER

Sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the implementation of the Project proposal entitled "Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*" by Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 at a total cost of Rs. 88.00 lakhs (Rupees Eighty eight Lakhs only) as a part of his Ramalingaswami Fellowship 2014-15 w.e.f. 1<sup>st</sup> February, 2016 on the terms and conditions detailed as per under:-

#### 2.0 The Project

2.1 Project Title: "Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*."

#### 2.2 Investigator

Name of the Awardee : Dr. Chaithanya Madhurantakam  
Assistant Professor  
Department of Biotechnology  
TERI University, 10, Institutional Area,  
Vasant Kunj, New Delhi-110070

#### Objectives

1. Crystal structure determination of MmaA1 methyl transferase.
2. Structure based inhibitor design against MmaA1

#### 2.3 Time Schedule

The duration of the fellowship is 5 years w.e.f. 1<sup>st</sup> February, 2016.

#### 2.4 Fellowship Amount

		(Rs. in Lakhs)					
		1 <sup>st</sup> Yr.	2 <sup>nd</sup> Yr.	3 <sup>rd</sup> Yr.	4 <sup>th</sup> Yr.	5 <sup>th</sup> Yr.	Total
Fellowship@ Rs.85,000/ p.m (consolidated)		10.20	10.20	10.20	10.20	10.20	51.00
Research/Contingency grant		10.00	7.50	5.00	5.00	5.00	32.50
HRA @ Rs. 7,500 p.m. consolidated		0.90	0.90	0.90	0.90	0.90	4.50
<b>Total</b>		<b>21.10</b>	<b>18.60</b>	<b>16.10</b>	<b>16.10</b>	<b>16.10</b>	<b>88.00</b>

2.5 The contingency/research grant may be utilized for the purchase of consumables, minor equipment, international and domestic travel, engaging manpower and other contingent expenditure to be incurred in connection with the implementation of the project.

- a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
- b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement



shall be limited to the IIRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.

4. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.

5. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

6. **Budget Head**

The expenditure involved is debitable to

Demand No. 79

3425

3425.60

3425.60.200

3425.60.200.29

3425.60.200.29.17

3525.60.200.29.17.31

**Department of Biotechnology**

Other Scientific Research (2016-2017)

Other (Sub Major Head)

Assistance to other Scientific Bodies (Minor Head)

Biotechnology Research and Development

Assistance for Research and Development

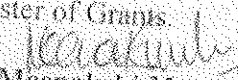
Grants-in-aid General

7. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.

8. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070 is requested to furnish to this Department 'Utilization Certificate' and an audited 'Statement of Expenditure' at the end of the year.

9. This issues under the powers delegated to this Department and with the concurrence of IFD vide their SAN No. 102/IFD/SAN/738/2016-17 dated:20-5-2016.

10. This sanction order has been noted at Serial No. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'

No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi - 110 003.

Dated: 20<sup>th</sup> May 2016.

**ORDER**

In continuation of this Department's sanction order of even number dated: 20<sup>th</sup> May, 2016 sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the release of an amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** to The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 being the first installment of Ramalingaswami Re-entry Fellowship (2014-15) awarded to Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 for the implementation of the project proposal entitled "**Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*.**" as per the details given below:-

**Fellowship Amount**

(Rs. in Lakhs)

S.No.	Head	Released Amount*
1.	Fellowship	10.20 @ Rs.85,000/ p.m (consolidated)
2.	Contingency/Research Grant	10.00
3.	HRA	0.90 Rs. 7,500/- p.m consolidated
	<b>Total</b>	<b>21.10</b>

\* **The release is made under recurring heads**

2. The other terms and conditions of the grant shall remain unaltered.
3. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.
4. It is certified that this being the first release no UC/SE pertaining to grants released under this programme is pending with the institute.
5.
  - a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
  - b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement shall be limited to the HRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.
6. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.
7. The amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** will be drawn by Drawing and Disbursing Officer, DBT from the Pay and Accounts Officer, DBT and disbursed to **The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070** and disbursed through RTGS as per following details.



**BANK ACCOUNT DETAILS**

(i) Bank Name	:	STATE BANK OF Hyderabad
(ii) Bank Account No.	:	52142908571
(iii) IFSC Code	:	SBHY0020511
(iv) 9 digit MICR Code	:	110004005

8. As per Rule 211 (1) of GFR, the Accounts of all grantee institution shall be open to inspection by the sanctioning authority/ audit, whenever the institution is called upon to do so.

9. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

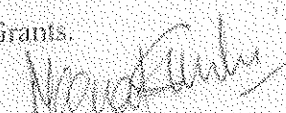
**10. Budget Head**

The expenditure involved is debitable to

Demand No.79	:	<b>Department of Biotechnology</b>
3425	:	Other Scientific Research (2016-2017)
3425.60	:	Other (Sub Major Head)
3425.60.200	:	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	:	Biotechnology Research and Development
3425.60.200.29.17	:	Assistance for Research and Development
3425.60.200.29.17.31	:	Grants-in-aid General

11. This issue under the powers delegated to this Department and with the concurrence of IFD vides their SAN No. 102/IFD/SAN/739/2016-17 dated:20-5-2016.

12. This sanction has been noted at serial no. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

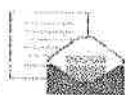
The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaitanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'

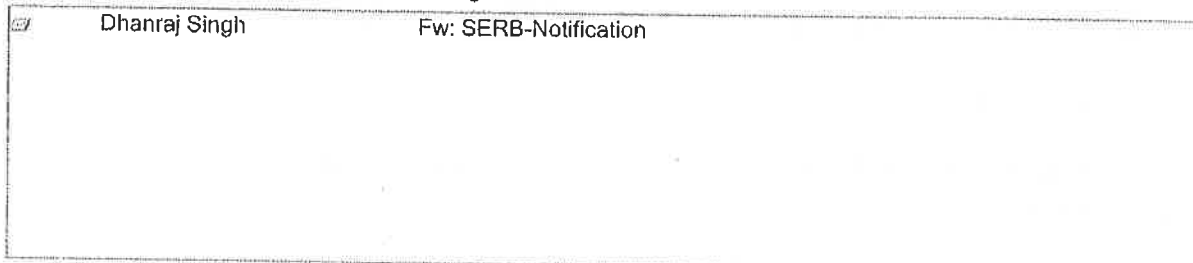
2016 B02



{In Archive} Fw: SERB-Notification  
Dhanraj Singh to: Vikas Prasad

05-08-2016 11:08

Archive: This message is being viewed in an archive.



Dear Vikas,

FYI.

Best regards,

Dhanraj Singh

----- Forwarded by Dhanraj Singh/ACC/DEL/TERI on 05-08-2016 11:07 -----

From: SERB\_Administrator@serbonline.in  
To: <"info@serbonline.in"@imsva02.cdacnoida.in>,  
Date: 05-08-2016 10:34  
Subject: SERB-Notification

**Science and Engineering Research Board**  
(Statutory Body Established Through an Act of Parliament : SERB Act 2008)  
Government of India  
FILE NO. PDF/2015/001057

**SCIENCE & ENGINEERING RESEARCH BOARD**

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 09-Jun-2016

**ORDER**

Subject: Financial Sanction under National Post-Doctoral Fellowship to **Dr. Anil Kumar Verma**, under the mentorship of **Dr. Ramakrishnan Sitaraman**, at **TERI University**, Plot No. 10, Institutional Area, Vasant Kunj, DELHI, New Delhi-110003- Release of 1st grant.



Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned fellowship at a total cost of **Rs. 19,20,000/-** (Rs. Nineteen Lakh Twenty Thousand **Only**) for a duration of Two years.

The date of start of the fellowship will be **24 May, 2016**

The items of expenditure for which the total allocation of **Rs. 19,20,000/-** has been approved are given below:

Sl. No.	Budget Head	Amount
1.	Fellowship	Rs. 13,20,000 ( @55,000/- per month (consolidated))
2.	Research Grant	Rs. 2,00,000/- per annum
3.	Overheads	Rs. 1,00,000/- per annum

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 8,20,650/-** (Rupees Eight Lakh Twenty Thousand Six Hundred and Fifty only) under 'Grants-in-aid General' to **TERI University**, Plot No. 10, Institutional Area, Vasant Kunj being the first installment of the grant for the year 2016-2017 for implementation of the said research project.

3. The expenditure involved is debitable to

#### **Fund for Science & Engineering Research (FSER)**

This release is being made under **National Post Doctoral Fellowship (N-PDF)**. (Life Sciences)

4. The Sanction has been issued to with the approval of the competent authority vide Diary No. **SERB/F/1040/2016-17** dated **08 June, 2016**

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ( [www.serb.gov.in](http://www.serb.gov.in) ).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

18.02.2016  
6.20.16

8. The release amount of **Rs. 8,20,650/-** (Rupees Eight Lakh Twenty Thousand Six Hundred and Fifty only) will be drawn by the Finance & Budget Officer of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

Account Name	TERI UNIVERSITY
Account Number	52142908571
Bank Name & Branch	STATE BANK OF HYDERABAD 20511, Pragati Vihar, New Delhi and Scope (
	-110003
IFSC/RTGS Code	SBHY0020511
Email id of A/C Holder	Dhanraj.singh@teri.res.in
Email id of PI	verma10anil@gmail.com
Email id of Mentor	rkraman@teriuniversity.ac.in

9. The institute will furnish Utilization certificate (UCs) financial year wise to the SERB and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

10. The institute will maintain separate audited accounts for the fellowship. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.

11. The File no. **PDF/2015/001057** may also be mentioned in all research communications arising from the above project with due acknowledgement of **SERB**.

12. As this is the first grant for the fellowship, no previous U/C is required.

13. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring **"FUND FOR SCIENCE AND ENGINEERING RESEARCH"** payable at New Delhi.

(Dr. Thangaradjou T)

Scientist E

ttradjou@serb.gov.in

To,

Finance & Budget Officer

SERB, New Delhi

Copy forwarded for information and necessary action to: -

1. The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2. Sanction Folder, SERB, New Delhi.
3. File Copy
4. Dr. Anil Kumar Verma

TERI University, Plot No. 10, Institutional Area, Vasant Kunj, DELHI, New Delhi-110003  
Email: verma10anil@gmail.com  
Mobile: 919678883549

Dr. Ramakrishnan Sitaraman  
Associate Professor  
Department of Biotechnology  
TERI University, Plot No. 10, Institutional Area, Vasant Kunj, DELHI-110003  
rkraman@teriuniversity.ac.in

(Start date of the project may be intimated by name to the undersigned. For guidance, terms & [www.serb.gov.in](http://www.serb.gov.in).)

5. Vice Chancellor,

TERI University, Plot No. 10, Institutional Area, Vasant Kunj

(Receipt of Grant may be intimated by name to the undersigned)

(Dr. Thangaradjou T)

Scientist E

ttradjou@serb.gov.in

\*\*\*\*\* LEGAL DISCLAIMER \*\*\*\*\*

[ SERB is now on Social-Media. Kindly follow us on Twitter: @serbonline

<https://www.twitter.com/serbonline>]

This is a system generated information and does not require any signature. This E-Mail may contain Confidential and/or legally privileged Information and is meant for the intended recipient(s) only. If you have received this e-mail in error and are not the intended recipient/s, kindly notify us at [info@serbonline.in](mailto:info@serbonline.in) and then delete this e-mail immediately from your system. Any unauthorized review, use, disclosure, dissemination, forwarding, printing or copying of this email or any action taken in reliance on this e-mail is strictly prohibited and may be unlawful. Internet communications cannot be guaranteed to be timely, secure, error or virus-free. The sender does not accept any liability for any errors, omissions, viruses or computer problems experienced by any recipient as a result of this e-mail.

\*\*\*\*\*

'SAVE PAPER - THINK BEFORE YOU PRINT!'

Please do not reply to this mail



3.2.1.G.5.



**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाइट/ Website : www.pcra.org



दिनांक 25/01/2017

संख्या: पीसीआरए/अनु.एवंविकास/78

रजिस्ट्रार - टीईआरआई यूनीवर्सिटी  
 प्लॉट संख्या 10, इन्स्टीट्यूसनल एरिया  
 वसंत कुंज  
 नई दिल्ली - 110 070

**विषय: प्रस्तावित परियोजना का अनुदान पत्र**

महोदय,  
 हमें आपके द्वारा प्रस्तावित अनुसंधान एवं विकास परियोजना "हवा भाप गैसीकरण के माध्यम से हाइड्रोजन संवर्धन द्वारा पूरित डाउन-ड्राफ्ट बायोमास गैसीफायर प्रणाली का डिजाइन, विकास और परीक्षण" (Design, development and testing of a down draft gasifier system completed by hydrogen enrichment thru air stream gasification) जो 80<sup>वीं</sup> स्क्रीनिंग कमीटी मीटिंग (एस.सी.एम) में अनुमोदित की गई है, हेतु अनुदान सहायता की स्वीकृति करने में प्रसन्नता हो रही है।

परियोजना का अनुदान स्वीकृति पत्र और उसकी एक प्रति इस पत्र के साथ संलग्न है। आप द्वारा स्वीकृति के रूप में संलग्न प्रति के प्रत्येक पृष्ठ पर परियोजना- प्रभारी/प्रधान अन्वेषक द्वारा हस्ताक्षर करके वापिस पीसीआरए को भिजवाने की कृपा करें।

धन्यवाद,

भवदीय

सुरेन्द्र प्रताप

निदेशक अनु. एवं विकास

पेट्रोलियम संरक्षण अनुसंधान संघ

*Singhania*



**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
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### Format for Sanction Letter

Doc. No. : R&D/QAF/10  
 Rev. No. : 01  
 Eff. Date: 15th Oct 2013

Ref. No.: PCRA/R&D/78

Date: 25/01/2017  
 25/01/2017

Kind Attn.: Dr. Priyanka Kaushal  
 Assistant Professor,  
 Department of Energy and Environment  
 TERI University (TU)  
 New Delhi - 110070

**Subject: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Dear Madam,

Please refer to the subject project proposal submitted by you to PCRA for grant-in-aid. The 80<sup>th</sup> Screening Committee in its meeting held on 15.02.2016 had technically approved the proposal with the following comments:

1. TU to submit a revised proposal reducing the manpower cost.
2. The revised proposal to clearly mention total project cost, contribution sought from PCRA, institution contribution and industry contribution.
3. Contractual manpower should not be more than two personnel.

Based on your revised proposal of March 11, 2016, complying the above requirements, we are pleased to convey approval of PCRA for grant in aid to TERI University (TU) to undertake the project titled "Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification".

- 1 PCRA will provide a total grant of Rs 21.78 lakhs. (Rs. Twenty One Lakh Seventy Eight Thousnd only) in instalments. No cost escalation will be allowed.

The head wise / item wise break up of the sanctioned amount from PCRA is enclosed in Annexure - D.

- 2 First instalment of grant-in-aid of Rs 5,44,500/- (Rs. Five Lakh Forty Four Thousand Five Hundred only) (less TDS, if applicable) will be released initially against your invoice.
- 3 You will be required to ensure completion of project within thirty months. Tenure of project will be calculated from the date of release of first instalment of grant-in-aid.
- 4 The terms and conditions for award of grant for the project are enclosed as Annex-A.

- 5 The final project details is attached as Annex-B & the physical and financial milestones along with target dates is enclosed as Annex-C.
- 6 We are sending herewith two copies of this letter in original. Please sign the duplicate copy and return it to us as a token of acceptance of the project with the above terms and conditions.

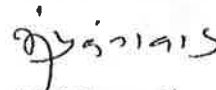
Kindly arrange to send the following for release of 1st instalment advance grant-in-aid :

- i. Signed duplicate copy as acceptance of the terms and conditions.
- ii. Invoice for 1st instalment amount.
- iii. RTGS / NEFT details for e-payment in PCRA format (available in PCRA website).
- iv. Certified copy of PAN issued by Income Tax Department.
- v. TDS exemption certificate from IT Dept., if applicable.

In case of change in Project-in-charge, for any reason, necessary prior information to be provided to PCRA.

Thanking you,

Yours faithfully.



M P Bangwal

Additional Director (R&D)

Petroleum Conservation Research Association (PCRA)





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Annexure - A

### TERMS & CONDITIONS

1. Periodic progress reports and expenditure statements in respect of above project against PCRA share shall be submitted to PCRA on quarterly basis without fail. Please note that these documents must reach PCRA office within 30 days on completion of each quarter. The progress report should clearly indicate targets mentioned in Annexure – C as completed / in progress / yet to take off.
2. In addition, details of institution contribution, if any, for the project, to be mentioned in the periodic expenditure statements separately.
3. Subsequent payments of instalments will be released as per Annexure – C attached on receipt of progress report & expenditure statements. However, the last 10% of the PCRA grant shall be released on submission and acceptance of final report. Tax deduction at source will be made as per the provisions of the Income Tax Act. If your organization is exempted from TDS, please submit valid certificate from IT authorities before or at the time of raising invoice. The institution has to return back the amount left unutilized out of total released amount, if any, after completion of project. TDS amount deducted, if any, will be considered as released amount to the institution. Institution may claim for the TDS deduction certificate, if any TDS is deducted.
4. Please note that the interest earned by your institute / organization on the funds sanctioned and paid by PCRA will be treated as amount paid by PCRA and must be shown as such in the accounts of the project. Also the interest earned on such amount should be reported regularly to PCRA.
5. The institute will prepare one film of about 10-15 minutes and a brochure within the above PCRA grant for dissemination of project findings for the benefit of masses.
6. PCRA reserves the right to seek any information/visit the actual site/laboratory at any point of time. A team of PCRA / member of screening committee and the institute officials may review the status of the project from time to time. One of our officials may also associate with the project as co-investigator at the discretion of PCRA. Nomination, if any, may be indicated later on.
7. You will submit draft technical completion report regarding the project to PCRA (one hard copy and one soft copy) within one month of completion of the project. The report should contain all relevant data, designs, detailed drawings, bills of materials, vendors for each item, approximate cost of each item, operation and maintenance procedures etc. as applicable.

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8. Also you will be required to make a presentation about the project work to the Screening Committee of PCRA for its review, comments and approval of the project, upon completion of project and submission of draft completion report. After incorporating comments of the Screening Committee of PCRA, if any, in the draft report, final technical report (both hard and soft copy) will be submitted to PCRA within one month of the date of Screening Committee meeting.

9. For commercialization / popularization of the technology, you may organize a meeting with the help of PCRA and make a detailed presentation / hold discussions with them about the new technology.

10. You will send the report to relevant agencies who can take corrective actions based on finding of the report along with your recommendation, under intimation to PCRA.

11. On completion of the project, R&D institute & PCRA would pass on the technology and assist in implementing the project who may desire to use the technology at their own cost. However, in case any revenues are generated this should be shared equally with PCRA. Technology transfer fee, license fee and royalty if any shall be equally shared between PCRA & the institute. Quantum of such fee to be approved by PCRA.

12. In the draft technical completion report, following shall be indicated by the research institute:


- i. Energy already saved at the time of writing the report & value thereof in MTOE.
- ii. Average Energy being saved per day at the time of writing report & value thereof.
- iii. Estimate of energy saving in next one year & futuristic view

13. If any research paper/article is published in national or international magazine or journal etc, it shall be in the joint name with PCRA & only after obtaining written consent of PCRA.

14. If any application is to be made for receiving any award or any award is to be received based on this work, it shall be in joint name with PCRA & with the written consent of PCRA.

15. CA audited head wise expenses for annual expenditure statement (clearly indicating actual expenses incurred against PCRA grant issued / to be issued and also clearly indicating any advance paid for future job / future material supply for the project against PCRA grant issued / to be issued) and CA audited annual utilisation certificate incurred up to 31st March of each financial year shall be submitted by 30th April to PCRA. CA audited accounts means the accounts audited by authorized chartered accountant / statutory auditors and not by internal auditors or accounts heads. Audited statement should accompany copies of documentary evidence of any work order issued and Invoice / bill specially for capital & high value items. Because expenses statement also shall be submitted to PCRA immediately after completion of the project followed by



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audited accounts. In addition, proof of beneficiary contribution for the project, if any, duly audited by Chartered Accounts and verified by Research Institutes are required to be provided to PCRA in respect of each beneficiary.

16. The Institute will maintain separate audited accounts for the project. The accounts of the grantee institution will be open to inspection by the sanctioning authority / audit whenever the institution is called upon to do so.

17. If expenditure statement and utilization certificate against the project is not audited by CA because of audit by CAG, then documentary proof of audit by CAG to be submitted to PCRA by 30<sup>th</sup> April for previous financial year up to 31<sup>st</sup> March and internal audited statement as per clause 14 above to be submitted.

18. For individual capital items procured from PCRA grant-in-aid for above Rs. five lakhs, if the Research Institute sells the items before 5 years after completion of the project, the realization value (sale proceeds) will be paid back to PCRA.

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## Project Proposal

*Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification resulting in substantial improvement in the efficiency of the gas engine.*

*Dr. Priyanka Kaushal  
TERI University, Delhi*

*Date: March 11<sup>th</sup>, 2016*

*Priyanka*



**Title of the project:**

Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the efficiency of the gas engine.

**Name of the Institution with address and contact nos.:**

Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070  
Phone: 011 2612 2222, Fax: +91 11 26122874

**Name of Project-in-charge with designation:**

Dr Priyanka Kaushal, Assistant Professor  
Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070  
Phone: 011 2612 2222, Fax: +91 11 26122874  
Email: priyanka.kaushal@teriuniversity.ac.in

N K Ram, Research scholar, Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070

Phone: 011 2612 2222, Fax: +91 11 26122874

&

Fellow, Biomass Energy Technology Applications,  
Energy, Environment and Technology division

The Energy and Resources Institute TERI, India Habitat Centre, Lodhi Road, New Delhi 110003, Phone:  
+91-11-24682100, Fax: +91-11-24682145

Email: nkram@teri.res.in

**Objectives of the project:**

The overall objective of the project is "To arrive at a design configuration and testing of biomass based down draft gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the conversion efficiency of the natural gas engine.

**The specific objectives of the project are:**

- To come up with a design configuration and development of a woody biomass based down draft biomass gasifier systems to produce a clean combustible gas (suitable for engine applications) and customizing the reactor for a specific rated capacity.
- To integrate air-steam gasification system and optimizing the reactor design in order to maximize the calorific value of the producer gas and minimize the impurities such as tar and particulate matter. Air steam gasification is chosen with a purpose to enhance the (engine) efficiency.
- To develop a complete package which includes simple cleaning and cooling components connected to an internal combustion engine coupled (to replace diesel) with an alternator
- To analyse the gas quality, i.e. tar and particulate matter, System optimization for reduction of impurities (tar and particulate matter), Testing the overall performance of the system with an engine, Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.

*Singh*

- Overall performance analysis of the reactor

#### Background and scope of work:

Globally 1.3 billion people are without access to electricity, 84 % of these people live in rural areas. In India about 289 million of people, account for 25 % population don't have access to electricity [1]. In the past six decades, India's energy need was increased 16 times and the installed electricity capacity by 84 times [2]. With the economy projected to grow at 8 % to 9 % per annum and the improving standards of millions of population, the energy demand is likely to grow significantly. Biomass is a potential renewable source for power generation [3]. Biomass gasification is one of the potential options for decentralized and distributed generation (DDG) of electricity [4]. Electricity generation through biomass combustion and gasification was considered as a potential source to meet the rural energy needs [5]. Deployment of biomass gasification technology can address three specific issues for the growth they are efficient utilization of local energy resources, creating employment opportunities for local community and to strengthen the local economy [6]. In specific the scenario in the island states such as A&N Islands which largely depends on Diesel fuel to meet their electricity needs. Diesel power accounts for 94% of the total power generation while remaining 6% is met through Hydel and Solar power generation. The cost of power generation through diesel based power plants are to the tune of 20 Rs/kWh which is highly expensive. In order to mitigate the use of diesel in the existing power plants, biomass provides can provide an alternate cheaper option which indeed is also available in abundance on the islands.

According to a study, the estimated potential availability is 5 MW, 2 MW & 1.5 MW of Agro fuel based power generation at South Andaman, Little Andaman and Car Nicobar respectively. It was observed that coconut is one of the main plantations and according to estimates 280 million nuts processed in the copra processing units annually. The potential for power generation from coconut shell is estimated as 4 MW generation capacities through Bio Mass using Coconut waste, etc., in South Andaman 2 MW generation capacity through Biomass in Little Andaman, 1.5 MW generation capacities through Biomass in Car Nicobar. Apart from coconut shell other loose biomass such as coir pith, Lantana (a Weed), rice husk and other forestry residues are available in abundance.

Lack of efficient biomass conversion technologies to generate electricity through gasification route has resulted in under utilization of the availability of bio-resources. To utilize these resources, in the existing designs of gasifier which indeed resulted in technical challenges. Usage of low bulk density fuel would result in chocking of fuel flow inside the reactor, resulting in intermittent gas production, High tar & dust content in the producer gas. Since in traditional downdraft gasifier are designed for certain bulk density of the fuel. In view of this there exists an opportunity to come up with a design configuration with two stage biomass gasifier concept to adopt the variety of biomass for power generation purpose. Also, hydrogen enrichment in the producer through air, steam gasification would contribute to improvement in the volumetric and overall efficiency of energy conversion. Development of such reliable technology package indeed enable adoption of decentralized, distributed generation power generation through biomass in A&N islands.

#### Background of the research carried out so far by the organization/other organizations in India.

Several premier institutions and research labs such as the Indian institute of science, Bangalore, Indian Institute, Anna university, National Institute of Technology, agricultural universities, across India are engaged in the development of biomass gasifier systems for power generation, hydrogen enrichment through steam gasification as well as development of thermal gasifiers to meet the process heat requirements in the industry. Relevant recent research work carried out by these organisations in the area of biomass gasification is summarised in the following section.

*Surya*

Anji reddy Bhavanam and R. C. Sastry reviewed various aspects of the research and development in biomass gasification in downdraft fixed bed reactors like advances in downdraft gasification systems, and the effect of various parameters like equivalence ratio, operating temperature, moisture content, superficial velocity, gasifying agents, residence time on the composition of producer gas, yield and conversion. Khardiwar et al experimented with gasification of agriculture residues, where soyabean, pigeon pea and their mix was briquetted for feeding. Using air gasification, the conversion efficiency obtained was maximum for soybean briquette of 56%, with the average Low Heating Value of producer gas reaching  $4.4 \text{ MJ/m}^3$ . Hydrogen composition of the producer gas obtained reached a maximum of 16.1% for pigeon pea briquette, where the LHV of gas was  $4.57 \text{ MJ/m}^3$  and flame temperatures was  $634^\circ\text{C}$ . These values showed promising results for replacement of agro-residues based biomass with wood and coal.

Abeenash V.N. and E. Natarajan investigated air and steam gasification and compared the results obtained from both methods. Initially, with air gasification the  $\text{H}_2$  yield obtained was around 25%, but drastically increased to 55% when steam was introduced. The range of temperature corresponding to maximum  $\text{H}_2$  was between  $700\text{--}800^\circ\text{C}$ . With sawdust as feed, the LHV of gas with a gasification air ratio of 0.2 was approximately  $8 \text{ MJ/m}^3$  and with a steam ratio of 0.2, it increased to  $11 \text{ MJ/m}^3$ .

K. Sandeep and S. Dasappa experimented with an open-top downdraft biomass gasifier developed at IISc Bengaluru, implementing Oxy-steam gasification and evaluating the performance characteristics using parameters such as Equivalence Ratio (ER), Steam Biomass Ratio (SBR) and fuel moisture content. The hydrogen percentage in the gas increases within SBR. The feed was dry Casuarina wood. The highest  $\text{H}_2$  yield of 51.7% was obtained at an SBR in 2.5 with gas LHV at  $7.5 \text{ MJ/m}^3$  and the ER takes a high value of 0.3. The gasification efficiency obtained was also high at 69.5%.

M. Campoy et al experimentally measured the gas composition for different steam-biomass and stoichiometric ratios. The procedure was carried out for Fluidized Bed Gasifier (FBG). About 8 kg of the bed material is loaded and the bed is subsequently heated with hot air and electric heater to  $700^\circ\text{C}$ . Biomass undergo complete oxidation under excess oxygen condition. A mixture of fuel air-steam is preheated to  $400^\circ\text{C}$  and fed into FBG. Biomass, air, steam and oxygen flow rates were variable parameters for the test, which was conducted in a maintained near adiabatic environment. A reported maximum of 27.5%  $\text{H}_2$  when S/B ratio is varied from 0 to 0.56 indicates a positive relationship. The gas yield obtained was around  $0.98 \text{ m}^3/\text{kg}$ , the Low Heating Value (LHV) was calculated to be  $8.84 \text{ MJ/m}^3$ , where the High Heating Value (HHV) of the fuel was  $17.1 \text{ MJ/kg}$ , resulting in a conversion efficiency of over 50% [12]. A variation from 19.7%  $\text{H}_2$  content to a maximum of 46.8%  $\text{H}_2$  has been reported [17].

Franco et al experimented similarly on Fluidized Bed Gasification with pine, holm-oak and eucalyptus as feed, with holm-oak having a High Heating Value of  $19.5 \text{ MJ/kg}$ . The reaction took place at around  $700\text{--}900^\circ\text{C}$  maintaining the free board temperature at  $750^\circ\text{C}$ . The steam-biomass ratio was varied from 0.4-0.85. The wood feed rate varied from  $5.7\text{--}11.5 \text{ g/min}$ , with emphasis on selecting particle size ranging from  $1250\text{--}2000 \mu\text{m}$  for reducing variations in mass flow rate. Furthermore, a rapid quenching system was employed to recover tars and condensable liquids from the product gas. Gas composition obtained contained around 42%  $\text{H}_2$ , 30%  $\text{CO}$ , 5%  $\text{CH}_4$  and a low  $\text{N}_2$  content of 7% [11].

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Pine wood with a High Heating Value of 20.54 MJ/kg, used as feed material in self-heating downdraft gasifier delivers a 29.92% H<sub>2</sub> rich composition and only 1.57% inert N<sub>2</sub>, with the gas Low Heating Value reaches 9.39 MJ/m<sup>3</sup>. The setup comprising of a downdraft gasifier, air intake equipment, provisions for gas cleaning, blower, flow meters and off-gas burner formed the complete gasification system. The gasifier is 1.3 m in height with an internal diameter of 35 cm. An air pre-heater is arranged near the neck of the gasifier below which a novel steam generating device is placed that produces steam at 1 atm and 100-120 °C. Before gas sampling and measurements, spray towers with steel springs are employed for gas cleaning that reduce gas temperature to 30 °C and remove 80-90 weight % of tar. A flow meter measures the gas yield. The composition is analysed using Kechuang GC-9800T thermal conductivity detector (TCD) and hydrogen flame ionization detector (FID) [14]. On comparing compositions obtained from steam-air and air gasification, there is a visible difference, with the H<sub>2</sub> range lying between 11.81% and 15.2% [13] [16]. The difference between the average values of H<sub>2</sub> content in producer gas obtained by steam-air and air gasification in producer gas is around 18%, from which it is inferred that the former is a more effective gasification method. As a further consequence of this method, the producer gas obtained has less inert gas percentage, with as low as 1.57% of N<sub>2</sub> in some cases [15].

**Domestic fixed bed down draft design of biomass gasifier technology:** Downdraft biomass gasifier are preferred for engine applications over any other type of gasifiers. A line diagram of the general scheme of a fixed bed down draft woody biomass gasifier based power system, explaining the working arrangement is shown in Figure 1. In the traditional downdraft gasifier the hot combustible gas coming out the gasifier carries impurities such as particles and tar vapors, which needs to be cleaned in the cleaning train before supplied to the IC engine for power generation. Hence an exhaustive cooling and cleaning train which consists of a series of filters such as gravity filters, wet scrubbers, cyclone separators and bag house filters. A paper filter is used as a safety filter to ensure that the clean gas with permissible levels of tar and dust particulate supplied to the engine.

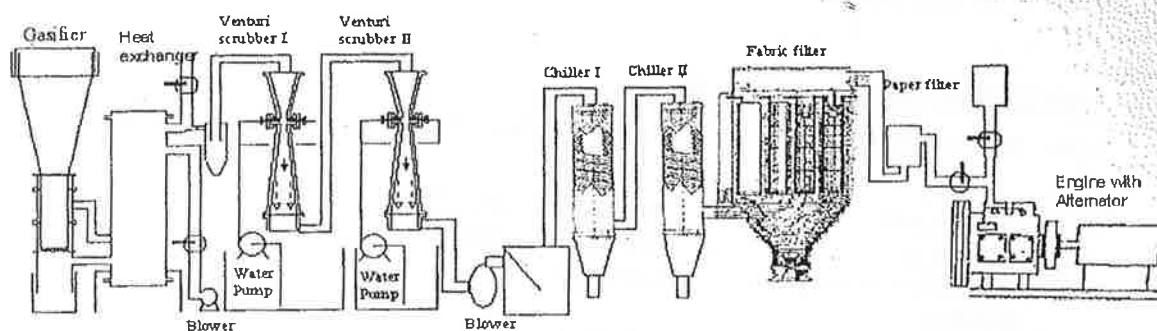


Figure 1: General scheme of biomass gasifier based power system

Past field experiences of biomass based distributed generation (DG) systems in the rural settings have not only established their benefits and technical viability, but had also helped in identifying the technological aspects where more work has to be done in order to make such systems more reliable and operator-friendly, such as:

- Biomass type and quality (Fixed bed design more sensitive to the bulk density of the fuel)
- Technology standardization and reliability testing (simple & rugged) to reduce downtime
- Continuous operation applications



- Waste water generation and disposal
- Scope to improve the engine efficiency through gas enrichment through steam air gasification route

In order to address the above mentioned points, TERI, subsequently engaged in evolving a design for two stage biomass gasifier design using wood as fuel. Thereafter TERI has now developed expertise & experience in developing wood based two-stage gasifier for power generation. The development of two stage gasifier system was done in collaboration with DTU and TERI. The design was evolved based picking up the silent features of DTU and TERI design of gasifiers, the two stage gasifier reactor produces clean producer gas, thus minimizing the need for maintenance and other day-to-day operational problems. This project thus, builds upon the past achievements of the TERI-SDC collaboration.

#### Description of the improved two stage biomass gasifier system

The two-staged process is characterized by having pyrolysis and gasification in separate reactors with an intermediate high-temperature tar-cracking zone. This allows for a very fine control of the process temperatures, resulting in extremely low tar concentrations in the producer gas. The line diagram and functional arrangement of the two stage gasifier system is shown in the figure 2. It is indeed evident from the figure that

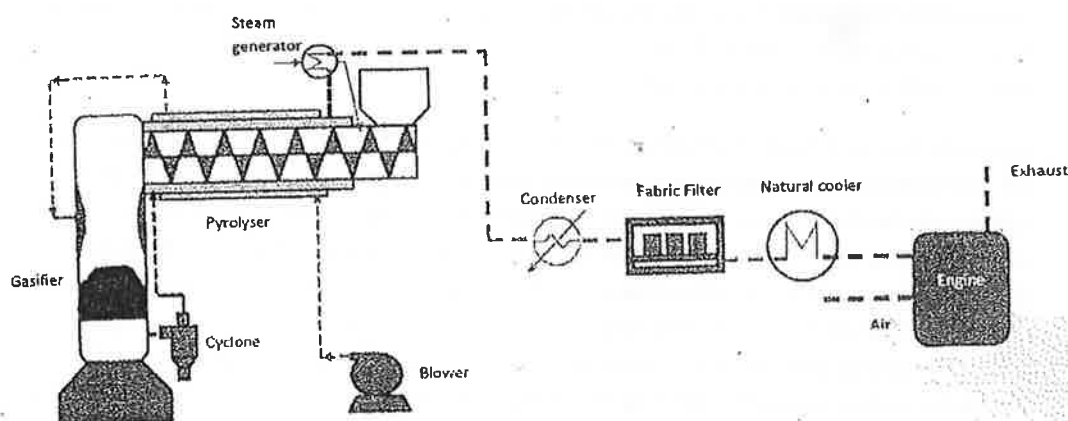


Figure 2: Two stage gasifier system

Table 1: Results of two stage gasifier system

S.No.	Key Parameters	Desirable Target
1	Tar (Raw gas)	Less than 25 mg/Nm <sup>3</sup>
2	Tar (Raw gas)	Less than 1 kg/kWh
3	Specific fuel consumption (kg/kWh)	Up to 30%
4	Input fuel moisture	Upto 2"
5	Fuel size	8-10%
6	Auxiliary electrical power	Without water scrubbing
7	Cooling cleaning system	Semi-automatic
8	Operational Controls	No

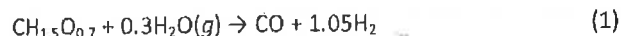
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## i. Scope of Proposed work, brief description of

## a) Research, b) Trial run plans, c) Engineering and d) Design

Although many institutions across the globe engaged in gasifier technology development with an emphasis to improve the gas quality suit engine requirements and to make the system more reliable [8, 9]. In the past, most of the research work is largely focussed around reducing the impurities in the gas considering the economical long term operation of the engine. Since tar and particulate matter acts as a deterrent for engine performance, hence detrimental contaminants in the gas has to be minimised in order to reduce the operation and maintenance cost of the such power plants.

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained. In the air, steam gasification steam will react with carbon monoxide to produce hydrogen and carbon dioxide. The principle gas-phase reaction in the steam gasification system is the water gas-shift reaction:



Improving hydrogen content in the gas will improve the energy density. In addition, enriched hydrogen gas, which is indeed called as syngas open up more endues applications apart from efficiency improvement in the engine. They are

- Research opportunities such as hydrogen generation from biomass,
- Generation of liquid fuels from the syngas, which indeed can be compressed in a cylinder for use in automobiles
- Hydrogen enriches syngas can be used in hydrogen fuel cells
- Enriched syngas will open up Gas to liquid route generation of liquid fuels for automobile applications

The first and foremost step in order to open up these opportunitiles is to generate a hydrogen enriched producer gas that constitutes minimum impurities and high energy content. Considering the challenges confronted in the past i.e.

1. Low calorific value of the producer gas
2. Low engine efficiency resulting in de-rating of the engines
3. Impurities and the inert gases

This proposal was carefully carved to address the above mentioned challenges, with an objective to improve the resource use efficiency address each of the challenges mentioned above. The detailed approach adopted to overcome the challenges mentioned with a threefold strategy they are:

- Improving the energy density through steam gasification
- Higher adiabatic flame temperature
- Higher engine efficiencies (volumetric & overall efficiencies)

**Energy density**

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low

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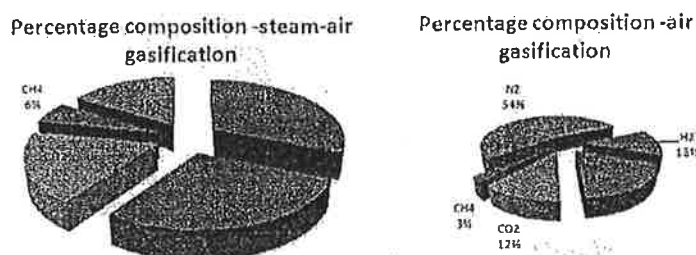


Figure 3: Comparison of inert gas percentages in steam-air and air gasification

Further authors tried to compile the gas composition using air, steam gasification in the table 2 below reported several authors. Careful analysis of the gas composition reported in the literature with air, steam gasification suggest that nitrogen content can be minimised to an extent of 1.57 % by volume to the current level of 50% by volume. This is due to the enrichment of hydrogen and Carbon monoxide composition in the producer gas from the current levels of  $H_2$  18% & CO 16% on a volume basis to  $H_2$  46.8 % & CO 20% on a volume basis. This also results in reduction of nitrogen since nitrogen is calculated by difference as illustrated in the table given below;

Table 2: Variations in the gas composition reported in the literature.

Reference	$H_2$	CO	$CO_2$	$CH_4$	$N_2$
M. Campoy et al [12]	27.5	28.5	14.6	7.7	21.7
Salami et al [7]	19.7	16.8	15.5	4	44
Franco et al [11]	42	30	16	5	7
Lv et al [6]	30	33	16	6	15
Subbaiah et al	23.8	18.46	23.5	4.07	30.17
Lv et al [15]	29.91	42.65	22.29	3.58	1.57
Lv et al [14]	30.81	39.26	17.41	8.2	4.32
Turn et al [17]	46.8	20.2	22.3	8.3	2.4

#### Adiabatic flame temperature

A comparison between steam-air and air oxidation can be drawn for inert gas percentage as well, where in the latter,  $N_2$  percentages are obtained as high as 64% against 44% maximum in steam-air oxidation. It is evident from this analysis theoretically there is a significant improvement in energy density in the volume of charge admitted into the engine cylinder which intern increase the adiabatic flame temperature and the power output from the engine. The calculations suggest that the energy content in the gas improves  $33.94 \text{ MJ/m}^3$  to  $61.01 \text{ MJ/m}^3$  which certainly is a significant improvement which is shown in the figure 5 given below.

*Signature*



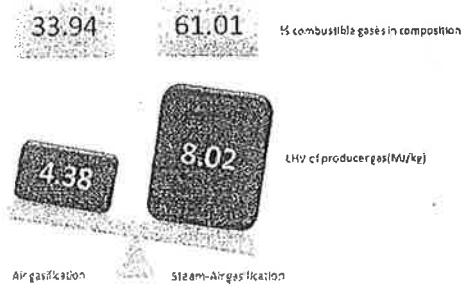


Figure 4: Effect of Combustible gas % in steam-air and air gasification

Subsequently, using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated from different observations. Figure 2 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature. Using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated for different observations. Figure 3 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature.

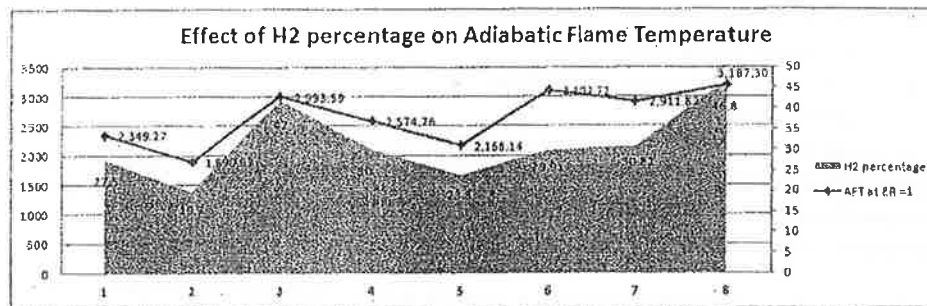


Figure 5: Effect of H2% on Adiabatic Flame Temperature °C

#### Engine performance

Using the Low Heating Value of producer gas thermal efficiency of the gas engine can be calculated. Other parameters include the capacity and performance characteristics of the engine. A three cylinder natural gas engine having a 3.8 L displacement running at 1500 RPM with an intake air fuel ratio of 1.3 produces a volumetric efficiency of around 0.8. Furthermore, the actual gas intake volume is calculated to be 0.0165 m<sup>3</sup>/s. The thermal power generated from producer gas with LHV of 8.84 MJ/m<sup>3</sup> is around 146.11 kW, which is further used to derive the mechanical power of the engine at 43.8 kW. For a cos phi rating of 0.814, the electric power in kVA is 35.68. The effect of higher gas LHV is observable on mechanical and electric power of the engine. Figure no displays the relationship for different observations.



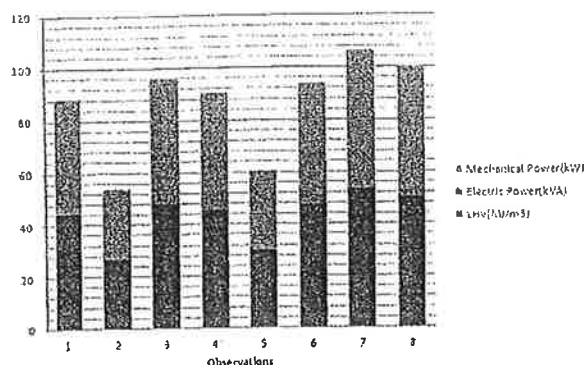


Figure 6: Influence of LHV on Mechanical and Electral Power

#### Research Plan:

To create a baseline data with existing setup "Air and Steam Gasification". A research plan has been developed based on experimental study to assess biomass flow, combustion zone temperature, and air flow, CHNO analysis of biomass, gas composition, gas chromatography, tar content and calorific value.

Parametric analysis shall be conducted

- (I) Measure the effect on gas composition and quality by varying the influencing parameters such as Steam/air ratio,
- (II) Study the influence of residence time by varying the position of steam injection inside the reactor,
- (III) Effect of reactor bed temperature etc.
- (IV) Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
- (V) This study shall also provide insights into the utilization of waste heat streams for steam generation.

It is proposed to conduct the experiments at our facility at Gual Phari, The proposed test rig is equipped with essential instrumentation and control, such as an array of thermocouples along with micro-Gas Chromatograph (GC) and other gas analysis equipment which are essential for conducting the proposed study.

The effect of various influencing factors, i.e. Reactor temperature, steam to biomass ratio (S/B), equivalence ratio (ER) and biomass particle size of gas composition, gas yield, steam decomposition, low heating value (LHV) and carbon conversion efficiency of steam gasification shall be studied

*Swigand*

6. Work Plan (should include stage wise detailed activities to be undertaken)

The proposed research shall be conducted in two steps, i.e.

**Step 1:** Is to introduce the steam injection into the first stage, also to optimize the steam injection point Integrate the steam generator into the existing system, the residence time and the utilization of the waste heat.

1. To optimize the steam, biomass ratio, residence time to optimize the hydrogen production in the producer gas. To conduct parametric studies by varying the steam, biomass ratio and observe the composition and calorific value of the gas.
2. To analyse the gas quality, i.e. tar and particulate matter in the producer gas at optimum hydrogen production and to if in case the tar and particulate matter is on the higher side efforts shall be taken to reduce the tar and particulate matter at the source.

**Step 2:** Is to develop a simple, clean and cooling cleaning system Integration of the complete package and testing the overall performance of the system.

1. This would involve the development of cleaning and cooling system, integration of the complete system with suitable rated engine.
2. The complete system shall be tested for its performance and also to quantify the efficiency improvement due to hydrogen enrichment.

**Step 3:** Testing, report writing, publication Mass balance, energy balance of the system to assess the performance of the system.

1. Study the influence of residence time by varying the position of steam Injection inside the reactor, Effect of reactor bed temperature etc.
2. Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
3. This study shall also provide insights into the utilization of waste heat streams for steam generation.
4. To report techno-economic and cost-benefit assessment of the hydrogen enrichment vis-à-vis without hydrogen enrichment.

*Singh*

7. Activity Time Schedule (Bar Chart indicating time duration required for completion of each of work plan stages/activities)

Time line	Time line 1 <sup>st</sup> year						Time line 1 <sup>st</sup> year						Time line 2 <sup>nd</sup> year						Time line 2 <sup>nd</sup> year					
Months	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Procurement of steam generator & integration with the system	■	■																						
To optimize the steam, biomass ratio, residence time to optimize the hydrogen production			■	■	■	■																		
To conduct parametric studies (variation/steam to biomass/ratio, gas; composition, calorific value etc.							■	■	■	■	■													
To analyse the gas quality, i.e. tar and particulate matter									■	■	■	■												
System optimization for reduction of impurities (tar and particulate matter)													■	■	■									
Procurement of at suitable engine Integration of the complete package. Testing the overall performance of the system with an engine																■	■	■						
Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.																			■	■	■	■	■	■
Comparative study with and without the hydrogen enrichment, techno-economic analysis highlighting benefits, Fuel saving and payback period etc																			■	■	■	■	■	■
Publications												■	■											■
Report writing																								■

*Swipark*

#### 8. Expected benefits (quantitative and qualitative):

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar islands for island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

#### 9. Likely potential end users with full address, mobile numbers, emails and applications:

#### 10. Cost estimates:

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital items	450000	150000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities			0	
v. Consultancy			0	
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

\*TERI University & TERI contribution is in kind that includes expenditure towards infrastructure, building, instrumentation, Test rig and manpower that includes Technicians and Interns (TERI University contribution)

*Singh*



11. Justification of the expenditure for additional:  
Budget for salaries/wages

Designation (number of persons)	Monthly emolument (person months)	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Research associate (1)	35000 (12)	420000	210000	840000
Research Assistant (1)	18000 (10)	432000	216000	648000
<b>Total</b>		<b>852000</b>	<b>426000</b>	<b>1278000</b>

Budget for permanent equipment

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Gasifier, blower and other associated system components (including accessories), their modifications in the field	350000	150000	600000
Steam generator and cleaning cooling system	100000	0	100000
<b>Total</b>	<b>450000</b>	<b>150000</b>	<b>600000</b>

Budget for consumable materials

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Fuel, hardware, spares etc.	50000	50000	100000

Budget for travel

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Travel	50,000	50,000	1,00,000

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## Year wise break-up of funds for the project

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital Items	500000	200000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities				0
v. Consultancy				0
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

## 12. Who are the identified potential beneficiaries (By name, address &amp; telephone nos.)

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar Islands for Island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

## 13. How much is the proposing institute willing to contribute towards the project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work. The in-kind contribution from TERI, if quantified, it is around 1000,000 (10 Lakhs) rupees.

## 14. How much is the proposing institute willing to contribute towards beneficiaries.

The current proposal is a research, develop and demonstrate proposal hence during this phase of the project the question is not applicable.

15. By the time project completion report is submitted how much energy would have been actually saved.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy/fossil fuel saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

16. What is the value of such energy that would be saved till completion of the project.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

17. What are the existing equipment & instruments which proposing institute is going to utilize for the proposed project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work.

18. Confirm that detailed justification of manpower cost, i.e. nos. of man-days & rate of man-days are indicated.

Since the project involves product development which requires engagement of experienced staff in designing and experimentation. Details are given in page number 12.

19. Confirm that items, which are to be purchased, are listed with an estimated cost of each.

Yes. Details are given in page number 13.

20. Letters from at least two potential beneficiaries (with telephone nos, mobile nos, email) needs to be enclosed indicating their willingness to implement the outcome of the project in their premises. Sharing of cost, whatever may be agreed, also to be indicated.

NA



15

21. Out of the total cost of project, please indicate how much value of material is actually going to be used in the premises for energy Efficiency.

100% of the project cost is utilized for product development which has energy efficiency as co-benefit.

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**DECLARATION**

I hereby declare that

- i) I have not undertaken this project earlier with any other organization
- ii) I have not taken any financial help for this project from any other institution
- iii) In case of receipt of grant-in-aid from PCRA, financial help shall not be taken from any other govt. organization against this project.
- iv) Patent search is the responsibility of the institution.
- v) The research lab under this institution is recognized by Govt./DSIR.



Principal, Investigator Signature

Date March 7<sup>th</sup>, 2016

TERI University



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*Srinivasan*



**पीसीआरए**

**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**

(तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)

दूरभाष/ Tel. : बोर्ड/ EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



**Annexure - C**

**Physical & Financial Milestones for R&D**

**Project: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Sl No.	Target	Period (in month nos)		Amount to be released at the end of period upon completion of target.		
		From	To	PCRA (Rs. in lakhs)	Institute / Beneficiary (Rs. in lakhs)	Total (Rs. in lakhs)
1	At the beginning of the project	N.A.	N.A.	5.445	NA	
2	a) Procurement of Steam Generator & Integration with the system b) To optimize the steam, biomass ratio, residence time for Hydrogen production.	Start of project (0)	6			
3	a) To conduct parametric studies (variation/steam to biomass/rati, gas; composition, calorific value etc. b) To analyse the gas quality, i.e Tar and Particulate matters. c) Publications & report writing.	6	12	9.075	NA	
4	a) System optimization for reduction of impurities (Tar & Particulate Matters) b) Procurement of suitable engine integration of the complete package & testing of the overall performance of the	12	18	2.00	NA	

*Signature*

### 3.2.1.G.6.

	system with an engine.					
5	a) Balance work of Procurement of suitable engine integration of the complete package & testing of the overall performance of the system with an engine on in 19 <sup>th</sup> Month. b) Performance analysis mass balance, energy balance efficiency improvement due to Hydrogen enrichment. c) Comparative studies with and without Hydrogen enrichment, techno-economic analysis highlighting benefits, fuel saving and Payback period etc. d) Publications & report writing	18	24	3.082	NA	
6	a) Presentation in SCM for approval of DCR, compliance of SC comments if any, submission of final completion report.	NA	NA	2.178	NA	2.178
TOTAL :				21.78	NA	21.78

Institute to return back the unutilized sanctioned amount, if any, after completion of project. Interest earned on sanctioned money, if any, will be considered as additional sanctioned money. TDS deducted amount, if any, will be considered as grant-in-aid. Amount will be released only after completion of target and utilization of previous installments with actual expenditure and committed / Tender raised / order placed values. Amount will be released only after expiry of period against the target.

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**पी सी आर ए**

**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)

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 ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



**Annexure - D**

**HEAD WISE PROJECT COST**

Sl. No	Activity	PCRA (Rs. in lakhs)	Industry / Beneficiary (Rs. in lakhs)	Institute (Rs. in lakhs)	Total (Rs. in lakhs)
1	Capital items	6.00	0	0	6.00
2	Chemical / Raw materials	1.00	0	0	1.00
3	Consumables	1.00	0	0	1.00
4	Utilities	0	0	0	0
5	Travel	1.00	0	0	1.00
6	Stationery	0	0	0	0
7	Manpower	12.78	0	0	12.78
8	Workshop / Seminar	0	0	0	0
9	Other research expenditure (Survey vehicles charges, driver charges etc.)	0	0	0	0
	<b>Total :</b>	<b>21.78</b>	<b>0</b>	<b>0</b>	<b>21.78</b>

*Signature*

**F. No. 13/12/2008-RE**  
**GOVERNMENT OF INDIA**  
**MINISTRY OF ENVIRONMENT & FORESTS**  
**(RE DIVISION)**

**Paryavaran Bhawan**  
**CGO Complex, Lodhi Road**  
**New Delhi-110003**  
 Date: 22.04.2013

To,  
 The Pay & Accounts Officer  
 Ministry of Environment & Forests  
 New Delhi.

**Subject: Research project entitled "Development of a Knowledge Based Decision Tool to Simulate Mechanism of Vegetation Change Due to Climatic Change in Western Himalayan Ecoregion (part of Uttarakhand) - a Precursor to Understanding Responses to Climate Change and Developing Scenarios for Adaptive Strategies" under the guidance of Dr. P.K. Joshi, Associate Professor, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 - release of Grant-in-Aid for the year 2013-14 - regarding.**

Sir,

I am directed to convey the Sanction of the President to the approval of the research project entitled "Development of a Knowledge Based Decision Tool to Simulate Mechanism of Vegetation Change Due to Climatic Change in Western Himalayan Ecoregion (part of Uttarakhand) -a Precursor to Understanding Responses to Climate Change and Developing Scenarios for Adaptive Strategies" under the guidance of Dr. P.K. Joshi, Associate Professor, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 at a total cost of ₹35,04,000/- (Rupees Thirty Five Lakhs Four Thousand Only) for a period of three years as per the break up given below:-

Head	1st Year	2nd Year	3rd Year	(Amount in ₹) Total
<b>A. Salaries</b>				
JRF-02 (Rs.16000-16000-18000 + 30%HRA)	4,99,200	4,99,200	5,61,600	15,60,000
<b>B. Permanent Equipments</b>				
i) Hand held GPS system (2) with mapping software,	50,000	-	-	50,000
ii) IGIS software developed by ISRO	1,50,000	-	-	1,50,000
<b>C. Satellite data (IRS P6 LISS III data) &amp; Primary data collection.</b>	3,60,000	-	-	3,60,000



<b>D. Consumable</b>	50,000	75,000	75,000	2,00,000
<b>E. Travel</b>	2,00,000	2,00,000	2,00,000	6,00,000
<b>Sub-Total (A+B+C+D+E)</b>	<b>13,09,200</b>	<b>7,74,200</b>	<b>8,36,600</b>	<b>29,20,000</b>
<b>F. Contingencies (5%)</b>	65,460	38,710	41,830	1,46,000
<b>G. Institutional Charges (15%)</b>	1,96,380	1,16,130	1,25,490	4,38,000
<b>Total (A+B+C+D+E+F+G)</b>	<b>15,71,040</b>	<b>9,29,040</b>	<b>10,03,920</b>	<b>35,04,000</b>

2. Sanction of the President is also hereby conveyed to the release of an amount of ₹10,00,000/- (Rupees Ten Lakhs Only) towards Grant-in-Aid to the Registrar, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 for the above research project for the financial year 2012-13-Plan-Recurring/Non-Recurring. The breakup of the amount of ₹10,00,000/- (Rupees Ten Lakhs Only) as first Installment of the grant for 2013-14 is per details given below:-

<b>Head</b>	<b>Amount in ₹</b>
Salaries	4,50,000/-
Permanent Equipment	2,00,000/-
Consumables	50,000/-
Travel	1,50,000/-
Contingency	50,000/-
Institution Charges	1,00,000/-
<b>Total</b>	<b>10,00,000/-</b>

3. The grants-in-aid will be regulated in accordance with the provisions contained in the GOI Rules. The Grants-in-Aid also subject to the Chapter 9 of the General Financial Rules, 2005, as amended from time to time, read with the Government of India's decisions incorporated there-under, and any other guidelines which may be issued in this regard, and in particular to the following conditions: -

- (i) All relevant information and documents/certificates as required under GFR 209 (1) have been received.
- (ii) The pattern of assistance of rules governing such grants-in-aid has received the approval of the Ministry of Finance, as required under Govt of India Decision No. (1) under DFPR - Rules 20.
- (iii) Assets acquired wholly or substantially out of Government Grants shall not be disposed off without obtaining the prior approval of the sanctioning authority of Grants-in-Aid.



- (iv) This is new project and hence no previous Utilization Certificate (UC) is required the UC for the amount being released now will be furnished by the Registrar, TERI University New Delhi, when request for release of further amount for the project is made, or at the end of the financial year, whichever is earlier, the Registrar, TERI University New Delhi shall furnish Utilization Certificate along with the request for release of further Grants-in-Aid certifying that the fund released to them for which Utilization Certificated has not been issued/utilized exclusively in pursuance of object envisaged in the Rules/Memorandum of the Registrar, TERI University New Delhi and that the grant has been spent for the project for which it was sanctioned with the extent instruction/rules and with the approval of competent authority in each case.
- (v) The Registrar, TERI University, New Delhi may furnish their performance-cum-achievement report on or before 31.03.2014 to the sanctioning authority.
- (vi) The sanction amount is noted at Serial No. R&D/NNRMS/2/2013-14 in the register of Grants-in-aid of RE-Division and sanction ID has been generated and enclosed.
- (vii) The Registrar, TERI University, New Delhi will spend Grants-in-Aid exclusively in pursuance of the objectives envisaged in rules/memorandum of the Registrar, TERI University, New Delhi and for the purpose it is being sanctioned.
- (viii) Grants-in-Aid to the Registrar, TERI University, New Delhi is subject to the Economy Instructions issued from time to time by the M/o Finance or by the Competent Authority.
- (ix) Grants-in-Aid shall be utilized before the end of the current financial year 2013-14 and unspent balance, if any, will be refunded/seek approval for carry forward by the Registrar, TERI University, New Delhi to the Govt. of India.
- (xi) The Registrar, TERI University, New Delhi will maintain and will present their annual accounts in the standard formats required under GFR 209 (xiii)

4. The sanction is subject to the conditions as detailed in Annexure-I attached. The grant-in-aid is recurring in nature and will be released in Installments. The grantee institute falls under category- (A)-Autonomous Body. This is new project & hence no UC is attached.

5. The Drawing and Disbursing Officer, Ministry of Environment and Forests hereby authorized to prepare and submit bill for amount of ₹10,00,000/- (Rupees Ten Lakhs Only) to Pay and Accounts Officer, Ministry of Environment and Forests New Delhi to make the payment electronically i.e. through CBS/RTGS to




the account of the Registrar, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 whose bank details are given below: -

Name of Bank : State Bank of Hyderabad  
 Name of the Branch : Scope Complex, Core-6,7 Institutional Area, Pragati Vihar, New Delhi-110 003  
 Bank Account No : 52142908571  
 IFSC Code : BSHY0020511  
 MICR Code : 110004005  
 Beneficiary's name : TERI University

6. The amount will be debitable to the Major Head 3435 Ecology and Environment; Minor Head 03.103 Research and Ecological Regeneration; 08.00.00 National Natural Resources Management System; 08.00.31 Grant in-aid-General (3435.03.103.08.00.31) under Demand No.31, Ministry of Environment and Forest for the financial year 2013-14 (Plan).

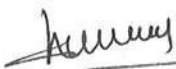
7. This sanction has been issued under the power of delegated to the Ministries/Department and with the concurrence of Integrated Finance Division vide Dy. No. 755/IFD/E/2013, dated 12/4/2013.

Yours faithfully,

  
 (Dr. H. Kharkwal)  
 Deputy Director

Copy to:

1. The Registrar, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070.
2. Cash Section (2 Copies). New Project
3. ✓ Dr. P.K. Joshi, Associate Professor, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070.
4. The Principal Director of Audit (Scientific Department), AGCR Building, I.P Estate, New Delhi-110002.
5. IFD/ B&A Section.
6. Adviser (RE)/ Dir.(Dr.JR).
7. Sanction folder/Guard File.

  
 (Dr. H. Kharkwal)  
 Deputy Director



**No. DST/IMRCD/ SARASWATI /2012/(G) (vi)**  
**DEPARTMENT OF SCIENCE & TECHNOLOGY**  
**GOVERNMENT OF INDIA**  
 (International Multilateral Regional Cooperation Division)

Dated: 02.July 2014

**ORDER**

Sanction of the President is accorded for incurring an expenditure not exceeding Rs.1350000 (Rupees Fifteen lakhs fifty thousand Only) for Research Project entitled ““Supporting consolidation, replication and up-scaling of sustainable wastewater treatment and reuse technologies for India” SARASWATI for three years duration under the framework of India-European Union Science & Technology Cooperation Agreement.

- 1.1 This project is between Indian Project Coordinator Dr. A.A. Kazmi, IIT, Roorkee (Others: Dr. M.M. Ghangrekar, IIT, Kharagpur, Dr. Ligy Philip, IIT Madras, Dr. S.K.P. Jaswal, TISS, Mumbai, Dr. Anju Singh, NITIE, Mumbai, Mr. S. Srivastava, DVWS, Ahmedabad, Dr. Sukanya Das, Madras School of Economics, Chennai and other local bodies and SMEs from Indian side) and European Project Coordinators Dr. Marcus Starkal, University of Natural Resources and Life Sciences, (BOKU) Vienna (Others : Dr. Lise Cary, Bureau de Recherches Géologiques et Minières (BRGM), France; Dr. Juan José Salas Rodríguez , Fundacion Centro de las Nuevas Tecnologías del Agua (CENTA), Spain; Dr. Jaime L. Garcia Heres, Sevilla, Centro de Estudios e Investigaciones Técnicas de Gipuzkoa (CEIT), Spain; Dr. Fayyaz Memon, University of Exeter (UNEXE), UK; Dr. Norbert Brunner Centre for Environmental Management and Decision Support (CEMDS), (Austria) , Félicien Poncelet, A3i France; Eng. Sérgio Simbiente - Engenharia e Gestão Ambiental (SIMBIENTE), Portugal; Mr David Armstrong Hydrok UK Ltd. UK; (HYDROK), Chris Shirley – Smith, Water Works UK Ltd.

2. Following is the budget details for the, Madras school of Economics for India-EU Water Project:

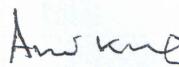
MSE	1st Year	2nd Year	3rd Year	Total
Manpower JRF/SRF ( 1)	300000	300000	300000	900000
Consumables	60000	80000	60000	200000
Mobility India to EU,	0	0	0	0
Domestic travel	25000	40000	35000	100000
Mobility EU to India	15000	20000	15000	50000
Overhead Expenses	100000	0	0	100000
Total	500000	440000	410000	1350000

3. Sanction of the President is also accorded for the release of first installment of Rs. 5,00,000/- (Rupees Five lakhs Only) to the Registrar Indian Institute of technology, Madras School Of Economics Gandhi Mandapam,, (to be utilized by : Dr, Sukanya Das) under 'Grants-in-Aid General' as First installment of the grant for implementation of the above said research project. The payment of this amount may be made to DDO, DST for electronic transfer to the following account of MSE, Chennai, in favour of Registrar MSE, Chennai ( to be utilized by :, Dr, Sukanya Das)

- Name /Designation of account holder. Madras School Of Economics Gandhi Mandapam,
- Name of bank and branch: Indian Bank Kotturpuram Branch Chennai- 600085.
- Bank account No. 479115905
- IFSC Code: IDIB000T117
- MICR: 600019090



4. As per MOF's O.M. No. 19024/1/2009-E-IV dated 13th July, 2009, all cases of air travel, both domestic and international, where the Government of India bears the cost of air passage, the officials concerned may travel only by Air India. For travel to stations not connected by Air India, the officials may travel by Air India to the hub/point closest to their eventual destination beyond which they may utilise the services of another airline preferably be an alliance partner of Air India
5. The institute will maintain separate audited accounts for the project and the amount of grant will be kept in a bank account earning interest. The interest earned should be reported to DST by submitting the statement of expenditure/utilization certificate. The interest thus earned will be treated as credit to the institute to be adjusted towards further instalments of the grant.
6. The project will be reviewed annually by DST appointed expert committee. The next release of the grant will be subject to recommendation of the expert committee. The general terms and conditions which are to be fulfilled by all the Indian partnering institutions are given in the annexure-1.
7. This sanction is subject to submission of utilization certificate/statement of expenditure (UC/SE) by the grantee institution along with the yearly technical progress report duly endorsed by Indian Project Coordinator. The next installment shall be released on receipt of audited statement of expenditure and utilization certificate from the grantee institution.
8. The accounts of the grantee institution shall be open to inspection by the sanctioning authority/audit whenever the institution is called upon to do so, as laid down under rule 150(1) of the General Financial Rules.
9. The expenditure involved is to be met out of the budget head Demand No. 86-Department of Science and Technology - 3425-Other Scientific Research (Major Head) 60.798 International Cooperation (Minor Head), 12-S&T Cooperation with Other Countries -12.00.31 – Grants-in-aid General (Plan) for the current financial year 2014-2015.
10. This issues under the delegated powers to the Ministries/Departments and with the concurrence of US (IFD) vide IFD concurrence Dy No. C/1863 /2014-2015 dated 02/ 07/2014.

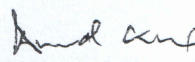
  
(Dr. Arvind Kumar)  
Scientist, 'E' 02.07.2014

To

The Pay & Accounts Officer,  
Deptt. of Science & Technology, New Delhi.

Copy to:-

1. Office of the Principal Director of Audit, Scientific Deptts., IP Estate, N Delhi- 110002.
2. Cash Section (3 copies), Department of Science & Technology (DST).
3. I.F. Division/Accounts Section, DST.
4. Registrar MSE, Chennai
5. Madras School Of Economics Gandhi Mandapam Road Kottur Chennai-600025
6. Dr.Sukanya Das, Assit Professor MSE, Chennai
7. Sanction folder.

  
(Dr. Arvind Kumar)  
Sc, E, 02.07.2014





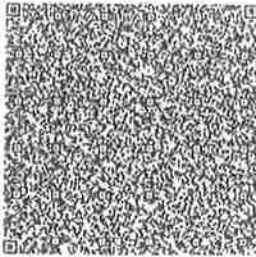
सत्यमेव जयते

## INDIA NON JUDICIAL

## Government of National Capital Territory of Delhi

## e-Stamp

Certificate No.	: IN-DL34202951971116N
Certificate Issued Date	: 27-Jul-2015 11:35 AM
Account Reference	: IMPACC (IV)/ dl900003/ DELHI/ DL-DLH
Unique Doc. Reference	: SUBIN-DL90000365906036803410N
Purchased by	: SIDBI
Description of Document	: Article Others
Property Description	: Not Applicable
Consideration Price (Rs.)	: 0 (Zero)
First Party	: SIDBI
Second Party	: Not Applicable
Stamp Duty Paid By	: SIDBI
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



Please write or type below this line.....

**India: Financing Energy efficiency at MSMEs Project**  
**CONTRACT FOR CONSULTING SERVICES**  
**(IBRD/IDA FINANCED)**  
**CONTRACT TITLE: PROJECT DEVELOPMENT SUPPORT FOR**  
**ENHANCEMENT OF ENERGY EFFICIENCY INVESTMENT IN VARANASI**  
**CLUSTER**  
**CONTRACT No. SIDBI/EEC/2015-16/CS-23**

THIS CONTRACT ("Contract") is entered into this Twenty Eighth day of July  
Two Thousand Fifteen, by and between **Small Industries Development Bank**



## Statutory Alert:

1. The authenticity of this Stamp Certificate should be verified at "www.sidbi.org.in". Any discrepancy in the details on this Certificate and as available on the website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.

3.2.2.89

Delhi  
 New Delhi

of India (SIDBI) (hereinafter referred to as "the client"), a Corporation established under the Small Industries Development Bank of India Act, 1989 and having its Head Office at SIDBI Tower, 15, Ashok Marg, Lucknow - 226 001 and an office at Ground Floor, Videocon Tower, E-1 Rani Jhansi Road, Jhandewalan Extension, New Delhi - 110055 (hereinafter referred to as the "the Client") and **M/s TERI University**, (hereinafter referred to as "the consultant") having its office at 10, Institutional Area, Vasant Kunj, New Delhi - 110070 (hereinafter referred to as "the Consultant").

WHEREAS, the Client wishes to have the Consultant perform the services hereinafter referred to, and

WHEREAS, the Consultant is willing to perform these services,

NOW THEREFORE THE PARTIES hereby agree as follows:

#### 1. Services

- (i) The Consultant shall perform the services specified in Annex A, "Terms of Reference and Scope of Services," which is made an integral part of this Contract ("the Services").
- (ii) The Consultant shall provide the personnel listed in Annex B, "Consultant's Personnel," to perform the Services.
- (iii) The Consultant shall submit to the Client the reports in the form and within the time periods specified in Annex C, "Consultant's Reporting Obligations."

#### 2. Term

The Consultant shall perform the Services during the period commencing **July 28, 2015** and continuing through **April 30, 2016** or any other period as may be subsequently agreed by the parties in writing.

#### 3. Payment

##### A. Ceiling

For Services rendered pursuant to Annex A, the Client shall pay the Consultant an amount not to exceed a ceiling of **Rupees Thirty Six Lakh only (₹ 36,00,000/-) plus applicable service tax**. This amount has been established based on the understanding that it includes all of the Consultant's costs and profits that may be imposed on the Consultant. Tax will be deducted at source (TDS) by the Client as per the guidelines.

##### B. Schedule of Payments

The schedule of payments is specified below:

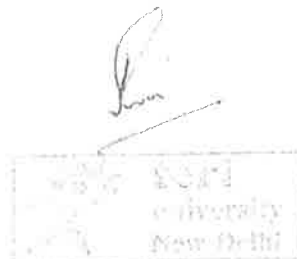


activities under the Contract, for receiving and approving invoices for payment, and for acceptance of the deliverables by the Client.

B. Reports.

The reports listed in Annex C, "Consultant's Reporting Obligations," shall be submitted in the course of the assignment, and will constitute the basis for the payments to be made under paragraph 3.

5. **Performance Standards** The Consultant undertakes to perform the Services with the highest standards of professional and ethical competence and integrity. The Consultant shall promptly replace any employees assigned under this Contract that the Client considers unsatisfactory.
6. **Inspections and Auditing** The Consultant shall permit, and shall cause its Sub-Consultants to permit, the Bank and/or persons or auditors appointed by the Bank to inspect and/or audit its accounts and records and other documents relating to the submission of the Proposal to provide the Services and performance of the Contract. Any failure to comply with this obligation may constitute a prohibited practice subject to contract termination and/or the imposition of sanctions by the Bank (including without limitation s determination of ineligibility) in accordance with prevailing Bank's sanctions procedures.
7. **Confidentiality** The Consultants shall not, during the term of this Contract and within two years after its expiration, disclose any proprietary or confidential information relating to the Services, this Contract or the Client's business or operations without the prior written consent of the Client.
8. **Ownership of Material** Any studies reports or other material, graphic, software or otherwise, prepared by the Consultant for the Client under the Contract shall belong to and remain the property of the Client. The Consultant may retain a copy of such documents and software
9. **Consultant Not to be Engaged in Certain Activities** The Consultant agrees that, during the term of this Contract and after its termination, the Consultants and any entity affiliated with the Consultant, shall be disqualified from providing goods, works or services (other than consulting services that would not give rise to a conflict of interest) resulting from or closely related to the Consulting Services for the preparation or implementation of the Project
10. **Insurance** The Consultant will be responsible for taking out any appropriate insurance coverage.





LIST OF ANNEXES

Annex A: Terms of Reference (ToR)

Annex B: Consultant's Personnel

Annex C: Consultant's Reporting Obligations

The detailed scope of work for conducting detailed energy audit in the identified MSME units would include but not limited to the following:

- To correlate monthly production data with the electricity, fuel consumption for a period of about 12 months of normal operation for individual section and overall system.
- To measure the present efficiency levels, specific energy consumption and identify the energy saving opportunities in all major energy consuming equipments and other process related utilities.
- To study monthly power factor, maximum demand, working hours, load factor, Harmonics level, capacitor's health checkup etc. and also to study monthly electricity consumption and establish scope for possible optimization.
- To study the current lighting load and the recommend possible energy saving opportunities.
- To undertake renewable energy application assessment study
- Development of overall energy flow diagram
- Development of process flow diagram
- Study of Single Line Diagram
- Review the present metering & monitoring
- Review the present energy management system and recommend improvement measures for better monitoring and consequent energy savings

**B. Study on Lean Manufacturing, possible improvement areas with cost benefit analysis and Implementation Support,**

The basic rationale for undertaking lean manufacturing (LM) is to enhance productivity and competitiveness of MSMEs by reduction of wastages in manufacturing processes, inventory management, space management, energy consumption, etc. The LM techniques may also result in reduction in rejection, standardization of processes, better layout of machines resulting in reduced transportation of products during manufacturing, etc. The implementation of LM techniques may lead to cost reduction for MSMEs.

The consultant shall undertake a detailed assessment of the plant layout and processes to identify possible improvement areas through suitable LM techniques. The consultant shall also provide support to the unit for implementation of the identified LM techniques to the extent feasible within the scope of the project and given timelines.

**C. Study on Cleaner Production, possible improvement areas with cost benefit analysis, and Implementation Support,**

- Based on the data collected like site layouts & plans, environmental data, inventories of raw materials & products, and the site visit: define the sources, quantities and types of waste generated through material and energy balances.
- A general flow diagram showing all process steps that are carried out and flow diagram for each key process should be constructed. This should identify all main steps that are carried out, list all of the inputs (including raw materials, process chemicals, steam, water and energy, etc.), outputs (products, byproducts, solid, liquid and gaseous emissions), and any recycling steps.
- The values derived for resource consumption and wastes generation should be compared to national (where they exist) and international benchmarks for each specific industry.
- Identify cleaner production opportunities and assess costs & benefits of each recommended measure. This assessment should cover technical feasibility (effect on production, availability of technology & suppliers, any perceived risks, etc), financial viability (investment required, operation & maintenance costs, economic savings, etc), and expected environmental benefits (GHGs emissions reductions, water savings, etc).

- c. Respond to queries as may be raised by the consultant and / or any related agency during the course of execution of the tasks.
- d. Participate in project meetings as and when required.
- 3) The consultant shall coordinate with other consultants (to be hired by SIDBI / BEE under the overall project) and extend cooperation to them as may be required from time to time.
- 4) All the tasks as outlined above shall be completed within 09 months from date of award of the contract.
- 5) The cumulative target for achieving EE investment potential and corresponding emission reduction (in tCO<sub>2</sub>) shall be decided by the client from time to time considering the need of the project / assignment.

### DELIVERABLES & EXPECTED TIMELINES

S. No.	Deliverables	Expected Timelines*
1	Meeting with SIDBI to discuss and finalize the work plan for implementation of the project for next 03 months and Submission of the same	2 Weeks
2	Conducting Detailed Energy Audits	From 1 <sup>st</sup> month to 6 <sup>th</sup> month
3	Submission of atleast 25 Investment Grade Detailed Project Reports (IGDPRs) to SIDBI.	
4	Providing Implementation support for implementation of the Possible improvement measures recommended in the IGDPRs and submission of Implementation Completion Reports for atleast 20 MSME units and also facilitate to arrange loans for MSME units from SIDBI / any other local banks, if so required and desired by the MSME units	From 3 <sup>rd</sup> month to 9 <sup>th</sup> month
5	Progress Reports	Monthly
6	Project Completion Report	Within 2 week upon completion of contract

\*From the date of award of contract.

### COUNTERPART FACILITIES

The project would help the consultant with introduction to the local IA. The project shall arrange to send the introductory letter to the IAs explaining the role of the consultant to facilitate the whole project and shall participate in initial project launch activities.


### SCHEDULE

The assignment will be for 09 months (starting on **July 28, 2015** and ending on **April 30, 2016**) and shall be subject to annual review.


### REPORTING ARRANGEMENTS

- The consultant shall report to the Deputy General Manager, SIDBI.
- The consultant shall be responsible for providing periodic reports, including but not limited to the achievements/shortfalls, revised schedules and lessons learnt to SIDBI to the satisfaction of SIDBI. SIDBI shall periodically assess the execution of the assignment. On being found

*Rajiv Kumar*



*Rajiv Kumar*






**ANNEXURE B****Consultant's Personnel**

<b>Name</b>	<b>Educational Qualification</b>	<b>Experience (No. of Years)</b>	<b>Area of Expertise</b>
Pawan Kumar Tiwari, Team Leader	B.E (E&C), RGPV Bhopal, 2002  M. Tech (Energy Management), School of Energy and Environment Study, DAVV Indore, 2006  Certification on "Small Group Activities (SGA) and Total Energy Management (TEM) in SMEs" by ECCJ, Tokyo (Japan), 2010  Certification on Energy Efficiency Techniques in Indian SMEs, JICA Japan, 2011  Certification on Emission Trading System: Using Market to Promote Low Emission Development, 2014	11 Years	Have lead the various national & international projects in the field of Energy Efficiency/Power/Clea ner Production/Lean Manufacturing.
Ayan Shubhro Ganguly, Energy Auditor	B.Tech (Electrical) – Nagpur University, 2008  M. Tech (Energy Management), School of Energy and Environment Study, DAVV Indore, 2011	7 Years	Conducting Walk- through audits, detailed energy audits, preparation of DPR, Vendor identification document, Energy Assessment Studies, for various EE projects
Sumit Sharma, Lean Manufacturing and Cleaner Production Expert	B.E. (Environment), Delhi College of Engineering, 2002  M. Tech. (Energy & Environmental Management), IIT, Delhi, 2006	11 Years	Conducting Lean Manufacturing & Cleaner Production assessment study and implementation support
Upinder Singh Dhingra, Finance Specialist	B.Com (Honors in Business Finance & Accounting), Punjab University, Chandigarh, 2007  MBA (Finance & Marketing) - Punjab Technical University, 2009	6 Years	Project Structuring, Project Financing

**All the team members proposed for the assignment need to be available for the entire duration of the assignment and substitutions shall be allowed only with prior approval of SIDBI**

*Dajivkumar*



*[Signature]*



No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi – 110 003.

Dated: 20<sup>th</sup> May, 2016.

### ORDER

Sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the implementation of the Project proposal entitled "Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*" by Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 at a total cost of Rs. 88.00 lakhs (Rupees Eighty eight Lakhs only) as a part of his Ramalingaswami Fellowship 2014-15 w.e.f. 1<sup>st</sup> February, 2016 on the terms and conditions detailed as per under:-

#### 2.0 The Project

2.1 Project Title: "Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*."

#### 2.2 Investigator

Name of the Awardee : Dr. Chaithanya Madhurantakam  
Assistant Professor  
Department of Biotechnology  
TERI University, 10, Institutional Area,  
Vasant Kunj, New Delhi-110070

#### Objectives

1. Crystal structure determination of MmaA1 methyl transferase.
2. Structure based inhibitor design against MmaA1

#### 2.3 Time Schedule

The duration of the fellowship is 5 years w.e.f. 1<sup>st</sup> February, 2016.

#### 2.4 Fellowship Amount

		(Rs. in Lakhs)					
		1 <sup>st</sup> Yr.	2 <sup>nd</sup> Yr.	3 <sup>rd</sup> Yr.	4 <sup>th</sup> Yr.	5 <sup>th</sup> Yr.	Total
Fellowship@	Rs.85,000/ p.m	10.20	10.20	10.20	10.20	10.20	51.00
(consolidated)							
Research/Contingency grant		10.00	7.50	5.00	5.00	5.00	32.50
HRA @ Rs. 7,500 p.m. consolidated		0.90	0.90	0.90	0.90	0.90	4.50
<b>Total</b>		<b>21.10</b>	<b>18.60</b>	<b>16.10</b>	<b>16.10</b>	<b>16.10</b>	<b>88.00</b>

2.5 The contingency/research grant may be utilized for the purchase of consumables, minor equipment, international and domestic travel, engaging manpower and other contingent expenditure to be incurred in connection with the implementation of the project.

- a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
- b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement



shall be limited to the IIRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.

4. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.

5. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

6. **Budget Head**

The expenditure involved is debitable to

Demand No. 79

3425

3425.60

3425.60.200

3425.60.200.29

3425.60.200.29.17

3525.60.200.29.17.31

**Department of Biotechnology**

Other Scientific Research (2016-2017)

Other (Sub Major Head)

Assistance to other Scientific Bodies (Minor Head)

Biotechnology Research and Development

Assistance for Research and Development

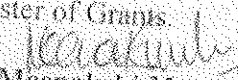
Grants-in-aid General

7. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.

8. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070 is requested to furnish to this Department 'Utilization Certificate' and an audited 'Statement of Expenditure' at the end of the year.

9. This issues under the powers delegated to this Department and with the concurrence of IFD vide their SAN No. 102/IFD/SAN/738/2016-17 dated:20-5-2016.

10. This sanction order has been noted at Serial No. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'



No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi - 110 003.

Dated: 20<sup>th</sup> May 2016.

**ORDER**

In continuation of this Department's sanction order of even number dated: 20<sup>th</sup> May, 2016 sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the release of an amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** to The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 being the first installment of Ramalingaswami Re-entry Fellowship (2014-15) awarded to Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 for the implementation of the project proposal entitled "**Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*.**" as per the details given below:-

**Fellowship Amount**

(Rs. in Lakhs)

S.No.	Head	Released Amount*
1.	Fellowship	10.20 @ Rs.85,000/ p.m (consolidated)
2.	Contingency/Research Grant	10.00
3.	HRA	0.90 Rs. 7,500/- p.m consolidated
	<b>Total</b>	<b>21.10</b>

\* **The release is made under recurring heads**

2. The other terms and conditions of the grant shall remain unaltered.
3. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.
4. It is certified that this being the first release no UC/SE pertaining to grants released under this programme is pending with the institute.
5.
  - a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
  - b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement shall be limited to the HRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.
6. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.
7. The amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** will be drawn by Drawing and Disbursing Officer, DBT from the Pay and Accounts Officer, DBT and disbursed to **The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070** and disbursed through RTGS as per following details.

**BANK ACCOUNT DETAILS**

(i) Bank Name	:	STATE BANK OF Hyderabad
(ii) Bank Account No.	:	52142908571
(iii) IFSC Code	:	SBHY0020511
(iv) 9 digit MICR Code	:	110004005

8. As per Rule 211 (1) of GFR, the Accounts of all grantee institution shall be open to inspection by the sanctioning authority/ audit, whenever the institution is called upon to do so.

9. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

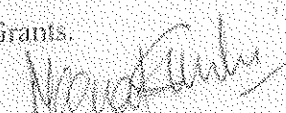
**10. Budget Head**

The expenditure involved is debitable to

Demand No.79	:	<b>Department of Biotechnology</b>
3425	:	Other Scientific Research (2016-2017)
3425.60	:	Other (Sub Major Head)
3425.60.200	:	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	:	Biotechnology Research and Development
3425.60.200.29.17	:	Assistance for Research and Development
3425.60.200.29.17.31	:	Grants-in-aid General

11. This issue under the powers delegated to this Department and with the concurrence of IFD vides their SAN No. 102/IFD/SAN/739/2016-17 dated:20-5-2016.

12. This sanction has been noted at serial no. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi-110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaitanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'





**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाइट/ Website : www.pcra.org



दिनांक 25/01/2017

संख्या: पीसीआरए/अनु.एवंविकास/78

रजिस्ट्रार - टीईआरआई यूनीवर्सिटी  
 प्लॉट संख्या 10, इन्स्टीट्यूसनल एरिया  
 वसंत कुंज  
 नई दिल्ली - 110 070

**विषय: प्रस्तावित परियोजना का अनुदान पत्र**

महोदय,  
 हमें आपके द्वारा प्रस्तावित अनुसंधान एवं विकास परियोजना "हवा भाप गैसीकरण के माध्यम से हाइड्रोजन संवर्धन द्वारा पूरित डाउन-ड्राफ्ट बायोमास गैसीफायर प्रणाली का डिजाइन, विकास और परीक्षण" (Design, development and testing of a down draft gasifier system completed by hydrogen enrichment thru air stream gasification) जो 80<sup>वीं</sup> स्क्रीनिंग कमिटी मीटिंग (एस.सी.एम) में अनुमोदित की गई है, हेतु अनुदान सहायता की स्वीकृति करने में प्रसन्नता हो रही है।

परियोजना का अनुदान स्वीकृति पत्र और उसकी एक प्रति इस पत्र के साथ संलग्न है। आप द्वारा स्वीकृति के रूप में संलग्न प्रति के प्रत्येक पृष्ठ पर परियोजना- प्रभारी/प्रधान अन्वेषक द्वारा हस्ताक्षर करके वापिस पीसीआरए को भिजवाने की कृपा करें।

धन्यवाद,

भवदीय

सुरेन्द्र प्रताप

निदेशक अनु. एवं विकास

पेट्रोलियम संरक्षण अनुसंधान संघ


*Singh*





**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



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		Rev. No. : 01
		Eff. Date: 15th Oct 2013

Ref. No.: PCRA/R&D/78

Date: 25/01/2017  
 25/01/2017

Kind Attn.: Dr. Priyanka Kaushal  
 Assistant Professor,  
 Department of Energy and Environment  
 TERI University (TU)  
 New Delhi - 110070

**Subject: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Dear Madam,

Please refer to the subject project proposal submitted by you to PCRA for grant-in-aid. The 80<sup>th</sup> Screening Committee in its meeting held on 15.02.2016 had technically approved the proposal with the following comments:

1. TU to submit a revised proposal reducing the manpower cost.
2. The revised proposal to clearly mention total project cost, contribution sought from PCRA, institution contribution and industry contribution.
3. Contractual manpower should not be more than two personnel.

Based on your revised proposal of March 11, 2016, complying the above requirements, we are pleased to convey approval of PCRA for grant in aid to TERI University (TU) to undertake the project titled "Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification".

- 1 PCRA will provide a total grant of Rs 21.78 lakhs. (Rs. Twenty One Lakh Seventy Eight Thousnd only) in instalments. No cost escalation will be allowed.

The head wise / item wise break up of the sanctioned amount from PCRA is enclosed in Annexure - D.

- 2 First instalment of grant-in-aid of Rs 5,44,500/- (Rs. Five Lakh Forty Four Thousand Five Hundred only) (less TDS, if applicable) will be released initially against your invoice.
- 3 You will be required to ensure completion of project within thirty months. Tenure of project will be calculated from the date of release of first instalment of grant-in-aid.
- 4 The terms and conditions for award of grant for the project are enclosed as Annex-A.

- 5 The final project details is attached as Annex-B & the physical and financial milestones along with target dates is enclosed as Annex-C.
- 6 We are sending herewith two copies of this letter in original. Please sign the duplicate copy and return it to us as a token of acceptance of the project with the above terms and conditions.

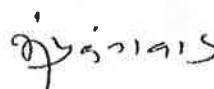
Kindly arrange to send the following for release of 1st instalment advance grant-in-aid :

- i. Signed duplicate copy as acceptance of the terms and conditions.
- ii. Invoice for 1st instalment amount.
- iii. RTGS / NEFT details for e-payment in PCRA format (available in PCRA website).
- iv. Certified copy of PAN issued by Income Tax Department.
- v. TDS exemption certificate from IT Dept., if applicable.

In case of change in Project-in-charge, for any reason, necessary prior information to be provided to PCRA.

Thanking you,

Yours faithfully.




M P Bangwal

Additional Director (R&D)

Petroleum Conservation Research Association (PCRA)



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Annexure - A

### TERMS & CONDITIONS

1. Periodic progress reports and expenditure statements in respect of above project against PCRA share shall be submitted to PCRA on quarterly basis without fail. Please note that these documents must reach PCRA office within 30 days on completion of each quarter. The progress report should clearly indicate targets mentioned in Annexure – C as completed / in progress / yet to take off.
2. In addition, details of institution contribution, if any, for the project, to be mentioned in the periodic expenditure statements separately.
3. Subsequent payments of instalments will be released as per Annexure – C attached on receipt of progress report & expenditure statements. However, the last 10% of the PCRA grant shall be released on submission and acceptance of final report. Tax deduction at source will be made as per the provisions of the Income Tax Act. If your organization is exempted from TDS, please submit valid certificate from IT authorities before or at the time of raising invoice. The institution has to return back the amount left unutilized out of total released amount, if any, after completion of project. TDS amount deducted, if any, will be considered as released amount to the institution. Institution may claim for the TDS deduction certificate, if any TDS is deducted.
4. Please note that the interest earned by your institute / organization on the funds sanctioned and paid by PCRA will be treated as amount paid by PCRA and must be shown as such in the accounts of the project. Also the interest earned on such amount should be reported regularly to PCRA.
5. The institute will prepare one film of about 10-15 minutes and a brochure within the above PCRA grant for dissemination of project findings for the benefit of masses.
6. PCRA reserves the right to seek any information/visit the actual site/laboratory at any point of time. A team of PCRA / member of screening committee and the institute officials may review the status of the project from time to time. One of our officials may also associate with the project as co-investigator at the discretion of PCRA. Nomination, if any, may be indicated later on.
7. You will submit draft technical completion report regarding the project to PCRA (one hard copy and one soft copy) within one month of completion of the project. The report should contain all relevant data, designs, detailed drawings, bills of materials, vendors for each item, approximate cost of each item, operation and maintenance procedures etc. as applicable.

*Swigant*






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8. Also you will be required to make a presentation about the project work to the Screening Committee of PCRA for its review, comments and approval of the project, upon completion of project and submission of draft completion report. After incorporating comments of the Screening Committee of PCRA, if any, in the draft report, final technical report (both hard and soft copy) will be submitted to PCRA within one month of the date of Screening Committee meeting.
9. For commercialization / popularization of the technology, you may organize a meeting with the help of PCRA and make a detailed presentation / hold discussions with them about the new technology.
10. You will send the report to relevant agencies who can take corrective actions based on finding of the report along with your recommendation, under intimation to PCRA.
11. On completion of the project, R&D institute & PCRA would pass on the technology and assist in implementing the project who may desire to use the technology at their own cost. However, in case any revenues are generated this should be shared equally with PCRA. Technology transfer fee, license fee and royalty if any shall be equally shared between PCRA & the institute. Quantum of such fee to be approved by PCRA.
12. In the draft technical completion report, following shall be indicated by the research institute:
  - i. Energy already saved at the time of writing the report & value thereof in MTOE.
  - ii. Average Energy being saved per day at the time of writing report & value thereof.
  - iii. Estimate of energy saving in next one year & futuristic view
13. If any research paper/article is published in national or international magazine or journal etc, it shall be in the joint name with PCRA & only after obtaining written consent of PCRA.
14. If any application is to be made for receiving any award or any award is to be received based on this work, it shall be in joint name with PCRA & with the written consent of PCRA.
15. CA audited head wise expenses for annual expenditure statement (clearly indicating actual expenses incurred against PCRA grant issued / to be issued and also clearly indicating any advance paid for future job / future material supply for the project against PCRA grant issued / to be issued) and CA audited annual utilisation certificate incurred up to 31st March of each financial year shall be submitted by 30th April to PCRA. CA audited accounts means the accounts audited by authorized chartered accountant / statutory auditors and not by internal auditors or accounts heads. Audited statement should accompany copies of documentary evidence of any work order issued and Invoice / bill specially for capital & high value items. Because expenses statement also shall be submitted to PCRA immediately after completion of the project followed by

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audited accounts. In addition, proof of beneficiary contribution for the project, if any, duly audited by Chartered Accounts and verified by Research Institutes are required to be provided to PCRA in respect of each beneficiary.

16. The Institute will maintain separate audited accounts for the project. The accounts of the grantee institution will be open to inspection by the sanctioning authority / audit whenever the institution is called upon to do so.

17. If expenditure statement and utilization certificate against the project is not audited by CA because of audit by CAG, then documentary proof of audit by CAG to be submitted to PCRA by 30<sup>th</sup> April for previous financial year up to 31<sup>st</sup> March and internal audited statement as per clause 14 above to be submitted.

18. For individual capital items procured from PCRA grant-in-aid for above Rs. five lakhs, if the Research Institute sells the items before 5 years after completion of the project, the realization value (sale proceeds) will be paid back to PCRA.

*Singhania*

## Project Proposal

*Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification resulting in substantial improvement in the efficiency of the gas engine.*

*Dr. Priyanka Kaushal  
TERI University, Delhi*

*Date: March 11<sup>th</sup>, 2016*

*Priyanka*



**Title of the project:**

Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the efficiency of the gas engine.

**Name of the Institution with address and contact nos.:**

Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070  
Phone: 011 2612 2222, Fax: +91 11 26122874

**Name of Project-in-charge with designation:**

Dr Priyanka Kaushal, Assistant Professor  
Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070  
Phone: 011 2612 2222, Fax: +91 11 26122874  
Email: priyanka.kaushal@teriuniversity.ac.in

N K Ram, Research scholar, Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070

Phone: 011 2612 2222, Fax: +91 11 26122874

&

Fellow, Biomass Energy Technology Applications,  
Energy, Environment and Technology division

The Energy and Resources Institute TERI, India Habitat Centre, Lodhi Road, New Delhi 110003, Phone:  
+91-11-24682100, Fax: +91-11-24682145  
Email: nkram@teri.res.in

**Objectives of the project:**

The overall objective of the project is "To arrive at a design configuration and testing of biomass based down draft gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the conversion efficiency of the natural gas engine.

**The specific objectives of the project are:**

- To come up with a design configuration and development of a woody biomass based down draft biomass gasifier systems to produce a clean combustible gas (suitable for engine applications) and customizing the reactor for a specific rated capacity.
- To integrate air-steam gasification system and optimizing the reactor design in order to maximize the calorific value of the producer gas and minimize the impurities such as tar and particulate matter. Air steam gasification is chosen with a purpose to enhance the (engine) efficiency.
- To develop a complete package which includes simple cleaning and cooling components connected to an internal combustion engine coupled (to replace diesel) with an alternator
- To analyse the gas quality, i.e. tar and particulate matter, System optimization for reduction of impurities (tar and particulate matter), Testing the overall performance of the system with an engine, Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.

*Singh*

- Overall performance analysis of the reactor

#### Background and scope of work:

Globally 1.3 billion people are without access to electricity, 84 % of these people live in rural areas. In India about 289 million of people, account for 25 % population don't have access to electricity [1]. In the past six decades, India's energy need was increased 16 times and the installed electricity capacity by 84 times [2]. With the economy projected to grow at 8 % to 9 % per annum and the improving standards of millions of population, the energy demand is likely to grow significantly. Biomass is a potential renewable source for power generation [3]. Biomass gasification is one of the potential options for decentralized and distributed generation (DDG) of electricity [4]. Electricity generation through biomass combustion and gasification was considered as a potential source to meet the rural energy needs [5]. Deployment of biomass gasification technology can address three specific issues for the growth they are efficient utilization of local energy resources, creating employment opportunities for local community and to strengthen the local economy [6]. In specific the scenario in the island states such as A&N Islands which largely depends on Diesel fuel to meet their electricity needs. Diesel power accounts for 94% of the total power generation while remaining 6% is met through Hydel and Solar power generation. The cost of power generation through diesel based power plants are to the tune of 20 Rs/kWh which is highly expensive. In order to mitigate the use of diesel in the existing power plants, biomass provides can provide an alternate cheaper option which indeed is also available in abundance on the islands.

According to a study, the estimated potential availability is 5 MW, 2 MW & 1.5 MW of Agro fuel based power generation at South Andaman, Little Andaman and Car Nicobar respectively. It was observed that coconut is one of the main plantations and according to estimates 280 million nuts processed in the copra processing units annually. The potential for power generation from coconut shell is estimated as 4 MW generation capacities through Bio Mass using Coconut waste, etc., in South Andaman 2 MW generation capacity through Biomass in Little Andaman, 1.5 MW generation capacities through Biomass in Car Nicobar. Apart from coconut shell other loose biomass such as coir pith, Lantana (a Weed), rice husk and other forestry residues are available in abundance.

Lack of efficient biomass conversion technologies to generate electricity through gasification route has resulted in under utilization of the availability of bio-resources. To utilize these resources, in the existing designs of gasifier which indeed resulted in technical challenges. Usage of low bulk density fuel would result in chocking of fuel flow inside the reactor, resulting in intermittent gas production, High tar & dust content in the producer gas. Since in traditional downdraft gasifier are designed for certain bulk density of the fuel. In view of this there exists an opportunity to come up with a design configuration with two stage biomass gasifier concept to adopt the variety of biomass for power generation purpose. Also, hydrogen enrichment in the producer through air, steam gasification would contribute to improvement in the volumetric and overall efficiency of energy conversion. Development of such reliable technology package indeed enable adoption of decentralized, distributed generation power generation through biomass in A&N islands.

#### Background of the research carried out so far by the organization/other organizations in India.

Several premier institutions and research labs such as the Indian institute of science, Bangalore, Indian Institute, Anna university, National Institute of Technology, agricultural universities, across India are engaged in the development of biomass gasifier systems for power generation, hydrogen enrichment through steam gasification as well as development of thermal gasifiers to meet the process heat requirements in the industry. Relevant recent research work carried out by these organisations in the area of biomass gasification is summarised in the following section.

*Surya*

Anji reddy Bhavanam and R. C. Sastry reviewed various aspects of the research and development in biomass gasification in downdraft fixed bed reactors like advances in downdraft gasification systems, and the effect of various parameters like equivalence ratio, operating temperature, moisture content, superficial velocity, gasifying agents, residence time on the composition of producer gas, yield and conversion. Khardiwar et al experimented with gasification of agriculture residues, where soyabean, pigeon pea and their mix was briquetted for feeding. Using air gasification, the conversion efficiency obtained was maximum for soybean briquette of 56%, with the average Low Heating Value of producer gas reaching  $4.4 \text{ MJ/m}^3$ . Hydrogen composition of the producer gas obtained reached a maximum of 16.1% for pigeon pea briquette, where the LHV of gas was  $4.57 \text{ MJ/m}^3$  and flame temperatures was  $634^\circ\text{C}$ . These values showed promising results for replacement of agro-residues based biomass with wood and coal.

Abeenash V.N. and E. Natarajan investigated air and steam gasification and compared the results obtained from both methods. Initially, with air gasification the  $\text{H}_2$  yield obtained was around 25%, but drastically increased to 55% when steam was introduced. The range of temperature corresponding to maximum  $\text{H}_2$  was between  $700\text{--}800^\circ\text{C}$ . With sawdust as feed, the LHV of gas with a gasification air ratio of 0.2 was approximately  $8 \text{ MJ/m}^3$  and with a steam ratio of 0.2, it increased to  $11 \text{ MJ/m}^3$ .

K. Sandeep and S. Dasappa experimented with an open-top downdraft biomass gasifier developed at IISc Bengaluru, implementing Oxy-steam gasification and evaluating the performance characteristics using parameters such as Equivalence Ratio (ER), Steam Biomass Ratio (SBR) and fuel moisture content. The hydrogen percentage in the gas increases within SBR. The feed was dry Casuarina wood. The highest  $\text{H}_2$  yield of 51.7% was obtained at an SBR in 2.5 with gas LHV at  $7.5 \text{ MJ/m}^3$  and the ER takes a high value of 0.3. The gasification efficiency obtained was also high at 69.5%.

M. Campoy et al experimentally measured the gas composition for different steam-biomass and stoichiometric ratios. The procedure was carried out for Fluidized Bed Gasifier (FBG). About 8 kg of the bed material is loaded and the bed is subsequently heated with hot air and electric heater to  $700^\circ\text{C}$ . Biomass undergo complete oxidation under excess oxygen condition. A mixture of fuel air-steam is preheated to  $400^\circ\text{C}$  and fed into FBG. Biomass, air, steam and oxygen flow rates were variable parameters for the test, which was conducted in a maintained near adiabatic environment. A reported maximum of 27.5%  $\text{H}_2$  when S/B ratio is varied from 0 to 0.56 indicates a positive relationship. The gas yield obtained was around  $0.98 \text{ m}^3/\text{kg}$ , the Low Heating Value (LHV) was calculated to be  $8.84 \text{ MJ/m}^3$ , where the High Heating Value (HHV) of the fuel was  $17.1 \text{ MJ/kg}$ , resulting in a conversion efficiency of over 50% [12]. A variation from 19.7%  $\text{H}_2$  content to a maximum of 46.8%  $\text{H}_2$  has been reported [17].

Franco et al experimented similarly on Fluidized Bed Gasification with pine, holm-oak and eucalyptus as feed, with holm-oak having a High Heating Value of  $19.5 \text{ MJ/kg}$ . The reaction took place at around  $700\text{--}900^\circ\text{C}$  maintaining the free board temperature at  $750^\circ\text{C}$ . The steam-biomass ratio was varied from 0.4-0.85. The wood feed rate varied from  $5.7\text{--}11.5 \text{ g/min}$ , with emphasis on selecting particle size ranging from  $1250\text{--}2000 \mu\text{m}$  for reducing variations in mass flow rate. Furthermore, a rapid quenching system was employed to recover tars and condensable liquids from the product gas. Gas composition obtained contained around 42%  $\text{H}_2$ , 30%  $\text{CO}$ , 5%  $\text{CH}_4$  and a low  $\text{N}_2$  content of 7% [11].

*Srinivas*



Pine wood with a High Heating Value of 20.54 MJ/kg, used as feed material in self-heating downdraft gasifier delivers a 29.92% H<sub>2</sub> rich composition and only 1.57% inert N<sub>2</sub>, with the gas Low Heating Value reaches 9.39 MJ/m<sup>3</sup>. The setup comprising of a downdraft gasifier, air intake equipment, provisions for gas cleaning, blower, flow meters and off-gas burner formed the complete gasification system. The gasifier is 1.3 m in height with an internal diameter of 35 cm. An air pre-heater is arranged near the neck of the gasifier below which a novel steam generating device is placed that produces steam at 1 atm and 100-120 °C. Before gas sampling and measurements, spray towers with steel springs are employed for gas cleaning that reduce gas temperature to 30 °C and remove 80-90 weight % of tar. A flow meter measures the gas yield. The composition is analysed using Kechuang GC-9800T thermal conductivity detector (TCD) and hydrogen flame ionization detector (FID) [14]. On comparing compositions obtained from steam-air and air gasification, there is a visible difference, with the H<sub>2</sub> range lying between 11.81% and 15.2% [13] [16]. The difference between the average values of H<sub>2</sub> content in producer gas obtained by steam-air and air gasification in producer gas is around 18%, from which it is inferred that the former is a more effective gasification method. As a further consequence of this method, the producer gas obtained has less inert gas percentage, with as low as 1.57% of N<sub>2</sub> in some cases [15].

**Domestic fixed bed down draft design of biomass gasifier technology:** Downdraft biomass gasifier are preferred for engine applications over any other type of gasifiers. A line diagram of the general scheme of a fixed bed down draft woody biomass gasifier based power system, explaining the working arrangement is shown in Figure 1. In the traditional downdraft gasifier the hot combustible gas coming out the gasifier carries impurities such as particles and tar vapors, which needs to be cleaned in the cleaning train before supplied to the IC engine for power generation. Hence an exhaustive cooling and cleaning train which consists of a series of filters such as gravity filters, wet scrubbers, cyclone separators and bag house filters. A paper filter is used as a safety filter to ensure that the clean gas with permissible levels of tar and dust particulate supplied to the engine.

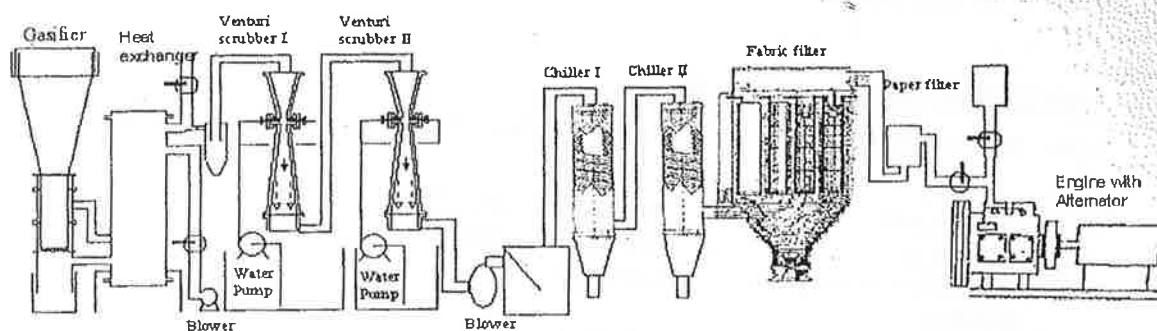


Figure 1: General scheme of biomass gasifier based power system

Past field experiences of biomass based distributed generation (DG) systems in the rural settings have not only established their benefits and technical viability, but had also helped in identifying the technological aspects where more work has to be done in order to make such systems more reliable and operator-friendly, such as:

- Biomass type and quality (Fixed bed design more sensitive to the bulk density of the fuel)
- Technology standardization and reliability testing (simple & rugged) to reduce downtime
- Continuous operation applications

- Waste water generation and disposal
- Scope to improve the engine efficiency through gas enrichment through steam air gasification route

In order to address the above mentioned points, TERI, subsequently engaged in evolving a design for two stage biomass gasifier design using wood as fuel. Thereafter TERI has now developed expertise & experience in developing wood based two-stage gasifier for power generation. The development of two stage gasifier system was done in collaboration with DTU and TERI. The design was evolved based picking up the silent features of DTU and TERI design of gasifiers, the two stage gasifier reactor produces clean producer gas, thus minimizing the need for maintenance and other day-to-day operational problems. This project thus, builds upon the past achievements of the TERI-SDC collaboration.

#### Description of the improved two stage biomass gasifier system

The two-staged process is characterized by having pyrolysis and gasification in separate reactors with an intermediate high-temperature tar-cracking zone. This allows for a very fine control of the process temperatures, resulting in extremely low tar concentrations in the producer gas. The line diagram and functional arrangement of the two stage gasifier system is shown in the figure 2. It is indeed evident from the figure that

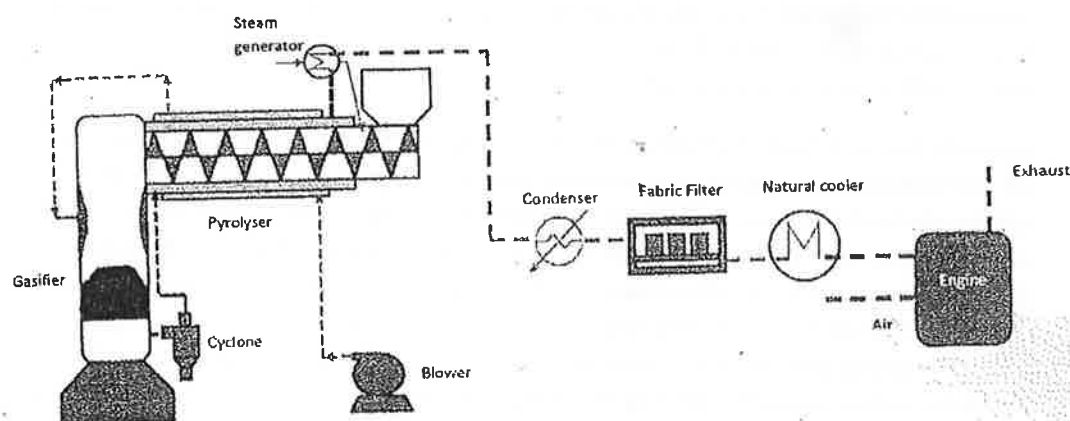


Figure 2: Two stage gasifier system

Table 1: Results of two stage gasifier system

S.No.	Key Parameters	Desirable Target
1	Tar (Raw gas)	Less than 25 mg/Nm <sup>3</sup>
2	Tar (Raw gas)	Less than 1 kg/kWh
3	Specific fuel consumption (kg/kWh)	Up to 30%
4	Input fuel moisture	Upto 2"
5	Fuel size	8-10%
6	Auxiliary electrical power	Without water scrubbing
7	Cooling cleaning system	Semi-automatic
8	Operational Controls	No

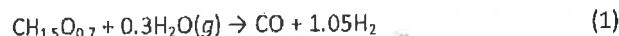
*Swiganka*

## i. Scope of Proposed work, brief description of

## a) Research, b) Trial run plans, c) Engineering and d) Design

Although many institutions across the globe engaged in gasifier technology development with an emphasis to improve the gas quality suit engine requirements and to make the system more reliable [8, 9]. In the past, most of the research work is largely focussed around reducing the impurities in the gas considering the economical long term operation of the engine. Since tar and particulate matter acts as a deterrent for engine performance, hence detrimental contaminants in the gas has to be minimised in order to reduce the operation and maintenance cost of the such power plants.

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained. In the air, steam gasification steam will react with carbon monoxide to produce hydrogen and carbon dioxide. The principle gas-phase reaction in the steam gasification system is the water gas-shift reaction:



Improving hydrogen content in the gas will improve the energy density. In addition, enriched hydrogen gas, which is indeed called as syngas open up more endues applications apart from efficiency improvement in the engine. They are

- Research opportunities such as hydrogen generation from biomass,
- Generation of liquid fuels from the syngas, which indeed can be compressed in a cylinder for use in automobiles
- Hydrogen enriches syngas can be used in hydrogen fuel cells
- Enriched syngas will open up Gas to liquid route generation of liquid fuels for automobile applications

The first and foremost step in order to open up these opportunities is to generate a hydrogen enriched producer gas that constitutes minimum impurities and high energy content. Considering the challenges confronted in the past i.e.

1. Low calorific value of the producer gas
2. Low engine efficiency resulting in de-rating of the engines
3. Impurities and the inert gases

This proposal was carefully carved to address the above mentioned challenges, with an objective to improve the resource use efficiency address each of the challenges mentioned above. The detailed approach adopted to overcome the challenges mentioned with a threefold strategy they are:

- Improving the energy density through steam gasification
- Higher adiabatic flame temperature
- Higher engine efficiencies (volumetric & overall efficiencies)

#### Energy density

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low



adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained.

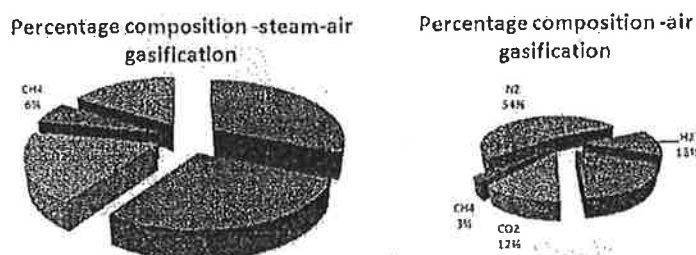


Figure 3: Comparison of inert gas percentages in steam-air and air gasification

Further authors tried to compile the gas composition using air, steam gasification in the table 2 below reported several authors. Careful analysis of the gas composition reported in the literature with air, steam gasification suggest that nitrogen content can be minimised to an extent of 1.57 % by volume to the current level of 50% by volume. This is due to the enrichment of hydrogen and Carbon monoxide composition in the producer gas from the current levels of  $H_2$  18% & CO 16% on a volume basis to  $H_2$  46.8 % & CO 20% on a volume basis. This also results in reduction of nitrogen since nitrogen is calculated by difference as illustrated in the table given below;

Table 2: Variations in the gas composition reported in the literature.

Reference	$H_2$	CO	$CO_2$	$CH_4$	$N_2$
M. Campoy et al [12]	27.5	28.5	14.6	7.7	21.7
Salami et al [7]	19.7	16.8	15.5	4	44
Franco et al[11]	42	30	16	5	7
Lv et al[6]	30	33	16	6	15
Subbaiah et al	23.8	18.46	23.5	4.07	30.17
Lv et al[15]	29.91	42.65	22.29	3.58	1.57
Lv et al [14]	30.81	39.26	17.41	8.2	4.32
Turn et al [17]	46.8	20.2	22.3	8.3	2.4

#### Adiabatic flame temperature

A comparison between steam-air and air oxidation can be drawn for inert gas percentage as well, where in the latter,  $N_2$  percentages are obtained as high as 64% against 44% maximum in steam-air oxidation. It is evident from this analysis theoretically there is a significant improvement in energy density in the volume of charge admitted into the engine cylinder which intern increase the adiabatic flame temperature and the power output from the engine. The calculations suggest that the energy content in the gas improves  $33.94 \text{ MJ/m}^3$  to  $61.01 \text{ MJ/m}^3$  which certainly is a significant improvement which is shown in the figure 5 given below.

*Signature*

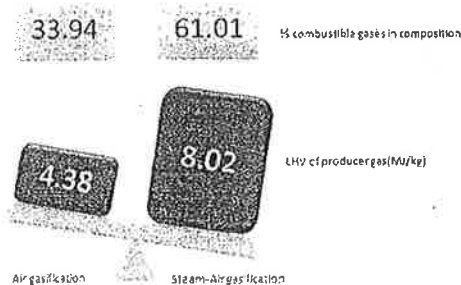


Figure 4: Effect of Combustible gas % in steam-air and air gasification

Subsequently, using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated from different observations. Figure 2 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature. Using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated for different observations. Figure 3 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature.

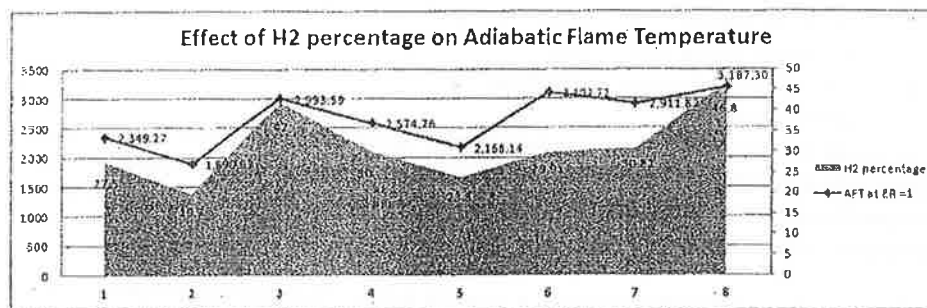


Figure 5: Effect of H2% on Adiabatic Flame Temperature °C

#### Engine performance

Using the Low Heating Value of producer gas thermal efficiency of the gas engine can be calculated. Other parameters include the capacity and performance characteristics of the engine. A three cylinder natural gas engine having a 3.8 L displacement running at 1500 RPM with an intake air fuel ratio of 1.3 produces a volumetric efficiency of around 0.8. Furthermore, the actual gas intake volume is calculated to be 0.0165 m<sup>3</sup>/s. The thermal power generated from producer gas with LHV of 8.84 MJ/m<sup>3</sup> is around 146.11 kW, which is further used to derive the mechanical power of the engine at 43.8 kW. For a cos phi rating of 0.814, the electric power in kVA is 35.68. The effect of higher gas LHV is observable on mechanical and electric power of the engine. Figure no displays the relationship for different observations.

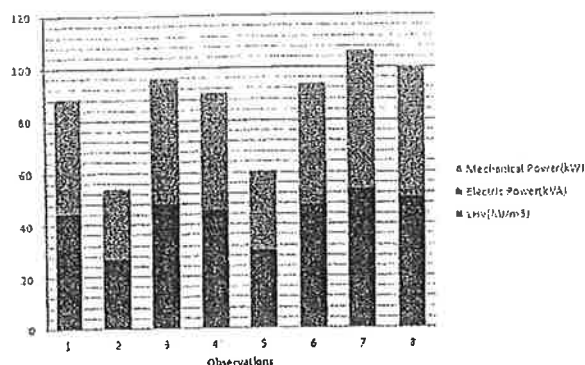


Figure 6: Influence of LHV on Mechanical and Electrical Power

#### Research Plan:

To create a baseline data with existing setup "Air and Steam Gasification". A research plan has been developed based on experimental study to assess biomass flow, combustion zone temperature, and air flow, CHNO analysis of biomass, gas composition, gas chromatography, tar content and calorific value.

Parametric analysis shall be conducted

- (I) Measure the effect on gas composition and quality by varying the influencing parameters such as Steam/air ratio,
- (II) Study the influence of residence time by varying the position of steam injection inside the reactor,
- (III) Effect of reactor bed temperature etc.
- (IV) Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
- (V) This study shall also provide insights into the utilization of waste heat streams for steam generation.

It is proposed to conduct the experiments at our facility at Gual Phari, The proposed test rig is equipped with essential instrumentation and control, such as an array of thermocouples along with micro-Gas Chromatograph (GC) and other gas analysis equipment which are essential for conducting the proposed study.

The effect of various influencing factors, i.e. Reactor temperature, steam to biomass ratio (S/B), equivalence ratio (ER) and biomass particle size of gas composition, gas yield, steam decomposition, low heating value (LHV) and carbon conversion efficiency of steam gasification shall be studied

*Srinivas*



6. Work Plan (should include stage wise detailed activities to be undertaken)

The proposed research shall be conducted in two steps, i.e.

**Step 1:** Is to introduce the steam injection into the first stage, also to optimize the steam injection point Integrate the steam generator into the existing system, the residence time and the utilization of the waste heat.

1. To optimize the steam, biomass ratio, residence time to optimize the hydrogen production in the producer gas. To conduct parametric studies by varying the steam, biomass ratio and observe the composition and calorific value of the gas.
2. To analyse the gas quality, i.e. tar and particulate matter in the producer gas at optimum hydrogen production and to if in case the tar and particulate matter is on the higher side efforts shall be taken to reduce the tar and particulate matter at the source.

**Step 2:** Is to develop a simple, clean and cooling cleaning system Integration of the complete package and testing the overall performance of the system.

1. This would involve the development of cleaning and cooling system, integration of the complete system with suitable rated engine.
2. The complete system shall be tested for its performance and also to quantify the efficiency improvement due to hydrogen enrichment.

**Step 3:** Testing, report writing, publication Mass balance, energy balance of the system to assess the performance of the system.

1. Study the influence of residence time by varying the position of steam Injection inside the reactor, Effect of reactor bed temperature etc.
2. Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
3. This study shall also provide insights into the utilization of waste heat streams for steam generation.
4. To report techno-economic and cost-benefit assessment of the hydrogen enrichment vis-à-vis without hydrogen enrichment.

*Singh*

7. Activity Time Schedule (Bar Chart indicating time duration required for completion of each of work plan stages/activities)

Time line	Time line 1 <sup>st</sup> year						Time line 1 <sup>st</sup> year						Time line 2 <sup>nd</sup> year						Time line 2 <sup>nd</sup> year					
Months	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Procurement of steam generator & integration with the system	■	■																						
To optimize the steam, biomass ratio, residence time to optimize the hydrogen production			■	■	■	■																		
To conduct parametric studies (variation/steam to biomass/ratio, gas; composition, calorific value etc.							■	■	■	■	■													
To analyse the gas quality, i.e. tar and particulate matter									■	■	■	■												
System optimization for reduction of impurities (tar and particulate matter)													■	■	■									
Procurement of at suitable engine Integration of the complete package. Testing the overall performance of the system with an engine																■	■	■						
Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.																			■	■	■	■	■	■
Comparative study with and without the hydrogen enrichment, techno-economic analysis highlighting benefits, Fuel saving and payback period etc																			■	■	■	■	■	■
Publications												■	■											■
Report writing																								■

**8. Expected benefits (quantitative and qualitative):**

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar islands for island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

**9. Likely potential end users with full address, mobile numbers, emails and applications:****10. Cost estimates:**

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital items	450000	150000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities			0	
v. Consultancy			0	
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

\*TERI University & TERI contribution is in kind that includes expenditure towards Infrastructure, building, Instrumentation, Test rig and manpower that includes Technicians and Interns (TERI University contribution)

*Singh*



11. Justification of the expenditure for additional:  
Budget for salaries/wages

Designation (number of persons)	Monthly emolument (person months)	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Research associate (1)	35000 (12)	420000	210000	840000
Research Assistant (1)	18000 (10)	432000	216000	648000
<b>Total</b>		<b>852000</b>	<b>426000</b>	<b>1278000</b>

Budget for permanent equipment

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Gasifier, blower and other associated system components (including accessories), their modifications in the field	350000	150000	600000
Steam generator and cleaning cooling system	100000	0	100000
<b>Total</b>	<b>450000</b>	<b>150000</b>	<b>600000</b>

Budget for consumable materials

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Fuel, hardware, spares etc.	50000	50000	100000

Budget for travel

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Travel	50,000	50,000	1,00,000

*Singh*

## Year wise break-up of funds for the project

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital Items	500000	200000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities				0
v. Consultancy				0
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

## 12. Who are the identified potential beneficiaries (By name, address &amp; telephone nos.)

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar Islands for Island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

## 13. How much is the proposing institute willing to contribute towards the project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work. The in-kind contribution from TERI, if quantified, it is around 1000,000 (10 Lakhs) rupees.

## 14. How much is the proposing institute willing to contribute towards beneficiaries.

The current proposal is a research, develop and demonstrate proposal hence during this phase of the project the question is not applicable.

15. By the time project completion report is submitted how much energy would have been actually saved.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy/fossil fuel saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

16. What is the value of such energy that would be saved till completion of the project.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

17. What are the existing equipment & instruments which proposing institute is going to utilize for the proposed project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work.

18. Confirm that detailed justification of manpower cost, i.e. nos. of man-days & rate of man-days are indicated.

Since the project involves product development which requires engagement of experienced staff in designing and experimentation. Details are given in page number 12.

19. Confirm that items, which are to be purchased, are listed with an estimated cost of each.

Yes. Details are given in page number 13.

20. Letters from at least two potential beneficiaries (with telephone nos, mobile nos, email) needs to be enclosed indicating their willingness to implement the outcome of the project in their premises. Sharing of cost, whatever may be agreed, also to be indicated.

NA



15



21. Out of the total cost of project, please indicate how much value of material is actually going to be used in the premises for energy Efficiency.

100% of the project cost is utilized for product development which has energy efficiency as co-benefit.

*Pringank*

**DECLARATION**

I hereby declare that

- i) I have not undertaken this project earlier with any other organization
- ii) I have not taken any financial help for this project from any other institution
- iii) In case of receipt of grant-in-aid from PCRA, financial help shall not be taken from any other govt. organization against this project.
- iv) Patent search is the responsibility of the institution.
- v) The research lab under this institution is recognized by Govt./DSIR.



Principal, Investigator Signature

Date March 7<sup>th</sup>, 2016

TERI University



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*Srinivasan*





**पीसीआरए**

## पेट्रोलियम संरक्षण अनुसंधान संघ PETROLEUM CONSERVATION RESEARCH ASSOCIATION

(तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
(MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)

दूरभाष/ Tel. : बोर्ड/ EPABX : 26198856 फैक्स/ Fax : 26109668  
ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



### Annexure - C

#### Physical & Financial Milestones for R&D

Project: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification

Sl No.	Target	Period (in month nos)		Amount to be released at the end of period upon completion of target.		
		From	To	PCRA (Rs. in lakhs)	Institute / Beneficiary (Rs. in lakhs)	Total (Rs. in lakhs)
1	At the beginning of the project	N.A.	N.A.	5.445	NA	
2	a) Procurement of Steam Generator & Integration with the system b) To optimize the steam, biomass ratio, residence time for Hydrogen production.	Start of project (0)	6			
3	a) To conduct parametric studies (variation/steam to biomass/rati, gas; composition, calorific value etc. b) To analyse the gas quality, i.e Tar and Particulate matters. c) Publications & report writing.	6	12	9.075	NA	
4	a) System optimization for reduction of impurities (Tar & Particulate Matters) b) Procurement of suitable engine integration of the complete package & testing of the overall performance of the	12	18	2.00	NA	

*Signature*

	system with an engine.					
5	a) Balance work of Procurement of suitable engine integration of the complete package & testing of the overall performance of the system with an engine on in 19 <sup>th</sup> Month. b) Performance analysis mass balance, energy balance efficiency improvement due to Hydrogen enrichment. c) Comparative studies with and without Hydrogen enrichment, techno-economic analysis highlighting benefits, fuel saving and Payback period etc. d) Publications & report writing	18	24	3.082	NA	
6	a) Presentation in SCM for approval of DCR, compliance of SC comments if any, submission of final completion report.	NA	NA	2.178	NA	2.178
TOTAL :				21.78	NA	21.78

Institute to return back the unutilized sanctioned amount, if any, after completion of project. Interest earned on sanctioned money, if any, will be considered as additional sanctioned money. TDS deducted amount, if any, will be considered as grant-in-aid. Amount will be released only after completion of target and utilization of previous installments with actual expenditure and committed / Tender raised / order placed values. Amount will be released only after expiry of period against the target.

*Singh*



**पी सी आर ए**

**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
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**Annexure - D**

**HEAD WISE PROJECT COST**

Sl. No	Activity	PCRA (Rs. in lakhs)	Industry / Beneficiary (Rs. in lakhs)	Institute (Rs. in lakhs)	Total (Rs. in lakhs)
1	Capital items	6.00	0	0	6.00
2	Chemical / Raw materials	1.00	0	0	1.00
3	Consumables	1.00	0	0	1.00
4	Utilities	0	0	0	0
5	Travel	1.00	0	0	1.00
6	Stationery	0	0	0	0
7	Manpower	12.78	0	0	12.78
8	Workshop / Seminar	0	0	0	0
9	Other research expenditure (Survey vehicles charges, driver charges etc.)	0	0	0	0
	<b>Total :</b>	<b>21.78</b>	<b>0</b>	<b>0</b>	<b>21.78</b>

*Signature*



**The Memorandum of Agreement entered into between the Water Resources Department, Government of Arunachal Pradesh and TERI University, New Delhi for the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh**

THIS AGREEMENT made on 18<sup>th</sup> day of May, 2017 between the Water Resources Department Government of Arunachal Pradesh and TERI University, a deemed to be University under section 3 of the UGC Act, 1956, having its registered office at Plot No. 10, Institutional Area, Vasant Kunj, New Delhi – 110070

TERI University hereby agrees to undertake the preparation of State Specific Action Plan for Water Sector – Arunachal Pradesh as per the requirements contained in the ToR (Annexure 1) for a total sum of Rs. 30,00,000 (Rupees Thirty Lakhs).

Both the parties agree to the following:

**1. Time Schedule:**

TERI University undertakes to complete the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh as per the following time schedule:

Stage	Time Frame
Stage I: Status Report on Water Resources, Availability, Development and Management	Six months from the date of signing of the MoU
Stage II: Preparation of Interim Report	Three Months from the date of submission of the Status Report on Water Resources, Availability, Development and Management
Stage III: Preparation of State Specific Action Plan	Three Months from the date of the submission of Interim Report

**2. Payment Terms and Schedule:**

The Water Resources Department, Government of Arunachal Pradesh agrees to pay TERI University a total amount of Rs. 30,00,000 (Rupees Thirty Lakh) for the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh. The payment will be released in three installments as per the following schedule:

Stage	Funds to be released
Stage: 1: On signing of the MoU	40% of the total amount (Rs. 12,00,000)
Stage 2: On submission of the Status Report on Water Resources, Availability, Development and Management	30% of the total amount (Rs. 9,00,000)

Stage 3: On submission of the Interim Report in presence of State Screening Committee with PPT	20% of the total amount (Rs. 6,00,000)
Stage 4 : Final Report submission	10% of the total amount (Rs. 300,000)

In addition, the Water Resources Department, Government of Arunachal Pradesh will facilitate and bear the cost of local lodging/boarding and local travel.

**3. Other Terms:**

The Water Resources Department, Government of Arunachal Pradesh will extend all help in collecting the relevant data needed for the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh from different government departments/statutory authorities and other institutions.

**4. Arbitration:**

All differences and disputes arising between the Water Resources Department, Government of Arunachal Pradesh, and TERI University on any matter connected with this Agreement or in regard to the interpretation of the contents thereof shall be referred to the sole arbitrator appointed jointly by the Chief Engineer (Western Zone), Water Resources Department, Government of Arunachal Pradesh and the Registrar, TERI University in accordance with the Arbitration and Conciliation Act, 1996.

( Er. L Angu )

Chief Engineer(W/Z)  
Water Resources Department  
Itanagar, Arunachal Pradesh

On behalf of Govt. of Arunachal Pradesh

Vinay Shanker Sinha  
18/05/2017

Dr. Vinay S.P. Sinha

Associate Professor  
TERI University  
Vasant Kunj, New Delhi

On behalf of TERI, University

FILE NO. PDF/2016/002385  
**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**  
(a statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 26-Jul-2017

**ORDER**

Subject: Financial Sanction under National Post-Doctoral Fellowship to **Ms. Aditi Jain**, under the mentorship of **Dr. Anandita Singh**, at **TERI University , Plot No. 10, Institutional Area, Vasant Kunj, New Delhi, Delhi-110070-** Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned fellowship at a total cost of **Rs. 19,20,000/- (Rs. Nineteen Lakh Twenty Thousand Only)** for a duration of 24 months.

The date of start of the fellowship will be **30 March, 2017**

The items of expenditure for which the total allocation of **Rs. 19,20,000/-** has been approved are given below:

Sl. No.	Budget Head	Amount
1.	Fellowship	Rs. 13,20,000 ( @55,000/- per month (consolidated))
2.	Research Grant	Rs. 2,00,000/- per annum
3.	Overheads	Rs. 1,00,000/- per annum

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 9,65,192/- (Rupees Nine Lakh Sixty Five Thousand One Hundred and Ninety Two only)** under 'Grants-in-aid General' to **TERI University, Plot No. 10, Institutional Area, Vasant Kunj** being the first installment of the grant for the year 2017-2018 for implementation of the said research project.

3. The expenditure involved is debitable to

**Fund for Science & Engineering Research (FSER)**

**This release is being made under National Post Doctoral Fellowship (N-PDF). (Life Sciences)**

4. The Sanction has been issued to with the approval of the competent authority vide Diary No. **SERB/F/3627/2017-2018** dated **25 July, 2017**

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

8. The release amount of **Rs. 9,65,192/- (Rupees Nine Lakh Sixty Five Thousand One Hundred and Ninety Two only)** will be drawn by the Finance & Budget Officer of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

Account Name	TERI University
Account Number	52142908571
Bank Name & Branch	State bank of India State bank of India, Scope complex, Pragati Vihar, ground floor, core 6 , scope complex, Lodi road, Delhi-110003
IFSC/RTGS Code	SBIN0020511
Email id of A/C Holder	pradeep.padhy@teriuniversity.ac.in
Email id of PI	imaditil1987@gmail.com
Email id of Mentor	asingh@teri.res.in



### 3.2.1.G.13.

9. The institute will furnish Utilization certificate(UCs) financial year wise to the SERB and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

10. The institute will maintain separate audited accounts for the fellowship. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.


11. The File no. **PDF/2016/002385** may also be mentioned in all research communications arising from the above project with due acknowledgement of **SERB**.

12. As this is the first grant for the fellowship, no previous U/C is required.

13. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "**FUND FOR SCIENCE AND ENGINEERING RESEARCH**" payable at New Delhi.

14. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.


15. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

  
(Dr. Thangaradjou T)  
Scientist E  
msls@serb.gov.in

To,  
Finance & Budget Officer  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<p><b>Ms. Aditi Jain</b> n.a TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 Email: imaditi1987@gmail.com Mobile: 919711736466</p> <p><b>Dr. Anandita Singh</b> Associate Professor Biotechnology TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 asingh@teri.res.in (Start date of the project may be intimated by name to the undersigned. For guidance, terms &amp; Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a>.)</p>
5.	<p><b>Registrar,</b> TERI University, Plot No. 10, Institutional Area, Vasant Kunj</p> <p>(Receipt of Grant may be intimated by name to the undersigned)</p>

  
(Dr. Thangaradjou T)  
Scientist E  
msls@serb.gov.in

**No. BT/PR17441/BPA/118/191/2016**  
GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY

Block 2, 6-8th Floors  
CGO Complex, Lodhi Road,  
New Delhi- 110 003  
Dated: 27/01/2018

**ORDER**

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled: "**Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection**" for a period of 3 Year 0 Month at a total cost of Rs. **6757400** (Rupees Sixty Seven Lakhs Fifty Seven Thousand Four Hundred Only) on the terms and conditions detailed here under:-

**2 The Project :**

**2.1 Title :** "Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection"

**2.2 Details of the Investigators:**

**Dr. Shashi Bhushan Tripathi**  
Associate Professor  
Department of Biotechnology  
TERI School of Advanced Studies  
10 Institutional Area, Vasant Kunj,  
New Delhi, Delhi, 110070

**CO-PI:**

**Dr. Madan Singh Negi**  
Fellow  
Biotechnology and Management of Bioresources  
The Energy And Resources Institute, New Delhi  
IHC Complex, Lodhi Road, New Delhi - 110003, Delhi

**2.3 Objectives:**

1. To evaluate different Bhut Jolokia accessions for their restoration ability
2. To transfer male sterile (S) cytoplasm from CMS line, CCA-4261, to Bhut Jolokia to develop a CMS line with genotype S/rfrf
3. To Transfer of rf allele from CCA-4261 to Bhut Jolokia to develop the maintainer line with genotype s/rfrf
4. To transfer the Rf allele from Pusa Jwala to Bhut Jolokia to develop a restorer line with genotype s/RfRf



**2.4 Time Schedule:**

The duration of the project is 3 Year 0 Month from the date of this sanction order.

**2.5 Project Cost:**

The total cost of the project is Rs. **6757400/-** (Rupees Sixty Seven Lakhs Fifty Seven Thousand Four Hundred Only) as per details given below :

Budget Head	Year I	Year II	Year III	Total (Rs.)
Equipment	467000.00			<b>467000.00</b>
Manpower	916800.00	916800.00	916800.00	<b>2750400.00</b>
Travel	30000.00	30000.00	30000.00	<b>90000.00</b>
Consumables	1000000.00	1000000.00	1000000.00	<b>3000000.00</b>
Contingency	50000.00	50000.00	50000.00	<b>150000.00</b>
Overhead	100000.00	100000.00	100000.00	<b>300000.00</b>
<b>Total (Rs.)</b>	<b>2563800.00</b>	<b>2096800.00</b>	<b>2096800.00</b>	<b>6757400.00</b>

**2.6 Equipment:**

The details of the equipment sanctioned for the implementation of the project at **Annexure-I**

**2.7 Manpower:**

The details of the manpower sanctioned for the implementation of the project at **Annexure-II**

**3. Head of Account:**

The **Non-Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
<b>3425</b>	Other Scientific Research 2017-2018
<b>3425.60</b>	Others (Sub Major Head)
<b>3425.60.200</b>	Assistance to other Scientific Bodies (Minor Head)
<b>3425.60.200.29</b>	Biotechnology Research and Development, Human Resource Development, Research Resources and Facilities
<b>3425.60.200.29.17</b>	Assistance for Research and Development
<b>3425.60.200.29.17.35</b>	Grants for creation of capital assets



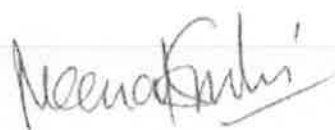
The **Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2017-2018
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development, Human Resource Development, Research Resources and Facilities
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.31	Grants-in-aid General


#### 4. Terms & Conditions:

Considering the time bound nature of the project, the project will be monitored by the Task Force /Committee constituted by DBT. IN addition, the PI will submit half yearly progress report as per format in Annexure-V

- 4.1 The other terms and conditions governing this sanction are attached at Annexure- III.
- 4.2A Memorandum of Agreement (MoA) will be signed between the Department of Biotechnology and the grantee institution on Non-Judicial stamp paper Rs. 100/- in the enclosed format and the second release/installment will be made only after signing of MoA by the grantee institutions and its acceptance by DBT. In case of NGO or Private Institution, MOA signed is mandatory first release. A format of the MoA is enclosed in Annexure-IV
- 4.3The Institute/Agency will keep the whole of the grant in a Bank Account earning interest, and the interest so earned should be reported to DBT in the Utilisation Certificate and Statement of Expenditure. The Interest so earned will be treated as created to the institute/Agency and shall be adjusted towards further installment of the grant and or at the time of Final Settlement of Accounts.
- 5.No International Travel will be undertaken from the sanctioned project grant unless specified otherwise.
- 6.The Registrar, TERI School of Advanced Studies, New Delhi, Delhi would be responsible for submission of Statements of Expenditure (SoE), utilization certificates (UC), Assets Certificates, Manpower staffing & expenditure details in prescribed DBT formats to DBT in respect of grants released in this project from time to time.
- 7.PI's of DBT sponsored projects can consider appointment of JRF from Category-II merit list of DBT-BET exam so that candidates can be paid fellowships at par with NET/GATE/BET qualified candidates as per DST OM No. A.SR/S9/Z-09/2012 dated on 21 Oct 2014. However, there is no compulsion on PI's to select candidates for JRF in their projects from Category-II of DBT-BET.
- 8.As per Rule 236 (1) of GFR 2017, the accounts of all Grantee Institutions or Organisations shall be open to inspection by the sanctioning authority and audit, both by the Comptroller and Auditor General of India under the provision of CAG(DPC) Act 1971 and internal audit by the Principal Accounts Office of the Ministry or Department, whenever the Institution or Organisation is called upon to do so.




- 9.If the Research Project involves biological resource, the obligations under the Biological Diversity Act 2002 as applicable shall be complied with by the Project Investigator, the details of such obligations can be accessed at [www.nbaindia.org](http://www.nbaindia.org)
- 10.This issues under the power delegated to this Department and with the concurrence of IFD vide their SAN No.**102/IFD/SAN/4045/2017-2018** dated **January, 24 2018**.
- 11.This sanction order has been noted at serial no. 126 in the Register of Grants.

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

To,  
The Pay & Accounts Officer,  
Department of Biotechnology,  
New Delhi - 110 003.


**Copy to:**

- 1 The Principal Director of Audit (Scientific Departments), DACR Building, New Delhi- 110 002.
- 2 The Registrar, TERI School of Advanced Studies, Plot No-10, Institutional Area, Vasant Kunj, New Delhi - 110070, Delhi
- 3 Dr. Madan Singh Negi, Fellow, Biotechnology and Management of Bioresources, The Energy And Resources Institute, New Delhi, IHC Complex, Lodhi Road, New Delhi - 110003, Delhi
- 4 Dr. Shashi Bhushan Tripathi, Associate Professor, Department of Biotechnology, TERI School of Advanced Studies, 10 Institutional Area, Vasant Kunj, New Delhi - 110070, Delhi
- 5 Cash Section, DBT (2 copies).
- 6 Sanction Folder.
- 7 File Copy.

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

Details of the Equipment sanctioned for the Implementation of the project titled "Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection":

The Energy And Resources Institute, New Delhi			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	Thermal Cycler with accessories	1	467000.00
Total			467000.00

  
(Dr. Meenakshi Munshi)  
Scientist 'G'



## Annexure -II

Details of the manpower sanctioned for the implementation of the project titled "**Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection**":

Head	No. of Position	Year I	Year II	Year III	Total (Rs.)
Senior Research Fellow @ Rs.28000 + 30% HRA	1	436800.00	436800.00	436800.00	1310400.00
Technical Assistant @ Rs. 20000 p.m.	2	480000.00	480000.00	480000.00	1440000.00
<b>Total(Rs.)</b>		<b>916800.00</b>	<b>916800.00</b>	<b>916800.00</b>	<b>2750400.00</b>

Emoluments detail of research personal(s) mentioned in table(s) of Annexure-II shall be applicable only if candidate(s) met educational qualification and eligibility criteria as per DST OM No.SR/S9/Z-09/2012 dated 21.10 2014.

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

Revathy Vishwanath  
Assistant Director I/c (RP)  
26716690

**Indian Council of Social Science Research**  
(Ministry of Human Resource Development)  
Aruna Asaf Ali Marg, New Delhi - 110067  
EPABX: 26741849-51 Fax: 91-11-26741836  
[rpr@icssr.org](mailto:rpr@icssr.org)

F.No. 02/296/2016-17/RP

Dated: 31.03.2017

The Registrar  
Teri University,  
10 Institutional Area, Vasant Kunj,  
New Delhi- 110070

**Subject: Sanction of Responsive Research Project entitled "Urban Transition beyond Municipal Boundaries: A Comparative Spatial Analysis of the Peri-Urban Areas of Gurugram and Noida to Dr. Bhawna Bali".**

Dear Sir,

The Indian Council of Social Science Research (ICSSR) considered the above research project submitted by Dr. Bhawna Bali, Assistant Professor and Programme Coordinator (M Tech. UDM), Department of Policy Studies, Teri University, 10 Institutional Area, Vasant Kunj, New Delhi- 110070.

2. The Study, as proposed by the researcher/(s), is to be located at and financially administered by your institution as per the guidelines of this award.

3. The ICSSR has sanctioned a grant-in-aid of Rs. 8,00,000/- (Rupees eight lakh only) for the above research project and the grant will be released as follows:

First installment:	Rs.	3,20,000/-
Second installment:	Rs.	3,20,000/-
Final installment:	Rs.	1,60,000/-
<b>Total</b>	<b>Rs.</b>	<b>8,00,000/-</b>

\*. The break-up budget approved by the ICSSR of Rs. 8.00 Lakh is enclosed.

Revathy

by 322.138  
Bhawna B

Cont'd...2/

Dhanraj S

18/5

4. The First installment of the approved grant-in-aid will be released after receiving the grant-in-aid bill duly filled in, stamped and signed by the Project Director as well as the affiliating organization. (GIB already received).

5. In case, the study involves survey research, the finalized schedules/questionnaires (5 copies) designed to elicit information should be sent to the ICSSR as per the following schedule:

- a) If the schedule /questionnaire for eliciting information is as per standard questionnaire, these will have to be sent to ICSSR immediately,
- b) If the schedule /questionnaire for eliciting information are to be designed afresh keeping in view the requirements of the project, these will have to be sent to the ICSSR within a period of six months in any case.

6. The second installment would be released on receipt of the **12 monthly** progress report on the project to be submitted by the Project Director in the prescribed format (enclosed) and simple statement of expenditure duly certified by the affiliating institution.

7. The Final installment will be released only after the receipt of the following documents under rule 1.10(3) of the ICSSR Research Grants and acceptance by the ICSSR:

- a) The final Report on the research project (in duplicate) in a publishable form.
- b) A short summary of the project report in duplicate in 2,000-5,000 words.
- c) Such data or information relating to the research project as may be asked for by the ICSSR for preservation in its Data Archives.
- d) The audited statement of accounts for all expenditure incurred together with utilization certificate in GFR 19-A form for the entire amount of the sanctioned grant.
- e) A statement of assets costing over Rs. 100/- and credit out of the project funds. Such assets are required to be donated to the affiliating organization after completion of the project.

8. The Director of the research project will be **Dr. Bhawna Bali**. Who will be responsible for its completion within **24 Months** from the date of commencement of the project, which is **30<sup>th</sup> June 2017** as intimated by the scholar.

9. In case, the Project Director does not submit the periodic/final project report as per schedule with adequate justification, the scholar may be debarred from availing all future financial assistance from ICSSR.

Cont'd...3/





10. All grants from ICSSR are subject to the general provision of GFR 2005 and in particular with reference to the provision contained in GFR 209, GFR 210, GFR 211 and GFR 212.

11. The Project Director will ensure that the expenditure incurred by her conforms to the approved budget heads. The grant-in-aid is subject to all the conditions laid down in the ICSSR Research Grants scheme (responsive), available in the ICSSR website [www.icssr.org](http://www.icssr.org)

12. The expenditure on this account is debitable to the Budget Head-B Programmes Research Grants-Plan **General**. (10) Grant-in-aid for research project (s).

13. As per MHRD instruction, the amount of grant sanctioned herein is to be utilized by the end of the project duration. Any amount of the grant remaining unspent shall be refunded to the ICSSR immediately after the expiry of the duration of the project. If the grantee fails to utilize the grant for the purpose for which the same has been sanctioned/or fails to submit the audited statement of expenditure within the stipulated period, the grantee will be required to refund the amount of the grant with interest thereon @ 10% per annum.

Yours faithfully,



(Revathy Vishwanath)  
For Member Secretary

**Encl: as above**

Copy to:

1. Dr. Bhawna Bali,  
Assistant Professor and Programme Coordinator (M Tech. UDM),  
Department of Policy Studies,  
Teri University,  
10 Institutional Area, Vasant Kunj,  
New Delhi- 110070
2. Finance Branch, ICSSR, New Delhi
3. Record file

  
(Revathy Vishwanath)  
For Member Secretary

**Title: Urban Transition beyond Municipal Boundaries: A Comparative Spatial Analysis of the Peri-Urban Areas of Gurugram and Noida**

By

**Dr. Bhawna Bali**

**Budget**

<b>Expenditure Head</b>	<b>Percentage Allocation to Total Budget of the Study</b>	<b>Actual value as per the Study (In Rs.)</b>
Full Time Research Staff Part Time Assistance/Hiring Charges	Not Exceeding 50%	4,00,000
Fieldwork Cost (Travel/Logistics/Lodging-Boarding etc.) Source Materials/Software/Data Base etc.	Not less than 37.5%	3,00,000
Contingency	5%	40,000
Institutional Overheads	7.5%	60,000
Total	100	8,00,000

(Rupees Eight lakh only)

Note:

- Period of appointment of full time/part time staff to be decided as per upper limit of financial allocation under each head.
- Payment of full-time/part-time research staff and other expenditure will be made as per rates approved by the ICSSR for different posts/heads as under:

Research Associates  
Research Assistant  
Research/Field Investigator

Rs. 16,000/- per month  
Rs. 13,000/- per month  
Not exceeding Rs.1,000/- per day

  
FOR MEMBER SECRETARY



Government of India  
Department of Atomic Energy (DAE)  
Board of Research in Nuclear Sciences (BRNS)

Dr. Debanik Roy  
Programme Officer (NRFCC)

BRNS Secretariat, 1st Floor,  
CC, BARC, Trombay,  
Mumbai-400085 Phone:  
+91-2225593946  
Fax: 2225593946  
Email: deroy@barc.gov.in

No: 36(4)/14/20/2017-BRNS/36191

Date: 04/12/2017

**OFFICE MEMORANDUM**

Sub: R/P entitled "Spatial distribution of uranium and associated water quality parameters in five districts of UP" under Dr. Chander Kumar Singh, Asst. Professor, Dept. of Energy and Environment,, TERI University, Vasant Kunj, Institutional Area, New Delhi, Delhi-110070 bearing sanction 36(4)/14/20/2017-BRNS with NRFCC, BRNS.

On the recommendations of the Board of Research in Nuclear Sciences (BRNS), I am pleased to convey the administrative approval and sanction of the President of India for the captioned project for **2 years** beginning from financial year **2017-2018** with a total grant of **Rs. 27,51,800/- (Rupees twenty seven lakh fifty one thousand eight hundred only)** for the project as under :

Item of expenditure	Year 1 (2017-2018)	Year 2 (2018-2019)
Equipments	1050000	0
Staff Salary - JRF (1)	300000	300000
Technical Assistance	196000	196000
Consumables	80000	80000
Travel - PI	40000	40000
Travel - PC/DC	25000	25000
Contingencies	35000	35000
Overheads	126825	48075
<b>Total(INR)</b>	<b>1852825</b>	<b>724075</b>

Note: \* GPS, Laser / LED fluorimeter, Radiation survey meter, Water quality sensors

JRF salary calculated @25,000/- p.m. for first two years and on redesignation by committee on in third year as SRF @ 28,000/- p.m. RA salary calculated @ 36,000/- p.m.

Please note that as per the government orders under **Direct Benefit Transfer (DBT) scheme**, the staff salary has to be transferred to his/her bank account. Accordingly, Aadhar Number (UID) of the appointed staff, Bank Account details and the Mobile number linked to the bank account should be obtained and it should be intimated to this office.

Overheads calculated @ 7.5% of the other heads except contingency. The remaining 7.5% towards overheads (Rs. 1,74,900/-) shall be released only on meeting the requirements specified (See Annex-B).

- I am also pleased to convey the sanction of the President of India to incur an expenditure of **Rs. 18,52,825/- (Rupees eighteen lakh fifty two thousand eight hundred twenty five only)** towards grant for the year 2017-2018.
- The expenditure involved is debitable to: **04 3401 00 004 27 0231**.
- This issues with the concurrence of Scientific Secretary, BRNS and IFA.

Signature of :  
Dr. Debanik Roy

Pay & Accounts Officer, DAE, Mumbai - 400 001.



Copy forwarded to:

1. Director of Audit, Scientific Department, AEAP, OYC, CSM Marg, Mumbai-400 001.
2. Joint Secretary (R&D), DAE, Anushakti Bhavan, CSM Marg, Mumbai-400 001.
3. Registrar, TERI University, Vasant Kunj, Institutional Area, New Delhi, Delhi, 110070..
4. Principal Investigator(PI): Dr. Chander Kumar Singh, Asst. Professor, Dept. of Energy and Environment,, TERI University, Vasant Kunj, Institutional Area, New Delhi, Delhi, 110070.

A. First year grant is being released in full along with this Sanction Letter through Pay & Accounts Officer, Department of Atomic Energy, Anushakti Bhavan, CSM Marg, Mumbai-400 001 directly. You may await a Money transfer (MT) through ECS and The amount would be credited electronically to A/C No: 52142908571, A/C Name: TERI University, IFSC: SBHY0020511, (20511) Pragati Vihar, Delhi Branch, Ground Floor, Core 6, Scope Complex, Lodhi Road, New Delhi-110003.

i) Acceptance of this sanction and the MT for the amount sanctioned for the first financial year may please be acknowledged (Form-I).

ii) A sticker of the BRNS LOGO (Copy Enclosed) should be pasted on all the items procured under the project.

iii) THIS SANCTION IS FURTHER SUBJECT TO THE CONDITIONS STIPULATED IN ANNEX (ENCLOSED), WHICH MAY BE GONE THROUGH CAREFULLY.

B. Second year Sanction Letter will be issued automatically in the month of April/May of the 2nd financial year, however, the grant will be released (unspent balance of previous year and Interest earned will be adjusted) after the PI submits the following documents to the Programme Officer NRFCC:

a) Claim in Form-II quoting the reference of the sanction issued for the first year.

b) Utilisation Certificate (UC) as on 31st March of the preceding financial year in Form-III duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.

c) Statement of Accounts (SA) as on 31st March of the preceding financial year should be updated on the website. Interest earned in previous year should be reflected in the Statement of Accounts. A printout of the same should be sent to BRNS after it is duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.

d) Copy of appointment order and joining report of the staff appointed for the project along with minutes of the Selection Committee, should be uploaded in a single pdf file under the file head "Staff Appointment Details". In addition, the details of the appointed staff should also be updated in the available menu.

e) The inventory of equipment also should be updated in the menu, besides uploading the purchase order of the items costing more than 1 Lakh.

f) A One Page report on the progress of work during first year.

C. Third and subsequent years (if any) the Sanction Letter and the grant will be released on fulfillment of the following requirements:

i) Renewal/ Extension Application: Principal Investigator (PI) is required to upload by January 15 a pdf copy of duly signed renewal/ extension application in the prescribed form-(PRA) after logging into his/her account at <https://brns.res.in>. All applications received shall be examined by experts from the field and PIs may be invited to a Technical Programme Discussion Meeting (TPDM). Renewal of the project will be based on the recommendations of the TPDM, Advisory Committee and the Board.

ii) Sanction Letter: If the progress is found to be satisfactory the renewal sanction for the year will be issued in the beginning of that financial year in April/May.

iii) Claim: On receipt of the renewal sanction, the PI shall claim the funds sanctioned by submitting the following documents to Programme Officer NRFCC, BRNS Secretariat, First Floor, Central Complex, BARC, Trombay, Mumbai-400 085:

a) Claim in Form-II quoting reference of the renewal sanction.

b) Utilisation Certificate (UC) as on 31st March of the preceding financial year in Form-III duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant. should be reflected in the Statement of Accounts.

c) Statement of Accounts (SA) as on 31st March of the preceding financial year including the amount of Interest earned in previous year and duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.

### 3.2.1.G.16.

- d) Copy of appointment order and joining report of the staff appointed for the project along with minutes of the Selection Committee.
- e) An inventory of equipment and the copy of Purchase order of equipments costing more than 1 Lakh.
- D. At the end of Terminal Year the Settlement Grant and the Balance 7.5% Overheads will be released on fulfillment of the following requirements:
- a) Claim Form-II if any,
  - b) The final Consolidated Statement of Accounts (SA) and Consolidated Utilization Certificate duly audited by an external Chartered Accountant or the Statutory (Govt.) Auditor. It is mandatory to include the amount of bank interest earned on the grant released into the SA.
  - c) Final Consolidated Progress Report and a brief report as per format given in Form-VII .
5. AAO (Cheque), DAE, Anushakti Bhavan, CSM Marg, Mumbai - 400 001 – With a request that the amount granted for the first year of the project may be released.
  6. Member Secretary (NRFCC) : Dr. Vivekanand Kain, [vivkain@barc.gov.in](mailto:vivkain@barc.gov.in); Ph:+91-2225595067
  7. Project Collaborator (PC): Shri Sunil K. Sahoo, Health Physics Division Bhabha Atomic Research Centre Trombay,Mumbai - 400 085, Email : [nupbarc@gmail.com](mailto:nupbarc@gmail.com), Mobile :2225598267

You or your nominee may please be the DAE representative for selection of Research Fellow/ Research Associate for the project.

  
Dr. Debanik Roy

Note:

1. Please quote the Sanction Number 36(4)/14/20/2017-BRNS in all your correspondence with BRNS

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## MEMORANDUM OF UNDERSTANDING

between

**The National Institute of Urban Affairs, New Delhi**

on behalf of

**Ministry of Housing and Urban Affairs, Government of India**

and

**TERI – School of Advanced Studies, New Delhi**

(NAME OF THE TRAINING ENTITY)

for

### **Conducting Third Party Evaluation of the States/UTs Regarding Implementation of Reforms under AMRUT**

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1. The Ministry of Housing and Urban Affairs (MoHUA) has appointed the National Institute of Urban Affairs (NIUA) for conducting third party audit of the performance of the States/UTs regarding implementation of reforms under AMRUT vide Sanction Order dated 03<sup>rd</sup> January 2018 (sanction entered at Sl.No. 10 of the sanction register for FY 2017-18 issued with the concurrence of Integrated Finance Division vide e-file No. 3129890 dated 29-12-2017). The duration of the assignment is scheduled to be one month (30 days).
2. NIUA has sought the consent of your institute for conducting the third party audit on its behalf, for specified states and ULBs. Vide email received on 10<sup>th</sup> January 2018 you have communicated your consent and provided the contact details of a nodal officer from your end for the same.
3. Out of a total of 54 milestones of the 11 reforms under AMRUT, 40 were targeted to be achieved in the first 2 years (28 in FY 2015-16 and 12 in FY 2016-17). This proposed exercise intends to verify the impact of these 40 milestones implemented so far.
4. Scope of Work as provided in the TOR attached with the Sanction Order:  
  
For this, the Training Entities as third party evaluators would be required to:  
  
a) Establish contacts with the assigned cities and states. Procure required documentary evidence from the states and ULBs for analysis for the identified milestones.



- b) Conduct city visits for on-site/Field verification of the identified milestones.
  - c) Follow the standard format developed by NIUA for Field Verification, Online Verification and Verification of Documentary Evidence from States and ULBs of the identified milestones.
  - d) Compile City-wise and State-wise report in the format developed by NIUA for preparing State-wise and City-wise reports and submit soft copies.
  - e) Submit the State-wise and City-wise report to NIUA and provide necessary support for compilation of the final report to NIUA.
  - f) Submit all documentary evidence collected from states and cities to NIUA in soft and hard copy.
5. For the third party audit, your institute would be required to undertake an impact assessment of the 40 milestones (refer Annexure 1) of the AMRUT reforms for the states of Rajasthan, Himachal Pradesh and Madhya Pradesh. The list of cities covered under each state is provided in Annexure 2.
  6. The Training Entity will use all reasonable endeavours not to disclose any information/documentary evidence (soft and hard copies) collected during the state and city visits to any third party or use the same for any purpose except as expressly permitted in this Agreement.
  7. The duration of the assignment would be maximum of 3 weeks from the date of signing of MoU, which will be no later than the initialisation workshop conducted by NIUA.
  8. For this assignment TERI- School of Advanced Studies would be paid as per the following schedule:

No.	Heads of Expenditure	Number of Cities	Estimated No. of Man-Days per city	Total Man-Days	Unit Cost (INR)	Total Cost (INR)
1	Field Visits for Verification and Impact assessment (includes Travel, stay and incidental expenses) for states other than NE states	9	3	27	13750*	3,71,250
2	Online Validation and Analysis	9	3	27	2500#	67,500
3	Communication and Documentation	9	3	27	3300*	89,100
Total						5,27,850

\* rates as per CCBP Toolkit

# estimate based on salary of RPMC in CCBP Toolkit

9. Timelines:

Milestones	Time Period
Signing of MoU	Latest by the 29 <sup>th</sup> January, 2018
Completion of data collection from States and Cities visit with Intimation to NIUA.	Latest by 2 <sup>nd</sup> Week from signing of MoU
Submission of State-Wise and City-Wise reports (based on data collection from States and Cities visit and online validation) along with all Documentary Evidence collected from States and Cities and all invoices related to expenses incurred.	Latest by end of 3 <sup>rd</sup> Week from signing of MoU

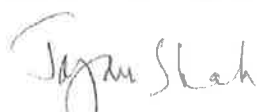
Please note: The Training Entity will have to strictly adhere to the given time schedules.

10. Payment schedules:

Milestones	Time Period
Signing of MoU	40% of the total payment (based on number of cities)
Submission of State-Wise and City-Wise reports (based on data collection from States and Cities visit and online validation) along with all Documentary Evidence collected from States and Cities and all invoices related to expenses incurred.	40% of the total payment
Acceptance of final report by MoHUA	20% of the total payment

Please note: the MoHUA would release 20% payment only upon the acceptance of the final report.

For and on behalf of the  
National Institute of Urban Affairs

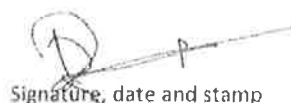


Signature, date and stamp

Director  
National Institute of Urban Affairs  
1st & 2nd Floor, Core 4 - B,  
India Habitat Centre, Lodhi Road,  
New Delhi - 110003

Designation

For and on behalf of the  
TERI - School of Advanced Studies, New Delhi



Signature, date and stamp

29 Jan 2018

Name

Capt. Pradeep K Padhy (Retd.)  
Registrar

TERI School of Advanced Studies  
Institutional Area, Vasant Kunj  
New Delhi - 110070

Annexure 1: List of Milestones

No	Reforms	Milestones	Target Year
1	E-Governance	Digital ULBs	Year 1 (2015-16)
		1. Creation of ULB website	
		2. Publication of e-newsletter	
		Digital India Initiatives	
		3. Support Digital India (ducting to be done on PPP mode by the ULB itself).	Year 2 (2016-17)
		4. Coverage with E-MAAS (from the date of hosting the software)	
		• Registration of Birth, Death and Marriage	
		• Water & Sewerage Charges	
		• Grievance Redressal	
		• Property Tax	
		• Advertisement tax	
		• Issuance of Licenses	
		• Building Permissions	
		• Mutations	
		• Payroll	
		• Pension	
		• e-procurement	
2	Constitution and professionalization of municipal cadre	1. Policy for engagement of interns in ULBs and implementation	Year 1 (2015-16)
		2. Establishment of municipal cadre	Year 2 (2016-17)
		3. Cadre linked training	Year 2 (2016-17)
3	Augmenting double entry accounting	1. Complete migration to double entry accounting system and obtaining an audit certificate With effect from FY2012-13 onwards	Year 1 (2015-16)
		2. Appointment of internal auditor	Year 2 (2016-17)
		3. Publication of annual financial statement on website	Every Year
4	Urban Planning and City level Plans	1. Preparation of Service Level Improvement Plans (SLIP), State Annual Action Plans (SAAP)	Year 1 (2015-16)
		2. Make action plan to progressively increase Green cover in cities to 15% in 5 years.	Every Year
		3. Develop at least one Children Park every year in AMRUT cities.	
		4. Establish a system for maintaining of parks, playground and recreational areas relying on People Public Private Partnership (PPPP) model.	Year 1 (2015-16)
		5. Energy Efficiency Projects	Year 2 (2016-17)



**केन्द्रीय प्रदूषण नियंत्रण बोर्ड**  
**CENTRAL POLLUTION CONTROL BOARD**  
 (पर्यावरण एवं वन मंत्रालय, भारत सरकार)  
 (MINISTRY OF ENVIRONMENT & FORESTS, GOVT. OF INDIA)

**DR. S.K. TYAGI,**  
**Additional Director & Head,**  
**Environmental Training Unit**

**Tel: 011-22383503, 011-43102344**  
**011-43102311, Telefax: 22300070**  
**E-mail: cpcb.etu@gmail.com**

**SPEED-POST**

F.No.B-13011/TERI University/ETU/2017-18/

Dated: 14.06.2017

To,

Dr. Kamna Sachdeva,  
 Assistant Professor,  
 TERI University,  
 10, Institutional Area, Vasant Kunj,  
 NEW DELHI – 110 070

**Sub: Sanction for conducting residential training programme during 2017-18**

Madam,

This has reference to your e-mail, dated 24.05.2017 for conducting training programme during the financial year 2017-18 under HRD Programme of Central Pollution Control Board (CPCB). I am directed to inform that the Competent Authority of CPCB has sanctioned 3-days residential training programme on **"Air Quality Management – Plans using decision support system UrbAir India"** during November 29 – December 01, 2017 to TERI University, Delhi for the year 2017-18 on the following terms & conditions:

1. TERI University, Delhi will invite nominations from target groups (Pollution Control Boards/ Committees, Dept. of Environment, Environmental Laboratories recognized under EPA, Govt. Depts., R&D/training institutes, NGO's, Universities, etc.) and list of nominations received shall be sent to CPCB for finalization and approval.
2. The first installment (80% of the total budget) will be released on receipt of confirmation of dates, approval of course contents and list of participants from Institutes.
3. The second installment (20% of the total budget) will be released on receipt of Utilization Certificate & Statement of Expenditure, training reports and course material one soft copy in CD and two hard bound copies, evaluation sheets of trainee and trainers and feedback forms from the participants.
4. TERI University, Delhi will send the filled in evaluation forms submitted by participants and trainers (enclosed) in original to CPCB after completion of training.
5. TERI University, Delhi will submit the training report, course materials in two hard bound copies and two soft copies in CD including list of participants with attendance having attended the training and resource persons.
6. TERI University, Delhi will provide the utilization certificate and statement of expenditure for settlement of accounts.

**contd..2..**

**'परिवेश भवन' पूर्वी अर्जुन नगर, दिल्ली-110032**

**'Parivesh Bhawan', East Arjun Nagar, Delhi - 110032**

दूरभाष/Tel. : 43102030, फैक्स/Fax : 22305793, 22307078, 22307079, 22301932, 22304948

ई-मेल/e-mail : cpcb@nic.in वेबसाइट/Website : www.cpcb.nic.in



..2..

7. CPCB shall have the propriety and intellectual rights on the course material developed for the training programme.
8. TERI University, Delhi is allowed to exceed their expenditure in some sub-budget heads, but not exceeding the total sanctioned budget for training programme.
9. The total sanctioned budget for 3 days residential training programme for 20 participants is ₹3,51,000/-. However, TERI University, Delhi can select five additional payee participants and use the fee for it's institutional development. The details of sanctioned budget are as follows:

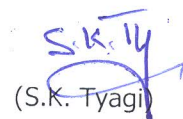
S. No.	Budget Sub-Head	For 3 days programme (₹)
1.	Infrastructure charges including hall & equipment charges	15,000
2.	Course material + stationary etc. @ ₹ 1000/- per participant	20,000
3.	Breakfast, lunch, tea, snacks & dinner etc. @ ₹ 600/day/person	45,000
4.	Faculty/resource persons charges	30,000
5.	Transportation (field trips/local)	20,000
6.	Accommodation @ ₹ 1000/day/person	60,000
7.	Course design and material development	20,000
8.	TA/DA for faculty (as per GoI rules)	30,000
	<b>Sub-Total</b>	<b>2,40,000</b>
9.	Institutional Charges + Service Tax (as applicable)	90,000
10.	Miscellaneous Charges	20,000
	<b>TOTAL</b>	<b>3,51,000</b>

10. Dates are subject to mutual consent between the sponsoring (CPCB) and organizing organization.
11. Final nominations of the participants will be approved by ETU Division and the Competent Authority of CPCB.

You are requested to kindly confirm the dates for conducting the above training programme and provide a list of participants to CPCB for approval and release of 1<sup>st</sup> installment of the sanctioned budget.

**While finalizing the programme dates, the Parliament Sessions shall be kept in view, to have sufficient number of participants.**

Yours faithfully,

  
(S.K. Tyagi)

Encl.: As above



TERI University  
10, Institutional Area  
Vasant Kunj  
New Delhi - 110 070

Tel. 7180 0222  
E-mail registrar@teriuniversity.ac.in  
Fax 2612 2874  
India +91 • Delhi (0) 11  
Web www.teriuniversity.ac.in

**Gp. Capt. Rajiv Seth (Retd.), Ph.D.**  
**Pro Vice Chancellor**

April 18, 2017

Dr. Rajendra Dobhal  
Director General  
Uttarakhand State Council for Science and Technology  
Vigyan Dham, Jhajra, Dehradun

**Subject: Regarding release of grant of first year to TERI University, New Delhi worth Rs. 20.60 lakh**  
DST sanction letter No.182 (WTI) dated 16/03/2017 Project  
**Title: Modelling for Enhancing Water Quality in Uttarakhand using Geospatial Technology**

Dear Dr. Dobhal,

This is with reference to the above referred project recently sanctioned under Water Technology Initiative (WTI) programme of DST, Govt. of India, New Delhi to UCOST, Dehradun in collaboration with TERI University, New Delhi and DAV (PG) College, Dehradun.

The grant worth Rs. 50,46,400/- for a period of three years has been sanctioned by DST to UCOST, with a share worth Rs 43,16,800/- from DST and Collaborator's (UCOST's) share of Rs 7,29,600/-. The amount worth Rs. 25,26,800/- as first year share of the project has been sanctioned by DST and Rs. 2,43,300/- as Collaborator share from UCOST has been sanctioned.

The budget component of the work to be undertaken by TERI University, New Delhi with Co-PI, Dr. Vinay S.P. Sinha formulated under the project during first year is as under:

S. No.	Head	Amount sanctioned & Released by DST to UCOST	Amount sanctioned by UCOST	Amount Requested to UCOST Being release grant to TERI University, New Delhi
1.	Equipments (I) Subsurface Ground Water Modeling S/W (II) Satellite Data (III) Workstation Machine	Rs. 16.000 lakhs	NIL	Rs. 16.000 lakhs [for all (I)-(III)]
2.	Manpower (02 JRF) @ Rs. 25,000/- PM + 20% HRA)	Rs. 6.768 lakhs	Rs. 0.432 lakhs	Rs. 3.60 lakhs (for one JRF)
3.	Contingencies	-	Rs. 1.00 lakh	Rs. 0.25 lakh

Contd...2.

4.	Travel	-	Rs. 1.00 lakh	Rs. 0.50 lakh
5.	Consumables	Rs. 1.50 lakh	NIL	NIL
6.	Overhead	Rs. 1.00 lakh	-	Rs. 0.25 lakh
	<b>Total</b>	<b>Rs. 25.268</b>	<b>Rs. 2.432 lakh</b>	<b>Rs. 20.60 lakh</b>

In order to start the work as early as possible and to attain project objectives within time frame, it is requested to kindly release the above grant worth Rs. 20.60 lakhs (Rupees Twenty lakhs sixty thousand only) in favour of "The Registrar, TERI University, New Delhi" at the earliest. The audited Utilization Certificate (UC) and statement of expenditure (SE) as per norms along with report of work carried out during first year will be submitted as per requirement.

The detail of the account is given below and payment shall be made in favour of **THE REGISTRAR.**

Organisation Name as per Bank records: TERI University

Bank Account No: 52142908571

IFSC Code: SBHY0020511

MICR Code: 110004005

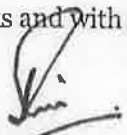
Bank Name: State Bank of Hyderabad

Bank Branch Address: Pragati Vihar, Ground Floor, Core 6, Scope Complex, Lodi Road, New Delhi-110003

Unique Agency code of the Organization and Institute: TERI UNIVERSITY

Looking forward for continued collaboration and association.

Thanks and with regards,

  
Gp Capt Rajiv Seth (Retd). PhD  
Pro Vice Chancellor

Encls: Sanction letter for project, P.D. WTI/DST dated 16.3.17

Gp Capt. Rajiv Seth (Retd), Ph.D

Pro Vice Chancellor

TERI University

10, Institutional Area, Vasant Kunj

New Delhi - 110 070

Administrative Sanction

File No. DBT-NER/AGRI/33/2016  
GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY  
(NER - BPMC)

\*\*\*\*\*

Block-2, 7<sup>th</sup> Floor,  
CGO Complex, Lodhi Road  
New Delhi-110003

Dated: 22/3 /2018

ORDER

Sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Powers Rules, 1978 for the implementation of a network project under 'DBT's NER-Banana Program for the NE' by Dr. S. Uma, National Research Centre for Banana, Tiruchirappalli; Dr. Ashok Bhattacharyya, Assam Agricultural University, Jorhat, Assam; Dr. Rakhi Chaturvedi, Indian Institute of Technology, Guwahati, Assam; Dr. K. Soorianathasundram, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu; Dr. C. K. Narayan, Indian Institute of Horticultural Research, Bengaluru and Dr. Rajappa Joga, ICAR Research Complex for NEH Region Umiam, Meghalaya at a total cost of ₹ 3039.40 Lakhs (Rupees Thirty Crore Thirty Nine Lakhs and Forty Thousand only) for a period of three years on the terms and conditions detailed as under:

**2.0 The Project:**

Group	Title	Co-ordinator Name	Associate Co-ordinator Name
Group - 1	Banana Biodiversity	Dr. S. Uma National Research Centre for Banana, Tiruchirappalli	Dr Robert Singh Thangjam Mizoram University, Aizawl, Mizoram
Group - 2	Pathogen Detection and Control	Dr. Ashok Bhattacharyya Assam Agricultural University, Jorhat, Assam	Dr. R. Thangavelu National Research Centre for Banana, Tiruchirappalli, Tamil Nadu
Group - 3	Tissue Culture	Dr. Rakhi Chaturvedi Indian Institute of Technology, Guwahati, Assam	Dr. M. S. Saraswathi National Research Centre for Banana, Tiruchirappalli, Tamil Nadu



Group – 4	Value Addition	<b>Dr. K. Soorianathasundram</b> Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	<b>Dr. Rajlakshmi Devi</b> Institute of Advanced Study in Science and Technology (IASST), Guwahati, Assam
Group – 5	Post Harvest Loss	<b>Dr. C. K. Narayan</b> Indian Institute of Horticultural Research, Bengaluru	
Group – 6	Down Streaming & Processing	<b>Dr. Rajappa Joga</b> ICAR Research Complex for NEH Region Umiam, Meghalaya	<b>Dr Akshaya Padmakar Gupte</b> N.V. Patel College of Pure and Applied Sciences, Gujarat

### 2.1 Project Title:

Project Title	
Group 1: Banana Biodiversity	
Sub-Title	<b>App. No. 2:</b> Genome Characterization of Banana/Plantain Genetic Resources of North-eastern Region and their Utilization in Multicenter Planning for Commercial Improvement
	<b>App. No. 3:</b> Exploration of Banana Biodiversity and its Biotechnological Research in Nagaland
	<b>App. No. 7:</b> Diversity Assessment, Germplasm Conservation and Database Development on Bananas resources of North Eastern India
	<b>App. No. 40:</b> Whole genome and transcriptome study of stress-tolerant banana cultivars
	<b>App. No. 75:</b> Collection, evaluation, documentation and conservation of banana genetic resources from north eastern region
	<b>App. No. 90:</b> Consortium for managing Indian banana genetic resources
Group 2: Pathogen Detection and Control	
Sub-Title	<b>App. No. 6:</b> Exploring diversity, genomic and transcriptome profiling and phytosemiochemicals of banana pest complex in NER region- An ecological and molecular approach
	<b>App. No. 9:</b> Screening of Banana germplasm from the NE for Fusarium wilt resistance and molecular characterization in contrasting genotypes
	<b>App. No. 11:</b> Harnessing the potential of endophytes against root knot nematode, <i>Meloidogyne incognita</i> in banana

W/



## 2.5. 17 Gauhati University, Guwahati (PI: Dr. Bhaben Tanti)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Nanodrop	6.87
2	Deep Freezer (-86 degree)	3.91
3	Horizontal Laminar Air Flow	1.05
4	Digital Hot Air Oven	0.28
5	Water Bath (Serological)	0.26
6	Air Curtain	0.20
7	Vortex Mixture	0.18
Total		12.75

## 2.5. 18 TERI, New Delhi (PI: Dr. Shashi Bhushan Tripathi)

(₹ in lakhs)

S. No.	Item	Grant , Recommended
1	-20° C deep freezer	0.94
Total		0.94

## 2.5. 19 NRC Banana, Tiruchirapalli (PI: Dr. M. S. Saraswathi)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Laminar Air Flow	1.05
2	Air curtain 3 ft	0.20
Total		1.25

## 2.5. 20 NBPGR, New Delhi (PI: Dr. Anuradha Agrawal)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Water Purification System	8.00
Total		8.00

## 2.5. 21 NRC Banana, Tiruchirapalli (PI: Dr. Uma S)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Flowcytometer setup with all accessories	23.00
Total		23.00

N /



**2.6.17 Gauhati University, Guwahati (PI: Dr. Bhaben Tanti)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 20 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 20 % HRA for 3 <sup>rd</sup> yr	3.60	3.60	4.03	11.23
Total			3.60	3.60	4.03	11.23

**2.6.18 TERI, New Delhi (PI: Dr. Shashi Bhushan Tripathi)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 30 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 30 % HRA for 3 <sup>rd</sup> yr	3.90	3.90	4.37	12.17
Total			3.90	3.90	4.37	12.17

**2.6.19 NRC Banana, Tiruchirapalli (PI: Dr. M. S. Saraswathi)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 20 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 20 % HRA for 3 <sup>rd</sup> yr	3.60	3.60	4.03	11.23
Total			3.60	3.60	4.03	11.23

**2.6.20 NBPGR, New Delhi (PI: Dr. Anuradha Agrawal)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 30 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 30 % HRA for 3 <sup>rd</sup> yr	3.90	3.90	4.37	12.17
Total			3.90	3.90	4.37	12.17



2.8.16 Nagaland University, Lumami, Nagaland (PI: Dr. Maibam Romeo Singh)  
(₹ in lakhs)

S. No	Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> year	Total
	<b>Non-Recurring</b>				
1.	(Equipments & accessories)	2.70	0.00	0.00	2.70
	<b>Recurring</b>				
2.	Manpower	3.30	3.30	3.70	10.30
3.	Consumables	1.50	1.50	2.00	5.00
4.	Travel	0.50	0.50	0.50	1.50
5.	Contingency	0.50	0.50	0.50	1.50
6.	Overhead Charge	0.50	0.50	0.50	1.50
	<b>Recurring Total</b>	<b>6.30</b>	<b>6.30</b>	<b>7.20</b>	<b>19.80</b>
	<b>TOTAL (NR + R)</b>	<b>9.00</b>	<b>6.30</b>	<b>7.20</b>	<b>22.50</b>

2.8.17 Gauhati University, Guwahati (PI: Dr. Bhaben Tanti)

(₹ in lakhs)

S. No	Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> year	Total
	<b>Non-Recurring</b>				
1.	(Equipments & accessories)	12.75	0.00	0.00	12.75
	<b>Recurring</b>				
2.	Manpower	3.60	3.60	4.03	11.23
3.	Consumables	5.00	2.00	1.00	8.00
4.	Travel	0.50	0.50	0.50	1.50
5.	Contingency	0.50	0.50	0.50	1.50
6.	Overhead Charge	1.00	1.00	1.00	3.00
	<b>Recurring Total</b>	<b>10.60</b>	<b>7.60</b>	<b>7.03</b>	<b>25.23</b>
	<b>TOTAL (NR + R)</b>	<b>23.35</b>	<b>7.60</b>	<b>7.03</b>	<b>37.98</b>

2.8.18 TERI, New Delhi (PI: Dr. Shashi Bhushan Tripathi)

(₹ in lakhs)

S. No	Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> year	Total
	<b>Non-Recurring</b>				
1.	(Equipments & accessories)	0.94	0.00	0.00	0.94
	<b>Recurring</b>				
2.	Manpower	3.90	3.90	4.37	12.17
3.	Consumables	2.70	2.70	2.60	8.00
4.	Travel	0.50	0.50	0.50	1.50
5.	Contingency	0.50	0.50	0.50	1.50
6.	Overhead Charge	0.50	0.50	0.50	1.50
	<b>Recurring Total</b>	<b>8.10</b>	<b>8.10</b>	<b>8.47</b>	<b>24.67</b>
	<b>TOTAL (NR + R)</b>	<b>9.04</b>	<b>8.10</b>	<b>8.47</b>	<b>25.61</b>



**M A Jawaid**  
**Deputy Director (R P)**  
**Tel # 011-26742351**

*Speedpan* 2012 x P21

**Indian Council of Social Science Research**  
 (Ministry of Human Resource Development)  
 J NU Institutional Area, Aruna Asaf Ali Marg  
 New Delhi - 110067  
 E-mail: [info@icssr.org](mailto:info@icssr.org)  
 Website: [www.icssr.org](http://www.icssr.org)

F.No. 02/361/2011/RP

Dated: 03.12.2012

The Registrar  
 TERI University,  
 10, Institutional Area,  
 Vasant Kunj,  
 New Delhi-110070

**Subject: Research Project entitled "Analyzing the Implementation of Forest Right Act (2006): A Cultural Political Study of Community Rights in Southern Rajasthan".**

Dear Sir,

In continuation to our sanction order of even No. dated 13.07.12, a partial modification has been made in the budget heads of the above project sanctioned to Dr. Smriti Das and Dr. Mala Narang Reddy, Assistant Professors, Department of Policy Science, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi 110 070.

I am directed to inform you that the ICSSR as per new guidelines has revised the financial allocation under various heads of expenditure in respect of research project. The percentage of break-up of expenditure to be incurred under each head for the research project shall be as under:

Expenditure Head	Percentage Allocation to Total Budget of the Study	Actual value as per the Study (In Rs.)
Full Time Research Staff	25%	1,67,163
Part-Time Assistance/ Hiring Charges	25%	1,67,163
Field work cost (Travel/Logistics/Lodging-Boarding etc.	30%	2,00,595
Source Materials/Software/Data Base etc.	7.5%	50,149
Office Equipment & Contingency	5%	33,433
Institutional Overheads	7.5%	50,149
<b>Total</b>	<b>100</b>	<b>Rs.6,68,650</b>

(Rupees six lakhs sixty eight thousand six hundred fifty only)

Cont'd

*Dhanraj S*  
*31/12*



**Note:**

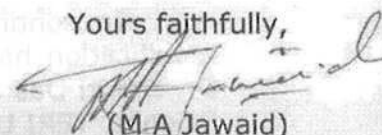
- a) Period of appointment of full time /part time staff to be decided as per upper limit of financial allocation under each head.
- b) Payment of full-time/part time research staff and other expenditure will be made as per rates approved by the ICSSR for different posts/heads as under:

- Research Associates Rs. 16,000/- pm
- Research Assistant Rs. 13,000/- pm
- Research Investigator Rs. 10,000/- pm
- Field work/Data collection Staff
  - i) Per Diem Rs. 600/- (per day) including food.
  - ii) Travel as per actual.
  - iii) Stay as per actual up to a maximum of Rs. 400/- per day.

Accordingly, the amount shall be spent as per the modified budget heads and rates as mentioned above. However, the total grant sanctioned for your research project and other terms and conditions will remain the same.

With Best regards,

Yours faithfully,



(M A Jawaid)

For MEMBER-SECRETARY

**Copy to:**

1. Dr. Smriti Das and Dr. Mala Narang Reddy  
Assistant Professor,  
Department of Policy Science,  
TERI University,  
10, Institutional Area,  
Vasant Kunj, New Delhi 110 070
2. Finance Branch, ICSSR, New Delhi
3. Record file



(M A Jawaid)

For MEMBER-SECRETARY



**M A Jawaid**  
**Deputy Director (R P)**  
**Tel # 011-26742351**

*Handwritten signature*  
**Indian Council of Social Science Research**  
 (Ministry of Human Resource Development)  
 J NU Institutional Area, Aruna Asaf Ali Marg  
 New Delhi - 110067  
 E-mail: [info@icssr.org](mailto:info@icssr.org)  
 Website: [www.icssr.org](http://www.icssr.org)

F.No. 02/361/2011/RP

Dated: 13.07.2012

The Registrar  
 TERI University,  
 10, Institutional Area,  
 Vasant Kunj,  
 New Delhi-110070

**Subject: Research Project entitled "Analyzing the Implementation of Forest Right Act (2006): A Cultural Political Study of Community Rights in Southern Rajasthan".**

Dear Sir,

The Indian Council of Social Science Research (ICSSR) considered the above research project submitted by Dr. Smriti Das and Dr. Mala Narang Reddy, Assistant Professors, Department of Policy Science, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi 110 070.

2. I am happy to inform that the ICSSR has sanctioned a grant-in-aid of **Rs. 6,68,650/- (Rupees six lakhs sixty eight thousand six hundred fifty only)** for the above research project and the grant will be released as follows:

First installment:	Rs. 2,48,800.00	— Rec. on 12/9/12
Second installment:	Rs. 1,63,275.00	
Third installment:	Rs. 1,63,275.00	
Fourth installment:	Rs. 46,650.00	
Final installment:	Rs. 46,650.00	
<b>Total</b>	<b>Rs. 6,68,650.00</b>	

Cont'd

*Handwritten signature: Sondeep A*  
*Handwritten signature: R. desai*



3. The **First** installment of the approved grant-in-aid will be released after receiving the grant-in-aid bill (proforma enclosed) duly filled in, stamped and signed by the Project Director as well as the affiliating organization. **This may kindly be sent immediately.**

4. In case, the study involves survey research, the finalized schedules/questionnaires (5 copies) designed to elicit information should be sent to the ICSSR as per the following schedule:

- a) If the schedule /questionnaire for eliciting information is as per standard questionnaire, these will have to be sent to ICSSR immediately,
- b) If the schedule /questionnaire for eliciting information are to be designed afresh keeping in view the requirements of the project, these will have to be sent to the ICSSR within a period of six months in any case.

5. The **subsequent** installments would be released on receipt of the **six monthly progress reports** on the project to be submitted by the Project Director **in the prescribed format** and simple statement of expenditure duly certified by the affiliating institution.

The **fourth** installment will be released after receiving:

- a) The final Report on the research project (in triplicate) in a publishable form.
- b) A short summary of the project report in triplicate in 2,000-5,000 words.
- c) Such data or information relating to the research project as may be asked for by the ICSSR for preservation in its Data Archives.

The **Final** installment will be released **only** after the receipt of the following documents under rule 1.10(3) of the ICSSR Research Grants and acceptance by the ICSSR:

- a) The audited statement of accounts for all expenditure incurred together with utilization certificate in GFR 19-A form for the entire amount of the sanctioned grant.
- b) A statement of assets costing over Rs. 100/- and credit out of the project funds. Such assets are required to be donated to the affiliating organization after completion of the project.

6. The Project Director will have to attend the Mid-Term Appraisal, to be conducted by ICSSR after part of the project work is completed and shall make presentation on the progress of the research project before the subject experts.

7. The Project Director of the research project will be **Dr. Smriti Das**. Who will be responsible for its completion within **18 Months** from the date of commencement of the project, which is **1<sup>st</sup> June 2012**, as intimated by the scholar.

Cont'd....





8. In case, the Project Director does not submit the periodic / final project report as per schedule with adequate justification, the scholar may be debarred from availing all future financial assistance from ICSSR.

9. All grants from ICSSR are subject to the general provision of GFR 2005 and in particular with reference to the provision contained in GFR 209, GFR 210, GFR 211 and GFR 212.

10. The Project Director will ensure that the expenditure incurred by him conforms to the approved budget heads. The grant-in-aid is subject to all the conditions laid down in the **ICSSR Research Grants scheme, available in the ICSSR website [www.icssr.org](http://www.icssr.org)**.

11. The expenditure on this account is debitable to the Budget Head-B Programmes Research Grants-**Plan General**. (10) Grant-in-aid for research project (s).

12. As per MHRD instruction, the amount of grant sanctioned herein is to be utilized by **the end of the project duration**. Any amount of the grant remaining unspent shall be refunded to the ICSSR immediately after the expiry of the duration of the project. If the grantee fails to utilize the grant for the purpose for which the same has been sanctioned/or fails to submit the audited statement of expenditure within the stipulated period, the grantee will be required to refund the amount of the grant with interest thereon @ 10% per annum.

Yours faithfully,



(M A Jawaid)

For MEMBER-SECRETARY

Encl: as above.

**Copy to:**

1. Dr. Smriti Das and Dr. Mala Narang Reddy  
Assistant Professor,  
Department of Policy Science,  
TERI University,  
10, Institutional Area,  
Vasant Kunj, New Delhi 110 070
2. Finance Branch, ICSSR, New Delhi
3. Record file



(M A Jawaid)

For MEMBER-SECRETARY



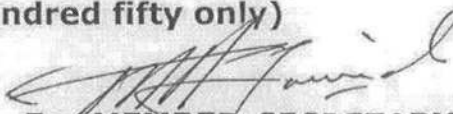
**"Analyzing the Implementation of Forest Right Act (2006): A Cultural Political Study of Community Rights in Southern Rajasthan"**

**Dr. Smriti Das**

**Budget Finalized in Consultation with Committee of Expert**

1.	Personnel Requirement		
	a. Research Assistant (Rs. 10,500/- X 2 X 12)	=	Rs. 2,52,000/-
	b. Typing Assistant/ Computer Operator (Lump sum)	=	Rs. 50,000/-
2.	Travel/fieldwork & DA	=	Rs. 1,50,000/-
3.	Data Processing	=	Rs. 60,000/-
4.	Stationary and Printing	=	Rs. 40,000/-
5.	Books & Journals	=	Rs. 35,000/-
6.	Contingency expenses including postage	=	Rs. 35,000/-
	<b>Sub-Total</b>	=	<b>Rs. 6,22,000/-</b>
7.	Overhead charges (7.5 %)	=	Rs. 46,650/-
	<b>Total</b>		<b>Rs. 6,68,650</b>

**(Rupees six lakhs sixty eight thousand six hundred fifty only)**

  
**For MEMBER-SECRETARY**



ICSSR



Dr. K.L. Khera  
Director (Research Projects)  
☎ 26741840

E-mail: [klkhera@icssr.org](mailto:klkhera@icssr.org)

Indian Council of Social Science Research  
(Ministry of Human Resource Development)  
JNU Campus, Aruna Asaf Ali Marg  
New Delhi – 110067

E-mail: [info@icssr.org](mailto:info@icssr.org) Website: [www.icssr.org](http://www.icssr.org)

F.No.02/361/2011/RP  
[smriti.das@teriuniversity.ac.in](mailto:smriti.das@teriuniversity.ac.in)

Dated: 10.3.2012

Dear Dr. Das,

We are happy to inform that the ICSSR has considered your research proposal entitled "Analyzing the Implementation of Forest Right Act (2006): A Cultural Political Study of Community Rights in Southern Rajasthan" and approved a grant-in-aid of Rs.6,68,650/- for the study.

Before we issue a formal sanction order, you are requested to communicate the probable date of commencement of the project and also enter into an agreement with the ICSSR in the format (copy attached). The agreement may be duly signed by the Project Director on a non-judicial stamp paper of Rs.50/- only and sent to the undersigned to enable us to issue the formal sanction order.

With warm regards,

Yours sincerely,

(K.L.Khera)

Encl: As above

Dr. Smriti Das  
Mala Narang Reddy  
TERI University  
10, Institutional Area, Vasant Kunj  
New Delhi 110 070

Copy to:

The Registrar  
TERI University  
10, Institutional Area, Vasant Kunj  
New Delhi 110 070

✓  
Sandeep A / Sharma

12/19/3

(K.L.Khera)

# INDIAN COUNCIL OF SOCIAL SCIENCE RESEARCH

## Grant-in-Aid Bill

Received a sum of Rs. 2,48,800  
 (Rupees Two Lakhs Forty Eight Thousand and Eight Hundred only) by cheque/demand draft No. \_\_\_\_\_  
 dated \_\_\_\_\_ in favour of \_\_\_\_\_ drawn  
 on Canara Bank, Jit Singh Marg, New Delhi-110067 being the grant-in-aid of  
 the project entitled "Analyzing the Implementation of Forest Rights Act (2006) : A Cultural Political Study of Community Rights in Southern Rajasthan"  
 towards the First installment of the total grant-in-aid of  
 Rs. 6,68,650 (Rupees Six Lakhs Sixty Eight Thousand Six Hundred and Fifty only) sanctioned vide letter  
 No. 02/361/2011/RP dated 13.07.2012 of the Indian Council of  
 Social Science Research, New Delhi.

*Malankaladdy*  
  
*malankaladdy*

*Smriti Das*  


*Smriti Das*  
 Signature  
 Project Director

**Please affix Revenue Stamp**

- Certified that the Institution accepts all the terms and conditions governing the above grant and that it lends itself to abide by these.
- Certified that the Institution/Organization was/has not been sanctioned any grant-in-aid for the same purpose by any other source of the Central Government during the period to which the grant relates.
- It should be countersigned by the Administrative Head of the Institution/University.



*[Signature]*  
 Signature of the Head  
 (Affiliating Institute/University)  
 Designation with Seal



**R&D PROJECT PROPOSAL FOR FUNDING  
UNDER MINISTRY OF COAL**

Submitted 15 October 2014

(Revised after presentation before Technical Sub-Committee of SSRC in its 11<sup>th</sup> meeting held at New Delhi on 28<sup>th</sup> July 2014)

1. Project Title: Sustainable livelihood activities on reclaimed open cast coal mines: a technology enabled integrated approach in Indian coal sector
2. Name and address of principal implementing agency: TERI / TERI University, 10 Institutional Area, Vasant Kunj, New Delhi – 110 070

Name of Project Leader / Co-ordinator: Professor Arabinda Mishra

Name of Co-investigators: Dr Parimita Mohanty (Fellow), Dr Manab Das (Fellow)

Team Members: Dr Sudipta Chatterji (Associate Professor), Dr Priyanka Kaushal (Assistant Professor), Dr Sapna Narula, Mr Gopal K Sarangi (Research Associate)

3. a. Name and address of Sub-Implementing agencies: Environment Division, CMPDI, Ranchi
- b. Mahanadi Coalfields Ltd., Burla

Name of Project Co-ordinator from CMPDI: Shri D. Basu, General Manager (Env)

Team Members: Shri V. K. Pandey, Senior Manager (Env), Shri P.C. Jha, Senior Manager (Env), Shri Abhishek Kumar, Assistant Manager (Env)



Definition of the problem:

- a. The concept of creating sustainable post mine land use has gained prominence after Ministry of Coal issued mine closure guidelines in the year 2009 with greater stress to plan land use pattern in the post mining period in a manner that does not become liability for the community and becomes a source of livelihood for the community in and around the mining area. At present there are no clear answers to questions about the long-term land use in the mined out area and the livelihoods that need to be created<sup>1</sup>; the kind of forest that is to be planted and the arrangement for sharing of benefits<sup>2</sup>; and, how to productively use the water bodies that form in the voids.
- b. The above challenge can be viewed through the lens of sustainable development. There are three dimensions to this perspective – environment, economy and society. Any project intervention would be successful only if it encompasses all three dimensions and there is an integrated and mutually reinforcing set of activities primarily focused on generating sustainable livelihoods in and around the project-affected region.
- c. In order to move further in this direction there is a need to undertake some demonstration projects that can be offered as model projects for possible replication at larger scales. This project proposal envisages all round work activities in the field of eco-friendly mine reclamation, utilization of reclaimed land to develop entrepreneurship and vocational skills among local communities for community empowerment.

It is proposed to undertake the proposed R&D activities in one of the reclaimed OCM areas of Mahanadi Coalfields Limited (MCL) in the State of Odisha, preferably in Talcher Coalfields. The present status of reclamation (for 50 open cast mines producing more than 5 million m<sup>3</sup> of coal & OB combined together is available in CMPDI Report<sup>3</sup> and will be useful as baseline data.

<sup>1</sup> Oskarsson, P. 2011.

<sup>2</sup> When a mine is closed, the land is usually handed over to the forest department for compensatory afforestation activities. Legally, the two main requirements of mine closure are to plant new forest to the same extent of land that was taken away during mining, and to pay compensation for the land to the State government, based on the Forest Conservation Act (1980 with amendments).

<sup>3</sup> CMPDI, March 2013. *Land restoration/ reclamation monitoring of 50 open cast coal mines of CIL producing more than 5 mcm (coal + OB) based on satellite data for the year 2012-13*. Ranchi.



#### 4. Objectives:

The primary objectives of this project proposal are as follows:

- a. To assess, through the application of a systematic multi-criteria evaluation framework, the suitability potential of post-mining land use for ecologically beneficial and socio-economically productive outcomes.
- b. To develop permanent green cover on overburden dumps/backfilled mined land area using mycorrhiza and various plant species of economic importance.
- c. To develop entrepreneurship and vocational skills among members of local Self Help Groups (SHGs) for community (with a focus on women and other weaker sections of the society) empowerment through access to new economic opportunities.

In addition to the above, the proposal also aims to build capacity among University students for conducting research in the coal sector through their involvement in the project activities for bringing in social and environmental upgradation in the mining areas.

#### 5. Justification for subject area:

- a. The proposed project with its focus on post mining land use and livelihood generation of the affected communities is expected to enhance the image of Coal India Limited (CIL) as an environmentally and socially responsible organization. The proposed project with its emphasis on creating permanent green cover and livelihood creation is very much consistent with the existing sustainable development policy of CIL.
- b. There are few studies on post-mining land use and livelihood activities in the Indian context. At the international level, 21 feasible post-mining land-uses have been identified from literature and ordered under 8 categories<sup>4</sup>. It is likely that reclaimed OCM sites have a wide range of potential functions and the present study will identify these for the first time in the Indian context using the MLSA framework and engaging stakeholders in the process. Our review of literature

<sup>4</sup> Soltanmohammadi, H., M. Oshanloo and A.A. Bazzazi (2010), "An analytical approach with a reliable logic and a ranking policy for post-mining land-use determination", *Land Use Policy* 27: 364-72.



suggests that there are no studies till date that apply an integrated approach consistent with the sustainable development concept for the demonstration of post-mining livelihoods generation.

- c. The project has the potential to be showcased as a model project for other CIL subsidiaries and can possibly be adopted for replication in the Indian coal sector.
- d. This proposal has the unique strength of linking R&D with university education by involving post graduate-level students. This is expected to contribute towards long-term capacity building for conducting research in the Indian coal sector.

## 6. Work plan:

### 7.1 Methodology:

**Objective (a):** To assess, through the application of a systematic multi-criteria evaluation framework, the suitability potential of post-mining land use for ecologically beneficial and socio-economically productive outcomes.

A useful methodological approach<sup>5</sup> for identifying the potential of mined lands for environmental and socioeconomic productive uses is called Land Suitability Analysis (LSA). In a recent research paper<sup>6</sup>, a Mined Land Suitability Analysis (MLSA) framework for post-mining land-use determination is presented that is composed of fifty most significant attributes in the post-mining land-use decision making. Drawing from this list of attributes as relevant for the OCM site chosen for this intervention in the Indian context, we propose to conduct a multi-attribute evaluation based on Analytical Hierarchy Process method and using the Expert Choice software. A stakeholder's workshop will be conducted to generate the necessary pair-wise rankings among feasible alternative land uses for the site, along with weights for the attributes.

The final output will be a score-based prioritization of the feasible alternative land uses (linked to livelihood activities) for the site. (Detailed methodological process and input requirements are presented in the Annexure – I).

<sup>5</sup> Mu, Y., 2006. Developing a suitability index for residential land use: a case study in Dianchi Drainage Area. A Thesis Submitted in Fulfillment of the Requirements for the Degree of Master of Science in Environmental Studies in Geography. Waterloo, Ontario, Canada.

<sup>6</sup> Soltanmohammadi, H., M. Osanloo and A.A. Bazzazi (2010), "An analytical approach with a reliable logic and a ranking policy for post-mining land-use determination". *Land Use Policy* 27: 364-72.



**Objective (b): To develop permanent green cover on overburden dumps/backfilled mined land area using mycorrhiza and various plant species of economic importance.**

Technically, the role of vegetation cover on overburden dump slope can be described as hydrogeological and mechanical actions. Roots of vegetation play an important role to enhance dump stability by controlling interception of rainwater and evapotranspiration, and the resulting pore pressure reduction, whereas mechanical action in turn, reinforces the dump material by roots and enhances the shear strength of dump material. The action is closely related to root density, depth and strength.

Use of "mycorrhiza" with selected plant species can prove to be beneficial in the afforestation effort. Mycorrhizal fungi are a beneficial group of microorganisms that form a mutualistic relationship with living roots of higher plants. They expand the interface between plants and soil environment through extraradical fungal mycelium radiating from the colonized root cortex far into the surrounding soil and contribute to plant uptake of macronutrients such as phosphorus, nitrogen as well as micronutrients copper, and zinc. Arbuscular mycorrhizal fungi (AMF) also produce "glomalin" with a strong cementing capacity of soil particles and hence help in aggregation loose soil particles. Mycorrhiza also influence the physiology of their host plants making them less vulnerable to pathogens, soil pollution, salinity, drought and a number of other environmental stress factors. Such plant-AMF restoration mechanism is also supported by secreting plant exudates, e.g. short chain organic acids, phenolics, and small concentrations of high molecular weight compounds (enzymes and proteins) to stimulate bacterial transformations (enzyme induction); by building up of organic carbon to increase microbial mineralization rates (substrate enhancement) or by providing habitat for increased microbial populations and activity.

The proposal will demonstrate a mechanism to carry out effective reclamation of the overburdened sites, which at present occupy large area of land would in due course allow establishment of forest cover that could trap various benefits and improve the local environment. Appropriate tree species planted at site would provide following benefits:

- i. Ability to survive in environments as hostile as that of overburden
- ii. Ability to colonize mycorrhizal fungi and consequently other beneficial soil microorganisms
- iii. Green canopy to combat air discharge of dust from overburdened to a maximum extent
- iv. Huge network of plant roots to control soil erosion and stabilize dump slope
- v. Reduction in fugitive dust emission would improve living quality of nearby areas and reduce health hazards associated with it.



- vi. Plants of economic importance to give forest product such as fuel, wood, timber and pulp that would improve livelihood of local peoples.

**Objective (c): To develop entrepreneurship and vocational skills among members of local Self Help Groups (SHGs) for community (with a focus on women) empowerment through access to new economic opportunities.**

Self-help groups (SHGs) have emerged as a promising tool for the socio-economic and political empowerment of rural communities in many developing countries of the world (Steiner, 2008<sup>7</sup>). It is a process of empowerment of rural communities (Alene, 2011). The process is often reckoned as "do-it-themselves" (Benedict<sup>8</sup>, 2010). In India, SHGs have been well accepted as a development strategy for poverty reduction in rural areas (Chen et al, 2007<sup>9</sup>). Though, the early focus of SHGs was to act as an alternative credit source for the poor, of late SHGs are viewed as an integral component for delivering financial services, livelihood promotion and overall community development (Das and Bhowal, 2013<sup>10</sup>). The success of SHGs hinges on providing them adequate local institutional support, building their capacities and guiding them on a continuous manner (Tesoriero, 2006<sup>11</sup>).

This project will aim to develop entrepreneurship and vocational skills among the local SHGs. In the first year the emphasis will be on formation of a number of SHGs from the project affected people (PAP) and local settlements. Capacity building workshops, exposure visits, demonstration activities, etc will be gradually scaled up as the project progresses. A unique aspect of the livelihood component will be the training of local trainers from the PAP over the project period.

#### Objective D:

TERI University follows a four semester curriculum design for all its Master's programmes. An attempt is made to build in research into all the master's programmes and this is done through research projects being undertaken by the students at two stages.

<sup>7</sup> Steiner, G (2008) "The Self Help Group Approach", Published by kindernothife, Germany.

<sup>8</sup> Benedict, A (2010) "Self-Help as a Strategy for Rural Development in Nigeria: A Bottom Up Approach", *Journal of Alternative Perspectives in the Social Sciences*, Vol. 2, No.1, pp.88-111.

<sup>9</sup> Chen, M., R. Jhabvala, R. Kanbur, and C Richards (2007) 'Membership based Organisations of the Poor: Concepts, Experience and Policy', Routledge Publications, London and New York

<sup>10</sup> Das, S K, and A Bhowal (2013) "Self Help Groups: An Empowerment Model or Financial Model: Perceptions of ZStakeholders", *European Journal of Business and Management*, Vol.5, No.29, pp.170-190.

<sup>11</sup> Tesoriero, F (2006) "Strengthening Communities through Women's Self Help Groups in South India", *Community Development Journal*, Issue 41, No.3, pp.321-333.



TERI University students could work on their major projects in the proposed R&D project. TERI University will collaborate with CMPDI to identify the themes of mutual interest, and formulate them as research topics that could be floated to the students in their third semester.

The student projects can possibly aim at generating baseline data on environmental parameters, conducting needs assessment of the villages near the project area, impact assessment of the clean energy intervention on local livelihoods, and so on. An emphasis will be on producing several case studies of the R&D project through the engagement of students.

## 7.2 Organization of work elements:

For Objective (a), the proposed work elements are as follows:

- a. Finalization of site choice from MCL's OCM areas (in consultation with CMPDI)
- b. Conceptualization of MLSA framework (expert validation of proposed land-use and livelihood activities; identification of decision attributes in consultation with CMPDI)
- c. Purchase of Expert Choice software
- d. Conduct of stakeholders workshop (in association with CMPDI)
- e. Data analysis using Expert Choice & paper presentation on results (in association with CMPDI)

For Objective (b), the proposed work elements are as follows:

- a. Arrangement of resources (store room, seed, compost etc.) at site
- b. Preparation of saplings at nursery
- c. Installation of drip irrigation system at site
- d. Plantation on 5 acres land (L1)
- e. Development of grasses on L1
- f. Plantation on another 5 acres land (L2)
- g. Development of grasses on L2
- h. Plantation on another 5 acres land (L3)
- i. Development of grasses on L3
- j. Maintenance of plants and grasses at site (L1+L2+L3)



For Objective (c), the proposed work elements are as follows:

- a. Socio-economic needs and capabilities assessment of local communities; assessment of market linkages, local value chains, micro-credit requirements, etc
- b. Liaison with forest department and other government agencies
- c. Community mobilization; formation of SHGs (if not existing at present); sensitization and exposure visits for SHG members
- d. Launch of vocational training programme (monthly once, 3 to 5 days) including training of trainers.
- e. Training (yearly once) on entrepreneurship development for SHGs (marketing, book-keeping, banking, etc)
- f. Refresher trainings (yearly once) on livelihood activities, experience sharing workshops, and exposure visits for SHG members
- g. Participatory monitoring and reporting

For Objective (d), the proposed work elements are as follows:

- a. Selection of themes for student projects (in collaboration with CMPDI)
- b. Project work by students (January to June, every year beginning 2015)
- c. Case study preparation by student team in last year of intervention



## 7.3 Time schedule of activities with milestones (shown in the shaded cells as "M"):

Activity Track #1	Time line (months/total required months)						Responsibility
	6/36	12/36	18/36	24/36	30/36	36/36	
Finalization of site choice							TU+ CMPDI
Conceptualization of MLSA framework							
Purchase of Expert Choice software							
Conduct of stakeholders workshop	M <sub>1</sub>						
Data analysis							
MLSA results presentation		M <sub>2</sub>					TU
Activity Track #2	6/36	12/36	18/36	24/36	30/36	36/36	
Arrangement of resources (store room, seed, compost etc.) at site							
Preparation of saplings at nursery							
Installation of drip irrigation system at site							
Plantation on 5 acres land (L1)		M <sub>4</sub>					
Development of grasses on L1							
Plantation on another 5 acres land (L2)			M <sub>6</sub>				
Development of grasses on L2							
Plantation on another 5 acres land (L3)					M <sub>8</sub>		
Development of grasses on L3							
Activity Track #3	6/36	12/36	18/36	24/36	30/36	36/36	TU
Socio-economic needs and capabilities assessment							
Liaison with forest dept. and other govt. agencies							
Community mobilization; formation of SHGs							
Launch of vocational training programme	M <sub>5</sub>						
Annual assessment and reporting of livelihood programme outputs and outcomes		M <sub>5</sub>		M <sub>7</sub>		M <sub>9</sub>	TU + CMPDI
Activity Track #4	6/36	12/36	18/36	24/36	30/36	36/36	
Student projects							
Case study preparation						M <sub>10</sub>	TU + CMPDI



## 8. Details of proposed outlay:

Sl No	Items	Total cost estimated in Rupees	Year-wise phasing of the cost		
			1st year	2nd year	3rd year
	<b>Capital expenditure</b>				
8.1	Land and building	2,00,000	2,00,000	0	0
8.2	Equipment	36,90,000	14,90,000	11,00,000	11,00,000
8.3a	Total capital (for TERI University)	38,90,000	16,90,000	11,00,000	11,00,000
8.3b	Total capital (for CMPDI)	NIL	NIL	NIL	NIL
	<b>Revenue expenditure</b>				
8.4a	Salaries and allowance (for TERI University)	44,92,800	14,97,600	14,97,600	14,97,600
8.4b	Salaries and allowance (for CMPDI)	81,00,000	31,50,000	27,00,000	22,50,000
8.5	Consumables	33,99,866	10,77,850	11,62,270	11,59,746
8.6	Travel	34,59,825	11,53,275	11,53,275	11,53,275
8.7	Others	1,00,36,034	37,37,667	28,44,278	34,54,089
8.8a	Total recurring (for TERI University)	2,13,88,525	74,66,392	66,57,423	72,64,710
8.8b	Total recurring (for CMPDI)	81,00,000	31,50,000	27,00,000	22,50,000
8.9a	Sub-Total (for TERI University)	2,52,78,525	91,56,392	77,57,423	83,64,710
8.9b	Sub-Total (for CMPDI)	81,00,000	31,50,000	27,00,000	22,50,000
8.10	Institute overheads (for TERI University = 15% of 8.9a)	37,91,779	13,73,459	11,63,613	12,54,707
8.11a	Total (for TERI University = 8.9a+8.10)	2,90,70,304	1,05,29,851	89,21,036	96,19,417
8.11b	Grand Total (for TERI University and CMPDI = 8.9b+8.11a)	3,71,70,304	1,36,79,851	1,16,21,036	1,18,69,417

Page 3 of 4

Foreign Exchange Component US \$ : 5000 (Exchange Rate : Rs 62 per 1 US\$)



F.No. 5-5/2014-TS.VII  
 Government of India  
 Ministry of Human Resource Development  
 Department of Higher Education  
 Technical Section - VII  
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Shastri Bhawan, New Delhi - 110115,  
 dated 4<sup>th</sup> September, 2014

To

The Pay & Accounts Officer (Edn.)  
 Pay & Accounts Office,  
 Department of Higher Education,  
 Shastri Bhawan, New Delhi-110115.

Subject: Release of 1<sup>st</sup> instalment of Grant to 20 Institutes (selected in 2<sup>nd</sup> round of selection) under the scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-15 (General).

Sir,

I am directed to convey the sanction of the President of India to the release of a sum of ₹ 22,27,35,000/- (₹ Twenty two crore twenty seven lakh thirty five thousand only) i.e. for release of ₹ 1,11,36,750/- (₹ One crore eleven lakh thirty six thousand seven hundred fifty only) to each of the following 20 Institutes (selected in 2<sup>nd</sup> round of selection by Steering Committee) under the Plan scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-2015 for meeting the recurring expenditure.

Sl No.	Name of the Institutions	Centres of Excellence (CoE)	Amt ₹ in lakh	Bank Details
1	Indian Institute of Technology, Kharagpur	E-Business	1,11,36,750	A/C No. 95562010000790, Syndicate Bank, IIT Branch, Kharagpur.
2	Indian Institute of Technology, Guwahati	Advanced Molecules and Materials	1,11,36,750	A/C No. 10196461054, State Bank of India, IIT Branch, Guwahati.
3	Indian Institute of Science Education and Research, Thiruvananthapuram	Computation, Modelling & Stimulations	1,11,36,750	A/C No. 0819101094002, Canara Bank, Cantonment Branch, Trivandrum.
4	TERI University, Vasant Kunj, New Delhi	Energy Storage and Solar Desalination	1,11,36,750	A/C No. 3159101001448, Canara Bank, Vasant Kunj Branch, New Delhi.
5	Central University of Jharkhand, Ranchi (Jharkhand)	Green & Efficient Energy Technologies (GEET)	1,11,36,750	A/C No. 30827946251, State Bank of India, Upper Bazar Branch, Ranchi (Jharkhand)
6	Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh)	Energy and Resources Development	1,11,36,750	A/C No. 32778803937, State Bank of India, IT Branch, BHU, Varanasi (U.P.)
7	Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu)	Energy Research	1,11,36,750	A/C No. 6241996830, Indian Bank, Sathyabama University Branch, Chennai (Tamil Nadu)
8	Indian School of Mines, Dhanbad	Renewable Energy	1,11,36,750	A/C No. 0986101009746, Canara Bank, Seraidheala Branch, Dhanbad (Jharkhand)

Dhanraj S / K Rajagopal  
 TERI

3.2.2.177

Under Secretary  
 Ministry of Human Resource Development,  
 Government of India  
 New Delhi

9	Banasthali University, Banasthali Vidyapith (Rajasthan)	Water and Energy	1,11,36,750	A/C No. 037094600000033, Yes Bank Ltd., Newai Branch, Tonk (Rajasthan)
10	Indian Institute of Technology, Bombay	Urban Science and Engineering	1,11,36,750	A/C No. 10725729173, State Bank of India, IIT Branch, Powai, Mumbai.
11	National Aerospace Laboratories, Bangalore (Karnataka)	Development of 3 dimensional composite concurred structures using Tufting technology	1,11,36,750	A/C No. 30268539001, State Bank of India, NAL Branch, Bangalore (Karnataka)
12	Tezpur University, Napam, Tezpur, Sonitpur (Assam)	Machine Learning Research and Big Data Analysis (MLRBD)	1,11,36,750	A/C No. 30448821505, State Bank of India, Tezpur Branch, Assam.
13	Indian Institute of Technology, Hyderabad	Sustainable Urban Development	1,11,36,750	A/C No. 34069788873, State Bank of India, IIT Branch, Hyderabad.
14	National Institute of Technology, Surathkal	Renewable Energy Integrated Smart Grid Technologies: Energy	1,11,36,750	A/C No. 8517101000001, Canara Bank, NITK Campus Branch, Surathkal.
15	Indian Institute of Technology, Bhubneshwar	Novel Energy Materials (NEM)	1,11,36,750	A/C No. 30824066553, State Bank of India, Fortune Towers Branch, Bhubneshwar.
16	Indian Institute of Science Education and Research, Mohali	Protein Science, Design & Engineering	1,11,36,750	A/C No. 2452201001094, Canara Bank, Consumer Finance Branch, Chandigarh.
17	Indian Institute of Science Education and Research, Pune	Research in Energy and Sustainable Materials	1,11,36,750	A/C No. 31125298801, State Bank of India, NCL Campus Branch, Pune.
18	Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu)	Microbes to Feed the World :Plant - Microbe Interactions to boost Agricultural Production	1,11,36,750	A/C No. 10663188052, State Bank of India, TANU Branch, Coimbatore (Tamil Nadu)
19	West Bengal University of Technology, Salt Lake, Kolkata (West Bengal)	Environment Technology and Management: Water treatment for clean and green environment	1,11,36,750	A/C No. 6243002394, Indian Bank, Salt Lake Branch, Kolkata.
20	Indian Institute of Science Education and Research, Bhopal	Centre for Research on Environment and Sustainable Technologies (CREST): Clean Environment (air, water, soil) and sustainable technologies	1,11,36,750	A/C No. 2073201002554, Canara Bank, Canara Bank Zone 2, MP Nagar, Bhopal.
<b>Total</b>			<b>22,27,35,000</b>	

2. The payment of ₹ 22,27,35,000/- is subject to the following terms and conditions:

- The Institutes will start the project immediately after receipt of grant-in-aid from the Ministry;
- While undertaking the above project, the Institutes will fully utilize their expertise in implementing the objectives of the above mentioned Scheme.
- The Institutes will ensure due diligence while executing the project under the Scheme;
- The Institutes will identify Physical and Financial Targets, output and outcomes for the project and submit progress report, on the project clearly indicating Physical and Financial targets achieved and outputs and outcomes;
- The Head of the Institutes receiving the grant and project Head will also be responsible for ensuring that the project sanctioned vide this sanction letter achieves its goal with prudence at all levels as also for achievement of physical and Financial Targets, outputs and outcomes;

- (vi) Intellectual Property Rights(s) if any, generated /or experiences gained/or objectives achieved, as the case may be shall vest in the Ministry of Human Resource Development, Government of India and in the entire expert community involved in its development, since this Ministry is providing project funding;
- (vii) Further release of funds, if any, shall be subject to satisfactory progress in the implementation of the Project as indicated by achievement of set Physical and Financial Targets, output and outcome, with in the approved objectives/guidelines of the project.
- (viii) The Institutes shall furnish all necessary details/documents such as bank details/agency details/bond, etc. As applicable and asked for by the Government of India, Ministry of Human Resource Development, Department of Higher Education for release of grants.

3. The release of this payment is further subject to the following conditions:-

- a. The amount sanctioned should be utilized for the purpose for which it is sanctioned, as per Government approval to the above mentioned Scheme, and the Institutes may ensure that the expenditure is incurred as per approval granted by the Steering Committee. The Institutes shall maintain a separate account for the purpose and bank interests earned on the grant released by this Department, vide this sanction letter, shall be treated as part and parcel of this payment/grant.
  - b. The Institutes shall maintain appropriate accounts of the expenditure out of the payment/grant, which may be audited by the Comptroller and Auditor General of India and Internal Audit by Principal Accounts Officer (PAO), Ministry of Human Resource Development (MHRD). The Utilization Certificate, to the effect that the payment/grant has been utilized shall be furnished to this Ministry along with audited accounts, i.e., receipt and payment account, income and expenditure account and balance sheet after close of the financial year. The institute shall furnish Utilisation Certificate immediately after the closing of the financial year 2014-15.
  - c. The Institutes shall maintain a Register (Form No. 19) prescribed in General Financial Rules, of assets acquired out of this grant. A copy of this shall be furnished to the Ministry of Human Resource Development, Department of Higher Education for record. The register and asset shall be open to scrutiny by Audit and PAO, MHRD.
  - d. The Institutes will submit a copy of the approved annual accounts, duly approved by the Executive Board, to the office of Director General of Audit, Central Revenues, I.P. Estates, New Delhi-110002 within three months from the close of the financial year (i.e. by 30<sup>th</sup> June).
4. The amount sanctioned is debitable to Demand No. 60, Department of Higher Education, Major Head 2203-Technical Education, Minor Head 00.800-Other Expenditure , Sub Head 17- Training & Research in Frontier Areas, 17.00.31 Grant-in-aid-General for the year 2014-15.
5. The of ₹ 22,27,35,000/- (₹ Twenty two crore twenty seven lakh thirty five thousand only) shall be drawn by the Drawing & Disbursing Officer (Grant), Ministry of Human Resource Development, Department of Higher Education, New Delhi on the prescribed proforma of Grant-in-aid Bill by presenting to Pay & Accounts Officer and paid to the Institutions and payment remitted directly to the grantee's account and telegraphically transferred to 20 Institute's as per detail at para 1 above.

(DAULAT RAM)  
 धन्य साहिब, Under Secretary  
 भारत सरकार / Govt. of India  
 श्री. ए. आ. मन्त्रालय / Min. of H. R. D.  
 प्रधान विद्या विभाग / Dir. Higher Edn.  
 नई दिल्ली / New Delhi



6. The pattern of grant /expenditure has been approved by the Ministry of Finance and the sanction is being issued in conformity with rules and principles of the 'Scheme as approved by the Ministry of Finance.

7. Any future grant will be released to these Institutions under this Scheme only after they have satisfied the Ministry that adequate provision for representation of SC/ST has been made in its constitution/rules and these are being followed in actual practice in filling up vacancies reserved for SC/ST candidates every year.

9. The funds released under the scheme is subject to the condition that the grantee Institutes are situated under jurisdiction of the concerned Director General of Audit.

10. The Accounts shall be open to a test check by the Comptroller and Auditor General of India at his discretion as well as Internal Audit by Principal Account Office, MHRD (Department of Higher Education).

11. It is certified that utilization certificate which is due in respect of the Scheme under this project against the grantee Institute(s) is submitted by the respective grantee Institution.

12. The sanction is issued in exercise of delegated powers and accordance with the Integrated Finance Division vide Dy. No. 4100 dated 19.08.2014 and IF.I Section vide their Dy. No. 394/14 IF.I dated 26.08.2014.

Yours faithfully,

(DAULAT RAM)  
Under Secretary  
Min. of H. R. D.  
Under Secretary to the Govt. of India  
New Delhi

Copy with two spare copies forwarded to Grant-in-Aid Section along with necessary bills.

Copy to:

- 1 Indian Institute of Technology, Kharagpur.
- 2 Indian Institute of Technology, Guwahati.
- 3 Indian Institute of Science Education and Research, Thiruvananthapuram.
- 4 TERI University, Vasant Kunj, New Delhi.
- 5 Central University of Jharkhand, Ranchi (Jharkhand).
- 6 Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh).
- 7 Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu).
- 8 Indian School of Mines, Dhanbad.
- 9 Banasthali University, Banasthali Vidyapith (Rajasthan).
- 10 Indian Institute of Technology, Bombay.
- 11 National Aerospace Laboratories, Bangalore (Karnataka).
- 12 Tezpur University, Napam, Tezpur, Sonitpur (Assam).

- 13 Indian Institute of Technology, Hyderabad.
- 14 National Institute of Technology, Surathkal.
- 15 Indian Institute of Technology, Bhubaneswar.
- 16 Indian Institute of Science Education and Research, Mohali.
- 17 Indian Institute of Science Education and Research, Pune.
- 18 Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu).
- 19 West Bengal University of Technology, Salt Lake, Kolkata (West Bengal).
- 20 Indian Institute of Science Education and Research, Bhopal.
- 21 The Director General of Audit, Central Revenues, I.P. Estate, New Delhi.
- 22 Internal Audit, Principal Accounts Office, MHRD, Shastri Bhawan, New Delhi.
- 23 IF-1                      24. E.C. Unit                      25. IFD                      26. Guard file

(Daulat Ram)

Under Secretary to the Government of India

(DAULAT RAM)

उपसचिव/Under Secretary

प्रधान सरकार/Govt. of India

मा. श. शि. मन्त्रालय/Min. of H. E. D.

प्रधान विद्यापीठ/Dia Higher Edu.

नई दिल्ली/New Delhi





F.No. 5-5/2014-TS.VII  
Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Technical Section - VII  
\*\*\*\*\*

Shastri Bhawan, New Delhi - 110115,  
dated 4<sup>th</sup> September, 2014

To

The Pay & Accounts Officer (Edn.)  
Pay & Accounts Office,  
Department of Higher Education,  
Shastri Bhawan, New Delhi-110115.

Subject: Release of 1<sup>st</sup> instalment of Grant to 20 Institutes (selected in 2<sup>nd</sup> round of selection) under the scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-15 (SC).

Sir,

I am directed to convey the sanction of the President of India to the release of a sum of ₹ 4,31,10,000/- (₹ Four crore thirty one lakh ten thousand only) i.e. for release ₹ 21,55,500/- (₹ Twenty one lakh fifty five thousand five hundred only) to each of the following 20 Institutes (selected in 2<sup>nd</sup> round of selection by Steering Committee) under the Plan scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-2015 for meeting the recurring expenditure.

Sl No.	Name of the Institutions	Centres of Excellence (CoE)	Amt ₹ in lakh	Bank Details
1	Indian Institute of Technology, Kharagpur	E-Business	21,55,500	A/C No. 95562010000790, Syndicate Bank, IIT Branch, Kharagpur.
2	Indian Institute of Technology, Guwahati	Advanced Molecules and Materials	21,55,500	A/C No. 10196461054, State Bank of India, IIT Branch, Guwahati.
3	Indian Institute of Science Education and Research, Thiruvananthapuram	Computation, Modelling & Stimulations	21,55,500	A/C No. 0819101094002, Canara Bank, Cantonment Branch, Trivandrum.
4	TERI University, Vasant Kunj, New Delhi	Energy Storage and Solar Desalination	21,55,500	A/C No. 3159101001448, Canara Bank, Vasant Kunj Branch, New Delhi.
5	Central University of Jharkhand, Ranchi (Jharkhand)	Green & Efficient Energy Technologies (GEET)	21,55,500	A/C No. 30827946251, State Bank of India, Upper Bazar Branch, Ranchi (Jharkhand)
6	Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh)	Energy and Resources Development	21,55,500	A/C No. 32778803937, State Bank of India, IT Branch, BHU, Varanasi (U.P.)
7	Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu)	Energy Research	21,55,500	A/C No. 6241996830, Indian Bank, Sathyabama University Branch, Chennai (Tamil Nadu)
8	Indian School of Mines, Dhanbad	Renewable Energy	21,55,500	A/C No. 0986101009746, Canara Bank, Seraidheala Branch, Dhanbad (Jharkhand)

9	Banasthali University, Banasthali Vidyapith (Rajasthan)	Water and Energy	21,55,500	A/C No. 037094600000033, Yes Bank Ltd., Newai Branch, Tonk (Rajasthan)
10	Indian Institute of Technology, Bombay	Urban Science and Engineering	21,55,500	A/C No. 10725729173, State Bank of India, IIT Branch, Powai, Mumbai.
11	National Aerospace Laboratories, Bangalore (Karnataka)	Development of 3 dimensional composite concurred structures using Tufting technology	21,55,500	A/C No. 30268539001, State Bank of India, NAL Branch, Bangalore (Karnataka)
12	Tezpur University, Napam, Tezpur, Sonitpur (Assam)	Machine Learning Research and Big Data Analysis (MLRBD)	21,55,500	A/C No. 30448821505, State Bank of India, Tezpur Branch, Assam.
13	Indian Institute of Technology, Hyderabad	Sustainable Urban Development	21,55,500	A/C No. 34069788873, State Bank of India, IIT Branch, Hyderabad.
14	National Institute of Technology, Surathkal	Renewable Energy Integrated Smart Grid Technologies: Energy	21,55,500	A/C No. 8517101000001, Canara Bank, NITK Campus Branch, Surathkal.
15	Indian Institute of Technology, Bhubneshwar	Novel Energy Materials (NEM)	21,55,500	A/C No. 30824066553, State Bank of India, Fortune Towers Branch, Bhubneshwar.
16	Indian Institute of Science Education and Research, Mohali	Protein Science, Design & Engineering	21,55,500	A/C No. 2452201001094, Canara Bank, Consumer Finance Branch, Chandigarh.
17	Indian Institute of Science Education and Research, Pune	Research in Energy and Sustainable Materials	21,55,500	A/C No. 31125298801, State Bank of India, NCL Campus Branch, Pune.
18	Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu)	Microbes to Feed the World: Plant - Microbe Interactions to boost Agricultural Production	21,55,500	A/C No. 10663188052, State Bank of India, TANU Branch, Coimbatore (Tamil Nadu)
19	West Bengal University of Technology, Salt Lake, Kolkata (West Bengal)	Environment Technology and Management: Water treatment for clean and green environment	21,55,500	A/C No. 6243002394, Indian Bank, Salt Lake Branch, Kolkata.
20	Indian Institute of Science Education and Research, Bhopal	Centre for Research on Environment and Sustainable Technologies (CREST): Clean Environment (air, water, soil) and sustainable technologies	21,55,500	A/C No. 2073201002554, Canara Bank, Canara Bank Zone 2, MP Nagar, Bhopal.
<b>Total</b>			<b>4,31,10,000</b>	

2. The payment of ₹ 4,31,10,000/- is subject to the following terms and conditions:

- The Institutes will start the project immediately after receipt of grant-in-aid from the Ministry;
- While undertaking the above project, the Institutes will fully utilize their expertise in implementing the objectives of the above mentioned Scheme.
- The Institutes will ensure due diligence while executing the project under the Scheme;
- The Institutes will identify Physical and Financial Targets, output and outcomes for the project and submit progress report, on the project clearly indicating Physical and Financial targets achieved and outputs and outcomes;
- The Head of the Institutes receiving the grant and project Head will also be responsible for ensuring that the project sanctioned vide this sanction letter achieves its goal with prudence at all levels as also for achievement of physical and Financial Targets, outputs and outcomes;

(DAULAT RAM)  
 Joint Secretary/Under Secretary  
 Ministry of Science & Technology, Govt. of India  
 Dr. R. K. Mishra/Min. of H. R. D.  
 Joint Secretary/Min. of Higher Education  
 Dr. R. K. Mishra/Min. of Health




- (vi) Intellectual Property Rights(s) if any, generated /or experiences gained/or objectives achieved, as the case may be shall vest in the Ministry of Human Resource Development, Government of India and in the entire expert community involved in its development, since this Ministry is providing project funding;
  - (vii) Further release of funds, if any, shall be subject to satisfactory progress in the implementation of the Project as indicated by achievement of sent Physical and Financial Targets, output and outcome, with in the approved objectives/guidelines of the project.
  - (viii) The Institutes shall furnish all necessary details/documents such as bank details, agency details/bond, etc. As applicable and asked for by the Government of India, Ministry of Human Resource Development, Department of Higher Education for release of grants.
3. The release of this payment is further subject to the following conditions:-
- a. The amount sanctioned should be utilized for the purpose for which it is sanctioned, as per Government approval to the above mentioned Scheme, and the Institutes may ensure that the expenditure is incurred as per approval granted by the Steering Committee. The Institutes shall maintain a separate account for the purpose and bank interests earned on the grant released by this Department, vide this sanction letter, shall be treated as part and parcel of this payment/grant.
  - b. The Institutes shall maintain appropriate accounts of the expenditure out of the payment/grant, which may be audited by the Comptroller and Auditor General of India and Internal Audit by Principal Accounts Officer (PAO), Ministry of Human Resource Development (MHRD). The Utilization Certificate, to the effect that the payment/grant has been utilized shall be furnished to this Ministry along with audited accounts, i.e., receipt and payment account, income and expenditure account and balance sheet after close of the financial year. The institute shall furnish Utilisation Certificate immediately after the closing of the financial year 2014-15.
  - c. The Institutes shall maintain a Register (Form No. 19) prescribed in General Financial Rules, of assets acquired out of this grant. A copy of this shall be furnished to the Ministry of Human Resource Development, Department of Higher Education for record. The register and asset shall be open to scrutiny by Audit and PAO, MHRD.
  - d. The Institutes will submit a copy of the approved annual accounts, duly approved by the Executive Board, to the office of Director General of Audit, Central Revenues, I.P. Estates, New Delhi-110002 within three months from the close of the financial year (i.e. by 30<sup>th</sup> June).
4. The amount sanctioned is debitable to Demand No. 60, Department of Higher Education, - Major Head 2203-Technical Education, Minor Head 00.789-Special Component Plan for Schedule Caste, Sub Head 38- Training & Research in Frontier Areas, 38.00.31 Grant-in-aid-General for the year 2014-15.
5. The of ₹ 4,31,10,000/- (₹ Four crore thirty one lakh ten thousand only) shall be drawn by the Drawing & Disbursing Officer (Grant), Ministry of Human Resource Development, Department of Higher Education, New Delhi on the prescribed proforma of Grant-in-aid Bill by presenting to Pay & Accounts Officer and paid to the Institutions and payment remitted directly to the grantee's account and telegraphically transferred to 20 Institute's as per para 1 above.

(सिनिअर ऑफिसर)  
 ऑफिस सचिव/Under Secretary  
 ऑफिस सचिव, Govt. of India  
 ऑफिस सचिव, Ministry of H.R.D.  
 ऑफिस सचिव, Ministry of H.E.  
 ऑफिस सचिव, New Delhi



6. The pattern of grant /expenditure has been approved by the Ministry of Finance and the sanction is being issued in conformity with rules and principles of the Scheme as approved by the Ministry of Finance.
7. Any future grant will be released to these Institutions under this Scheme only after they have satisfied the Ministry that adequate provision for representation of SC/ST has been made in its constitution/rules and these are being followed in actual practice in filling up vacancies reserved for SC/ST candidates every year.
9. The funds released under the scheme is subject to the condition that the grantee Institutes are situated under jurisdiction of the concerned Director General of Audit.
10. The Accounts shall be open to a test check by the Comptroller and Auditor General of India at his discretion as well as Internal Audit by Principal Account Office, MHRD (Department of Higher Education).
11. It is certified that utilization certificate which is due in respect of the Scheme under this project against the grantee Institute(s) is submitted by the respective grantee Institution.
12. The sanction is issued in exercise of delegated powers and accordance with the Integrated Finance Division vide Dy. No. 4100 dated 19.08.2014 and I.F.I Section vide their Dy. No. 394/14 I.F.I dated 26.08.2014.

Yours faithfully,

  
 (DAULET RAM)  
 Under Secretary to the Govt. of India  
 Ministry of Education, New Delhi

Copy with two spare copies forwarded to Grant-in-Aid Section along with necessary bills.

Copy to:

- 1 Indian Institute of Technology, Kharagpur.
- 2 Indian Institute of Technology, Guwahati.
- 3 Indian Institute of Science Education and Research, Thiruvananthapuram.
- 4 TERI University, Vasant Kunj, New Delhi.
- 5 Central University of Jharkhand, Ranchi (Jharkhand).
- 6 Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh).
- 7 Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu).
- 8 Indian School of Mines, Dhanbad.
- 9 Banasthali University, Banasthali Vidyapith (Rajasthan).
- 10 Indian Institute of Technology, Bombay.
- 11 National Aerospace Laboratories, Bangalore (Karnataka).
- 12 Tezpur University, Napam, Tezpur, Sonitpur (Assam).

- 13 Indian Institute of Technology, Hyderabad.
- 14 National Institute of Technology, Surathkal.
- 15 Indian Institute of Technology, Bhubaneswar.
- 16 Indian Institute of Science Education and Research, Mohali.
- 17 Indian Institute of Science Education and Research, Pune.
- 18 Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu).
- 19 West Bengal University of Technology, Salt Lake, Kolkata (West Bengal).
- 20 Indian Institute of Science Education and Research, Bhopal.
- 21 The Director General of Audit, Central Revenues, I.P. Estate, New Delhi.
- 22 Internal Audit, Principal Accounts Office, MHRD, Shastri Bhawan, New Delhi.
- 23 IF-1
24. E.C. Unit
25. IFD
26. Guard file

(विनीत शर्मा)  
 (DAU/Drafting Room)  
 Under Secretary to the Govt. of India  
 न. स. वि. मन्त्रालय / MIN. of H. R. D.  
 प्रधान मन्त्री, दिल्ली / Prime Minister, Delhi  
 नया दिल्ली / New Delhi

3.2.1.G.23.

3.2.2.188



F.No. 5-5/2014-15.VII  
Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Technical Section - VII  
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Shastri Bhawan, New Delhi - 110115  
dated 4<sup>th</sup> September, 2014

To

The Pay & Accounts Officer (Edn.)  
Pay & Accounts Office,  
Department of Higher Education,  
Shastri Bhawan, New Delhi-110115.

Subject: Release of 1<sup>st</sup> instalment of Grant to 20 Institutes (selected in 2<sup>nd</sup> round of selection) under the scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-15 (ST).

Sir,

I am directed to convey the sanction of the President of India to the release of a sum of ₹ 2,15,55,000/- (₹ Two crore fifteen lakh fifty five thousand only) i.e. for release of ₹ 10,77,750/- (₹ Ten lakh seventy seven thousand seven hundred fifty only) to each of the following 20 Institutes (selected in 2<sup>nd</sup> round of selection by Steering Committee) under the Plan scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-2015 for meeting the recurring expenditure.

Sl No.	Name of the Institutions	Centres of Excellence (CoE)	Amt ₹ in lakh	Bank Details
1	Indian Institute of Technology, Kharagpur	E-Business	10,77,750	A/C No. 95562010000790, Syndicate Bank, IIT Branch, Kharagpur.
2	Indian Institute of Technology, Guwahati	Advanced Molecules and Materials	10,77,750	A/C No. 10196461054, State Bank of India, IIT Branch, Guwahati.
3	Indian Institute of Science Education and Research, Thiruvananthapuram	Computation, Modelling & Stimulations	10,77,750	A/C No. 0819101094002, Canara Bank, Cantonment Branch, Trivandrum.
4	TERI University, Vasant Kunj, New Delhi	Energy Storage and Solar Desalination	10,77,750	A/C No. 3159101001448, Canara Bank, Vasant Kunj Branch, New Delhi.
5	Central University of Jharkhand, Ranchi (Jharkhand)	Green & Efficient Energy Technologies (GEET)	10,77,750	A/C No. 30827946251, State Bank of India, Upper Bazar Branch, Ranchi (Jharkhand)
6	Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh)	Energy and Resources Development	10,77,750	A/C No. 32778803937, State Bank of India, IT Branch, BHU, Varanasi (U.P.)
7	Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu)	Energy Research	10,77,750	A/C No. 6241996830, Indian Bank, Sathyabama University Branch, Chennai (Tamil Nadu)
8	Indian School of Mines, Dhanbad	Renewable Energy	10,77,750	A/C No. 0986101009746, Canara Bank, Seraidheela Branch, Dhanbad (Jharkhand)

9	Banasthali University, Banasthali Vidyapith (Rajasthan)	Water and Energy	10,77,750	A/C No. 037094600000033, Yes Bank Ltd., Newai Branch, Tonk (Rajasthan)
10	Indian Institute of Technology, Bombay	Urban Science and Engineering	10,77,750	A/C No. 10725729173, State Bank of India, IIT Branch, Powai, Mumbai.
11	National Aerospace Laboratories, Bangalore (Karnataka)	Development of 3 dimensional composite concurred structures using Tufting technology	10,77,750	A/C No. 30268539001, State Bank of India, NAL Branch, Bangalore (Karnataka)
12	Tezpur University, Napam, Tezpur, Sonitpur (Assam)	Machine Learning Research and Big Data Analysis (MLRBD)	10,77,750	A/C No. 30448821505, State Bank of India, Tezpur Branch, Assam.
13	Indian Institute of Technology, Hyderabad	Sustainable Urban Development	10,77,750	A/C No. 34069788873, State Bank of India, IIT Branch, Hyderabad.
14	National Institute of Technology, Surathkal	Renewable Energy Integrated Smart Grid Technologies: Energy	10,77,750	A/C No. 8517101000001, Canara Bank, NITK Campus Branch, Surathkal.
15	Indian Institute of Technology, Bhubneshwar	Novel Energy Materials (NEM)	10,77,750	A/C No. 30824066553, State Bank of India, Fortune Towers Branch, Bhubneshwar.
16	Indian Institute of Science Education and Research, Mohali	Protein Science, Design & Engineering	10,77,750	A/C No. 2452201001094, Canara Bank, Consumer Finance Branch, Chandigarh.
17	Indian Institute of Science Education and Research, Pune	Research in Energy and Sustainable Materials	10,77,750	A/C No. 31125298801, State Bank of India, NCL Campus Branch, Pune.
18	Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu)	Microbes to Feed the World : Plant – Microbe Interactions to boost Agricultural Production	10,77,750	A/C No. 10663188052, State Bank of India, TANU Branch, Coimbatore (Tamil Nadu)
19	West Bengal University of Technology, Salt Lake, Kolkata (West Bengal)	Environment Technology and Management: Water treatment for clean and green environment	10,77,750	A/C No. 6243002394, Indian Bank, Salt Lake Branch, Kolkata.
20	Indian Institute of Science Education and Research, Bhopal	Centre for Research on Environment and Sustainable Technologies (CREST): Clean Environment (air, water, soil) and sustainable technologies	10,77,750	A/C No. 2073201002554, Canara Bank, Canara Bank Zone 2, MP Nagar, Bhopal.
<b>Total</b>			<b>2,15,55,000</b>	

2. The payment of ₹ 2,15,55,000/- is subject to the following terms and conditions:

- The Institutes will start the project immediately after receipt of grant-in-aid from the Ministry;
- While undertaking the above project, the Institutes will fully utilize their expertise in implementing the objectives of the above mentioned Scheme.
- The Institutes will ensure due diligence while executing the project under the Scheme;
- The Institutes will identify Physical and Financial Targets, output and outcomes for the project and submit progress report, on the project clearly indicating Physical and Financial targets achieved and outputs and outcomes;
- The Head of the Institutes receiving the grant and project Head will also be responsible for ensuring that the project sanctioned vide this sanction letter achieves its goal with prudence at all levels as also for achievement of physical and Financial Targets, outputs and outcomes;

- (vi) Intellectual Property Rights(s) if any, generated /or experiences gained/or objectives achieved, as the case may be shall vest in the Ministry of Human Resource Development, Government of India and in the entire expert community involved in its development, since this Ministry is providing project funding;
- (vii) Further release of funds, if any, shall be subject to satisfactory progress in the implementation of the Project as indicated by achievement of sent Physical and Financial Targets, output and outcome, with in the approved objectives/guidelines of the project.
- (viii) The Institutes shall furnish all necessary details/documents such as bank details/agency details/bond, etc. As applicable and asked for by the Government of India, Ministry of Human Resource Development, Department of Higher Education for release of grants.

3. The release of this payment is further subject to the following conditions:-

- a. The amount sanctioned should be utilized for the purpose for which it is sanctioned, as per Government approval to the above mentioned Scheme, and the Institutes may ensure that the expenditure is incurred as per approval granted by the Steering Committee. The Institutes shall maintain a separate account for the purpose and bank interests earned on the grant released by this Department, vide this sanction letter, shall be treated as part and parcel of this payment/grant.
- b. The Institutes shall maintain appropriate accounts of the expenditure out of the payment/grant, which may be audited by the Comptroller and Auditor General of India and Internal Audit by Principal Accounts Officer (PAO), Ministry of Human Resource Development (MHRD). The Utilization Certificate, to the effect that the payment/grant has been utilized shall be furnished to this Ministry along with audited accounts, i.e., receipt and payment account, income and expenditure account and balance sheet after close of the financial year. The institute shall furnish Utilisation Certificate immediately after the closing of the financial year 2014-15.
- c. The Institutes shall maintain a Register (Form No. 19) prescribed in General Financial Rules, of assets acquired out of this grant. A copy of this shall be furnished to the Ministry of Human Resource Development, Department of Higher Education for record. The register and asset shall be open to scrutiny by Audit and PAO, MHRD.
- d. The Institutes will submit a copy of the approved annual accounts, duly approved by the Executive Board, to the office of Director General of Audit, Central Revenues, I.P. Estates, New Delhi-110002 within three months from the close of the financial year (i.e. by 30<sup>th</sup> June).

4. The amount sanctioned is debitable to Demand No. 60, Department of Higher Education, Major Head 2203-Technical Education, Minor Head 00.796-Schedule Tribe Sub Plans, Sub Head 38- Training & Research in Frontier Areas, 38.00.31 Grant-in-aid-General for the year 2014-15.

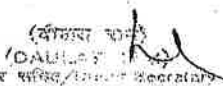
5. The of ₹ 2,15,55,000/- (₹ Two crore fifteen lakh fifty five thousand only) shall be drawn by the Drawing & Disbursing Officer (Grant), Ministry of Human Resource Development, Department of Higher Education, New Delhi on the prescribed proforma of Grant-in-aid Bill by presenting to Pay & Accounts Officer and paid to the Institutions and payment remitted directly to the grantee's account and telegraphically transferred to 20 Institute's as per detail at para 1 above.

(Signature)  
 (Official Stamp)  
 Director General of Audit,  
 Central Revenues, I.P. Estates,  
 New Delhi-110002



6. The pattern of grant /expenditure has been approved by the Ministry of Finance and the sanction is being issued in conformity with rules and principles of the Scheme as approved by the Ministry of Finance.
7. Any future grant will be released to these Institutions under this Scheme only after they have satisfied the Ministry that adequate provision for representation of SC/ST has been made in its constitution/rules and these are being followed in actual practice in filling up vacancies reserved for SC/ST candidates every year.
9. The funds released under the scheme is subject to the condition that the grantee Institutes are situated under jurisdiction of the concerned Director General of Audit.
10. The Accounts shall be open to a test check by the Comptroller and Auditor General of India at his discretion as well as Internal Audit by Principal Account Office, MHRD (Department of Higher Education).
11. It is certified that utilization certificate which is due in respect of the Scheme under this project against the grantee Institute(s) is submitted by the respective grantee Institution.
12. The sanction is issued in exercise of delegated powers and accordance with the Integrated Finance Division vide Dy. No. 4100 dated 19.08.2014 and IF.I Section vide their Dy. No. 394/14 IF.I dated 26.08.2014.

Yours faithfully,

  
 (DAVLAT RAM)  
 Under Secretary to the Govt. of India

Copy with two spare copies forwarded to Grant-in-Aid Section along with necessary bills.

Copy to:

- 1 Indian Institute of Technology, Kharagpur.
- 2 Indian Institute of Technology, Guwahati.
- 3 Indian Institute of Science Education and Research, Thiruvananthapuram.
- 4 TERI University, Vasant Kunj, New Delhi.
- 5 Central University of Jharkhand, Ranchi (Jharkhand).
- 6 Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh).
- 7 Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu).
- 8 Indian School of Mines, Dhanbad.
- 9 Banasthali University, Banasthali Vidyapith (Rajasthan).
- 10 Indian Institute of Technology, Bombay.
- 11 National Aerospace Laboratories, Bangalore (Karnataka).
- 12 Tezpur University, Napam, Tezpur, Sonitpur (Assam).

- 13 Indian Institute of Technology, Hyderabad.
- 14 National Institute of Technology, Surathkal.
- 15 Indian Institute of Technology, Bhubaneswar.
- 16 Indian Institute of Science Education and Research, Mohali.
- 17 Indian Institute of Science Education and Research, Pune.
- 18 Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu).
- 19 West Bengal University of Technology, Salt Lake, Kolkata (West Bengal).
- 20 Indian Institute of Science Education and Research, Bhopal.
- 21 The Director General of Audit, Central Revenues, I.P. Estate, New Delhi.
- 22 Internal Audit, Principal Accounts Office, MHRD, Shastri Bhawan, New Delhi.
- 23 IF-1                      24. E.C. Unit                      25. IFD                      26. Guard file

(Daulat Ram)  
Under Secretary to the Govt. of India  
Ministry of Education, Government of India

3.2.1.G.23.

3.2.2.194



F.No. 5-5/2014-TS.VII  
Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Technical Section - VII  
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Shastri Bhawan, New Delhi - 110115,  
dated 4<sup>th</sup> September, 2014

To

The Pay & Accounts Officer (Edn.)  
Pay & Accounts Office,  
Department of Higher Education,  
Shastri Bhawan, New Delhi-110115.

Subject: Release of 1<sup>st</sup> instalment of Grant to 20 Institutes (selected in 2<sup>nd</sup> round of selection) under the scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-15 (**General**).

Sir,

I am directed to convey the sanction of the President of India to the release of a sum of ₹ 97,65,000/- (₹ Ninety seven lakh sixty five thousand only) i.e. for release of ₹ 4,88,250/- (₹ Four lakh eighty eight thousand two hundred fifty only) to each of the following 20 Institutes (selected in 2<sup>nd</sup> round of selection by Steering Committee) under the Plan scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-2015 for meeting the non-recurring expenditure.

Sl No.	Name of the Institutions	Centres of Excellence (CoE)	Amt ₹ in lakh	Bank Details
1	Indian Institute of Technology, Kharagpur	E-Business	4,88,250	A/C No. 95562010000790, Syndicate Bank, IIT Branch, Kharagpur.
2	Indian Institute of Technology, Guwahati	Advanced Molecules and Materials	4,88,250	A/C No. 10196461054, State Bank of India, IIT Branch, Guwahati.
3	Indian Institute of Science Education and Research, Thiruvananthapuram	Computation, Modelling & Stimulations	4,88,250	A/C No. 0819101094002, Canara Bank, Cantonment Branch, Trivandrum.
✓ 4	TERI University, Vasant Kunj, New Delhi	Energy Storage and Solar Desalination	4,88,250	A/C No. 3159101001448, Canara Bank, Vasant Kunj Branch, New Delhi.
5	Central University of Jharkhand, Ranchi (Jharkhand)	Green & Efficient Energy Technologies (GEET)	4,88,250	A/C No. 30827946251, State Bank of India, Upper Bazar Branch, Ranchi (Jharkhand).
6	Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh)	Energy and Resources Development	4,88,250	A/C No. 32778803937, State Bank of India, IT Branch, BHU, Varanasi (U.P.).
7	Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu)	Energy Research	4,88,250	A/C No. 6241996830, Indian Bank, Sathyabama University Branch, Chennai (Tamil Nadu).
8	Indian School of Mines, Dhanbad	Renewable Energy	4,88,250	A/C No. 0986101009746, Canara Bank, Seraidheala Branch, Dhanbad (Jharkhand).

9	Banasthali University, Banasthali Vidyapith (Rajasthan)	Water and Energy	4,88,250	A/C No. 037094600000033, Yes Bank Ltd., Newai Branch, Tonk (Rajasthan)
10	Indian Institute of Technology, Bombay	Urban Science and Engineering	4,88,250	A/C No. 10725729173, State Bank of India, IIT Branch, Powai, Mumbai.
11	National Aerospace Laboratories, Bangalore (Karnataka)	Development of 3 dimensional composite concurred structures using Tufting technology	4,88,250	A/C No. 30268539001, State Bank of India, NAL Branch, Bangalore (Karnataka)
12	Tezpur University, Napam, Tezpur, Sonitpur (Assam)	Machine Learning Research and Big Data Analysis (MLRBD)	4,88,250	A/C No. 30448821505, State Bank of India, Tezpur Branch, Assam.
13	Indian Institute of Technology, Hyderabad	Sustainable Urban Development	4,88,250	A/C No. 34069788873, State Bank of India, IIT Branch, Hyderabad.
14	National Institute of Technology, Surathkal	Renewable Energy Integrated Smart Grid Technologies: Energy	4,88,250	A/C No. 8517101000001, Canara Bank, NITK Campus Branch, Surathkal.
15	Indian Institute of Technology, Bhubneshwar	Novel Energy Materials (NEM)	4,88,250	A/C No. 30824066553, State Bank of India, Fortune Towers Branch, Bhubneshwar.
16	Indian Institute of Science Education and Research, Mohali	Protein Science, Design & Engineering	4,88,250	A/C No. 2452201001094, Canara Bank, Consumer Finance Branch, Chandigarh.
17	Indian Institute of Science Education and Research, Pune	Research in Energy and Sustainable Materials	4,88,250	A/C No. 31125298801, State Bank of India, NCL Campus Branch, Pune.
18	Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu)	Microbes to Feed the World :Plant – Microbe Interactions to boost Agricultural Production	4,88,250	A/C No. 10663188052, State Bank of India, TANU Branch, Coimbatore (Tamil Nadu)
19	West Bengal University of Technology, Salt Lake, Kolkata (West Bengal)	Environment Technology and Management: Water treatment for clean and green environment	4,88,250	A/C No. 6243002394, Indian Bank, Salt Lake Branch, Kolkata.
20	Indian Institute of Science Education and Research, Bhopal	Centre for Research on Environment and Sustainable Technologies (CREST): Clean Environment (air, water, soil) and sustainable technologies	4,88,250	A/C No. 2073201002554, Canara Bank, Canara Bank Zone 2, MP Nagar, Bhopal.
<b>Total</b>			<b>97,65,000</b>	

2. The payment of ₹ 97,65,000/- is subject to the following terms and conditions:

- The Institutes will start the project immediately after receipt of grant-in-aid from the Ministry;
- While undertaking the above project, the Institutes will fully utilize their expertise in implementing the objectives of the above mentioned Scheme.
- The Institutes will ensure due diligence while executing the project under the Scheme;
- The Institutes will identify Physical and Financial Targets, output and outcomes for the project and submit progress report, on the project clearly indicating Physical and Financial targets achieved and outputs and outcomes;
- The Head of the Institutes receiving the grant and project Head will also be responsible for ensuring that the project sanctioned vide this sanction letter achieves its goal with prudence at all levels as also for achievement of physical and Financial Targets, outputs and outcomes;



- (vi) Intellectual Property Rights(s) if any, generated /or experiences gained/or objectives achieved, as the case may be shall vest in the Ministry of Human Resource Development, Government of India and in the entire expert community involved in its development, since this Ministry is providing project funding;
- (vii) Further release of funds, if any, shall be subject to satisfactory progress in the implementation of the Project as indicated by achievement of set Physical and Financial Targets, output and outcome, with in the approved objectives/guidelines of the project.
- (viii) The Institutes shall furnish all necessary details/documents such as bank details/agency details/bond, etc. As applicable and asked for by the Government of India, Ministry of Human Resource Development, Department of Higher Education for release of grants.

3. The release of this payment is further subject to the following conditions:-

- a. The amount sanctioned should be utilized for the purpose for which it is sanctioned, as per Government approval to the above mentioned Scheme, and the Institutes may ensure that the expenditure is incurred as per approval granted by the Steering Committee. The Institutes shall maintain a separate account for the purpose and bank interests earned on the grant released by this Department, vide this sanction letter, shall be treated as part and parcel of this payment/grant.
- b. The Institutes shall maintain appropriate accounts of the expenditure out of the payment/grant, which may be audited by the Comptroller and Auditor General of India and Internal Audit by Principal Accounts Officer (PAO), Ministry of Human Resource Development (MHRD). The Utilization Certificate, to the effect that the payment/grant has been utilized shall be furnished to this Ministry along with audited accounts, i.e., receipt and payment account, income and expenditure account and balance sheet after close of the financial year. The institute shall furnish Utilisation Certificate within 9 months after the closing of the financial year 2014-15.
- c. The Institutes shall maintain a Register (Form No. 19) prescribed in General Financial Rules, of assets acquired out of this grant. A copy of this shall be furnished to the Ministry of Human Resource Development, Department of Higher Education for record. The register and asset shall be open to scrutiny by Audit and PAO, MHRD.
- d. The Institutes will submit a copy of the approved annual accounts, duly approved by the Executive Board, to the office of Director General of Audit, Central Revenues, I.P. Estates, New Delhi-110002 within three months from the close of the financial year (i.e. by 30<sup>th</sup> June).

4. The amount sanctioned is debitable to Demand No. 60, Department of Higher Education, - Major Head 2203-Technical Education, Minor Head 00.800-Other Expenditure, Sub Head 17- Training & Research in Frontier Areas, 17.00.35 Grant for creation of capital assets for the year 2014-15.

5. The of ₹ 97,65,000/- (₹ Ninety seven lakh sixty five thousand only) shall be drawn by the Drawing & Disbursing Officer (Grant), Ministry of Human Resource Development, Department of Higher Education, New Delhi on the prescribed proforma of Grant-in-aid Bill by presenting to Pay & Accounts Officer and paid to the Institutions and payment remitted directly to the grantee's account and telegraphically transferred to 20 Institute's as per detail at para 1 above.



-: 4 :-

6. The pattern of grant /expenditure has been approved by the Ministry of Finance and the sanction is being issued in conformity with rules and principles of the Scheme as approved by the Ministry of Finance.

7. Any future grant will be released to these Institutions under this Scheme only after they have satisfied the Ministry that adequate provision for representation of SC/ST has been made in its constitution/rules and these are being followed in actual practice in filling up vacancies reserved for SC/ST candidates every year.

9. The funds released under the scheme is subject to the condition that the grantee Institutes are situated under jurisdiction of the concerned Director General of Audit.

10. The Accounts shall be open to a test check by the Comptroller and Auditor General of India at his discretion as well as Internal Audit by Principal Account Office, MHRD (Department of Higher Education).

11. It is certified that utilization certificate which is due in respect of the Scheme under this project against the grantee Institute(s) is submitted by the respective grantee Institution.

12. The sanction is issued in exercise of delegated powers and accordance with the Integrated Finance Division vide Dy. No. 4100 dated 19.08.2014 and IF.I Section vide their Dy. No. 394/14 IF.I dated 26.08.2014.

Yours faithfully,

(Daulai Ram) S. D.

Under Secretary to the Govt. of India

Copy with two spare copies forwarded to Grant-in-Aid Section along with necessary bills.

Copy to:

- 1 Indian Institute of Technology, Kharagpur.
- 2 Indian Institute of Technology, Guwahati.
- 3 Indian Institute of Science Education and Research, Thiruvananthapuram.
- 4 TERI University, Vasant Kunj, New Delhi.
- 5 Central University of Jharkhand, Ranchi (Jharkhand).
- 6 Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh).
- 7 Saithyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu).
- 8 Indian School of Mines, Dhanbad.
- 9 Banasthali University, Banasthali Vidyapith (Rajasthan).
- 10 Indian Institute of Technology, Bombay.
- 11 National Aerospace Laboratories, Bangalore (Karnataka).
- 12 Tezpur University, Napam, Tezpur, Sonitpur (Assam).

- 13 Indian Institute of Technology, Hyderabad.
- 14 National Institute of Technology, Surathkal.
- 15 Indian Institute of Technology, Bhubaneswar.
- 16 Indian Institute of Science Education and Research, Mohali.
- 17 Indian Institute of Science Education and Research, Pune.
- 18 Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu).
- 19 West Bengal University of Technology, Salt Lake, Kolkata (West Bengal).
- 20 Indian Institute of Science Education and Research, Bhopal.
- 21 The Director General of Audit, Central Revenues, I.P. Estate, New Delhi.
- 22 Internal Audit, Principal Accounts Office, MHRD, Shastri Bhawan, New Delhi.
- 23 IF-1                      24. E.C. Unit                      25. IFD                      26. Guard file

(Daulat Ram)

Under Secretary to the Govt. of India

OFFICE OF THE  
Under Secretary to the Govt. of India  
Ministry of Education  
New Delhi

3.2.1.G.23.

3.2.2.200



F.No. 5-5/2014-TS.VII  
Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Technical Section - VII  
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Shastri Bhawan, New Delhi - 110115,  
dated 4<sup>th</sup> September, 2014

To

The Pay & Accounts Officer (Edn.)  
Pay & Accounts Office,  
Department of Higher Education,  
Shastri Bhawan, New Delhi-110115.

Subject: Release of 1<sup>st</sup> instalment of Grant to 20 Institutes (selected in 2<sup>nd</sup> round of selection) under the scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-15 (SC).

Sir,

I am directed to convey the sanction of the President of India to the release of a sum of ₹ 18,90,000/- (₹ Eighteen lakh ninety thousand only) i.e. for release of ₹ 94,500/- (₹ Ninety four thousand five hundred only) to each of the following 20 Institutes (selected in 2<sup>nd</sup> round of selection by Steering Committee) under the Plan scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-2015 for meeting the non-recurring expenditure.

Sl No.	Name of the Institutions	Centres of Excellence (CoE)	Amt ₹ in lakh	Bank Details
1	Indian Institute of Technology, Kharagpur	E-Business	94,500	A/C No. 95562010000790, Syndicate Bank, IIT Branch, Kharagpur.
2	Indian Institute of Technology, Guwahati	Advanced Molecules and Materials	94,500	A/C No. 10196461054, State Bank of India, IIT Branch, Guwahati.
3	Indian Institute of Science Education and Research, Thiruvananthapuram	Computation, Modelling & Stimulations	94,500	A/C No. 0819101094002, Canara Bank, Cantonment Branch, Trivandrum.
4	TERI University, Vasant Kunj, New Delhi	Energy Storage and Solar Desalination	94,500	A/C No. 3159101001448, Canara Bank, Vasant Kunj Branch, New Delhi.
5	Central University of Jharkhand, Ranchi (Jharkhand)	Green & Efficient Energy Technologies (GEET)	94,500	A/C No. 30827946251, State Bank of India, Upper Bazar Branch, Ranchi (Jharkhand)
6	Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh)	Energy and Resources Development	94,500	A/C No. 32778803937, State Bank of India, IT Branch, BHU, Varanasi (U.P.)
7	Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu)	Energy Research	94,500	A/C No. 6241996830, Indian Bank, Sathyabama University Branch, Chennai (Tamil Nadu)
8	Indian School of Mines, Dhanbad	Renewable Energy	94,500	A/C No. 0986101009746, Canara Bank, Seraidheala Branch, Dhanbad (Jharkhand)

(दावुल राम)  
(DAULAT RAM)

उप सचिव/Under Secretary  
उप सचिव/Under Secretary  
म. व. वि. मंत्रालय/Min. of H. R. D.  
श. व. वि. मंत्रालय/Min. of H. R. D.  
मह. वि. विभाग/Min. of H. R. D.

9	Banasthali University, Banasthali Vidyapith (Rajasthan)	Water and Energy	94,500	A/C No. 037094600000033, Yes Bank Ltd., Newai Branch, Tonk (Rajasthan)
10	Indian Institute of Technology, Bombay	Urban Science and Engineering	94,500	A/C No. 10725729173, State Bank of India, IIT Branch, Powai, Mumbai.
11	National Aerospace Laboratories, Bangalore (Karnataka)	Development of 3 dimensional composite concurred structures using Tufting technology	94,500	A/C No. 30268539001, State Bank of India, NAL Branch, Bangalore (Karnataka)
12	Tezpur University, Napam, Tezpur, Sonitpur (Assam)	Machine Learning Research and Big Data Analysis (MLRBD)	94,500	A/C No. 30448821505, State Bank of India, Tezpur Branch, Assam.
13	Indian Institute of Technology, Hyderabad	Sustainable Urban Development	94,500	A/C No. 34069788873, State Bank of India, IIT Branch, Hyderabad.
14	National Institute of Technology, Surathkal	Renewable Energy Integrated Smart Grid Technologies: Energy	94,500	A/C No. 8517101000001, Canara Bank, NITK Campus Branch, Surathkal.
15	Indian Institute of Technology, Bhubneshwar	Novel Energy Materials (NEM)	94,500	A/C No. 30824066553, State Bank of India, Fortune Towers Branch, Bhubneshwar.
16	Indian Institute of Science Education and Research, Mohali	Protein Science, Design & Engineering	94,500	A/C No. 2452201001094, Canara Bank, Consumer Finance Branch, Chandigarh.
17	Indian Institute of Science Education and Research, Pune	Research in Energy and Sustainable Materials	94,500	A/C No. 31125298801, State Bank of India, NCL Campus Branch, Pune.
18	Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu)	Microbes to Feed the World :Plant – Microbe Interactions to boost Agricultural Production	94,500	A/C No. 10663188052, State Bank of India, TANU Branch, Coimbatore (Tamil Nadu)
19	West Bengal University of Technology, Salt Lake, Kolkata (West Bengal)	Environment Technology and Management: Water treatment for clean and green environment	94,500	A/C No. 6243002394, Indian Bank, Salt Lake Branch, Kolkata.
20	Indian Institute of Science Education and Research, Bhopal	Centre for Research on Environment and Sustainable Technologies (CREST): Clean Environment (air, water, soil) and sustainable technologies	94,500	A/C No. 2073201002554, Canara Bank, Canara Bank Zone 2, MP Nagar, Bhopal.
<b>Total</b>			<b>18,90,000</b>	

2. The payment of ₹ 18,90,000/- is subject to the following terms and conditions:

- The Institutes will start the project immediately after receipt of grant-in-aid from the Ministry;
- While undertaking the above project, the Institutes will fully utilize their expertise in implementing the objectives of the above mentioned Scheme.
- The Institutes will ensure due diligence while executing the project under the Scheme;
- The Institutes will identify Physical and Financial Targets, output and outcomes for the project and submit progress report, on the project clearly indicating Physical and Financial targets achieved and outputs and outcomes;
- The Head of the Institutes receiving the grant and project Head will also be responsible for ensuring that the project sanctioned vide this sanction letter achieves its goal with prudence at all levels as also for achievement of physical and Financial Targets, outputs and outcomes;



- (vi) Intellectual Property Rights(s) if any, generated /or experiences gained/or objectives achieved, as the case may be shall vest in the Ministry of Human Resource Development, Government of India and in the entire expert community involved in its development, since this Ministry is providing project funding;
- (vii) Further release of funds, if any, shall be subject to satisfactory progress in the implementation of the Project as indicated by achievement of set Physical and Financial Targets, output and outcome, with in the approved objectives/guidelines of the project.
- (viii) The Institutes shall furnish all necessary details/documents such as bank details/agency details/bond, etc. As applicable and asked for by the Government of India, Ministry of Human Resource Development, Department of Higher Education for release of grants.

3. The release of this payment is further subject to the following conditions:-

- a. The amount sanctioned should be utilized for the purpose for which it is sanctioned, as per Government approval to the above mentioned Scheme, and the Institutes may ensure that the expenditure is incurred as per approval granted by the Steering Committee. The Institutes shall maintain a separate account for the purpose and bank interests earned on the grant released by this Department, vide this sanction letter, shall be treated as part and parcel of this payment/grant.
- b. The Institutes shall maintain appropriate accounts of the expenditure out of the payment/grant, which may be audited by the Comptroller and Auditor General of India and Internal Audit by Principal Accounts Officer (PAO), Ministry of Human Resource Development (MHRD). The Utilization Certificate, to the effect that the payment/grant has been utilized shall be furnished to this Ministry along with audited accounts, i.e., receipt and payment account, income and expenditure account and balance sheet after close of the financial year. The institute shall furnish Utilisation Certificate within 9 months after the closing of the financial year 2014-15.
- c. The Institutes shall maintain a Register (Form No. 19) prescribed in General Financial Rules, of assets acquired out of this grant. A copy of this shall be furnished to the Ministry of Human Resource Development, Department of Higher Education for record. The register and asset shall be open to scrutiny by Audit and PAO, MHRD.
- d. The Institutes will submit a copy of the approved annual accounts, duly approved by the Executive Board, to the office of Director General of Audit, Central Revenues, I.P. Estates, New Delhi-110002 within three months from the close of the financial year (i.e. by 30<sup>th</sup> June).


4. The amount sanctioned is debit to Demand No. 60, Department of Higher Education, Major Head 2203-Technical Education, Minor Head 00.789-Special Component Plan for Schedule Caste, Sub Head 38- Training & Research in Frontier Areas, 38.00.35 Grant for creation of capital assets for the year 2014-15.

5. The of ₹ 18,90,000/- (₹ Eighteen lakh ninety thousand only) shall be drawn by the Drawing & Disbursing Officer (Grant), Ministry of Human Resource Development, Department of Higher Education, New Delhi on the prescribed proforma of Grant-in-aid Bill by presenting to Pay & Accounts Officer and paid to the Institutions and payment remitted directly to the grantee's account and telegraphically transferred to 20 Institute's as per detail at para 1 above.



6. The pattern of grant /expenditure has been approved by the Ministry of Finance and the sanction is being issued in conformity with rules and principles of the Scheme as approved by the Ministry of Finance.
7. Any future grant will be released to these Institutions under this Scheme only after they have satisfied the Ministry that adequate provision for representation of SC/ST has been made in its constitution/rules and these are being followed in actual practice in filling up vacancies reserved for SC/ST candidates every year.
9. The funds released under the scheme is subject to the condition that the grantee Institutes are situated under jurisdiction of the concerned Director General of Audit.
10. The Accounts shall be open to a test check by the Comptroller and Auditor General of India at his discretion as well as Internal Audit by Principal Account Office, MHRD (Department of Higher Education).
11. It is certified that utilization certificate which is due in respect of the Scheme under this project against the grantee Institute(s) is submitted by the respective grantee Institution.
12. The sanction is issued in exercise of delegated powers and accordance with the Integrated Finance Division vide Dy. No. 4100 dated 19.08.2014 and IF.I Section vide their Dy. No. 394/14-IF.I dated 26.08.2014.

Yours faithfully,

  
(DAULAT RAM)  
Under Secretary to the Govt. of India


Copy with two spare copies forwarded to Grant-in-Aid Section along with necessary bills.

Copy to:

- 1 Indian Institute of Technology, Kharagpur.
- 2 Indian Institute of Technology, Guwahati.
- 3 Indian Institute of Science Education and Research, Thiruvananthapuram.
- 4 TERI University, Vasant Kunj, New Delhi.
- 5 Central University of Jharkhand, Ranchi (Jharkhand).
- 6 Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh).
- 7 Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu).
- 8 Indian School of Mines, Dhanbad.
- 9 Banasthali University, Banasthali Vidyapith (Rajasthan).
- 10 Indian Institute of Technology, Bombay.
- 11 National Aerospace Laboratories, Bangalore (Karnataka).
- 12 Tezpur University, Napam, Tezpur, Sonitpur (Assam).

### 3.2.1.G.23.

- 13 Indian Institute of Technology, Hyderabad.
- 14 National Institute of Technology, Surathkal.
- 15 Indian Institute of Technology, Bhubaneswar.
- 16 Indian Institute of Science Education and Research, Mohali.
- 17 Indian Institute of Science Education and Research, Pune.
- 18 Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu).
- 19 West Bengal University of Technology, Salt Lake, Kolkata (West Bengal).
- 20 Indian Institute of Science Education and Research, Bhopal.
- 21 The Director General of Audit, Central Revenues, I.P. Estate, New Delhi.
- 22 Internal Audit, Principal Accounts Office, MHRD, Shastri Bhawan, New Delhi.
- 23 IF-1                      24. E.C. Unit                      25. IFD                      26. Guard file

  
(~~Dr. Daulat Ram~~)  
DAULAT RAM  
Under Secretary to the Govt. of India  
Ministry of Education / Govt. of India  
Min. of Education / Min. of Education  
Principal Accounts Office, New Delhi  
New Delhi

3.2.1.G.23.

3.2.2.206



F.No. 5-5/2014-TS.VII  
Government of India  
Ministry of Human Resource Development  
Department of Higher Education  
Technical Section - VII  
\*\*\*\*\*

Shastri Bhawan, New Delhi - 110115,  
dated 4<sup>th</sup> September, 2014

To

The Pay & Accounts Officer (Edn.)  
Pay & Accounts Office,  
Department of Higher Education,  
Shastri Bhawan, New Delhi-110115.

Subject: Release of 1<sup>st</sup> instalment of Grant to 20 Institutes (selected in 2<sup>nd</sup> round of selection) under the scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-15 (ST).

Sir,

I am directed to convey the sanction of the President of India to the release of a sum of ₹ 9,45,000/- (₹ Nine lakh forty five thousand only) i.e. for release of ₹ 47,250/- (₹ Forty seven thousand two hundred fifty only) to each of the following 20 Institutes (selected in 2<sup>nd</sup> round of selection by Steering Committee) under the Plan scheme Establishment of Centre of Excellence for Training and Research in Frontier Areas of Science and Technology (FAST) for the year 2014-2015 for meeting the non-recurring expenditure.

Sl No.	Name of the Institutions	Centres of Excellence (CoE)	Amt ₹ in lakh	Bank Details
1	Indian Institute of Technology, Kharagpur	E-Business	47,250	A/C No. 95562010000790, Syndicate Bank, IIT Branch, Kharagpur.
2	Indian Institute of Technology, Guwahati	Advanced Molecules and Materials	47,250	A/C No. 10196461054, State Bank of India, IIT Branch, Guwahati.
3	Indian Institute of Science Education and Research, Thiruvananthapuram	Computation, Modelling & Stimulations	47,250	A/C No. 0819101094002, Canara Bank, Cantonment Branch, Trivandrum.
4	TERI University, Vasant Kunj, New Delhi	Energy Storage and Solar Desalination	47,250	A/C No. 3159101001448, Canara Bank, Vasant Kunj Branch, New Delhi.
5	Central University of Jharkhand, Ranchi (Jharkhand)	Green & Efficient Energy Technologies (GEET)	47,250	A/C No. 30827946251, State Bank of India, Upper Bazar Branch, Ranchi (Jharkhand)
6	Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh)	Energy and Resources Development	47,250	A/C No. 32778803937, State Bank of India, IT Branch, BHU, Varanasi (U.P.)
7	Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu)	Energy Research	47,250	A/C No. 6241996830, Indian Bank, Sathyabama University Branch, Chennai (Tamil Nadu)
8	Indian School of Mines, Dhanbad	Renewable Energy	47,250	A/C No. 0986101009746, Canara Bank, Seraidheala Branch, Dhanbad (Jharkhand)

(CAULAT RAM)  
अध्यक्ष/अधीक्षक/अधीक्षक  
श्री. ए. आर. मिश्र/Min. of H. R. D.  
सचिव/Secretary/Secy. to Min. of H. R. D.  
श्री. ए. आर. मिश्र/Min. of H. R. D.

9	Banasthali University, Banasthali Vidyapith (Rajasthan)	Water and Energy	47,250	A/C No. 037094600000033, Yes Bank Ltd., Newai Branch, Tonk (Rajasthan)
10	Indian Institute of Technology, Bombay	Urban Science and Engineering	47,250	A/C No. 10725729173, State Bank of India, IIT Branch, Powai, Mumbai.
11	National Aerospace Laboratories, Bangalore (Karnataka)	Development of 3 dimensional composite concurred structures using Tufting technology	47,250	A/C No. 30268539001, State Bank of India, NAL Branch, Bangalore (Karnataka)
12	Tezpur University, Napam, Tezpur, Sonitpur (Assam)	Machine Learning Research and Big Data Analysis (MLRBDA)	47,250	A/C No. 30448821505, State Bank of India, Tezpur Branch, Assam.
13	Indian Institute of Technology, Hyderabad	Sustainable Urban Development	47,250	A/C No. 34069788873, State Bank of India, IIT Branch, Hyderabad.
14	National Institute of Technology, Surathkal	Renewable Energy Integrated Smart Grid Technologies: Energy	47,250	A/C No. 8517101000001, Canara Bank, NITK Campus Branch, Surathkal.
15	Indian Institute of Technology, Bhubneshwar	Novel Energy Materials (NEM)	47,250	A/C No. 30824066553, State Bank of India, Fortune Towers Branch, Bhubneshwar.
16	Indian Institute of Science Education and Research, Mohali	Protein Science, Design & Engineering	47,250	A/C No. 2452201001094, Canara Bank, Consumer Finance Branch, Chandigarh.
17	Indian Institute of Science Education and Research, Pune	Research in Energy and Sustainable Materials	47,250	A/C No. 31125298801, State Bank of India, NCL Campus Branch, Pune.
18	Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu)	Microbes to Feed the World :Plant – Microbe Interactions to boost Agricultural Production	47,250	A/C No. 10663188052, State Bank of India, TANU Branch, Coimbatore (Tamil Nadu)
19	West Bengal University of Technology, Salt Lake, Kolkata (West Bengal)	Environment Technology and Management: Water treatment for clean and green environment	47,250	A/C No. 6243002394, Indian Bank, Salt Lake Branch, Kolkata.
20	Indian Institute of Science Education and Research, Bhopal	Centre for Research on Environment and Sustainable Technologies (CREST): Clean Environment (air, water, soil) and sustainable technologies	47,250	A/C No. 2073201002554, Canara Bank, Canara Bank Zone 2, MP Nagar, Bhopal.
<b>Total</b>			<b>9,45,000</b>	

2. The payment of ₹ 9,45,000/- is subject to the following terms and conditions:

- The Institutes will start the project immediately after receipt of grant-in-aid from the Ministry;
- While undertaking the above project, the Institutes will fully utilize their expertise in implementing the objectives of the above mentioned Scheme.
- The Institutes will ensure due diligence while executing the project under the Scheme;
- The Institutes will identify Physical and Financial Targets, output and outcomes for the project and submit progress report, on the project clearly indicating Physical and Financial targets achieved and outputs and outcomes;
- The Head of the Institutes receiving the grant and project Head will also be responsible for ensuring that the project sanctioned vide this sanction letter achieves its goal with prudence at all levels as also for achievement of physical and financial targets, outputs and outcomes;

- (vi) Intellectual Property Rights(s) if any, generated /or experiences gained/or objectives achieved, as the case may be shall vest in the Ministry of Human Resource Development, Government of India and in the entire expert community involved in its development, since this Ministry is providing project funding;
- (vii) Further release of funds, if any, shall be subject to satisfactory progress in the implementation of the Project as indicated by achievement of set Physical and Financial Targets, output and outcome, with in the approved objectives/guidelines of the project.
- (viii) The Institutes shall furnish all necessary details/documents such as bank details/agency details, bond, etc. As applicable and asked for by the Government of India, Ministry of Human Resource Development, Department of Higher Education for release of grants.

3. The release of this payment is further subject to the following conditions:-

- a. The amount sanctioned should be utilized for the purpose for which it is sanctioned, as per Government approval to the above mentioned Scheme, and the Institutes may ensure that the expenditure is incurred as per approval granted by the Steering Committee. The Institutes shall maintain a separate account for the purpose and bank interests earned on the grant released by this Department, vide this sanction letter, shall be treated as part and parcel of this payment/grant.
- b. The Institutes shall maintain appropriate accounts of the expenditure out of the payment/grant, which may be audited by the Comptroller and Auditor General of India and Internal Audit by Principal Accounts Officer (PAO), Ministry of Human Resource Development (MHRD). The Utilization Certificate, to the effect that the payment/grant has been utilized shall be furnished to this Ministry along with audited accounts, i.e., receipt and payment account, income and expenditure account and balance sheet after close of the financial year. The institute shall furnish Utilisation Certificate within 9 months after the closing of the financial year 2014-15.
- c. The Institutes shall maintain a Register (Form No. 19) prescribed in General Financial Rules, of assets acquired out of this grant. A copy of this shall be furnished to the Ministry of Human Resource Development, Department of Higher Education for record. The register and asset shall be open to scrutiny by Audit and PAO, MHRD.
- d. The Institutes will submit a copy of the approved annual accounts, duly approved by the Executive Board, to the office of Director General of Audit, Central Revenues, I.P. Estates, New Delhi-110002 within three months from the close of the financial year (i.e. by 30<sup>th</sup> June).

4. The amount sanctioned is debit to Demand No. 60, Department of Higher Education, Major Head 2203-Technical Education, Minor Head 00.796-Schedule Tribe Sub Plans, Sub Head 38- Training & Research in Frontier Areas, 38.00.35 Grant for creation of capital assets for the year 2014-15.

5. The of ₹ 9,45,000/- (₹ Nine lakh forty five thousand only) shall be drawn by the Drawing & Disbursing Officer (Grant), Ministry of Human Resource Development, Department of Higher Education, New Delhi on the prescribed proforma of Grant-in-aid Bill by presenting to Pay & Accounts Officer and paid to the Institutions and payment remitted directly to the grantee's account and telegraphically transferred to 20 Institute's as per details given above.

(सिनेट) (सिनेट)  
 Under Secretary  
 Govt. of India  
 Ministry of Human Resource Development  
 Department of Higher Education  
 New Delhi



-: 4 :-

6. The pattern of grant /expenditure has been approved by the Ministry of Finance and the sanction is being issued in conformity with rules and principles of the Scheme as approved by the Ministry of Finance.
7. Any future grant will be released to these Institutions under this Scheme only after they have satisfied the Ministry that adequate provision for representation of SC/ST has been made in its constitution/rules and these are being followed in actual practice in filling up vacancies reserved for SC/ST candidates every year.
9. The funds released under the scheme is subject to the condition that the grantee Institutes are situated under jurisdiction of the concerned Director General of Audit.
10. The Accounts shall be open to a test check by the Comptroller and Auditor General of India at his discretion as well as Internal Audit by Principal Account Office, MHRD (Department of Higher Education).
11. It is certified that utilization certificate which is due in respect of the Scheme under this project against the grantee Institute(s) is submitted by the respective grantee Institution.
12. The sanction is issued in exercise of delegated powers and accordance with the Integrated Finance Division vide Dy. No. 4100 dated 19.08.2014 and IF.I Section vide their Dy. No. 394/14-IF.I dated 26.08.2014.

Yours faithfully,


(Signature)  
(DANULAT RAM)  
Under Secretary to the Government of India  
(DANULAT RAM)  
Min. of Education / Min. of H. R. D.  
New Delhi, India

Copy with two spare copies forwarded to Grant-in-Aid Section along with necessary bills.

Copy to:

- 1 Indian Institute of Technology, Kharagpur.
- 2 Indian Institute of Technology, Guwahati.
- 3 Indian Institute of Science Education and Research, Thiruvananthapuram.
- 4 TERI University, Vasant Kunj, New Delhi.
- 5 Central University of Jharkhand, Ranchi (Jharkhand).
- 6 Indian Institute of Technology, (Banaras Hindu University) Varanasi (Uttar Pradesh).
- 7 Sathyabama University, Rajiv Gandhi Salai, Chennai (Tamil Nadu).
- 8 Indian School of Mines, Dhanbad.
- 9 Banasthali University, Banasthali Vidyapith (Rajasthan).
- 10 Indian Institute of Technology, Bombay.
- 11 National Aerospace Laboratories, Bangalore (Karnataka).
- 12 Tezpur University, Napam, Tezpur, Sonitpur (Assam).

- 13 Indian Institute of Technology, Hyderabad.
- 14 National Institute of Technology, Surathkal.
- 15 Indian Institute of Technology, Bhubaneswar.
- 16 Indian Institute of Science Education and Research, Mohali.
- 17 Indian Institute of Science Education and Research, Pune.
- 18 Tamil Nadu Agriculture University, Coimbatore (Tamil Nadu).
- 19 West Bengal University of Technology, Salt Lake, Kolkata (West Bengal).
- 20 Indian Institute of Science Education and Research, Bhopal.
- 21 The Director General of Audit, Central Revenues, I.P. Estate, New Delhi.
- 22 Internal Audit, Principal Accounts Office, MHRD, Shastri Bhawan, New Delhi.
- 23 IF-1                      24. E.C. Unit                      25. IFD                      26. Guard file

  
(Daylat Ram)  
(दीलत राम)  
Under Secretary to the Government of India  
आयत सचिव/Under Secretary  
भारत सरकार/Govt. of India  
कृ. व. वि. मन्त्रालय/Min. of  
उच्च शिक्षा विभाग/Dro. Min.  
नई दिल्ली, भारत 25.6.

3.2.1.G.23.

3.2.2.212



No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi – 110 003.

Dated: 20<sup>th</sup> May, 2016.

### ORDER

Sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the implementation of the Project proposal entitled "**Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis***" by Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 at a total cost of Rs. 88.00 lakhs (Rupees Eighty eight Lakhs only) as a part of his Ramalingaswami Fellowship 2014-15 w.e.f. 1<sup>st</sup> February, 2016 on the terms and conditions detailed as per under:-

#### 2.0 The Project

2.1 Project Title: "**Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*.**"

#### 2.2 Investigator

Name of the Awardee : Dr. Chaithanya Madhurantakam  
Assistant Professor  
Department of Biotechnology  
TERI University, 10, Institutional Area,  
Vasant Kunj, New Delhi-110070

#### Objectives

1. Crystal structure determination of MmaA1 methyl transferase.
2. Structure based inhibitor design against MmaA1

#### 2.3 Time Schedule

The duration of the fellowship is 5 years w.e.f. 1<sup>st</sup> February, 2016.

#### 2.4 Fellowship Amount

		(Rs. in Lakhs)					
		1 <sup>st</sup> Yr.	2 <sup>nd</sup> Yr.	3 <sup>rd</sup> Yr.	4 <sup>th</sup> Yr.	5 <sup>th</sup> Yr.	Total
Fellowship@	Rs.85,000/ p.m	10.20	10.20	10.20	10.20	10.20	51.00
(consolidated)							
Research/Contingency grant		10.00	7.50	5.00	5.00	5.00	32.50
HRA @ Rs. 7,500 p.m. consolidated		0.90	0.90	0.90	0.90	0.90	4.50
<b>Total</b>		<b>21.10</b>	<b>18.60</b>	<b>16.10</b>	<b>16.10</b>	<b>16.10</b>	<b>88.00</b>

2.5 The contingency/research grant may be utilized for the purchase of consumables, minor equipment, international and domestic travel, engaging manpower and other contingent expenditure to be incurred in connection with the implementation of the project.

- a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
- b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement

shall be limited to the IIRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.

4. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.

5. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

6. **Budget Head**

The expenditure involved is debitable to

Demand No. 79

3425

3425.60

3425.60.200

3425.60.200.29

3425.60.200.29.17

3525.60.200.29.17.31

**Department of Biotechnology**

Other Scientific Research (2016-2017)

Other (Sub Major Head)

Assistance to other Scientific Bodies (Minor Head)

Biotechnology Research and Development

Assistance for Research and Development

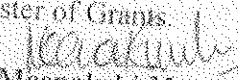
Grants-in-aid General

7. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.

8. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070 is requested to furnish to this Department 'Utilization Certificate' and an audited 'Statement of Expenditure' at the end of the year.

9. This issues under the powers delegated to this Department and with the concurrence of IFD vide their SAN No. 102/IFD/SAN/738/2016-17 dated:20-5-2016.

10. This sanction order has been noted at Serial No. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'



No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi - 110 003.

Dated: 20<sup>th</sup> May 2016.

**ORDER**

In continuation of this Department's sanction order of even number dated: 20<sup>th</sup> May, 2016 sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the release of an amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** to The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 being the first installment of Ramalingaswami Re-entry Fellowship (2014-15) awarded to Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 for the implementation of the project proposal entitled "**Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*.**" as per the details given below:-

**Fellowship Amount**

(Rs. in Lakhs)

S.No.	Head	Released Amount*
1.	Fellowship	10.20 @ Rs.85,000/ p.m (consolidated)
2.	Contingency/Research Grant	10.00
3.	HRA	0.90 Rs. 7,500/- p.m consolidated
	<b>Total</b>	<b>21.10</b>

\* **The release is made under recurring heads**

2. The other terms and conditions of the grant shall remain unaltered.
3. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.
4. It is certified that this being the first release no UC/SE pertaining to grants released under this programme is pending with the institute.
5.
  - a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
  - b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement shall be limited to the HRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.
6. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.
7. The amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** will be drawn by Drawing and Disbursing Officer, DBT from the Pay and Accounts Officer, DBT and disbursed to **The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070** and disbursed through RTGS as per following details.



**BANK ACCOUNT DETAILS**

(i) Bank Name	:	STATE BANK OF Hyderabad
(ii) Bank Account No.	:	52142908571
(iii) IFSC Code	:	SBHY0020511
(iv) 9 digit MICR Code	:	110004005

8. As per Rule 211 (1) of GFR, the Accounts of all grantee institution shall be open to inspection by the sanctioning authority/ audit, whenever the institution is called upon to do so.

9. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

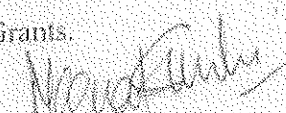
10. **Budget Head**

The expenditure involved is debitable to

Demand No.79	:	<b>Department of Biotechnology</b>
3425	:	Other Scientific Research (2016-2017)
3425.60	:	Other (Sub Major Head)
3425.60.200	:	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	:	Biotechnology Research and Development
3425.60.200.29.17	:	Assistance for Research and Development
3425.60.200.29.17.31	:	Grants-in-aid General

11. This issue under the powers delegated to this Department and with the concurrence of IFD vides their SAN No. 102/IFD/SAN/739/2016-17 dated:20-5-2016.

12. This sanction has been noted at serial no. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaitanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'

No.A.33024/12/2016-Ad  
Government of India  
National Security Council Secretariat

3<sup>rd</sup> Floor Sardar Patel Bhawan,  
Sansad Marg, New Delhi-110001

Dated 24 October 2016

To

The Sr. Accounts Officer,  
Pay & Accounts Office,  
Cabinet Affairs,  
New Delhi.

Sir,

TERI University, 10 Institutional Area, Vasanth Kunj, New Delhi has been engaged for undertaking a project to develop Advanced Models for Climate Related Studies at a cost of Rs.9,94,750/- (Rupees nine lakh ninety four thousand seven hundred fifty only) payable in three installments.

2. Sanction of the competent authority is hereby conveyed to the payment of Rs.3,97,900/- (Rupees three lakh ninety seven thousand nine hundred only) towards first installment for the aforesaid study.

3. The expenditure involved is debitable to the following Head of Account during the current financial year 2016-2017:-

"47- Cabinet  
Major Head 2013  
106.2 – National Security Council Secretariat  
02.00.28 – Payment for Professional and Special Services"

4. The payment may be released through ECS.

Yours faithfully,



(R.K. Jain)  
Deputy Secretary (Admn.)  
☎.23349311

Copy to :-

✓ 1. Dr. Y. Nithyanandam, Assistant Professor, TERI University, 10 Institutional area, Vasanth Kunj, New Delhi-100 070 w.r.t. this Secretariat's letter dated 14.10.2016.

2. Shri Dhanraj Singh, Finance Officer, TERI University, 10 Institutional area, Vasanth Kunj, New Delhi-100 070

3. SO (C&G), NSCS (2 copies).

4. Def. spl. (SK), NSCS



**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाइट/ Website : www.pcra.org



दिनांक 25/01/2017

संख्या: पीसीआरए/अनु.एवंविकास/78

रजिस्ट्रार - टीईआरआई यूनीवर्सिटी  
 प्लॉट संख्या 10, इन्स्टीट्यूसनल एरिया  
 वसंत कुंज  
 नई दिल्ली - 110 070

विषय: प्रस्तावित परियोजना का अनुदान पत्र

महोदय,  
 हमें आपके द्वारा प्रस्तावित अनुसंधान एवं विकास परियोजना "हवा भाप गैसीकरण के माध्यम से हाइड्रोजन संवर्धन द्वारा पूरित डाउन-ड्राफ्ट बायोमास गैसीफायर प्रणाली का डिजाइन, विकास और परीक्षण" (Design, development and testing of a down draft gasifier system completed by hydrogen enrichment thru air stream gasification) जो 80<sup>वीं</sup> स्क्रीनिंग कमिटी मीटिंग (एस.सी.एम) में अनुमोदित की गई है, हेतु अनुदान सहायता की स्वीकृति करने में प्रसन्नता हो रही है।

परियोजना का अनुदान स्वीकृति पत्र और उसकी एक प्रति इस पत्र के साथ संलग्न है। आप द्वारा स्वीकृति के रूप में संलग्न प्रति के प्रत्येक पृष्ठ पर परियोजना- प्रभारी/प्रधान अन्वेषक द्वारा हस्ताक्षर करके वापिस पीसीआरए को भिजवाने की कृपा करें।

धन्यवाद,

भवदीय

सुरेन्द्र प्रताप

निदेशक अनु. एवं विकास

पेट्रोलियम संरक्षण अनुसंधान संघ


*Singh*





**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



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		Rev. No. : 01
		Eff. Date: 15th Oct 2013

Ref. No.: PCRA/R&D/78

Date: 25/01/2017  
 25/01/17

Kind Attn.: Dr. Priyanka Kaushal  
 Assistant Professor,  
 Department of Energy and Environment  
 TERI University (TU)  
 New Delhi - 110070

**Subject: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Dear Madam,

Please refer to the subject project proposal submitted by you to PCRA for grant-in-aid. The 80<sup>th</sup> Screening Committee in its meeting held on 15.02.2016 had technically approved the proposal with the following comments:

1. TU to submit a revised proposal reducing the manpower cost.
2. The revised proposal to clearly mention total project cost, contribution sought from PCRA, institution contribution and industry contribution.
3. Contractual manpower should not be more than two personnel.

Based on your revised proposal of March 11, 2016, complying the above requirements, we are pleased to convey approval of PCRA for grant in aid to TERI University (TU) to undertake the project titled "Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification".

- 1 PCRA will provide a total grant of Rs 21.78 lakhs. (Rs. Twenty One Lakh Seventy Eight Thousand only) in instalments. No cost escalation will be allowed.

The head wise / item wise break up of the sanctioned amount from PCRA is enclosed in Annexure - D.

- 2 First instalment of grant-in-aid of Rs 5,44,500/- (Rs. Five Lakh Forty Four Thousand Five Hundred only) (less TDS, if applicable) will be released initially against your invoice.
- 3 You will be required to ensure completion of project within thirty months. Tenure of project will be calculated from the date of release of first instalment of grant-in-aid.
- 4 The terms and conditions for award of grant for the project are enclosed as Annex-A.

- 5 The final project details is attached as Annex-B & the physical and financial milestones along with target dates is enclosed as Annex-C.
- 6 We are sending herewith two copies of this letter in original. Please sign the duplicate copy and return it to us as a token of acceptance of the project with the above terms and conditions.

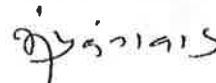
Kindly arrange to send the following for release of 1st instalment advance grant-in-aid :

- i. Signed duplicate copy as acceptance of the terms and conditions.
- ii. Invoice for 1st instalment amount.
- iii. RTGS / NEFT details for e-payment in PCRA format (available in PCRA website).
- iv. Certified copy of PAN issued by Income Tax Department.
- v. TDS exemption certificate from IT Dept., if applicable.

In case of change in Project-in-charge, for any reason, necessary prior information to be provided to PCRA.

Thanking you,

Yours faithfully.




M P Bangwal

Additional Director (R&D)

Petroleum Conservation Research Association (PCRA)



 <b>PCRA</b>	<b><u>Format for Sanction Letter</u></b>	Doc. No. : R&D/QAF/10
		Rev. No. :
		Eff. Date: Proposed

Annexure - A

### TERMS & CONDITIONS

1. Periodic progress reports and expenditure statements in respect of above project against PCRA share shall be submitted to PCRA on quarterly basis without fail. Please note that these documents must reach PCRA office within 30 days on completion of each quarter. The progress report should clearly indicate targets mentioned in Annexure – C as completed / in progress / yet to take off.
2. In addition, details of institution contribution, if any, for the project, to be mentioned in the periodic expenditure statements separately.
3. Subsequent payments of instalments will be released as per Annexure – C attached on receipt of progress report & expenditure statements. However, the last 10% of the PCRA grant shall be released on submission and acceptance of final report. Tax deduction at source will be made as per the provisions of the Income Tax Act. If your organization is exempted from TDS, please submit valid certificate from IT authorities before or at the time of raising invoice. The institution has to return back the amount left unutilized out of total released amount, if any, after completion of project. TDS amount deducted, if any, will be considered as released amount to the institution. Institution may claim for the TDS deduction certificate, if any TDS is deducted.
4. Please note that the interest earned by your institute / organization on the funds sanctioned and paid by PCRA will be treated as amount paid by PCRA and must be shown as such in the accounts of the project. Also the interest earned on such amount should be reported regularly to PCRA.
5. The institute will prepare one film of about 10-15 minutes and a brochure within the above PCRA grant for dissemination of project findings for the benefit of masses.
6. PCRA reserves the right to seek any information/visit the actual site/laboratory at any point of time. A team of PCRA / member of screening committee and the institute officials may review the status of the project from time to time. One of our officials may also associate with the project as co-investigator at the discretion of PCRA. Nomination, if any, may be indicated later on.
7. You will submit draft technical completion report regarding the project to PCRA (one hard copy and one soft copy) within one month of completion of the project. The report should contain all relevant data, designs, detailed drawings, bills of materials, vendors for each item, approximate cost of each item, operation and maintenance procedures etc. as applicable.

*Swigant*





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8. Also you will be required to make a presentation about the project work to the Screening Committee of PCRA for its review, comments and approval of the project, upon completion of project and submission of draft completion report. After incorporating comments of the Screening Committee of PCRA, if any, in the draft report, final technical report (both hard and soft copy) will be submitted to PCRA within one month of the date of Screening Committee meeting.

9. For commercialization / popularization of the technology, you may organize a meeting with the help of PCRA and make a detailed presentation / hold discussions with them about the new technology.

10. You will send the report to relevant agencies who can take corrective actions based on finding of the report along with your recommendation, under intimation to PCRA.

11. On completion of the project, R&D institute & PCRA would pass on the technology and assist in implementing the project who may desire to use the technology at their own cost. However, in case any revenues are generated this should be shared equally with PCRA. Technology transfer fee, license fee and royalty if any shall be equally shared between PCRA & the institute. Quantum of such fee to be approved by PCRA.


12. In the draft technical completion report, following shall be indicated by the research institute:

- i. Energy already saved at the time of writing the report & value thereof in MTOE.
- ii. Average Energy being saved per day at the time of writing report & value thereof.
- iii. Estimate of energy saving in next one year & futuristic view

13. If any research paper/article is published in national or international magazine or journal etc, it shall be in the joint name with PCRA & only after obtaining written consent of PCRA.

14. If any application is to be made for receiving any award or any award is to be received based on this work, it shall be in joint name with PCRA & with the written consent of PCRA.

15. CA audited head wise expenses for annual expenditure statement (clearly indicating actual expenses incurred against PCRA grant issued / to be issued and also clearly indicating any advance paid for future job / future material supply for the project against PCRA grant issued / to be issued) and CA audited annual utilisation certificate incurred up to 31st March of each financial year shall be submitted by 30th April to PCRA. CA audited accounts means the accounts audited by authorized chartered accountant / statutory auditors and not by internal auditors or accounts heads. Audited statement should accompany copies of documentary evidence of any work order issued and Invoice / bill specially for capital & high value items. Because expenses statement also shall be submitted to PCRA immediately after completion of the project followed by

 <b>PCRA</b>	<b><u>Format for Sanction Letter</u></b>	Doc. No. : R&D/QAF/10 Rev. No. : Eff. Date: Proposed
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audited accounts. In addition, proof of beneficiary contribution for the project, if any, duly audited by Chartered Accounts and verified by Research Institutes are required to be provided to PCRA in respect of each beneficiary.

16. The Institute will maintain separate audited accounts for the project. The accounts of the grantee institution will be open to inspection by the sanctioning authority / audit whenever the institution is called upon to do so.

17. If expenditure statement and utilization certificate against the project is not audited by CA because of audit by CAG, then documentary proof of audit by CAG to be submitted to PCRA by 30<sup>th</sup> April for previous financial year up to 31<sup>st</sup> March and internal audited statement as per clause 14 above to be submitted.

18. For individual capital items procured from PCRA grant-in-aid for above Rs. five lakhs, if the Research Institute sells the items before 5 years after completion of the project, the realization value (sale proceeds) will be paid back to PCRA.

*Singhania*

## Project Proposal

*Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification resulting in substantial improvement in the efficiency of the gas engine.*

Dr. Priyanka Kaushal  
TERI University, Delhi

Date: March 11<sup>th</sup>, 2016

*Priyanka*



**Title of the project:**

Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the efficiency of the gas engine.

**Name of the Institution with address and contact nos.:**

Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070  
Phone: 011 2612 2222, Fax: +91 11 26122874

**Name of Project-in-charge with designation:**

Dr Priyanka Kaushal, Assistant Professor  
Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070  
Phone: 011 2612 2222, Fax: +91 11 26122874  
Email: priyanka.kaushal@teriuniversity.ac.in

N K Ram, Research scholar, Department of Energy and Environment  
TERI University (TU), Plot No. 10, Institutional Area, Vasant Kunj, New Delhi,  
Delhi 110070

Phone: 011 2612 2222, Fax: +91 11 26122874

&

Fellow, Biomass Energy Technology Applications,  
Energy, Environment and Technology division

The Energy and Resources Institute TERI, India Habitat Centre, Lodhi Road, New Delhi 110003, Phone:  
+91-11-24682100, Fax: +91-11-24682145

Email: nkram@teri.res.in

**Objectives of the project:**

The overall objective of the project is "To arrive at a design configuration and testing of biomass based down draft gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the conversion efficiency of the natural gas engine.

**The specific objectives of the project are:**

- To come up with a design configuration and development of a woody biomass based down draft biomass gasifier systems to produce a clean combustible gas (suitable for engine applications) and customizing the reactor for a specific rated capacity.
- To integrate air-steam gasification system and optimizing the reactor design in order to maximize the calorific value of the producer gas and minimize the impurities such as tar and particulate matter. Air steam gasification is chosen with a purpose to enhance the (engine) efficiency.
- To develop a complete package which includes simple cleaning and cooling components connected to an internal combustion engine coupled (to replace diesel) with an alternator
- To analyse the gas quality, i.e. tar and particulate matter, System optimization for reduction of impurities (tar and particulate matter), Testing the overall performance of the system with an engine, Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.

*Singh*

- Overall performance analysis of the reactor

#### Background and scope of work:

Globally 1.3 billion people are without access to electricity, 84 % of these people live in rural areas. In India about 289 million of people, account for 25 % population don't have access to electricity [1]. In the past six decades, India's energy need was increased 16 times and the installed electricity capacity by 84 times [2]. With the economy projected to grow at 8 % to 9 % per annum and the improving standards of millions of population, the energy demand is likely to grow significantly. Biomass is a potential renewable source for power generation [3]. Biomass gasification is one of the potential options for decentralized and distributed generation (DDG) of electricity [4]. Electricity generation through biomass combustion and gasification was considered as a potential source to meet the rural energy needs [5]. Deployment of biomass gasification technology can address three specific issues for the growth they are efficient utilization of local energy resources, creating employment opportunities for local community and to strengthen the local economy [6]. In specific the scenario in the island states such as A&N Islands which largely depends on Diesel fuel to meet their electricity needs. Diesel power accounts for 94% of the total power generation while remaining 6% is met through Hydel and Solar power generation. The cost of power generation through diesel based power plants are to the tune of 20 Rs/kWh which is highly expensive. In order to mitigate the use of diesel in the existing power plants, biomass provides can provide an alternate cheaper option which indeed is also available in abundance on the islands.

According to a study, the estimated potential availability is 5 MW, 2 MW & 1.5 MW of Agro fuel based power generation at South Andaman, Little Andaman and Car Nicobar respectively. It was observed that coconut is one of the main plantations and according to estimates 280 million nuts processed in the copra processing units annually. The potential for power generation from coconut shell is estimated as 4 MW generation capacities through Bio Mass using Coconut waste, etc., in South Andaman 2 MW generation capacity through Biomass in Little Andaman, 1.5 MW generation capacities through Biomass in Car Nicobar. Apart from coconut shell other loose biomass such as coir pith, Lantana (a Weed), rice husk and other forestry residues are available in abundance.

Lack of efficient biomass conversion technologies to generate electricity through gasification route has resulted in under utilization of the availability of bio-resources. To utilize these resources, in the existing designs of gasifier which indeed resulted in technical challenges. Usage of low bulk density fuel would result in chocking of fuel flow inside the reactor, resulting in intermittent gas production, High tar & dust content in the producer gas. Since in traditional downdraft gasifier are designed for certain bulk density of the fuel. In view of this there exists an opportunity to come up with a design configuration with two stage biomass gasifier concept to adopt the variety of biomass for power generation purpose. Also, hydrogen enrichment in the producer through air, steam gasification would contribute to improvement in the volumetric and overall efficiency of energy conversion. Development of such reliable technology package indeed enable adoption of decentralized, distributed generation power generation through biomass in A&N islands.

#### Background of the research carried out so far by the organization/other organizations in India.

Several premier institutions and research labs such as the Indian institute of science, Bangalore, Indian Institute, Anna university, National Institute of Technology, agricultural universities, across India are engaged in the development of biomass gasifier systems for power generation, hydrogen enrichment through steam gasification as well as development of thermal gasifiers to meet the process heat requirements in the industry. Relevant recent research work carried out by these organisations in the area of biomass gasification is summarised in the following section.

*Swingale*

12.1.6.26

Anji reddy Bhavanam and R. C. Sastry reviewed various aspects of the research and development in biomass gasification in downdraft fixed bed reactors like advances in downdraft gasification systems, and the effect of various parameters like equivalence ratio, operating temperature, moisture content, superficial velocity, gasifying agents, residence time on the composition of producer gas, yield and conversion. Khardiwar et al experimented with gasification of agriculture residues, where soyabean, pigeon pea and their mix was briquetted for feeding. Using air gasification, the conversion efficiency obtained was maximum for soybean briquette of 56%, with the average Low Heating Value of producer gas reaching  $4.4 \text{ MJ/m}^3$ . Hydrogen composition of the producer gas obtained reached a maximum of 16.1% for pigeon pea briquette, where the LHV of gas was  $4.57 \text{ MJ/m}^3$  and flame temperatures was  $634^\circ\text{C}$ . These values showed promising results for replacement of agro-residues based biomass with wood and coal.

Abeenash V.N. and E. Natarajan investigated air and steam gasification and compared the results obtained from both methods. Initially, with air gasification the  $\text{H}_2$  yield obtained was around 25%, but drastically increased to 55% when steam was introduced. The range of temperature corresponding to maximum  $\text{H}_2$  was between  $700\text{--}800^\circ\text{C}$ . With sawdust as feed, the LHV of gas with a gasification air ratio of 0.2 was approximately  $8 \text{ MJ/m}^3$  and with a steam ratio of 0.2, it increased to  $11 \text{ MJ/m}^3$ .

K. Sandeep and S. Dasappa experimented with an open-top downdraft biomass gasifier developed at IISc Bengaluru, implementing Oxy-steam gasification and evaluating the performance characteristics using parameters such as Equivalence Ratio (ER), Steam Biomass Ratio (SBR) and fuel moisture content. The hydrogen percentage in the gas increases within SBR. The feed was dry Casuarina wood. The highest  $\text{H}_2$  yield of 51.7% was obtained at an SBR in 2.5 with gas LHV at  $7.5 \text{ MJ/m}^3$  and the ER takes a high value of 0.3. The gasification efficiency obtained was also high at 69.5%.

M. Campoy et al experimentally measured the gas composition for different steam-biomass and stoichiometric ratios. The procedure was carried out for Fluidized Bed Gasifier (FBG). About 8 kg of the bed material is loaded and the bed is subsequently heated with hot air and electric heater to  $700^\circ\text{C}$ . Biomass undergo complete oxidation under excess oxygen condition. A mixture of fuel air-steam is preheated to  $400^\circ\text{C}$  and fed into FBG. Biomass, air, steam and oxygen flow rates were variable parameters for the test, which was conducted in a maintained near adiabatic environment. A reported maximum of 27.5%  $\text{H}_2$  when S/B ratio is varied from 0 to 0.56 indicates a positive relationship. The gas yield obtained was around  $0.98 \text{ m}^3/\text{kg}$ , the Low Heating Value (LHV) was calculated to be  $8.84 \text{ MJ/m}^3$ , where the High Heating Value (HHV) of the fuel was  $17.1 \text{ MJ/kg}$ , resulting in a conversion efficiency of over 50% [12]. A variation from 19.7%  $\text{H}_2$  content to a maximum of 46.8%  $\text{H}_2$  has been reported [17].

Franco et al experimented similarly on Fluidized Bed Gasification with pine, holm-oak and eucalyptus as feed, with holm-oak having a High Heating Value of  $19.5 \text{ MJ/kg}$ . The reaction took place at around  $700\text{--}900^\circ\text{C}$  maintaining the free board temperature at  $750^\circ\text{C}$ . The steam-biomass ratio was varied from 0.4-0.85. The wood feed rate varied from  $5.7\text{--}11.5 \text{ g/min}$ , with emphasis on selecting particle size ranging from  $1250\text{--}2000 \mu\text{m}$  for reducing variations in mass flow rate. Furthermore, a rapid quenching system was employed to recover tars and condensable liquids from the product gas. Gas composition obtained contained around 42%  $\text{H}_2$ , 30%  $\text{CO}$ , 5%  $\text{CH}_4$  and a low  $\text{N}_2$  content of 7% [11].

*Srinivas*



Pine wood with a High Heating Value of 20.54 MJ/kg, used as feed material in self-heating downdraft gasifier delivers a 29.92% H<sub>2</sub> rich composition and only 1.57% inert N<sub>2</sub>, with the gas Low Heating Value reaches 9.39 MJ/m<sup>3</sup>. The setup comprising of a downdraft gasifier, air intake equipment, provisions for gas cleaning, blower, flow meters and off-gas burner formed the complete gasification system. The gasifier is 1.3 m in height with an internal diameter of 35 cm. An air pre-heater is arranged near the neck of the gasifier below which a novel steam generating device is placed that produces steam at 1 atm and 100-120 °C. Before gas sampling and measurements, spray towers with steel springs are employed for gas cleaning that reduce gas temperature to 30 °C and remove 80-90 weight % of tar. A flow meter measures the gas yield. The composition is analysed using Kechuang GC-9800T thermal conductivity detector (TCD) and hydrogen flame ionization detector (FID) [14]. On comparing compositions obtained from steam-air and air gasification, there is a visible difference, with the H<sub>2</sub> range lying between 11.81% and 15.2% [13] [16]. The difference between the average values of H<sub>2</sub> content in producer gas obtained by steam-air and air gasification in producer gas is around 18%, from which it is inferred that the former is a more effective gasification method. As a further consequence of this method, the producer gas obtained has less inert gas percentage, with as low as 1.57% of N<sub>2</sub> in some cases [15].

**Domestic fixed bed down draft design of biomass gasifier technology:** Downdraft biomass gasifier are preferred for engine applications over any other type of gasifiers. A line diagram of the general scheme of a fixed bed down draft woody biomass gasifier based power system, explaining the working arrangement is shown in Figure 1. In the traditional downdraft gasifier the hot combustible gas coming out the gasifier carries impurities such as particles and tar vapors, which needs to be cleaned in the cleaning train before supplied to the IC engine for power generation. Hence an exhaustive cooling and cleaning train which consists of a series of filters such as gravity filters, wet scrubbers, cyclone separators and bag house filters. A paper filter is used as a safety filter to ensure that the clean gas with permissible levels of tar and dust particulate supplied to the engine.

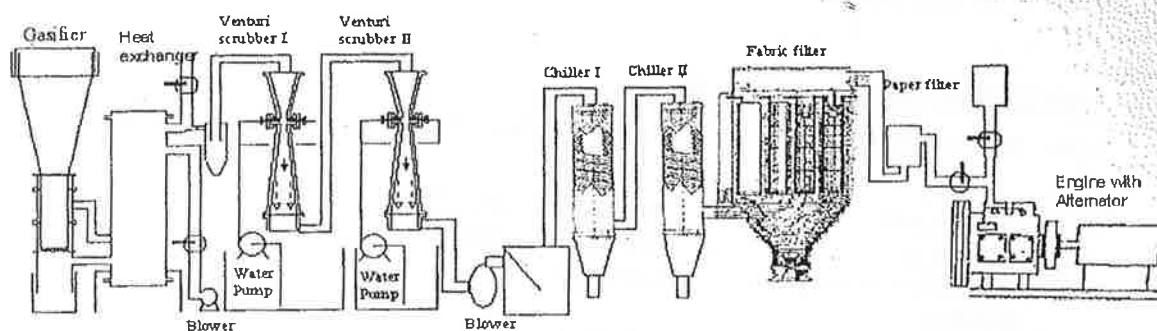


Figure 1: General scheme of biomass gasifier based power system

Past field experiences of biomass based distributed generation (DG) systems in the rural settings have not only established their benefits and technical viability, but had also helped in identifying the technological aspects where more work has to be done in order to make such systems more reliable and operator-friendly, such as:

- Biomass type and quality (Fixed bed design more sensitive to the bulk density of the fuel)
- Technology standardization and reliability testing (simple & rugged) to reduce downtime
- Continuous operation applications

- Waste water generation and disposal
- Scope to improve the engine efficiency through gas enrichment through steam air gasification route

In order to address the above mentioned points, TERI, subsequently engaged in evolving a design for two stage biomass gasifier design using wood as fuel. Thereafter TERI has now developed expertise & experience in developing wood based two-stage gasifier for power generation. The development of two stage gasifier system was done in collaboration with DTU and TERI. The design was evolved based picking up the silent features of DTU and TERI design of gasifiers, the two stage gasifier reactor produces clean producer gas, thus minimizing the need for maintenance and other day-to-day operational problems. This project thus, builds upon the past achievements of the TERI-SDC collaboration.

#### Description of the improved two stage biomass gasifier system

The two-staged process is characterized by having pyrolysis and gasification in separate reactors with an intermediate high-temperature tar-cracking zone. This allows for a very fine control of the process temperatures, resulting in extremely low tar concentrations in the producer gas. The line diagram and functional arrangement of the two stage gasifier system is shown in the figure 2. It is indeed evident from the figure that

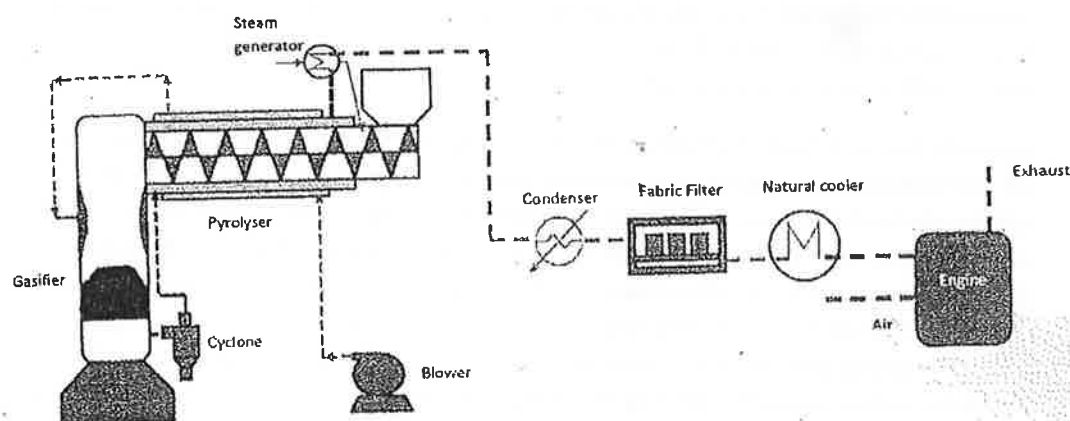


Figure 2: Two stage gasifier system

Table 1: Results of two stage gasifier system

S.No.	Key Parameters	Desirable Target
1	Tar (Raw gas)	Less than 25 mg/Nm <sup>3</sup>
2	Tar (Raw gas)	Less than 1 kg/kWh
3	Specific fuel consumption (kg/kWh)	Up to 30%
4	Input fuel moisture	Upto 2"
5	Fuel size	8-10%
6	Auxiliary electrical power	Without water scrubbing
7	Cooling cleaning system	Semi-automatic
8	Operational Controls	No

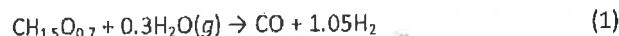
*Swiganka*

## i. Scope of Proposed work, brief description of

## a) Research, b) Trial run plans, c) Engineering and d) Design

Although many institutions across the globe engaged in gasifier technology development with an emphasis to improve the gas quality suit engine requirements and to make the system more reliable [8, 9]. In the past, most of the research work is largely focussed around reducing the impurities in the gas considering the economical long term operation of the engine. Since tar and particulate matter acts as a deterrent for engine performance, hence detrimental contaminants in the gas has to be minimised in order to reduce the operation and maintenance cost of the such power plants.

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained. In the air, steam gasification steam will react with carbon monoxide to produce hydrogen and carbon dioxide. The principle gas-phase reaction in the steam gasification system is the water gas-shift reaction:



Improving hydrogen content in the gas will improve the energy density. In addition, enriched hydrogen gas, which is indeed called as syngas open up more endues applications apart from efficiency improvement in the engine. They are

- Research opportunities such as hydrogen generation from biomass,
- Generation of liquid fuels from the syngas, which indeed can be compressed in a cylinder for use in automobiles
- Hydrogen enriches syngas can be used in hydrogen fuel cells
- Enriched syngas will open up Gas to liquid route generation of liquid fuels for automobile applications

The first and foremost step in order to open up these opportunities is to generate a hydrogen enriched producer gas that constitutes minimum impurities and high energy content. Considering the challenges confronted in the past i.e.

1. Low calorific value of the producer gas
2. Low engine efficiency resulting in de-rating of the engines
3. Impurities and the inert gases

This proposal was carefully carved to address the above mentioned challenges, with an objective to improve the resource use efficiency address each of the challenges mentioned above. The detailed approach adopted to overcome the challenges mentioned with a threefold strategy they are:

- Improving the energy density through steam gasification
- Higher adiabatic flame temperature
- Higher engine efficiencies (volumetric & overall efficiencies)

**Energy density**

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low



adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained.

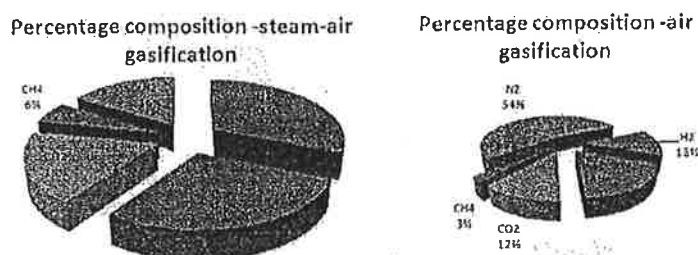


Figure 3: Comparison of inert gas percentages in steam-air and air gasification

Further authors tried to compile the gas composition using air, steam gasification in the table 2 below reported several authors. Careful analysis of the gas composition reported in the literature with air, steam gasification suggest that nitrogen content can be minimised to an extent of 1.57 % by volume to the current level of 50% by volume. This is due to the enrichment of hydrogen and Carbon monoxide composition in the producer gas from the current levels of  $H_2$  18% & CO 16% on a volume basis to  $H_2$  46.8 % & CO 20% on a volume basis. This also results in reduction of nitrogen since nitrogen is calculated by difference as illustrated in the table given below;

Table 2: Variations in the gas composition reported in the literature.

Reference	$H_2$	CO	$CO_2$	$CH_4$	$N_2$
M. Campoy et al [12]	27.5	28.5	14.6	7.7	21.7
Salami et al [7]	19.7	16.8	15.5	4	44
Franco et al [11]	42	30	16	5	7
Lv et al [6]	30	33	16	6	15
Subbaiah et al	23.8	18.46	23.5	4.07	30.17
Lv et al [15]	29.91	42.65	22.29	3.58	1.57
Lv et al [14]	30.81	39.26	17.41	8.2	4.32
Turn et al [17]	46.8	20.2	22.3	8.3	2.4

#### Adiabatic flame temperature

A comparison between steam-air and air oxidation can be drawn for inert gas percentage as well, where in the latter,  $N_2$  percentages are obtained as high as 64% against 44% maximum in steam-air oxidation. It is evident from this analysis theoretically there is a significant improvement in energy density in the volume of charge admitted into the engine cylinder which intern increase the adiabatic flame temperature and the power output from the engine. The calculations suggest that the energy content in the gas improves  $33.94 \text{ MJ/m}^3$  to  $61.01 \text{ MJ/m}^3$  which certainly is a significant improvement which is shown in the figure 5 given below.

*Signature*

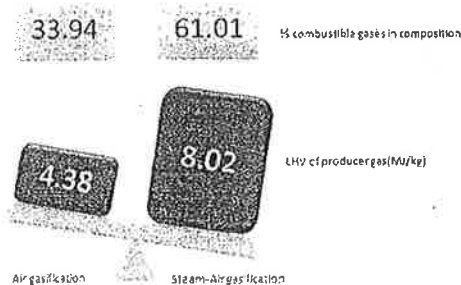


Figure 4: Effect of Combustible gas % in steam-air and air gasification

Subsequently, using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated from different observations. Figure 2 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature. Using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated for different observations. Figure 3 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature.

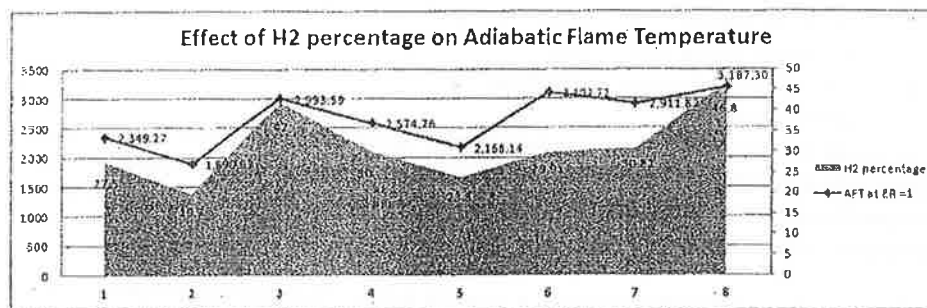


Figure 5: Effect of H2% on Adiabatic Flame Temperature °C

#### Engine performance

Using the Low Heating Value of producer gas thermal efficiency of the gas engine can be calculated. Other parameters include the capacity and performance characteristics of the engine. A three cylinder natural gas engine having a 3.8 L displacement running at 1500 RPM with an intake air fuel ratio of 1.3 produces a volumetric efficiency of around 0.8. Furthermore, the actual gas intake volume is calculated to be 0.0165 m<sup>3</sup>/s. The thermal power generated from producer gas with LHV of 8.84 MJ/m<sup>3</sup> is around 146.11 kW, which is further used to derive the mechanical power of the engine at 43.8 kW. For a cos phi rating of 0.814, the electric power in kVA is 35.68. The effect of higher gas LHV is observable on mechanical and electric power of the engine. Figure no displays the relationship for different observations.

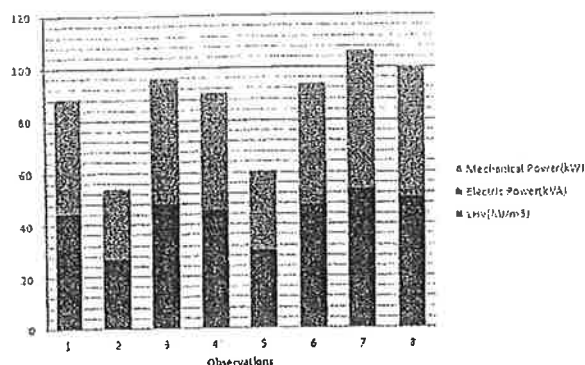


Figure 6: Influence of LHV on Mechanical and Electral Power

#### Research Plan:

To create a baseline data with existing setup "Air and Steam Gasification". A research plan has been developed based on experimental study to assess biomass flow, combustion zone temperature, and air flow, CHNO analysis of biomass, gas composition, gas chromatography, tar content and calorific value.

Parametric analysis shall be conducted

- (I) Measure the effect on gas composition and quality by varying the influencing parameters such as Steam/air ratio,
- (II) Study the influence of residence time by varying the position of steam injection inside the reactor,
- (III) Effect of reactor bed temperature etc.
- (IV) Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
- (V) This study shall also provide insights into the utilization of waste heat streams for steam generation.

It is proposed to conduct the experiments at our facility at Gual Phari, The proposed test rig is equipped with essential instrumentation and control, such as an array of thermocouples along with micro-Gas Chromatograph (GC) and other gas analysis equipment which are essential for conducting the proposed study.

The effect of various influencing factors, i.e. Reactor temperature, steam to biomass ratio (S/B), equivalence ratio (ER) and biomass particle size of gas composition, gas yield, steam decomposition, low heating value (LHV) and carbon conversion efficiency of steam gasification shall be studied

*Swigand*



6. Work Plan (should include stage wise detailed activities to be undertaken)

The proposed research shall be conducted in two steps, i.e.

**Step 1:** Is to introduce the steam injection into the first stage, also to optimize the steam injection point Integrate the steam generator into the existing system, the residence time and the utilization of the waste heat.

1. To optimize the steam, biomass ratio, residence time to optimize the hydrogen production in the producer gas. To conduct parametric studies by varying the steam, biomass ratio and observe the composition and calorific value of the gas.
2. To analyse the gas quality, i.e. tar and particulate matter in the producer gas at optimum hydrogen production and to if in case the tar and particulate matter is on the higher side efforts shall be taken to reduce the tar and particulate matter at the source.

**Step 2:** Is to develop a simple, clean and cooling cleaning system Integration of the complete package and testing the overall performance of the system.

1. This would involve the development of cleaning and cooling system, integration of the complete system with suitable rated engine.
2. The complete system shall be tested for its performance and also to quantify the efficiency improvement due to hydrogen enrichment.

**Step 3:** Testing, report writing, publication Mass balance, energy balance of the system to assess the performance of the system.

1. Study the influence of residence time by varying the position of steam Injection inside the reactor, Effect of reactor bed temperature etc.
2. Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
3. This study shall also provide insights into the utilization of waste heat streams for steam generation.
4. To report techno-economic and cost-benefit assessment of the hydrogen enrichment vis-à-vis without hydrogen enrichment.

*Singh*

7. Activity Time Schedule (Bar Chart indicating time duration required for completion of each of work plan stages/activities)

Time line	Time line 1 <sup>st</sup> year						Time line 1 <sup>st</sup> year						Time line 2 <sup>nd</sup> year						Time line 2 <sup>nd</sup> year					
Months	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Procurement of steam generator & integration with the system	■	■																						
To optimize the steam, biomass ratio, residence time to optimize the hydrogen production			■	■	■	■																		
To conduct parametric studies (variation/steam to biomass/ratio, gas; composition, calorific value etc.							■	■	■	■	■													
To analyse the gas quality, i.e. tar and particulate matter									■	■	■	■												
System optimization for reduction of impurities (tar and particulate matter)													■	■	■									
Procurement of at suitable engine Integration of the complete package. Testing the overall performance of the system with an engine																■	■	■						
Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.																			■	■	■	■	■	■
Comparative study with and without the hydrogen enrichment, techno-economic analysis highlighting benefits, Fuel saving and payback period etc																			■	■	■	■	■	■
Publications												■	■											■
Report writing																								■

*Swirpale*

#### 8. Expected benefits (quantitative and qualitative):

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar islands for island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

#### 9. Likely potential end users with full address, mobile numbers, emails and applications:

#### 10. Cost estimates:

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital items	450000	150000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities			0	
v. Consultancy			0	
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

\*TERI University & TERI contribution is in kind that includes expenditure towards Infrastructure, building, Instrumentation, Test rig and manpower that includes Technicians and Interns (TERI University contribution)

*Singh*



11. Justification of the expenditure for additional:  
Budget for salaries/wages

Designation (number of persons)	Monthly emolument (person months)	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Research associate (1)	35000 (12)	420000	210000	840000
Research Assistant (1)	18000 (10)	432000	216000	648000
<b>Total</b>		<b>852000</b>	<b>426000</b>	<b>1278000</b>

Budget for permanent equipment

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Gasifier, blower and other associated system components (including accessories), their modifications in the field	350000	150000	600000
Steam generator and cleaning cooling system	100000	0	100000
<b>Total</b>	<b>450000</b>	<b>150000</b>	<b>600000</b>

Budget for consumable materials

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Fuel, hardware, spares etc.	50000	50000	100000

Budget for travel

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Travel	50,000	50,000	1,00,000

*Swigank*

## Year wise break-up of funds for the project

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital Items	500000	200000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities				0
v. Consultancy				0
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

## 12. Who are the identified potential beneficiaries (By name, address &amp; telephone nos.)

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar Islands for Island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

## 13. How much is the proposing institute willing to contribute towards the project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work. The in-kind contribution from TERI, if quantified, it is around 1000,000 (10 Lakhs) rupees.

## 14. How much is the proposing institute willing to contribute towards beneficiaries.

The current proposal is a research, develop and demonstrate proposal hence during this phase of the project the question is not applicable.

15. By the time project completion report is submitted how much energy would have been actually saved.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy/fossil fuel saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

16. What is the value of such energy that would be saved till completion of the project.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

17. What are the existing equipment & instruments which proposing institute is going to utilize for the proposed project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work.

18. Confirm that detailed justification of manpower cost, i.e. nos. of man-days & rate of man-days are indicated.

Since the project involves product development which requires engagement of experienced staff in designing and experimentation. Details are given in page number 12.

19. Confirm that items, which are to be purchased, are listed with an estimated cost of each.

Yes. Details are given in page number 13.

20. Letters from at least two potential beneficiaries (with telephone nos, mobile nos, email) needs to be enclosed indicating their willingness to implement the outcome of the project in their premises. Sharing of cost, whatever may be agreed, also to be indicated.

NA



15



21. Out of the total cost of project, please indicate how much value of material is actually going to be used in the premises for energy Efficiency.

100% of the project cost is utilized for product development which has energy efficiency as co-benefit.

*Pringank*

**DECLARATION**

I hereby declare that

- i) I have not undertaken this project earlier with any other organization
- ii) I have not taken any financial help for this project from any other institution
- iii) In case of receipt of grant-in-aid from PCRA, financial help shall not be taken from any other govt. organization against this project.
- iv) Patent search is the responsibility of the institution.
- v) The research lab under this institution is recognized by Govt./DSIR.



Principal, Investigator Signature

Date March 7<sup>th</sup>, 2016

TERI University



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*Srinivasan*





**पीसीआरए**

**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**

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**Annexure - C**

**Physical & Financial Milestones for R&D**

**Project: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Sl No.	Target	Period (in month nos)		Amount to be released at the end of period upon completion of target.		
		From	To	PCRA (Rs. in lakhs)	Institute / Beneficiary (Rs. in lakhs)	Total (Rs. in lakhs)
1	At the beginning of the project	N.A.	N.A.	5.445	NA	
2	a) Procurement of Steam Generator & Integration with the system b) To optimize the steam, biomass ratio, residence time for Hydrogen production.	Start of project (0)	6			
3	a) To conduct parametric studies (variation/steam to biomass/rati, gas; composition, calorific value etc. b) To analyse the gas quality, i.e Tar and Particulate matters. c) Publications & report writing.	6	12	9.075	NA	
4	a) System optimization for reduction of impurities (Tar & Particulate Matters) b) Procurement of suitable engine integration of the complete package & testing of the overall performance of the	12	18	2.00	NA	

*Signature*

	system with an engine.					
5	a) Balance work of Procurement of suitable engine integration of the complete package & testing of the overall performance of the system with an engine on in 19 <sup>th</sup> Month. b) Performance analysis mass balance, energy balance efficiency improvement due to Hydrogen enrichment. c) Comparative studies with and without Hydrogen enrichment, techno-economic analysis highlighting benefits, fuel saving and Payback period etc. d) Publications & report writing	18	24	3.082	NA	
6	a) Presentation in SCM for approval of DCR, compliance of SC comments if any, submission of final completion report.	NA	NA	2.178	NA	2.178
TOTAL :				21.78	NA	21.78

Institute to return back the unutilized sanctioned amount, if any, after completion of project. Interest earned on sanctioned money, if any, will be considered as additional sanctioned money. TDS deducted amount, if any, will be considered as grant-in-aid. Amount will be released only after completion of target and utilization of previous installments with actual expenditure and committed / Tender raised / order placed values. Amount will be released only after expiry of period against the target.

*Singh*



**पीसीआरए**

**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)

दूरभाष/ Tel. : बोर्ड/ EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



**Annexure - D**

**HEAD WISE PROJECT COST**

Sl. No	Activity	PCRA (Rs. in lakhs)	Industry / Beneficiary (Rs. in lakhs)	Institute (Rs. in lakhs)	Total (Rs. in lakhs)
1	Capital items	6.00	0	0	6.00
2	Chemical / Raw materials	1.00	0	0	1.00
3	Consumables	1.00	0	0	1.00
4	Utilities	0	0	0	0
5	Travel	1.00	0	0	1.00
6	Stationery	0	0	0	0
7	Manpower	12.78	0	0	12.78
8	Workshop / Seminar	0	0	0	0
9	Other research expenditure (Survey vehicles charges, driver charges etc.)	0	0	0	0
	<b>Total :</b>	<b>21.78</b>	<b>0</b>	<b>0</b>	<b>21.78</b>

*Signature*



FILE NO. EMR/2016/007813

**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**

(a statutory body of the Department of Science & Technology, government of India)  
5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 28-Jun-2018

**ORDER**

Subject: Financial Sanction of the research project titled "**Understanding the role of MIR160 and AUXIN RESPONSE FACTORS in establishment of root system architecture for improvement of crop Brassicas**" under the guidance of Dr. Anandita Singh, Biotechnology, TERI School of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi, DELHI-110003 and by Dr. Chaithanya Madhurantakam, Associate Professor, Department Of Biotechnology, TERI School Of Advanced Studies - Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned project at a total cost of **Rs. 3648480/- (Rs. Thirty Six Lakh Forty Eight Thousand Four Hundred and Eighty Only)** with break-up of **Rs. 0/- under Capital (Non-recurring) head and Rs.3648480/- under General (Recurring) head** for a duration of 36 months. The items of expenditure for which the total allocation of **Rs. 3648480/-** has been approved are given below:  
The following budget may be considered for **TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi**

S. No	Head	Total (in Rs.)
<b>A</b>	<b>Non-recurring</b>	
1	Equipment	0
A'	Total (Non-Recurring)	0
<b>B</b>	<b>Recurring Items</b>	
1	Recurring - I : (Manpower)	1216800
	Recurring - II : ( Consumables, Travel, Contingencies)	2100000
2	Recurring - III : (Overhead Charges)	331680
B'	Total (Recurring)	3648480
<b>C</b>	<b>Total cost of the project (A' + B')</b>	<b>3648480</b>

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 1216160/-** (Rupees Twelve Lakh Sixteen Thousand One Hundred and Sixty only) under 'Grants-in-aid General' to **Registrar, TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi** being the first installment of the grant for the year 2018-2019 for implementation of the said research project.

3. The expenditure involved is debitable to **Fund for Science & Engineering Research (FSER)**  
**This release is being made under Core Research Grant. (PAC Plant Sciences)**

4. The Sanction has been issued to **TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi** with the approval of the competent authority



under delegated powers on **07 June, 2018** and vide Diary No. **SERB/F/2604/2018-2019**  
**3.2.1.G.27** dated **25 June, 2018**

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).
6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.
7. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.
8. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.
9. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.
10. The release amount of **Rs. 1216160/-** (Rupees Twelve Lakh Sixteen Thousand One Hundred and Sixty only) will be drawn by the Under Secretary of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

<b>Account Name</b>	<b>TERI School of Advanced Studies</b>
<b>Account Number</b>	<b>52142908571</b>
<b>Bank Name &amp; Branch</b>	<b>State Bank of India Pragati Vihar, Scope Complex, Lodhi Road, New Delhi 110003, INDIA</b>
<b>IFSC/RTGS Code</b>	<b>SBIN0020511</b>
<b>Email id of A/C Holder</b>	<b>registrar@terisas.ac.in</b>
<b>Email id of PI</b>	<b>asingh@teri.res.in</b>

11. The institute will furnish to the SERB, New Delhi, separate Utilization certificate(UCs) financial year wise to the SERB for Recurring (Grants-in-aid General) & Non-Recurring (Grants for creation of capital assets) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.
12. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.
13. The project File no. EMR/2016/007813 may also be mentioned in all research communications arising from the above project with due acknowledgement of SERB.
14. The manpower sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship and salary of supporting staff if any. beyond the duration of the project
15. As this is the first grant being released for the project, no previous U/C is required.



**3.2.1.G17.** The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "FUND FOR SCIENCE AND ENGINEERING RESEARCH" payable at New Delhi.

17. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

18. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

92141

(Dr. Shilpi Paul)

Scientist E

ms\_ps@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<b>Dr. Anandita Singh</b> <b>Biotechnology</b> <b>TERI School of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi, DELHI-110003</b> <b>Email: asingh@teri.res.in</b> <b>Mobile: 99119891510730</b>  <b>Dr. Chaithanya Madhurantakam</b> <b>Department Of Biotechnology</b> <b>TERI School Of Advanced Studies</b> (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a> .)
5.	<b>Registrar,</b> <b>TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi</b>  (Receipt of Grant may be intimated by name to the undersigned)

92141

(Dr. Shilpi Paul)

Scientist E

ms\_ps@serbonline.in



Revathy Vishwanath  
Assistant Director I/c (RP)  
26716690

**Indian Council of Social Science Research**  
(Ministry of Human Resource Development)  
Aruna Asaf Ali Marg, New Delhi - 110067  
EPABX: 26741849-51 Fax: 91-11-26741836  
[rpr@icssr.org](mailto:rpr@icssr.org)

F.No. 02/296/2016-17/RP

Dated: 31.03.2017

The Registrar  
Teri University,  
10 Institutional Area, Vasant Kunj,  
New Delhi- 110070

**Subject: Sanction of Responsive Research Project entitled "Urban Transition beyond Municipal Boundaries: A Comparative Spatial Analysis of the Peri-Urban Areas of Gurugram and Noida to Dr. Bhawna Bali".**

Dear Sir,

The Indian Council of Social Science Research (ICSSR) considered the above research project submitted by Dr. Bhawna Bali, Assistant Professor and Programme Coordinator (M Tech. UDM), Department of Policy Studies, Teri University, 10 Institutional Area, Vasant Kunj, New Delhi- 110070.

2. The Study, as proposed by the researcher/(s), is to be located at and financially administered by your institution as per the guidelines of this award.

3. The ICSSR has sanctioned a grant-in-aid of Rs. 8,00,000/- (Rupees eight lakh only) for the above research project and the grant will be released as follows:

First installment:	Rs.	3,20,000/-
Second installment:	Rs.	3,20,000/-
Final installment:	Rs.	1,60,000/-
<b>Total</b>	<b>Rs.</b>	<b>8,00,000/-</b>

\*. The break-up budget approved by the ICSSR of Rs. 8.00 Lakh is enclosed.

Revathy

by 322.249  
Bhawna B

Cont'd...2/

Dhanraj S

18/5

4. The First installment of the approved grant-in-aid will be released after receiving the grant-in-aid bill duly filled in, stamped and signed by the Project Director as well as the affiliating organization. (GIB already received).

5. In case, the study involves survey research, the finalized schedules/questionnaires (5 copies) designed to elicit information should be sent to the ICSSR as per the following schedule:

- a) If the schedule /questionnaire for eliciting information is as per standard questionnaire, these will have to be sent to ICSSR immediately,
- b) If the schedule /questionnaire for eliciting information are to be designed afresh keeping in view the requirements of the project, these will have to be sent to the ICSSR within a period of six months in any case.

6. The second installment would be released on receipt of the **12 monthly** progress report on the project to be submitted by the Project Director in the prescribed format (enclosed) and simple statement of expenditure duly certified by the affiliating institution.

7. The Final installment will be released only after the receipt of the following documents under rule 1.10(3) of the ICSSR Research Grants and acceptance by the ICSSR:

- a) The final Report on the research project (in duplicate) in a publishable form.
- b) A short summary of the project report in duplicate in 2,000-5,000 words.
- c) Such data or information relating to the research project as may be asked for by the ICSSR for preservation in its Data Archives.
- d) The audited statement of accounts for all expenditure incurred together with utilization certificate in GFR 19-A form for the entire amount of the sanctioned grant.
- e) A statement of assets costing over Rs. 100/- and credit out of the project funds. Such assets are required to be donated to the affiliating organization after completion of the project.

8. The Director of the research project will be **Dr. Bhawna Bali**. Who will be responsible for its completion within **24 Months** from the date of commencement of the project, which is **30<sup>th</sup> June 2017** as intimated by the scholar.

9. In case, the Project Director does not submit the periodic/final project report as per schedule with adequate justification, the scholar may be debarred from availing all future financial assistance from ICSSR.

Cont'd...3/



10. All grants from ICSSR are subject to the general provision of GFR 2005 and in particular with reference to the provision contained in GFR 209, GFR 210, GFR 211 and GFR 212.

11. The Project Director will ensure that the expenditure incurred by her conforms to the approved budget heads. The grant-in-aid is subject to all the conditions laid down in the ICSSR Research Grants scheme (responsive), available in the ICSSR website [www.icssr.org](http://www.icssr.org)

12. The expenditure on this account is debitable to the Budget Head-B Programmes Research Grants-Plan **General**. (10) Grant-in-aid for research project (s).

13. As per MHRD instruction, the amount of grant sanctioned herein is to be utilized by the end of the project duration. Any amount of the grant remaining unspent shall be refunded to the ICSSR immediately after the expiry of the duration of the project. If the grantee fails to utilize the grant for the purpose for which the same has been sanctioned/or fails to submit the audited statement of expenditure within the stipulated period, the grantee will be required to refund the amount of the grant with interest thereon @ 10% per annum.

Yours faithfully,



(Revathy Vishwanath)  
For Member Secretary

**Encl: as above**

Copy to:

1. Dr. Bhawna Bali,  
Assistant Professor and Programme Coordinator (M Tech. UDM),  
Department of Policy Studies,  
Teri University,  
10 Institutional Area, Vasant Kunj,  
New Delhi- 110070
2. Finance Branch, ICSSR, New Delhi
3. Record file

  
(Revathy Vishwanath)  
For Member Secretary



**Title: Urban Transition beyond Municipal Boundaries: A Comparative Spatial Analysis of the Peri-Urban Areas of Gurugram and Noida**

By

**Dr. Bhawna Bali**

**Budget**

<b>Expenditure Head</b>	<b>Percentage Allocation to Total Budget of the Study</b>	<b>Actual value as per the Study (In Rs.)</b>
Full Time Research Staff Part Time Assistance/Hiring Charges	Not Exceeding 50%	4,00,000
Fieldwork Cost (Travel/Logistics/Lodging-Boarding etc.) Source Materials/Software/Data Base etc.	Not less than 37.5%	3,00,000
Contingency	5%	40,000
Institutional Overheads	7.5%	60,000
Total	100	8,00,000

(Rupees Eight lakh only)

Note:

- Period of appointment of full time/part time staff to be decided as per upper limit of financial allocation under each head.
- Payment of full-time/part-time research staff and other expenditure will be made as per rates approved by the ICSSR for different posts/heads as under:

Research Associates  
Research Assistant  
Research/Field Investigator

Rs. 16,000/- per month  
Rs. 13,000/- per month  
Not exceeding Rs.1,000/- per day

  
FOR MEMBER SECRETARY



TERI University  
10, Institutional Area  
Vasant Kunj  
New Delhi - 110 070

Tel. 7180 0222  
E-mail registrar@teriuniversity.ac.in  
Fax 2612 2874  
India +91 • Delhi (0) 11  
Web www.teriuniversity.ac.in

**Gp. Capt. Rajiv Seth (Retd.), Ph.D.**  
**Pro Vice Chancellor**

April 18, 2017

Dr. Rajendra Dobhal  
Director General  
Uttarakhand State Council for Science and Technology  
Vigyan Dham, Jhajra, Dehradun

**Subject: Regarding release of grant of first year to TERI University, New Delhi worth Rs. 20.60 lakh**  
DST sanction letter No.182 (WTI) dated 16/03/2017 Project  
**Title: Modelling for Enhancing Water Quality in Uttarakhand using Geospatial Technology**

Dear Dr. Dobhal,

This is with reference to the above referred project recently sanctioned under Water Technology Initiative (WTI) programme of DST, Govt. of India, New Delhi to UCOST, Dehradun in collaboration with TERI University, New Delhi and DAV (PG) College, Dehradun.

The grant worth Rs. 50,46,400/- for a period of three years has been sanctioned by DST to UCOST, with a share worth Rs 43,16,800/- from DST and Collaborator's (UCOST's) share of Rs 7,29,600/-. The amount worth Rs. 25,26,800/- as first year share of the project has been sanctioned by DST and Rs. 2,43,300/- as Collaborator share from UCOST has been sanctioned.

The budget component of the work to be undertaken by TERI University, New Delhi with Co-PI, Dr. Vinay S.P. Sinha formulated under the project during first year is as under:

S. No.	Head	Amount sanctioned & Released by DST to UCOST	Amount sanctioned by UCOST	Amount Requested to UCOST Being release grant to TERI University, New Delhi
1.	Equipments (I) Subsurface Ground Water Modeling S/W (II) Satellite Data (III) Workstation Machine	Rs. 16.000 lakhs	NIL	Rs. 16.000 lakhs [for all (I)-(III)]
2.	Manpower (02 JRF) @ Rs. 25,000/- PM + 20% HRA)	Rs. 6.768 lakhs	Rs. 0.432 lakhs	Rs. 3.60 lakhs (for one JRF)
3.	Contingencies	-	Rs. 1.00 lakh	Rs. 0.25 lakh

Contd...2.

4.	Travel	-	Rs. 1.00 lakh	Rs. 0.50 lakh
5.	Consumables	Rs. 1.50 lakh	NIL	NIL
6.	Overhead	Rs. 1.00 lakh	-	Rs. 0.25 lakh
	<b>Total</b>	<b>Rs. 25.268</b>	<b>Rs. 2.432 lakh</b>	<b>Rs. 20.60 lakh</b>

In order to start the work as early as possible and to attain project objectives within time frame, it is requested to kindly release the above grant worth Rs. 20.60 lakhs (Rupees Twenty lakhs sixty thousand only) in favour of "The Registrar, TERI University, New Delhi" at the earliest. The audited Utilization Certificate (UC) and statement of expenditure (SE) as per norms along with report of work carried out during first year will be submitted as per requirement.

The detail of the account is given below and payment shall be made in favour of **THE REGISTRAR.**

Organisation Name as per Bank records: TERI University

Bank Account No: 52142908571

IFSC Code: SBHY0020511

MICR Code: 110004005

Bank Name: State Bank of Hyderabad

Bank Branch Address: Pragati Vihar, Ground Floor, Core 6, Scope Complex, Lodi Road, New Delhi-110003

Unique Agency code of the Organization and Institute: TERI UNIVERSITY

Looking forward for continued collaboration and association.

Thanks and with regards,

Gp Capt Rajiv Seth (Retd). PhD  
Pro Vice Chancellor

Encls: Sanction letter for project, P.D. WTI/DST dated 16.3.17

Gp Capt. Rajiv Seth (Retd), P.D.

Pro Vice Chancellor

TERI University

10, Institutional Area, Vasant Kunj

New Delhi - 110 070



## Dhanraj Singh

---

**From:** Shashi Tripathi  
**Sent:** Thursday, March 08, 2018 3:01 PM  
**To:** Amit Sharma  
**Cc:** Anoop Anand Malik; Jagpreet Singh; IT Help (TERI University); Jitendra Bisht; Priyanka Gururani; Dhanraj Singh; Sandeep Arora  
**Subject:** RE: Quotation required

Everything is fine. The correct Project code is 2017DB02.

**From:** Amit Sharma  
**Sent:** 08 March 2018 14:19  
**To:** Shashi Tripathi <shashi.tripathi@terisas.ac.in>  
**Cc:** Anoop Anand Malik <anoopanandmalik@gmail.com>; Jagpreet Singh <jagpreet@terisas.ac.in>; IT Help (TERI University) <ithelp@teriuniversity.ac.in>; Jitendra Bisht <jitendra.bisht@terisas.ac.in>; Priyanka Gururani <priyanka.gururani@terisas.ac.in>; Dhanraj Singh <dhanraj.singh@teriuniversity.ac.in>; Sandeep Arora <sandeepa@terisas.ac.in>  
**Subject:** RE: Quotation required

Dear Sir,

As discussed, Following are the Configuration you required. Please update if anything left.

Project Code – 2017DBT02

1. Desktop  
Make – Dell  
Processor – i5  
Hard disk – 1 TB  
Ram – 16 GB  
Operating System – Windows 10 Professional  
Display Port - VGA  
TFT/LED – 19 Inch Screen  
Graphic Card – Not Required
2. External Hard Drive  
Make – Seagate / Western Digital  
Capacity – 1 TB

Thanks

Amit Sharma

**Please note my new email id:** [amit.sharma@terisas.ac.in](mailto:amit.sharma@terisas.ac.in)  
**Also, please note the new URL for our website:** [www.terisas.ac.in](http://www.terisas.ac.in)

**From:** Amit Sharma  
**Sent:** 08 March 2018 11:33  
**To:** Shashi Tripathi <shashi.tripathi@terisas.ac.in>

### 3.2.1.G.30.

Cc: Anoop Anand Malik <[anoopanandmalik@gmail.com](mailto:anoopanandmalik@gmail.com)>; Jagpreet Singh <[jagpreet@terisas.ac.in](mailto:jagpreet@terisas.ac.in)>; 'IT Help (TERI University)' <[ithelp@teriuniversity.ac.in](mailto:ithelp@teriuniversity.ac.in)>; Jitendra Bisht <[jitendra.bisht@terisas.ac.in](mailto:jitendra.bisht@terisas.ac.in)>; Priyanka Gururani <[priyanka.gururani@terisas.ac.in](mailto:priyanka.gururani@terisas.ac.in)>

Subject: RE: Quotation required

Dear Sir,

Kindly share the required details...

1. Project Code –
2. Operating System – Windows / Linux ?
3. Graphic Card –  
Make -  
Configuration –

Thanks

Amit Sharma

Please note my new email id: [amit.sharma@terisas.ac.in](mailto:amit.sharma@terisas.ac.in)

Also, please note the new URL for our website: [www.terisas.ac.in](http://www.terisas.ac.in)

From: IT Help (TERI University) <[ithelp@teriuniversity.ac.in](mailto:ithelp@teriuniversity.ac.in)>

Sent: 08 March 2018 09:58

To: Jitendra Bisht <[jitendra.bisht@terisas.ac.in](mailto:jitendra.bisht@terisas.ac.in)>; Priyanka Gururani <[priyanka.gururani@terisas.ac.in](mailto:priyanka.gururani@terisas.ac.in)>

Cc: Shashi Tripathi <[shashi.tripathi@terisas.ac.in](mailto:shashi.tripathi@terisas.ac.in)>; Anoop Anand Malik <[anoopanandmalik@gmail.com](mailto:anoopanandmalik@gmail.com)>; Jagpreet Singh <[jagpreet@terisas.ac.in](mailto:jagpreet@terisas.ac.in)>; Amit Sharma <[amit.sharma@terisas.ac.in](mailto:amit.sharma@terisas.ac.in)>

Subject: Re: Quotation required

Dear Jitendra/Priyanka,

Kindly get the quotation for the below-given configuration.

Thanks

Yogesh Sharma

TERI School of Advanced Studies

Ext. 4916/7

On 7 March 2018 at 17:15, Shashi Tripathi <[shashi.tripathi@terisas.ac.in](mailto:shashi.tripathi@terisas.ac.in)> wrote:

Kindly obtain a best price quotation for a computer system with following specifications

Dell make  
i5 or i7 processor  
16 GB RAM  
1TB Hard Disk  
Graphic card  
19 inch monitor

In addition, 1 TB external portable hard disk (1 no)

Sincerely,

Shashi Bhushan Tripathi

\*\*\*\*\*

Shashi Bhushan Tripathi, PhD.

Associate Professor

Department of Biotechnology

TERI School of Advanced Studies

10 Institutional Area, Vasant Kunj

New Delhi- 110070, India

Tel. (91)-11-71800222 extn. 4809

(91)-9811870528 (Mobile)

Alternative E-mail: [sbtripathi1967@gmail.com](mailto:sbtripathi1967@gmail.com)<<mailto:sbtripathi1967@gmail.com>>

Website: <http://www.terisas.ac.in><<http://www.teriuniversity.ac.in/>>

\*\*\*\*\*

Please do not print this document unless absolutely necessary!

\*\*\*\*\*



No. BT/PR24047/BPA/118/364/2017

GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY

Block 2, 6-8th Floors  
CGO Complex, Lodhi Road,  
New Delhi- 110 003  
Dated: 21/08/2018

**ORDER**

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**" for a period of 3 Year 0 Month at a total cost of Rs. **5258600** (Rupees Fifty Two Lakhs Fifty Eight Thousand Six Hundred Only) on the terms and conditions detailed here under:-

**2 The Project :**

**2.1 Title :** Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas

**2.2 Details of the Investigators:**

**Dr. Anandita Singh**

Professor  
Department of Biotechnology  
The Energy And Resources  
Institute, New Delhi  
TERI- UNIVERSITY, 10 Institutional  
Area, Vasant Kunj, New Delhi-  
110070, New Delhi, Delhi, 110070

**CO-PI:**

**Dr. Shashi Bhushan Tripathi**

Fellow  
Biotechnology and Management of Bioresources  
The Energy And Resources Institute, New Delhi  
IHC, Lodhi Road, New Delhi - 110003, Delhi

**2.3 Objectives:**

1. Analysis of natural variation in sub-genome specific SOC1 promoter homeologs (Least Fractionated, Moderately Fractionated 1 and Most Fractionated 2) from select Brassica species of India
2. Analysis of diversification of promoter activity in homeologs derived from diploid (B. rapa-AA genome; and B. nigra-BB genome) and amphidiploid (B. juncea-AABB genome) species of Brassica via comparative expression studies of associated SOC1 transcripts
3. Molecular characterization of SOC1 promoter(s) homeologs from B. juncea
4. Functional characterization of select B. juncea SOC1 promoter homeologs



**2.4 Time Schedule:**

The duration of the project is 3 Year 0 Month from the date of this sanction order.

**2.5 Project Cost:**

The total cost of the project is Rs. **5258600/-** (Rupees Fifty Two Lakhs Fifty Eight Thousand Six Hundred Only) as per details given below:

Budget Head	Year I	Year II	Year III	Total (Rs.)
Equipment	800000.00			<b>800000.00</b>
Manpower	780000.00	780000.00	873600.00	<b>2433600.00</b>
Contingency	50000.00	50000.00	50000.00	<b>150000.00</b>
Consumables	600000.00	600000.00	600000.00	<b>1800000.00</b>
Travel	25000.00	25000.00	25000.00	<b>75000.00</b>
<b>Total (Rs.)</b>	<b>2255000.00</b>	<b>1455000.00</b>	<b>1548600.00</b>	<b>5258600.00</b>

**2.6 Equipment**

The details of the equipment sanctioned for the implementation of the project at  
**Annexure-I**

**2.7 Manpower:**

The details of the manpower sanctioned for the implementation of the project at  
**Annexure-II**

**3. Head of Account:**

The **Non-Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2018-2019
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.35	Grants for creation of capital assets

The **Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2018-2019
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.31	Grants-in-Aid General

#### 4. Terms & Conditions:

No utilization Certificate is pending with the implementing Institute. All the Utilization certificate due for rendition have been received and accepted by the head of the Division/Competent Authority.

In case the whole or a part of the amount of the grant in aid is being refunded, an interest at the rate of ten percent per annum thereon shall be recovered.

The Non-recurring amount should be utilized within 18 months from the date of Sanction order.

**If project involves transgenic work, therefore IBSC clearance is required before initiating the study. A copy of the same should be forwarded to the department. Investigators should follow biocontainment guidelines 2017-2018 available at <http://www.dbtindia.nic.in/wp-content/uploads/Regulations-Guidelines-for-Recombinant-DNA-Research-and-Biocontainment-2017.pdf>**

- 4.1 The other terms and conditions governing this sanction are attached at Annexure- III.
- 4.2 A Memorandum of Agreement (MoA) will be signed between the Department of Biotechnology and the grantee institution on Non-Judicial stamp paper Rs. 100/- in the enclosed format and the second release/installment will be made only after signing of MoA by the grantee institutions and its acceptance by DBT. In case of NGO or Private Institution, MOA signed is mandatory first release. A format of the MoA is enclosed in Annexure-IV
- 4.3 The Institute/Agency will keep the whole of the grant in a Bank Account earning interest, and the interest so earned should be reported to DBT in the Utilisation Certificate and Statement of Expenditure. The Interest so earned will be treated as created to the institute/Agency and shall be adjusted towards further installment of the grant and or at the time of Final Settlement of Accounts.
5. No International Travel will be undertaken from the sanctioned project grant unless specified otherwise.
6. The Registrar, The Energy And Resources Institute, New Delhi, New Delhi, Delhi would be responsible for submission of Statements of Expenditure (SoE), utilization certificates (UC), Assets Certificates, Manpower staffing & expenditure details in prescribed DBT formats to DBT in respect of grants released in this project from time to time.
7. PI's of DBT sponsored projects can consider appointment of JRF from Category-II merit list of DBT-BET exam so that candidates can be paid fellowships at par with NET/GATE/BET qualified candidates as per DST OM No. A.SR/S9/Z-09/2012 dated 21 Oct 2014. However, there is no compulsion on PI's to select candidates for JRF in their projects from Category-II of DBT-BET.
8. As per Rule 236 (1) of GFR 2017, the accounts of all Grantee Institutions or Organisations shall be open to inspection by the sanctioning authority and audit, both by the Comptroller and Auditor General of India under the provision of CAG(DPC) Act 1971 and internal audit by the Principal Accounts Office of the Ministry or Department, whenever the Institution or Organisation is called upon to do so.
9. If the Research Project involves biological resource, the obligations under the Biological Diversity Act 2002 as applicable shall be complied with by the Project Investigator, the details of such obligations can be accessed at [www.nbaindia.org](http://www.nbaindia.org)
10. This issues under the power delegated to this Department and with the concurrence of IFD vide their **SAN No 102/IFD/SAN/1660/2018-2019 dated 20/08/2018.**
11. This sanction order has been noted at serial no. 76 in the Register of Grants.

  
Dr. Sanjay Kalia  
(Scientist 'E')




To,

The Pay & Accounts Officer,  
Department of Biotechnology,  
New Delhi - 110 003.

**Copy to:**


- 1 The Principal Director of Audit (Scientific Departments), DACR Building, New Delhi- 110 002.
- 2 The Registrar, The Energy And Resources Institute, New Delhi, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110003, Delhi
- 3 Dr. Anandita Singh, Professor, Department of Biotechnology, The Energy And Resources Institute, New Delhi, TERI- UNIVERSITY, 10 Institutional Area, Vasant Kunj, New Delhi- 110070, New Delhi - 110070, Delhi
- 4 Dr. Shashi Bhushan Tripathi, Fellow, Biotechnology and Management of Bioresources, The Energy And Resources Institute, IHC, Lodhi Road, New Delhi - 110003, Delhi
- 5 Cash Section, DBT (2 copies).
- 6 Sanction Folder.
- 7 File Copy.

  
**Dr. Sanjay Kalia**  
(Scientist 'E')

## Annexure -I

Details of the Equipment sanctioned for the implementation of the project titled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**":

The Energy And Resources Institute, New Delhi			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	Referigerated water bath	1	200000.00
2.	PCR	1	600000.00
Total			800000.00


  
Dr. Sanjay Kalia  
(Scientist 'E')

## Annexure -II

Details of the manpower sanctioned for the implementation of the project titled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**":

Head	No. of Position	Year I	Year II	Year III	Total (Rs.)
Junior Research Fellow The two JRFs will undertake the workplan of the four objective of isolation and characterization of cis elements of orthologs and paralogs of SOC1 from Brassica species	2	780000.00	780000.00		1560000.00
Senior Research Fellow The two SRFs will undertake the workplan of the four objective of isolation and characterization of cis elements of orthologs and paralogs of SOC1 from Brassica species	2			873600.00	873600.00
<b>Total(Rs.)</b>		<b>780000.00</b>	<b>780000.00</b>	<b>873600.00</b>	<b>2433600.00</b>

Emoluments detail of research personal(s) mentioned in table(s) of Annexure-II shall be applicable only if candidate(s) met educational qualification and eligibility criteria as per DST OM No.SR/S9/Z-09/2012 dated 21.10.2014.

  
Dr. Sanjay Kalia  
(Scientist 'E')



FILE NO. EMR/2016/005382  
**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**  
(a statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 18-Sep-2018

**ORDER**

Subject: Financial Sanction of the research project titled "**Gene regulation by DNA methylation in Bacillus anthracis (Sterne)**" under the guidance of Dr. Ramakrishnan Sitaraman, Biotechnology, TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 - Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned project at a total cost of **Rs. 3812800/- (Rs. Thirty Eight Lakh Twelve Thousand Eight Hundred Only)** with break-up of **Rs. 500000/- under Capital (Non-recurring)** head and **Rs. 3312800/- under General (Recurring)** head for a duration of 36 months. The items of expenditure for which the total allocation of **Rs. 3812800/-** has been approved are given below:

The following budget may be considered for **TERI University, Plot No. 10, Institutional Area, Vasant Kunj**

S. No	Head	Total (in Rs.)
<b>A</b>	<b>Non-recurring</b>	
1	Equipment -> Deep freezer (-80 degrees)	500000
<b>A'</b>	<b>Total (Non-Recurring)</b>	<b>500000</b>
<b>B</b>	<b>Recurring Items</b>	
1	Recurring - I : (Manpower) Recurring - II : ( Consumables, Travel, Contingencies)	1216800 1750000
2	Recurring - III : (Overhead Charges)	346000
<b>B'</b>	<b>Total (Recurring)</b>	<b>3312800</b>
<b>C</b>	<b>Total cost of the project (A' + B')</b>	<b>3812800</b>

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 500000/-** (Rupees Five Lakh only) under 'Grants for creation of capital assets' and **Rs. 990000/-** (Rupees Nine Lakh Ninety Thousand only) under 'Grants-in-aid General' to **Registrar, TERI School of Advanced Studies, TERI University, Plot No. 10, Institutional Area, Vasant Kunj** being the first installment of the grant for the year 2018-2019 for implementation of the said research project.

3. The expenditure involved is debitable to **Fund for Science & Engineering Research (FSER)**

**This release is being made under Core Research Grant. (PAC Biophysics, Biochemistry, Molecular Biology & Microbiology)**

4. The Sanction has been issued to TERI University, Plot No. 10, Institutional Area, Vasant Kunj with the approval of the competent authority under delegated powers on **14 September, 2018** and vide Diary No. **SERB/F/7046/2018-2019** dated **17 September, 2018**

Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.

8. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

9. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.

10. The release amount of **Rs. 1490000/-** (Rupees Fourteen Lakh Ninety Thousand only) will be drawn by the Under Secretary of the SERB and will be **disbursed by means of RTGS transaction as per their Bank details given below:**

Account Name	TERI School of Advanced Studies
Account Number	52142908571
Bank Name & Branch	State Bank of India Branch: (20511) Pragati Vihar, New Delhi Address: Scope Complex, Ground Floor, Core 6, Lodhi Road, New Delhi - 110003

### 3.2.1.G.32.

IFSC/RTGS Code	SBIN0020511
Email id of A/C Holder	dhanraj.singh@terisas.ac.in
Email id of PI	rkraman@terisas.ac.in

11. The institute will furnish to the SERB, New Delhi, separate Utilization certificate(UCs) financial year wise to the SERB for Recurring (Grants-in-aid General) & Non-Recurring (Grants for creation of capital assets) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

12. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.

13. The project File no. EMR/2016/005382 may also be mentioned in all research communications arising from the above project with due acknowledgement of SERB.

14. The manpower sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship and salary of supporting staff if any beyond the duration of the project

15. As this is the first grant being released for the project, no previous U/C is required.

16. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "FUND FOR SCIENCE AND ENGINEERING RESEARCH" payable at New Delhi.

17. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

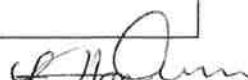
18. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

  
(Dr. Harish Kumar)  
Scientist E  
ms\_bb@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<b>Dr. Ramakrishnan Sitaraman</b> <b>Biotechnology</b> TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 Email: rkraman@terisas.ac.in Mobile: 919971005164 (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a> .)
5.	<b>Registrar, TERI School of Advanced Studies,</b> <b>TERI University, Plot No. 10, Institutional Area, Vasant Kunj</b>  (Receipt of Grant may be intimated by name to the undersigned)

  
(Dr. Harish Kumar)  
Scientist E  
ms\_bb@serbonline.in

3.2.1.G.32.

**From:** Ramakrishnan Sitaraman  
**Sent:** Wednesday, July 4, 2018 9:39:58 AM  
**To:** Dhanraj Singh  
**Subject:** FW: SERB File Number: EMR/2016/005382 Urgent message from Dr. Harish Kumar, DST

**From:** Dr. Harish Kumar <ms\_bb@serbonline.in>  
**Sent:** 27 June 2018 11:40  
**To:** "info@serbonline.in"@imsva02.cdacnoida.in  
**Subject:** SERB File Number: EMR/2016/005382 Urgent message from Dr. Harish Kumar, DST



**Science and Engineering Research Board**  
(Statutory Body Established Through an Act of Parliament : SERB Act 2008)  
Department of Science and Technology, Government of India

From: Dr. Harish Kumar  
Dear Dr. Sitaraman,

You are requested to re-submit the RTGS details corresponding to your file no : EMR/2016/005382

The finance has returned the file seeking updated renamed institute RTGS details to enable us to process it in finance.

\*\*\*\*\* LEGAL DISCLAIMER \*\*\*\*\*

**Please do not reply to this mail !!**

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3.2.1.G.32.

3.2.2.267

Dhanraj Singh

m: Chaithanya Madhurantakam  
06 March 2019 15:51  
To: Dhanraj Singh; Devvrata Guglani  
Cc: Pradeep Padhy; Leena Srivastava  
Subj: Reg: ICMR project funding  
Attachments: view\_crp\_budget\_institutewise.pdf

Dear Colleagues,

To update, the final fund sanctioned by ICMR is 38,69,650.00 INR.

I am attaching the pdf document indicating the break up of overall fund over 3 year time period.  
Starting date of the project has been decided by ICMR as 15-12-2018.

So far we have received the first instalment of 18,40,000 INR of 1<sup>st</sup> year from sanctioned 21,81,250.00 INR for the first year.  
Copying this mail to you all as you were earlier kept in loop for ICMR project.

Best regards  
Chaithanya

(38,69,650 INR)  
ICMR - project funding  
A. Chaithanya Madhurantakam  
06/03/2019  
15:51 PM

## TERI University

## nctioned Budget (in Rs.)

Year	Manpower	Equipment	Recurring	Travel	Overhead Charges	Total
Year : 1	<u>0</u>	<u>1500000.00</u>	<u>625000.00</u>	<u>25000.00</u>	<u>31250.00</u>	<b>2181250.00</b>
Year : 2	<u>217000.00</u>	<u>0</u>	<u>600000.00</u>	<u>25000.00</u>	<u>42100.00</u>	<b>884100.00</b>
Year : 3	<u>241000.00</u>	<u>0</u>	<u>500000.00</u>	<u>25000.00</u>	<u>38300.00</u>	<b>804300.00</b>
Year : 4	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<b>0.00</b>
<b>Total Budget (in Rs) :</b>						<b>38,69,650.00</b>



INDIAN COUNCIL OF MEDICAL RESEARCH  
ANSARI NAGAR NEW DELHI- 110029

No. IIC/12(18)/2018

Dated 27-12-18

Subject: Payment of 1<sup>st</sup> installment of the 1<sup>st</sup> year grant-in-aid for the project entitled "Structural characterization of a non-specific acid phosphatase HppA from Helicobacter pylori"

Memorandum

The Director General, ICMR sanctions the grant of Rs. 18,40,625/- (Rupees Eighteen lakh forty thousand six hundred twenty five only) being the 1<sup>st</sup> installment of the 1<sup>st</sup> year grant for the period from 15-12-2018 to 14-06-2019 towards expenditure in connection with the above-mentioned project

The amount of Rs. 18,40,625/- may be debited from the sanctioned budget of Rs. 21,81,250/- for the captioned project for the year 2018-19.

A formal bill for Rs. 18,40,625/- is sent herewith to release the payment by cheque/demand draft in drawn in favour of TERI University, 10, Institutional Area, Vasant Kunj, New Delhi. This issues with the concurrence of the Finance Divn., vide RFC No. ISRM/Ad-hoc/5/2018-19 dated 19.11.2018.

STAFF:

Contingencies	Rs. 12,500.00
Non-recurring (equipment) AKTA Prime plus	Rs. 15,00,000.00
Recurring	Rs. 3,00,000.00
(i) Consumables including chemicals & (ii) Crystallization screen/tools & kits	
Travel	Rs. 12,500.00
Overhead Charges @5%	Rs. 15,625.00
<b>TOTAL</b>	<b>Rs. 18,40,625.00</b>



Administrative Officer  
for Director General

Accounts V. ICMR

- Copy to:
1. Dr. Chaithanya Madhurantakam, Associate Professor & Head, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi - 110070
  2. Vice-Chancellor, Teri University, 10, Institutional Area, Vasant Kunj, New Delhi - 110070.
  3. IRIS ID : 2017-0325



Geetam Tiwari, Ph.D.  
MoUD Chair Professor  
for Transport Planning

भारतीय प्रौद्योगिकी संस्थान दिल्ली  
**INDIAN INSTITUTE OF TECHNOLOGY, DELHI**  
Civil Engineering Department  
Transportation Research & Injury Prevention Programme (TRIPP)  
Room No. MS 815, Main Building, Hauz Khas, New Delhi - 110 016 (India)

☎ 91-11-26596361  
Fax 91-11-26858703  
Email: trippiitd@gmail.com  
<http://tripp.iitd.ernet.in>

Dated: 20<sup>th</sup> February 2018

Ref: RP03390/18/

Deepty Jain  
Assistant Professor  
TERI School of Advanced Studies  
Vasant Kunj  
New Delhi.

Subject: Professional assignment for preparation of resource material for project (TIGTHAT)

Dear Deepty:

This is with reference to your proposal submission and meeting with purchase committee members at TRIPP complex. You will be glad to know that the purchase committee have approved your proposal as submitted for project "Towards an Integrated Global Transport and Health Assessment Tool (TIGTHAT)".

Deliverables

Assignment/Task:

1. To participate and present in the workshops/meetings summary of the travel data from various Indian studies.
2. Prepare draft papers/reports on travel data quality available from different Indian studies

Time schedule: Task 1 - March 2018 – July 2018  
Task 2 - July 2018 – February 2019

Total Cost: Rs. 1,00,000.00 (Rupees one lakhs only) including all taxes


Payment schedule:

1. 50% will be paid at the completion of task 1 (July 2018)
2. 50% will be paid at the completion of task 2 (March 2019)

You are, therefore requested that you may contact the undersigned for further course of action.

Best regards,

Sincerely,

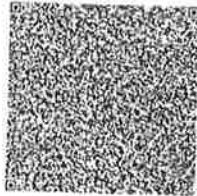
  
(Geetam Tiwari)



सत्यमेव जयते

**INDIA NON JUDICIAL****Government of National Capital Territory of Delhi****e-Stamp**

Certificate No.	: IN-DL68788514879802Q
Certificate Issued Date	: 24-Aug-2018 11:42 AM
Account Reference	: IMPACC (IV)/ dl725503/ DELHI/ DL-DLH
Unique Doc. Reference	: SUBIN-DL72550341690841909655Q
Purchased by	: TERI SAS
Description of Document	: Article Others
Property Description	: Not Applicable
Consideration Price (Rs.)	: 0 (Zero)
First Party	: TERI SAS
Second Party	: Not Applicable
Stamp Duty Paid By	: TERI SAS
Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



Please write or type below this line.....

**MEMORANDUM OF UNDERSTANDING BETWEEN  
THE INDIRA GANDHI NATIONAL CENTRE FOR THE ARTS, (IGNCA)  
NEW DELHI**

**(An Autonomous Trust of Ministry of Culture, Govt. of India)  
and**

**TERI School of Advanced Studies**

Name of the Project: **'Paddy Growing Culture of the Ao-Naga Tribe and Climate Change'**

This Memorandum of Understanding is made and executed on this 07 day of September, 2018, by and between the **Indira Gandhi National Centre for the Arts, C.V. Mess, New Delhi 110001**, (hereinafter referred to as First Party/IGNCA), which

**Statutory Alert:**

1. The authenticity of this Stamp Certificate should be verified at "www.echcstamp.com". Any discrepancy in the details on this website renders it invalid.
2. The onus of checking the legitimacy is on the users of the certificate.
3. In case of any discrepancy please inform the Competent Authority.

Capt. Pradeep K. Padhy (Retd.)

**TERI School of Advanced Studies  
10, Institutional Area, Vasant Kunj  
New Delhi-110070**



expression, shall unless repugnant to the context or meaning thereof be deemed to mean and include its executor, successors, administrators and assignees, on one part and **TERI School of Advanced Studies, 10, Institution Area, Vasant Kunj, New Delhi, 110070** hereinafter referred to as Second Party, which unless repugnant to the context or meaning thereof be deemed to mean and include its executors, successors, administrators and assignees on the other part.

## 2. **First Party/ IGNCA**

The First Party, i.e. IGNCA is an academic research institution. It is an autonomous Trust under the Ministry of Culture, Government of India. It has been mandated to carry out research, documentation and dissemination of knowledge in the field of Indian art and culture.

2.1 Interest of IGNCA in the proposed collaboration to provide a forum for creative and critical dialogue among the diverse arts ranging from architecture and literature to music, dance, theatre, sculpture, painting, photography, films, pottery, puppetry, weaving, embroidery, etc. through performance, exhibitions, multi-media projections, conferences, seminars and workshops, and to affiliate with universities and other academic institutions.

## 3. **Second Party**

TERI School of Advanced Studies, 10, Institution Area, Vasant Kunj, New Delhi, 110070. TERI School of Advanced Studies is a deemed university recognized by UGC. The Principal Investigator for the project will be Dr. Chubamenla Jamir, Department of Energy & Environment.

## 4. **Broad objective of collaborative proposal**

- To document the traditional paddy growing practices, oral narratives, stories, songs and rituals of the Ao-Naga Tribe.
- To examine the impact of climate change on the paddy growing practices.

## 5. **Responsibilities/ Deliverables/ Timelines (Second Party)**


- The expected outcome of the project after its completion will result in the following deliverables:
  - Monograph (150 pages) of paddy growing culture of Ao Naga tribe in publishable form
  - Lexicon of terms related to paddy cultivation

*Handwritten signature*

TERI School of Advanced Studies  
10, Institutional Area, Vasant Kunj  
New Delhi-110070

Capt. Pradeep K. Bhatia (Retd.)  
Registrar  
TERI School of Advanced Studies  
10, Institutional Area, Vasant Kunj  
New Delhi-110 070

- High resolution photographs -100- 150 numbers (300 dpi & 1200 pixel)
  - This project will be completed within a period 18 months from the date of signing of the MoU.
6. **Responsibilities/ Deliverables/ Time-lines (First Party/ IGNCA)**  
Overall supervision of the project and IGNCA shall provide the Budget.
7. **Combined Responsibilities of the First and Second Party**  
➤ To execute the project well in time.
8. **Budgetary Implication on part of First Party (IGNCA), if any**  
Total estimated cost of the project is Rs. 4,45,700 lakh (Rupees four lakh forty five thousand seven hundred only) including taxes for the extensive field work of the project till the final approval of IGNCA.
9. **Budgetary implication on part of Second Party, if any**  
If the project is not completed and does not progress satisfactorily within the stipulated time, the entire money advanced to Second Party is to be refunded along with 10% p.a. penal interest and decision of IGNCA in this regard shall be final and binding.
10. **Payment procedures, schedule of payment and other conditions like Bank Guarantee, Linking of installments with deliverable etc.**
- i) Total project cost Rs. 4,45,700 (all inclusive). All expenditure is subject to actual.
  - ii) IGNCA shall pay to Second Party the first installment of 30% of the total estimate i.e Rs. 133,710/- (Rupees one lakh thirty three thousand seven hundred ten only) on the signing of the agreement and receipt of the request for release.
  - iii) The second installment of 30% of the total cost of the project i.e Rs. 133,710/- (Rupees one lakh thirty three thousand seven hundred ten only) will be released after the approval of the interim report along with statement of accounts of the 1<sup>st</sup> installment along with supporting bills and vouchers and its acceptance by IGNCA. The interim report has to be submitted within 6 months from its date of signing of agreement.
  - iv) Last installment of 40% total cost i.e Rs. 178,280/- (Rupees one lakh seventy eight thousand two hundred eighty only) will be released on submission and

  
 Capt. Pradeep K Padhy (Retd.)  
 Registrar  
 TERI School of Advanced Studies  
 10, Institutional Area, Vasant Kunj  
 New Delhi-110070

acceptance of the final report to the Centre. Monograph in publishable form and all the related materials connected with it including the unused material along with a complete statement of accounts certified by a Chartered Accountant with original supporting bills/vouchers and U.C.

- v) Second Party will submit copy of the PAN Card and online banking details to IGNC A for releasing the payment.
- vi) TDS would be deducted as per rules.

#### 11. Arbitration

In case of any difference arising during the course of execution, the matter will be referred to the arbitration officer of the IGNC A, not below the rank of Joint Secretary to be appointed by Member-Secretary, IGNC A legal jurisdiction will be Delhi.

#### 12. Copyright, if any:

The copyright of all the materials will vest with the IGNC A.

Now, therefore, the Memorandum of Understanding is executed and signed at New Delhi in the presence of following witness(s) on the day, month and year cited herein above. Both the parties have read the MoU before signing and abide by its clauses

For and on behalf of First Party  
IGNCA, CV Mess,  
New Delhi 110001 (Seal)

Witness:

1.

2.

For and on behalf of the Regional Party  
Capt. Pradeep K Padhy (Retd.)  
TERI School of Advanced Studies  
TERI Institutional Area, Vasant Kunj  
New Delhi-110070 (Seal)

Witness:

1.

2.

(VIKAS PRASAD)

(Chubamenla Jami)





**NATIONAL MISSION ON HIMALAYAN STUDIES (NMHS)**  
**G.B. Pant National Institute of Himalayan Environment and Sustainable Development**  
**(GBPNIHESD)**  
**Kosi-Katarmal, Almora - 263643, Uttarakhand, India**

Ref. No.: GBPNI/NMHS-2018-19/MG 2

Date: 21-01-2019

**To,****Dr. V.S.P. Sinha**

TERI School of Advanced Studies  
 10-Institutional Area, Vasant Kunj  
 New Delhi 110070

**Subject:** Approval of the Medium Grant (MG) for the project entitled "**Water Resource Management through Spring and Catchment Rejuvenation in Uttarakhand for Improving Water Security**"

Sir,

I am directed to convey the approval of the Competent Authority for the above-mentioned project at a total cost of **Rs. 1,37,68,867.00 (Rupees: One Crore Thirty Seven Lakh Sixty Eight Thousand Eight Hundred Sixty Seven Only)** for a period of three years, as per the break-up given below:-

Head	1 <sup>st</sup> year (in Rs.)	2 <sup>nd</sup> year (in Rs.)	3 <sup>rd</sup> year (in Rs.)	Total grant
<b>A. Recurring</b>				
<b>(i) Salary:</b> 02 RA-II @ Rs.38,000/- + HRA @ 24% per month for three years. 01 JPF @ 16,000/- + HRA @ 16% or minimum @ Rs.3,600/- per month for first two years and Rs.18,000/-+ HRA @ 16% or minimum @ Rs.3,600/- per month for third year. 01 Field Assistant @ Rs.10,000/- per month fix for three years.	1486080.00	1486080.00	1510080.00	<b>4482240.00</b>
<b>(ii) Travel(Domestic):</b>	450000.00	450000.00	500000.00	<b>1400000.00</b>
<b>(iii) Consumables:</b>	300000.00	300000.00	250000.00	<b>850000.00</b>
<b>(iv) Contingency:</b>	250000.00	250000.00	250000.00	<b>750000.00</b>

<b>(v) Activities &amp; other project cost:</b> Climate modeling, water balance study, Inventory survey and stakeholder meetings, Geological investigation, Structural investigation, Physico-chemical soil survey, Vegetation survey, LULC Mapping, Flow measurement, Isotope sampling, Sensitivity survey, setting-up the pilot and implementation of research outcome of Hydro-geological analysis for spring rejuvenation, FGDs and stakeholder consultation, Monitoring and evaluation, Participatory resource mapping for springshed management, Site specific technical solutions for water harvesting, Comprehensive springshed rejuvenation framework and Trainings/workshop.	950000.00	2450000.00	2000000.00	<b>5400000.00</b>
<b>(vi) Institutional charges/ Overhead :</b>	150000.00	150000.00	200000.00	<b>500000.00</b>
<b>B. Non Recurring</b>				
<b>(i) Equipment:</b> Satellite data (NRSC), Carto DEM, Flow meters- 2 nos, System/ Data logger.	386627.00	Nil	Nil	<b>386627.00</b>
<b>Grand Total A+B</b>	<b>3972707.00</b>	<b>5086080.00</b>	<b>4710080.00</b>	<b>13768867.00</b>

2. The approval of the project is subject to incorporation of following points:

- The proposed model should be checked and authenticated; on completion it should be handed over to NMHS-PMU along with imparting training to PMU Scientists on the model;
- Geo-tagging of treatment sites should be done, specifying the inventor details of springs with details of districts.
- A report based on baseline data should be submitted by the project proponent in the **1st quarter of the project** since the initiation of the project, and quantification of improvement in economic status of beneficiaries against baseline should be specified. The PI must also submit the baseline data, past work done and **all the supporting data generated** under the NMHS Project along with the quarterly progress report to NMHS-PMU.
- A Certificate should be provided that this work is not the repeat of earlier work (as a mandatory exercise).
- The roles and responsibilities of each implementing partners should be delineated properly with their budget. The budget allocations to partners should be done in accordance with the MoEF&CC guidelines (Max. 30% for salary, 30% for equipment and 5% contingency). The same should be communicated to NMHS-PMU, before start of the project.
- The Periodic Progress Report of the NMHS Project needs to be submitted and updated on the Online Portal of the NMHS (<http://nmhsportal.org>) by the PI/ Project Proponent **on Quarterly basis** consistently. Monitoring indicators for the project should be able to quantify the difference made on ground.
- On completion of the study, a Seminar/ Conference/ Workshop should essentially be organized by the PI/ Proponent to discuss and disseminate the findings among the experts and concerned beneficiaries/stakeholders.

3. The Project Objectives, Quantifiable Deliverables and Monitoring Indicators are as follows:

### 3.2.1.G.36.

Project Objectives	Quantifiable Deliverables	Monitoring Indicators
<ul style="list-style-type: none"> <li>Generating future climatic projections with high resolution regional climate model</li> <li>To identify regional and local water imbalance and water stress index</li> <li>To quantify water availability at regional and local level</li> <li>Inventory preparation, Protection, Restoration and Rejuvenation of springs by piloting solutions for selected springs</li> <li>Recommendation for community based solutions for sustainable water management and use</li> <li>Recommendation for water harvesting techniques and spring-shed management</li> <li>Action plan for land and water resources management for selected spring-sheds and catchments</li> </ul>	<ul style="list-style-type: none"> <li>Development of spring-shed management framework</li> <li>Integrated Geospatial Climate Modelling (IGCM) for sustainable water resources management, applicable for entire Uttarakhand State.</li> <li>04 spring-sheds for pilot intervention for restoration and rejuvenation activities.</li> <li>New recharge structures to increase the water flow at least 15-25% in the selected spring shed.</li> <li>Relief from water drudgery particularly for women (Approx. 1000 no.) residing in the selected spring shed.</li> <li>01 Report on Implementation oriented Action Plan for spring-shed management.</li> </ul>	<ul style="list-style-type: none"> <li>Future Climatic projection Model Developed at regional scale (No)</li> <li>Number of spring-shed treated/demonstrated (Nos.)</li> <li>Increased the water flow at selected site (%)</li> <li>Number of beneficiaries (Nos.)</li> <li>No. of documents prepared and published (Nos.)</li> <li>No. of databases developed</li> <li>No. of policy documents/research paper/repot prepared and published (Nos.)</li> </ul>

4. Sanction of the Competent Authority is also hereby conveyed for the release of **Rs. 39,72,707.00 (Rupees Thirty Nine Lakh Seventy Two Thousand Seven Hundred Seven Only)** towards Grants-in-Aid to **Registrar, TERI School of Advanced Studies, 10-Institutional Area, Vasant Kunj, New Delhi 110070** for the aforementioned NMHS-MG project for the Financial Year 2018-19 Plan/recurring being the 1<sup>st</sup> installment of grants as per the following break-up.

Expenditure Head	Amount (INR)
<b>A : Recurring (as Above)</b>	
(i) Salary	1486080.00
(ii) Travel	450000.00
(iii) Consumables:	300000.00
(iv) Contingency:	250000.00
(v) Activities & other project cost(as above):	950000.00
(vi) Institutional charges/Overhead:	150000.00
<b>B. Non Recurring</b>	
(i) Equipment(as above):	386627.00
<b>Total A+B</b>	<b>3972707.00</b>

5. The Grants-in-Aid will be regulated in accordance with the provisions contained in the guidelines of the Ministry of Environment, Forest & Climate Change, New Delhi. The Grants-in-aid is also subject to Chapter 9 of the General Financial Rules (GFRs), 2017, as amended from time-to-time, read with Government of India's decisions incorporated there under and any other guidelines which may be issued in this regard, and in particular to the following conditions:-

- I. A separate ledger is maintained for the purchasing of equipments/Instruments as per the provision of GFRs.



- II. Engagement of staff as per the provision of GFRs and MoEF&CC guidelines given in **Appendix A**. The emoluments for the retired persons hired for the project should not exceed **Rs. 30,000/- consolidated (fixed) per month** as stipulated in the MoEF&CC guidelines.
- III. Expenditure on items other than salary is incurred keeping in view the austerity measures issued on the subject, and GFR is followed by the Institute as well as regional office and other agencies receiving funds.
- IV. All account maintained by the concerned Organization will be subject to audit by the C&AG or internal auditors. On termination of the project, statements of accounts duly certified by the Competent Authority of the Organization shall be submitted and the unspent balance, if any, in the funds sanctioned will be refunded to G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand.
- V. No cash payment is made exceeding Rs. 20,000/- to anybody for any expenditure. The taxes and dues are recovered and deposited in Government Account as per law.
- VI. The 2<sup>nd</sup> installment will be considered only after the expenditure of 80% of the 1<sup>st</sup> installment released and on submission of the latest UC as per GFR format along with the Statement of Expenditure (item-wise) and signed duly by the Competent Authority. The UC shall also be verified and signed by the Chartered Accountant/Finance Officer along with the cash flow statement.
- VII. The UC shall be submitted along with up-to-date physical progress report (annual/ half yearly/quarterly) indicating progress made against each objective and quantifiable deliverables, both online on NMHS web portal <http://nmhsportal.org> and offline hardcopy *via* speed post, certified by the authorized person, along with data, photographs/satellite pictures, etc.
- VIII. Assets acquired wholly or substantially out of Government grants shall not be disposed of without obtaining the prior approval of the sanctioning authority of Grants-in-aid, and a separate sheet should be enclosed with details of Assets with cost.
- IX. The accounts of concerned Organization shall be audited by C&AG or by any person/agency authorized by it on its behalf in accordance with the provisions laid down in Section 14 of the C&AG (DPC) Act, 1971 as amended from time-to-time.
- X. The internal audit party of the Principal Accounts Office of the Ministry or Department may also inspect the accounts whenever it is called upon to do so.
- XI. The Grants-in-aid will be spent exclusively in pursuance of the objectives for the project entitled **"Water Resource Management through Spring and Catchment Rejuvenation in Uttarakhand for Improving Water Security"** as given above and for the purpose it is being sanctioned.
- XII. The Grants-in-aid is subject to the Economy Instruction(s) issued from time-to-time by the Ministry of Finance or by the Competent Authority.
- XIII. The sanction of the NMHS grant is subject to compliance with the Terms and Conditions given in **Annexure-I** and duly signing of the Bond with NMHS-PMU in the prescribed format (**Appendix B**). Compliance of all conditions mentioned in the Bond and **Annexure I** must be ensured.
- XIV. On the basis of the Terms and Conditions given in **Annexure-I**, action is being taken up for the drawal of the sanctioned amount of the first installment of the first year's grant during the Financial Year 2018-19.
- XV. The sanction of the grant is subject to the whole details with nature of work of this project under "National Mission on Himalayan Studies (NMHS)" clearly mentioned in the website/all knowledge products of the Grantee.

- XVI. A **separate saving bank account** is to be opened for NMHS Project as per the provision Direct Beneficiary Account (DBA) as laid out by the Govt. of India, with facilitation of the audit of accounts as and when required. The interest earned out of the NMHS project Grant should be reported clearly in the latest Utilization Certificate (UC).
- XVII. The Project commissioned under "National Mission Himalayan Studies-Medium Grant" would be for the **tenure of three years w.e.f. 01.02.2019**. If the project proponent/ lead agency is able to produce the desired results after mid-term evaluation/ assessment in terms of measurable and quantifiable deliverables on the ground, the extension can be given for maximum up to 2 years.
- XVIII. As per the directive of the Govt. of India, the implementing agency should be registered online on **Public Financial Management System (PFMS)**. After registration on the PFMS (accessible at <https://pfms.nic.in/Users/LoginDetails/NewlayoutLogin.aspx>), please provide the Unique Code for further needful.
- XIX. The amount of **Rs. 39,72,707.00 (Rupees: Thirty Nine Lakh Seventy Two Thousand Seven Hundred Seven Only)** will be drawn by the Drawing and Disbursing Officer, G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora (U.K.) and disbursed to **Registrar, TERI School of Advanced Studies, 10-Institutional Area, Vasant Kunj, New Delhi 110070** through bank by ECS. The Grantee will open a **new saving Bank Account** in a nationalized bank and send the following details to NMHS-PMU for release of the NMHS Grant.
- |                |   |
|----------------|---|
| Bank Name      | - |
| Account No.    | - |
| IFSC Code      | - |
| Account Holder | - |
6. The amount will be debited in the Major Head 3435.03.104.11.04.31 Grant-in-Aid-General-NMHS.
7. **Please send your acceptance with the Terms and Conditions of this NMHS Grant sanction letter so that aforementioned grant could be transferred to the Head of Implementing Agency through Bank transfer on the designated account.**
8. Please note that following documents must be submitted before the start of the project activities.
1. **Quotations for the equipments/instruments to be procured.**
  2. **Roles and responsibilities of the partners with the budget allocated to each of them.**
  3. **Original copy of Bond duly signed by authorized person of grantee (Rs. 100 stamp paper)**

**Encl.: Annexure-I**  
**Appendix- A**  
**Appendix- B**

Yours Sincerely,



(Kireet Kumar)  
 Scientist 'G' & Nodal Officer  
 NMHS-PMU, GBPNIHESD

***Copy to:***

1. Registrar, TERI School of Advanced Studies, 10-Institutional Area, Vasant Kunj, New Delhi 110070
2. Dr. Subrata Bose, Director, Mountain Division, CS-I, 2<sup>nd</sup> Floor, Vayu Wing, Indira Paryavaran Bhavan, Ministry of Environment Forest & Climate Change, Govt. of India, Jorbagh Road, New Delhi-110003
3. PS to Director, G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand-263643
4. Finance Officer, G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand-263643
5. Principal Director of Audit, Scientific Department, AGCR Building, IP Estate, New Delhi
6. Guard File – NMHS.



**F. No. 13/12/2008-RE**  
**GOVERNMENT OF INDIA**  
**MINISTRY OF ENVIRONMENT & FORESTS**  
**(RE DIVISION)**

**Paryavaran Bhawan**  
**CGO Complex, Lodhi Road**  
**New Delhi-110003**  
 Date: 22.04.2013

To,  
 The Pay & Accounts Officer  
 Ministry of Environment & Forests  
 New Delhi.

**Subject: Research project entitled "Development of a Knowledge Based Decision Tool to Simulate Mechanism of Vegetation Change Due to Climatic Change in Western Himalayan Ecoregion (part of Uttarakhand) - a Precursor to Understanding Responses to Climate Change and Developing Scenarios for Adaptive Strategies" under the guidance of Dr. P.K. Joshi, Associate Professor, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 - release of Grant-in-Aid for the year 2013-14 - regarding.**

Sir,

I am directed to convey the Sanction of the President to the approval of the research project entitled "Development of a Knowledge Based Decision Tool to Simulate Mechanism of Vegetation Change Due to Climatic Change in Western Himalayan Ecoregion (part of Uttarakhand) -a Precursor to Understanding Responses to Climate Change and Developing Scenarios for Adaptive Strategies" under the guidance of Dr. P.K. Joshi, Associate Professor, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 at a total cost of ₹35,04,000/- (Rupees Thirty Five Lakhs Four Thousand Only) for a period of three years as per the break up given below:-

Head	1st Year	2nd Year	3rd Year	(Amount in ₹) Total
<b>A. Salaries</b>				
JRF-02 (Rs.16000-16000-18000 + 30%HRA)	4,99,200	4,99,200	5,61,600	15,60,000
<b>B. Permanent Equipments</b>				
i) Hand held GPS system (2) with mapping software,	50,000	-	-	50,000
ii) IGIS software developed by ISRO	1,50,000	-	-	1,50,000
<b>C. Satellite data (IRS P6 LISS III data) &amp; Primary data collection.</b>	3,60,000	-	-	3,60,000

<b>D. Consumable</b>	50,000	75,000	75,000	2,00,000
<b>E. Travel</b>	2,00,000	2,00,000	2,00,000	6,00,000
<b>Sub-Total (A+B+C+D+E)</b>	<b>13,09,200</b>	<b>7,74,200</b>	<b>8,36,600</b>	<b>29,20,000</b>
<b>F. Contingencies (5%)</b>	65,460	38,710	41,830	1,46,000
<b>G. Institutional Charges (15%)</b>	1,96,380	1,16,130	1,25,490	4,38,000
<b>Total (A+B+C+D+E+F+G)</b>	<b>15,71,040</b>	<b>9,29,040</b>	<b>10,03,920</b>	<b>35,04,000</b>

2. Sanction of the President is also hereby conveyed to the release of an amount of ₹10,00,000/- (Rupees Ten Lakhs Only) towards Grant-in-Aid to the Registrar, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 for the above research project for the financial year 2012-13-Plan-Recurring/Non-Recurring. The breakup of the amount of ₹10,00,000/- (Rupees Ten Lakhs Only) as first Installment of the grant for 2013-14 is per details given below:-

<b>Head</b>	<b>Amount in ₹</b>
Salaries	4,50,000/-
Permanent Equipment	2,00,000/-
Consumables	50,000/-
Travel	1,50,000/-
Contingency	50,000/-
Institution Charges	1,00,000/-
<b>Total</b>	<b>10,00,000/-</b>

3. The grants-in-aid will be regulated in accordance with the provisions contained in the GOI Rules. The Grants-in-Aid also subject to the Chapter 9 of the General Financial Rules, 2005, as amended from time to time, read with the Government of India's decisions incorporated there-under, and any other guidelines which may be issued in this regard, and in particular to the following conditions: -

- (i) All relevant information and documents/certificates as required under GFR 209 (1) have been received.
- (ii) The pattern of assistance of rules governing such grants-in-aid has received the approval of the Ministry of Finance, as required under Govt of India Decision No. (1) under DFPR - Rules 20.
- (iii) Assets acquired wholly or substantially out of Government Grants shall not be disposed off without obtaining the prior approval of the sanctioning authority of Grants-in-Aid.



- (iv) This is new project and hence no previous Utilization Certificate (UC) is required the UC for the amount being released now will be furnished by the Registrar, TERI University New Delhi, when request for release of further amount for the project is made, or at the end of the financial year, whichever is earlier, the Registrar, TERI University New Delhi shall furnish Utilization Certificate along with the request for release of further Grants-in-Aid certifying that the fund released to them for which Utilization Certificated has not been issued/utilized exclusively in pursuance of object envisaged in the Rules/Memorandum of the Registrar, TERI University New Delhi and that the grant has been spent for the project for which it was sanctioned with the extent instruction/rules and with the approval of competent authority in each case.
- (v) The Registrar, TERI University, New Delhi may furnish their performance-cum-achievement report on or before 31.03.2014 to the sanctioning authority.
- (vi) The sanction amount is noted at Serial No. R&D/NNRMS/2/2013-14 in the register of Grants-in-aid of RE-Division and sanction ID has been generated and enclosed.
- (vii) The Registrar, TERI University, New Delhi will spend Grants-in-Aid exclusively in pursuance of the objectives envisaged in rules/memorandum of the Registrar, TERI University, New Delhi and for the purpose it is being sanctioned.
- (viii) Grants-in-Aid to the Registrar, TERI University, New Delhi is subject to the Economy Instructions issued from time to time by the M/o Finance or by the Competent Authority.
- (ix) Grants-in-Aid shall be utilized before the end of the current financial year 2013-14 and unspent balance, if any, will be refunded/seek approval for carry forward by the Registrar, TERI University, New Delhi to the Govt. of India.
- (xi) The Registrar, TERI University, New Delhi will maintain and will present their annual accounts in the standard formats required under GFR 209 (xiii)

4. The sanction is subject to the conditions as detailed in Annexure-I attached. The grant-in-aid is recurring in nature and will be released in Installments. The grantee institute falls under category- (A)-Autonomous Body. This is new project & hence no UC is attached.

5. The Drawing and Disbursing Officer, Ministry of Environment and Forests hereby authorized to prepare and submit bill for amount of ₹10,00,000/- (Rupees Ten Lakhs Only) to Pay and Accounts Officer, Ministry of Environment and Forests New Delhi to make the payment electronically i.e. through CBS/RTGS to



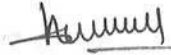
the account of the Registrar, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070 whose bank details are given below: -

Name of Bank : State Bank of Hyderabad  
 Name of the Branch : Scope Complex, Core-6,7 Institutional Area, Pragati Vihar, New Delhi-110 003  
 Bank Account No : 52142908571  
 IFSC Code : BSHY0020511  
 MICR Code : 110004005  
 Beneficiary's name : TERI University

6. The amount will be debitable to the Major Head 3435 Ecology and Environment; Minor Head 03.103 Research and Ecological Regeneration; 08.00.00 National Natural Resources Management System; 08.00.31 Grant in-aid-General (3435.03.103.08.00.31) under Demand No.31, Ministry of Environment and Forest for the financial year 2013-14 (Plan).

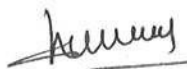
7. This sanction has been issued under the power of delegated to the Ministries/Department and with the concurrence of Integrated Finance Division vide Dy. No. 755/IFD/E/2013, dated 12/4/2013.

Yours faithfully,

  
 (Dr. H. Kharkwal)  
 Deputy Director

Copy to:

1. The Registrar, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070.
2. Cash Section (2 Copies). New Project
3. ✓ Dr. P.K. Joshi, Associate Professor, TERI University, Plot No. 10 Institutional Area Vasant Kunj, New Delhi - 110 070.
4. The Principal Director of Audit (Scientific Department), AGCR Building, I.P Estate, New Delhi-110002.
5. IFD/ B&A Section.
6. Adviser (RE)/ Dir.(Dr.JR).
7. Sanction folder/Guard File.

  
 (Dr. H. Kharkwal)  
 Deputy Director

डॉ. एस. के. गुप्ता  
कार्यकारी निदेशक (प्रशिक्षण)  
Dr. S. K. Gupta  
Executive Director (Training)

हुडको-ह्यूमन सेटलमेंट मैनेजमेंट इंस्टीट्यूट  
हुडको हाउस, लोधी रोड, नई दिल्ली - 110 003  
Hudco's Human Settlement Management Institute  
HUDCO House, Lodhi Road, New Delhi-110 003  
दूरभाष / Tel : 24365292, 24367834 (दूरभाष / Direct)  
ईपीएबीएक्स / EPABX : 24369534, 24308600 फैक्स / Fax : 24365292  
ई-मेल / E-mail : odhsmi2013@gmail.com, skgupta102003@gmail.com

No.HSMI/HUDCOCHAIR/Prog. (Reviewed) 2012-15



हाउसिंग एण्ड अर्बन डेवलपमेंट कॉर्पोरेशन लिमिटेड  
(भारत सरकार का उपक्रम)  
आई. एस. ओ. 9001:2008 प्रमाणित कंपनी  
Housing and Urban Development Corporation Limited  
(A Government of India Enterprise)  
AN ISO 9001:2008 CERTIFIED COMPANY  
CIN : U74829DL1970GOI005276

Dated: 30.3.2015

To,

The Registrar  
The Energy and Resource-Institute (TERI),  
Barbari Seth Block, India Habitat Centre Complex  
Lodhi Road, New Delhi - 110003  
Tel: 24682121 / 24682122  
Fax: 24682144 / 24682145  
Email: [pachauri@teri.res.in](mailto:pachauri@teri.res.in)

Sir/Madam,

We at HSMI appreciate and are thankful to you for the interest shown by your Institution in undertaking activities under the HUDCO Chair Programme. As you are aware, the MoA was for a period of three years upto March 2015 with provision for extension of the collaboration. We are pleased to inform you that the Competent Authority has considered renewal of the HUDCO Chair Programme and your institution has been considered for collaboration under the HUDCO Chair Programme for an extended period of three years upto March 2018.

The objective of HUDCO Chair Programme would remain to be the same i.e. to strengthen research and capacity building activities in the Habitat Sector with regard to specialized areas such as Human Settlement Planning and Design, Environmental Planning, Building material and Technology, Economic Policy and Analysis, Regional development etc. Annual funding to a maximum of Rs. Twenty lakhs per financial year would be provided to support activities/deliverables outlined by the collaborating Institution as an annual activity plan detailing various activities proposed such as research, documentation, training including preparation of modules/manuals and other training material, best practices/ evaluation study, seminars etc.

We look forward to a meaningful collaboration and will be delighted to initiate further action on signing of the MoA on hearing from you at the earliest.

With best wishes and regards,

Dr. SK Gupta



Concerning the letter No. 24532/SK/10 (Ph.D.) Dated 04<sup>th</sup> December 2015, the following proposal is submitted to the National Security Council Secretariat, Room no 116, 1<sup>st</sup> Floor, Sardar Patel Bhawan, New Delhi – 110 001.

## **MODEL BUILDING AND DEVELOPING CUSTOMIZED ALGORITHM FOR CLIMATE STUDIES**

### **1. Aim**

To develop application based models for meaningful analysis of satellite data for climate-related research in the various area of interest.

### **2. Objectives**

- To develop those models are simple to use yet effective in retrieving information from the satellite images.
- To customize existing remote sensing algorithms appropriate to the local environment of the various area of interest.

### **3. Project Specification**

Some of the key aspects of the project are summarized below

- The project mainly focuses on building models that are capable of producing results based on remote sensing analysis associated with different climate-related issues. Data of remote sensing satellites like Land Remote-sensing satellite (system) LANDSAT (1-8), Advanced Spaceborne Thermal Emission and Reflection Radiometer (ASTER), and Indian Remote Sensing Satellite series (IRS) will be used to estimate different indicators of climate change. The selection of the sensor depends on the specification, requirement and preference in the data analysis along with image availability. These models may work as a platform to perform quick and accurate satellite image processing for specific purposes over



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the larger study area. These requirements based image processing and algorithm customization opportunities are limited in commercially available image processing software's. The proposed work relies on the thermal and optical remote sensing images which are useful for climate change analysis.

- All satellite images require an accurate atmospheric correction for a reliable information extraction. In this project, atmospheric and aerosol modules suitable for the different local environment will be identified, and wired with the Graphical User Interface (GUI).
- The indices could be used to analyse the surface cover characteristics of any study area. Analysing vegetation, water quality, built environment, and soil will help to identify the climate change impact on any given environment.
- Satellite images from the thermal and infrared portion of the electromagnetic spectrum will be used to estimate the thermal values of the underlying objects. Parameters like land surface temperature, brightness temperature, emissivity, and radiance could help to understand the thermal property of any materials at a particular time.
- If the project is extended further, the system for object based automatic feature extraction from the remotely sensed images can be developed. It helps to identify objects and materials in near real time.

#### **4. Principal Investigator**

Dr. Nithiyanandam, Assistant Professor, TERI University, New Delhi.

#### **5. Project Duration and Budget**

The task duration is four months commencing from the day of final approval. The manpower cost of the project is below

Junior research fellow salary: 1, 00,000 INR

Project Investigator cost: 80,000 INR.

This amount will be paid in advance to TERI University.







## 6. Data and Other Requirements

The project requires high-end software's and hardware for building and visualizing model outputs. The satellite images required and its detail is given in Table 1.

Table 1. The list satellite data necessary for the proposed project.

S.no	Satellite	Sensors	Country /Agency	Approximate cost per scene* In USD
1	ASTER	VNIR, SWIR, & TIR	Japan & USA/ JAXA & NASA	80
2	LANDSAT series	TM, ETM, ETM+, OLI, & TIRS	USA/NASA	Free
3	IRS & Cartosat series	PAN & MSS	India/ISRO	Free+

Source: Remote-sensing Satellites and Airborne Sensors – Springer, 2011.

Note: If required, other satellite sensors that are not mentioned above may also be used.

\*The scene extent (swath) of satellite image may vary with sensors, for example, ASTER has 60 km swath while Landsat 8 has 185 km swath. I.e. Landsat 8 has more land area covered in a scene compared to ASTER. The images corresponding to the reflective and infrared portion of the electromagnetic spectrum will be utilized from all the satellites listed above. However, it is subject to the availability of images in a given area of interest of NSCS at a particular time. The input for models based on thermal-infrared data could be obtained from the TIR bands of ASTER and LANDSAT satellites. Both ASTER and Landsat have decent spatial resolutions of 90m and 100m respectively in the TIR region that enable mapping thermal anomalies in the ground to a greater extent. It is advised to use ASTER data over LANDSAT for application related to thermal emissions because of the availability of five narrow bands in the TIR region of the electromagnetic spectrum, whereas LANDSAT has only two bands.

+The images of Indian satellites could be obtained by NSCS from NRSC at no cost upon request.

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## 7. Expected outcomes

The expected outcomes are listed below

- Models customized for indices like Enhanced Vegetation Index, Normalized Difference Vegetation Index, Red Green Ratio Index, Ratio Vegetation Index, and Difference Vegetation Index, Built index, Soil Background Line, Vegetation Condition Index, Wetness Index, Water Quality Index and Global Environment Monitoring Index can be created. It is to mention that the actual usage of the indices listed above depends on the requirement of the application of interest of NSCS.
- Parameters like Land surface temperature, brightness temperature, emissivity, and radiance that depicts thermal characteristics of an object will be modelled only for ASTER satellite images.
- The link between image processing output and climate change will be examined in the area of interest.

## 8. Pert Chart

The activities proposed and respective timeline is given below

Activity	Month			
	1	2	3	4
Data collection				
Literature review				
Experimenting algorithms and building models				
Image Interpretation				

*Note: Project may require an extension if study area is large and heterogeneous (with the different climatic condition), and also depend on the requirement of the NSCS.*

## 9. Some related links

- <https://asterweb.jpl.nasa.gov/characteristics.asp>
- [http://www.science.aster.ersdac.jpacesystems.or.jp/en/documnts/users\\_guide/part1/01\\_05.html](http://www.science.aster.ersdac.jpacesystems.or.jp/en/documnts/users_guide/part1/01_05.html)
- [http://earthobservatory.nasa.gov/Features/MeasuringVegetation/measuring\\_vegetation\\_2.php](http://earthobservatory.nasa.gov/Features/MeasuringVegetation/measuring_vegetation_2.php)
- <http://www.springer.com/in/book/9780857296665>
- <http://www.lsgi.polyu.edu.hk/RSRG/resources/people/Nithi.html>



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Annexure I

CERTIFICATE

ENDORSEMENT FROM THE HEAD OF THE INSTITUTE

PROJECT TITLE: MODEL BUILDING AND ALGORITHM DEVELOPMENT FOR CLIMATE STUDIES.

1. Certified that our University welcomes the participation of Dr. Nithiyanandam Yogeswaran as the principal investigator.
2. Certified that the hardware, administrative support, and other facilities require as performs and condition of the grant will be extended to the PI throughout the duration of the project.
3. Our University assumes to undertake the financial and other management responsibilities of the project, in case the project is sanctioned.

Date: 31 Dec 2015

Place: N. Delhi



Name and signature

Head of the institute

Gp Capt. Rajiv Seth (Retd.), Ph.D  
Actg Vice-Chancellor  
TERI University  
10, Institutional Area  
Vasant Kunj, New Delhi - 110 070

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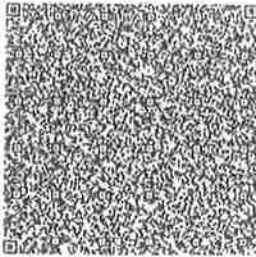
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## INDIA NON JUDICIAL

## Government of National Capital Territory of Delhi

## e-Stamp

Certificate No.	: IN-DL34202951971116N
Certificate Issued Date	: 27-Jul-2015 11:35 AM
Account Reference	: IMPACC (IV)/ dl900003/ DELHI/ DL-DLH
Unique Doc. Reference	: SUBIN-DL90000365906036803410N
Purchased by	: SIDBI
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First Party	: SIDBI
Second Party	: Not Applicable
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Stamp Duty Amount(Rs.)	: 100 (One Hundred only)



Please write or type below this line.....

**India: Financing Energy efficiency at MSMEs Project**  
**CONTRACT FOR CONSULTING SERVICES**  
**(IBRD/IDA FINANCED)**  
**CONTRACT TITLE: PROJECT DEVELOPMENT SUPPORT FOR**  
**ENHANCEMENT OF ENERGY EFFICIENCY INVESTMENT IN VARANASI**  
**CLUSTER**  
**CONTRACT No. SIDBI/EEC/2015-16/CS-23**

THIS CONTRACT ("Contract") is entered into this Twenty Eighth day of July  
Two Thousand Fifteen, by and between **Small Industries Development Bank**



## Statutory Alert:

1. The authenticity of this Stamp Certificate should be verified at "www.sidbi.org" Any discrepancy in the details on this Certificate and as available on the website renders it invalid
2. The onus of checking the legitimacy is on the users of the certificate
3. In case of any discrepancy please inform the Competent Authority.

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CERI  
 New Delhi

of India (SIDBI) (hereinafter referred to as "the client"), a Corporation established under the Small Industries Development Bank of India Act, 1989 and having its Head Office at SIDBI Tower, 15, Ashok Marg, Lucknow - 226 001 and an office at Ground Floor, Videocon Tower, E-1 Rani Jhansi Road, Jhandewalan Extension, New Delhi - 110055 (hereinafter referred to as the "the Client") and **M/s TERI University**, (hereinafter referred to as "the consultant") having its office at 10, Institutional Area, Vasant Kunj, New Delhi - 110070 (hereinafter referred to as "the Consultant").

WHEREAS, the Client wishes to have the Consultant perform the services hereinafter referred to, and

WHEREAS, the Consultant is willing to perform these services,

NOW THEREFORE THE PARTIES hereby agree as follows:

**1. Services**

- (i) The Consultant shall perform the services specified in Annex A, "Terms of Reference and Scope of Services," which is made an integral part of this Contract ("the Services").
- (ii) The Consultant shall provide the personnel listed in Annex B, "Consultant's Personnel," to perform the Services.
- (iii) The Consultant shall submit to the Client the reports in the form and within the time periods specified in Annex C, "Consultant's Reporting Obligations."

**2. Term**

The Consultant shall perform the Services during the period commencing **July 28, 2015** and continuing through **April 30, 2016** or any other period as may be subsequently agreed by the parties in writing.

**3. Payment**

A. Ceiling

For Services rendered pursuant to Annex A, the Client shall pay the Consultant an amount not to exceed a ceiling of **Rupees Thirty Six Lakh only (₹ 36,00,000/-) plus applicable service tax**. This amount has been established based on the understanding that it includes all of the Consultant's costs and profits that may be imposed on the Consultant. Tax will be deducted at source (TDS) by the Client as per the guidelines.

B. Schedule of Payments

The schedule of payments is specified below:

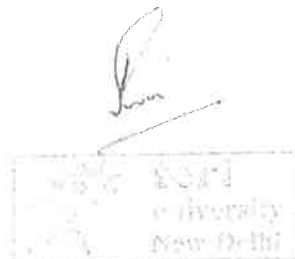


activities under the Contract, for receiving and approving invoices for payment, and for acceptance of the deliverables by the Client.

B. Reports.

The reports listed in Annex C, "Consultant's Reporting Obligations," shall be submitted in the course of the assignment, and will constitute the basis for the payments to be made under paragraph 3.

5. **Performance Standards** The Consultant undertakes to perform the Services with the highest standards of professional and ethical competence and integrity. The Consultant shall promptly replace any employees assigned under this Contract that the Client considers unsatisfactory.
6. **Inspections and Auditing** The Consultant shall permit, and shall cause its Sub-Consultants to permit, the Bank and/or persons or auditors appointed by the Bank to inspect and/or audit its accounts and records and other documents relating to the submission of the Proposal to provide the Services and performance of the Contract. Any failure to comply with this obligation may constitute a prohibited practice subject to contract termination and/or the imposition of sanctions by the Bank (including without limitation s determination of ineligibility) in accordance with prevailing Bank's sanctions procedures.
7. **Confidentiality** The Consultants shall not, during the term of this Contract and within two years after its expiration, disclose any proprietary or confidential information relating to the Services, this Contract or the Client's business or operations without the prior written consent of the Client.
8. **Ownership of Material** Any studies reports or other material, graphic, software or otherwise, prepared by the Consultant for the Client under the Contract shall belong to and remain the property of the Client. The Consultant may retain a copy of such documents and software
9. **Consultant Not to be Engaged in Certain Activities** The Consultant agrees that, during the term of this Contract and after its termination, the Consultants and any entity affiliated with the Consultant, shall be disqualified from providing goods, works or services (other than consulting services that would not give rise to a conflict of interest) resulting from or closely related to the Consulting Services for the preparation or implementation of the Project
10. **Insurance** The Consultant will be responsible for taking out any appropriate insurance coverage.





LIST OF ANNEXES

Annex A: Terms of Reference (ToR)

Annex B: Consultant's Personnel

Annex C: Consultant's Reporting Obligations

  
A circular official stamp of the Ministry of Education, Government of India, is placed over the signature. The stamp contains the text "Ministry of Education, Government of India" and "New Delhi" around a central emblem.

  
A rectangular stamp of LPU University, New Delhi, is placed below the signature. The stamp contains the text "LPU University, New Delhi" and a logo on the left.

The detailed scope of work for conducting detailed energy audit in the identified MSME units would include but not limited to the following:

- To correlate monthly production data with the electricity, fuel consumption for a period of about 12 months of normal operation for individual section and overall system.
- To measure the present efficiency levels, specific energy consumption and identify the energy saving opportunities in all major energy consuming equipments and other process related utilities.
- To study monthly power factor, maximum demand, working hours, load factor, Harmonics level, capacitor's health checkup etc. and also to study monthly electricity consumption and establish scope for possible optimization.
- To study the current lighting load and the recommend possible energy saving opportunities.
- To undertake renewable energy application assessment study
- Development of overall energy flow diagram
- Development of process flow diagram
- Study of Single Line Diagram
- Review the present metering & monitoring
- Review the present energy management system and recommend improvement measures for better monitoring and consequent energy savings

**B. Study on Lean Manufacturing, possible improvement areas with cost benefit analysis and Implementation Support,**

The basic rationale for undertaking lean manufacturing (LM) is to enhance productivity and competitiveness of MSMEs by reduction of wastages in manufacturing processes, inventory management, space management, energy consumption, etc. The LM techniques may also result in reduction in rejection, standardization of processes, better layout of machines resulting in reduced transportation of products during manufacturing, etc. The implementation of LM techniques may lead to cost reduction for MSMEs.

The consultant shall undertake a detailed assessment of the plant layout and processes to identify possible improvement areas through suitable LM techniques. The consultant shall also provide support to the unit for implementation of the identified LM techniques to the extent feasible within the scope of the project and given timelines.

**C. Study on Cleaner Production, possible improvement areas with cost benefit analysis, and Implementation Support,**

- Based on the data collected like site layouts & plans, environmental data, inventories of raw materials & products, and the site visit: define the sources, quantities and types of waste generated through material and energy balances.
- A general flow diagram showing all process steps that are carried out and flow diagram for each key process should be constructed. This should identify all main steps that are carried out, list all of the inputs (including raw materials, process chemicals, steam, water and energy, etc.), outputs (products, byproducts, solid, liquid and gaseous emissions), and any recycling steps.
- The values derived for resource consumption and wastes generation should be compared to national (where they exist) and international benchmarks for each specific industry.
- Identify cleaner production opportunities and assess costs & benefits of each recommended measure. This assessment should cover technical feasibility (effect on production, availability of technology & suppliers, any perceived risks, etc), financial viability (investment required, operation & maintenance costs, economic savings, etc), and expected environmental benefits (GHGs emissions reductions, water savings, etc).

- c. Respond to queries as may be raised by the consultant and / or any related agency during the course of execution of the tasks.
- d. Participate in project meetings as and when required.
- 3) The consultant shall coordinate with other consultants (to be hired by SIDBI / BEE under the overall project) and extend cooperation to them as may be required from time to time.
- 4) All the tasks as outlined above shall be completed within 09 months from date of award of the contract.
- 5) The cumulative target for achieving EE investment potential and corresponding emission reduction (in tCO<sub>2</sub>) shall be decided by the client from time to time considering the need of the project / assignment.

### DELIVERABLES & EXPECTED TIMELINES

S. No.	Deliverables	Expected Timelines*
1	Meeting with SIDBI to discuss and finalize the work plan for implementation of the project for next 03 months and Submission of the same	2 Weeks
2	Conducting Detailed Energy Audits	From 1 <sup>st</sup> month to 6 <sup>th</sup> month
3	Submission of atleast 25 Investment Grade Detailed Project Reports (IGDPRs) to SIDBI.	
4	Providing Implementation support for implementation of the Possible improvement measures recommended in the IGDPRs and submission of Implementation Completion Reports for atleast 20 MSME units and also facilitate to arrange loans for MSME units from SIDBI / any other local banks, if so required and desired by the MSME units	From 3 <sup>rd</sup> month to 9 <sup>th</sup> month
5	Progress Reports	Monthly
6	Project Completion Report	Within 2 week upon completion of contract

\*From the date of award of contract.

### COUNTERPART FACILITIES

The project would help the consultant with introduction to the local IA. The project shall arrange to send the introductory letter to the IAs explaining the role of the consultant to facilitate the whole project and shall participate in initial project launch activities.


### SCHEDULE

The assignment will be for 09 months (starting on **July 28, 2015** and ending on **April 30, 2016**) and shall be subject to annual review.


### REPORTING ARRANGEMENTS

- The consultant shall report to the Deputy General Manager, SIDBI.
- The consultant shall be responsible for providing periodic reports, including but not limited to the achievements/shortfalls, revised schedules and lessons learnt to SIDBI to the satisfaction of SIDBI. SIDBI shall periodically assess the execution of the assignment. On being found

*Rajiv Kumar*



*Rajiv Kumar*





**ANNEXURE B****Consultant's Personnel**

<b>Name</b>	<b>Educational Qualification</b>	<b>Experience (No. of Years)</b>	<b>Area of Expertise</b>
Pawan Kumar Tiwari, Team Leader	B.E (E&C), RGPV Bhopal, 2002  M. Tech (Energy Management), School of Energy and Environment Study, DAVV Indore, 2006  Certification on "Small Group Activities (SGA) and Total Energy Management (TEM) in SMEs" by ECCJ, Tokyo (Japan), 2010  Certification on Energy Efficiency Techniques in Indian SMEs, JICA Japan, 2011  Certification on Emission Trading System: Using Market to Promote Low Emission Development, 2014	11 Years	Have lead the various national & international projects in the field of Energy Efficiency/Power/Clea ner Production/Lean Manufacturing.
Ayan Shubhro Ganguly, Energy Auditor	B.Tech (Electrical) – Nagpur University, 2008  M. Tech (Energy Management), School of Energy and Environment Study, DAVV Indore, 2011	7 Years	Conducting Walk- through audits, detailed energy audits, preparation of DPR, Vendor identification document, Energy Assessment Studies, for various EE projects
Sumit Sharma, Lean Manufacturing and Cleaner Production Expert	B.E. (Environment), Delhi College of Engineering, 2002  M. Tech. (Energy & Environmental Management), IIT, Delhi, 2006	11 Years	Conducting Lean Manufacturing & Cleaner Production assessment study and implementation support
Upinder Singh Dhingra, Finance Specialist	B.Com (Honors in Business Finance & Accounting), Punjab University, Chandigarh, 2007  MBA (Finance & Marketing) - Punjab Technical University, 2009	6 Years	Project Structuring, Project Financing

**All the team members proposed for the assignment need to be available for the entire duration of the assignment and substitutions shall be allowed only with prior approval of SIDBI**

*Dajivkumar*



*[Signature]*



FILE NO. PDF/2016/002385

**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**

(a statutory body of the Department of Science &amp; Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 26-Jul-2017

**ORDER**

Subject: Financial Sanction under National Post-Doctoral Fellowship to **Ms. Aditi Jain**, under the mentorship of **Dr. Anandita Singh**, at **TERI University , Plot No. 10, Institutional Area, Vasant Kunj, New Delhi, Delhi-110070-** Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned fellowship at a total cost of **Rs. 19,20,000/-** (Rs. Nineteen Lakh Twenty Thousand **Only**) for a duration of 24 months.

The date of start of the fellowship will be **30 March, 2017**

The items of expenditure for which the total allocation of **Rs. 19,20,000/-** has been approved are given below:

Sl. No.	Budget Head	Amount
1.	Fellowship	Rs. 13,20,000 ( @55,000/- per month (consolidated))
2.	Research Grant	Rs. 2,00,000/- per annum
3.	Overheads	Rs. 1,00,000/- per annum

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 9,65,192/-** (Rupees Nine Lakh Sixty Five Thousand One Hundred and Ninety Two only) under 'Grants-in-aid General' to **TERI University, Plot No. 10, Institutional Area, Vasant Kunj** being the first installment of the grant for the year 2017-2018 for implementation of the said research project.

3. The expenditure involved is debitable to

**Fund for Science & Engineering Research (FSER)**

**This release is being made under National Post Doctoral Fellowship (N-PDF). (Life Sciences)**

4. The Sanction has been issued to with the approval of the competent authority vide Diary No. **SERB/F/3627/2017-2018** dated **25 July, 2017**

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.


7. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

8. The release amount of **Rs. 9,65,192/-** (Rupees Nine Lakh Sixty Five Thousand One Hundred and Ninety Two only) will be drawn by the Finance & Budget Officer of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

Account Name	TERI University
Account Number	52142908571
Bank Name & Branch	State bank of India State bank of India, Scope complex, Pragati Vihar, ground floor, core 6 , scope complex, Lodi road, Delhi-110003
IFSC/RTGS Code	SBIN0020511
Email id of A/C Holder	pradeep.padhy@teriuniversity.ac.in
Email id of PI	imaditil1987@gmail.com
Email id of Mentor	asingh@teri.res.in

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9. The institute will furnish Utilization certificate(UCs) financial year wise to the SERB and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.
10. The institute will maintain separate audited accounts for the fellowship. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.
11. The File no. **PDF/2016/002385** may also be mentioned in all research communications arising from the above project with due acknowledgement of **SERB**.
12. As this is the first grant for the fellowship, no previous U/C is required.
13. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "**FUND FOR SCIENCE AND ENGINEERING RESEARCH**" payable at New Delhi.
14. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.
15. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

  
(Dr. Thangaradjou T)  
Scientist E  
msls@serb.gov.in

To,  
Finance & Budget Officer  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<p><b>Ms. Aditi Jain</b> n.a TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 Email: imaditi1987@gmail.com Mobile: 919711736466</p> <p><b>Dr. Anandita Singh</b> Associate Professor Biotechnology TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 asingh@teri.res.in (Start date of the project may be intimated by name to the undersigned. For guidance, terms &amp; Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a>.)</p>
5.	<p><b>Registrar,</b> TERI University, Plot No. 10, Institutional Area, Vasant Kunj</p> <p>(Receipt of Grant may be intimated by name to the undersigned)</p>

  
(Dr. Thangaradjou T)  
Scientist E  
msls@serb.gov.in



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## MEMORANDUM OF UNDERSTANDING

between

**The National Institute of Urban Affairs, New Delhi**

on behalf of

**Ministry of Housing and Urban Affairs, Government of India**

and

**TERI – School of Advanced Studies, New Delhi**

(NAME OF THE TRAINING ENTITY)

for

### **Conducting Third Party Evaluation of the States/UTs Regarding Implementation of Reforms under AMRUT**

1. The Ministry of Housing and Urban Affairs (MoHUA) has appointed the National Institute of Urban Affairs (NIUA) for conducting third party audit of the performance of the States/UTs regarding implementation of reforms under AMRUT vide Sanction Order dated 03<sup>rd</sup> January 2018 (sanction entered at Sl.No. 10 of the sanction register for FY 2017-18 issued with the concurrence of Integrated Finance Division vide e-file No. 3129890 dated 29-12-2017). The duration of the assignment is scheduled to be one month (30 days).
2. NIUA has sought the consent of your institute for conducting the third party audit on its behalf, for specified states and ULBs. Vide email received on 10<sup>th</sup> January 2018 you have communicated your consent and provided the contact details of a nodal officer from your end for the same.
3. Out of a total of 54 milestones of the 11 reforms under AMRUT, 40 were targeted to be achieved in the first 2 years (28 in FY 2015-16 and 12 in FY 2016-17). This proposed exercise intends to verify the impact of these 40 milestones implemented so far.
4. Scope of Work as provided in the TOR attached with the Sanction Order:

For this, the Training Entities as third party evaluators would be required to:

- a) Establish contacts with the assigned cities and states. Procure required documentary evidence from the states and ULBs for analysis for the identified milestones.

- b) Conduct city visits for on-site/Field verification of the identified milestones.
  - c) Follow the standard format developed by NIUA for Field Verification, Online Verification and Verification of Documentary Evidence from States and ULBs of the identified milestones.
  - d) Compile City-wise and State-wise report in the format developed by NIUA for preparing State-wise and City-wise reports and submit soft copies.
  - e) Submit the State-wise and City-wise report to NIUA and provide necessary support for compilation of the final report to NIUA.
  - f) Submit all documentary evidence collected from states and cities to NIUA in soft and hard copy.
5. For the third party audit, your institute would be required to undertake an impact assessment of the 40 milestones (refer Annexure 1) of the AMRUT reforms for the states of Rajasthan, Himachal Pradesh and Madhya Pradesh. The list of cities covered under each state is provided in Annexure 2.
  6. The Training Entity will use all reasonable endeavours not to disclose any information/documentary evidence (soft and hard copies) collected during the state and city visits to any third party or use the same for any purpose except as expressly permitted in this Agreement.
  7. The duration of the assignment would be maximum of 3 weeks from the date of signing of MoU, which will be no later than the initialisation workshop conducted by NIUA.
  8. For this assignment TERI- School of Advanced Studies would be paid as per the following schedule:

No.	Heads of Expenditure	Number of Cities	Estimated No. of Man-Days per city	Total Man-Days	Unit Cost (INR)	Total Cost (INR)
1	Field Visits for Verification and Impact assessment (includes Travel, stay and incidental expenses) for states other than NE states	9	3	27	13750*	3,71,250
2	Online Validation and Analysis	9	3	27	2500#	67,500
3	Communication and Documentation	9	3	27	3300*	89,100
<b>Total</b>						<b>5,27,850</b>

\* rates as per CCBP Toolkit  
# estimate based on salary of RPMC in CCBP Toolkit

## 9. Timelines:

Milestones	Time Period
Signing of MoU	Latest by the 29 <sup>th</sup> January, 2018
Completion of data collection from States and Cities visit with intimation to NIUA.	Latest by 2 <sup>nd</sup> Week from signing of MoU
Submission of State-Wise and City-Wise reports (based on data collection from States and Cities visit and online validation) along with all Documentary Evidence collected from States and Cities and all invoices related to expenses incurred.	Latest by end of 3 <sup>rd</sup> Week from signing of MoU

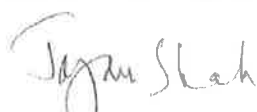
Please note: The Training Entity will have to strictly adhere to the given time schedules.

## 10. Payment schedules:

Milestones	Time Period
Signing of MoU	40% of the total payment (based on number of cities)
Submission of State-Wise and City-Wise reports (based on data collection from States and Cities visit and online validation) along with all Documentary Evidence collected from States and Cities and all invoices related to expenses incurred.	40% of the total payment
Acceptance of final report by MoHUA	20% of the total payment

Please note: the MoHUA would release 20% payment only upon the acceptance of the final report.

For and on behalf of the  
National Institute of Urban Affairs

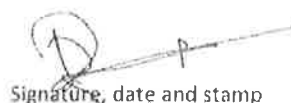


Signature, date and stamp

Director  
National Institute of Urban Affairs  
1st & 2nd Floor, Core 4 - B,  
India Habitat Centre, Lodhi Road,  
New Delhi - 110003

Designation

For and on behalf of the  
TERI - School of Advanced Studies, New Delhi



Signature, date and stamp

29 Jan 2018

Name

Capt. Pradeep K Padhy (Retd.)  
Registrar

TERI School of Advanced Studies  
Institutional Area, Vasant Kunj  
New Delhi - 110 070



Annexure 1: List of Milestones

No	Reforms	Milestones	Target Year
1	E-Governance	Digital ULBs	Year 1 (2015-16)
		1. Creation of ULB website	
		2. Publication of e-newsletter	
		Digital India Initiatives	
		3. Support Digital India (ducting to be done on PPP mode by the ULB itself).	Year 2 (2016-17)
		4. Coverage with E-MAAS (from the date of hosting the software)	
		• Registration of Birth, Death and Marriage	
		• Water & Sewerage Charges	
		• Grievance Redressal	
		• Property Tax	
		• Advertisement tax	
		• Issuance of Licenses	
		• Building Permissions	
		• Mutations	
		• Payroll	
		• Pension	
		• e-procurement	
2	Constitution and professionalization of municipal cadre	1. Policy for engagement of interns in ULBs and implementation	Year 1 (2015-16)
		2. Establishment of municipal cadre	Year 2 (2016-17)
		3. Cadre linked training	Year 2 (2016-17)
3	Augmenting double entry accounting	1. Complete migration to double entry accounting system and obtaining an audit certificate With effect from FY2012-13 onwards	Year 1 (2015-16)
		2. Appointment of internal auditor	Year 2 (2016-17)
		3. Publication of annual financial statement on website	Every Year
4	Urban Planning and City level Plans	1. Preparation of Service Level Improvement Plans (SLIP), State Annual Action Plans (SAAP)	Year 1 (2015-16)
		2. Make action plan to progressively increase Green cover in cities to 15% in 5 years.	Every Year
		3. Develop at least one Children Park every year in AMRUT cities.	
		4. Establish a system for maintaining of parks, playground and recreational areas relying on People Public Private Partnership (PPPP) model.	Year 1 (2015-16)
		5. Energy Efficiency Projects	Year 2 (2016-17)

## MEMORANDUM OF UNDERSTANDING

BETWEEN

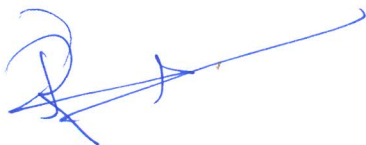
**TAMIL NADU URBAN FINANCE AND INFRASTRUCTURE DEVELOPMENT CORPORATION LTD [TUFIDCO], CHENNAI**

[Mission Directorate for SMART CITIES MISSION and AMRUT SCHEME]

AND

**TERI UNIVERSITY, NEW DELHI**

1. The Ministry of Urban Development, Government of India (hereinafter called MOUD), has launched the Atal Mission for Rejuvenation and Urban Transformation (AMRUT) for facilitating the provision of urban services in 500 cities across the country. The Mission emphasizes capacity building as a necessary component and provides funds and other non-financial support explicitly for this purpose.
2. As part of the AMRUT Mission, the **Tamil Nadu Urban Finance and Infrastructure development Corporation Ltd (hereinafter called the TUFIDCO), Mission Directorate for SMART Cities Mission and AMRUT Scheme**, is committed to building the capacity of elected representatives and officials from cities for undertaking the various tasks envisaged under the Mission, with a focus on the following departments/areas and subjects
  - i. **Finance & Revenue:**  
Revenue, Accounts Finance and Market/Tax Departments
  - ii. **Engineering and Public Health:**  
Public Works, Water Works/ Street Lighting, Public Health and Sanitation, Horticulture and gardens Departments,




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- iii. **Town Planning:** Town planning, Building and town survey, Encroachment and license Departments'
3. **The necessary funds for roll out of the individual capacity building plan will be from the ongoing Capacity Building for Urban Development (CBUD) Project of the MOUD, supported by the World Bank;**
4. Individual capacity building training courses will be aligned to the Training Needs Assessment and Strategic Training Plan conducted under the CBUD Project (accessible at [www.jnnurm.nic.in](http://www.jnnurm.nic.in));
5. The **TUFIDCO** intends to get into MOUs with Training Entity the training entity empanelled by the MOUD under the Mission, for rolling out individual capacity building activities as per its specific requirements;
6. The National Institute of Urban Affairs, New Delhi (hereinafter called **NIUA**) is the strategic partner of the MOUD in capacity building and will provide single window services for capacity building under AMRUT;
7. Accordingly, the **TUFIDCO** has requested the **TERI University, New Delhi**, (hereinafter called 'Training Entity' to provide individual capacity building services in the following subject areas (based on the subject-wise empanelment list of MOUD) and as defined in this MoU (Pick from the following four options as per MoUD empanelment)
  - a. **Finance and Revenue**
  - b. **Engineering and Public Health**
  - c. **Town Planning**
8. With a view to further clarify the respective roles and responsibilities for implementing individual capacity buildings in the **State of Tamil Nadu** under the AMRUT Mission (hereinafter referred to as the 'Training Programme'), the **TUFIDCO** and the Training Entity have decided to enter into a Memorandum of Understanding (MoU), and agree on the following:

**9. The Training Entity agrees to undertake the following:**

**a. Design of Training Programme**




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- (i) The Training Entity will design the Training Programme, in consultation with the NIUA and TUFIDCO after assessing the knowledge and skill needs of the trainees through a process of **self-assessment**. For this purpose the questionnaire used in the Training Needs Assessment conducted under the CBUD Project will be used (*accessible at [www.jnnurm.nic.in](http://www.jnnurm.nic.in)*). The self-assessment to be done after conducting the first capsule/Orientation Capsule mentioned in Clause 9.b (i) of this MoU.
- (ii) The Training Entity **will maintain a database** of all trainees including, *inter-alia*, the profile of the trainees, details of their present work, the name and designation of their supervising officer, present level of knowledge and skills, specific knowledge needs and required training subjects for the Department-Specific Capsules mentioned in Clause 9.b (i) of this MoU, in the formats specified by NIUA/MOUD/CBUD.
- (iii) **Develop training content and session-wise learning objectives** for the Department- Specific Capsules based on the profile and needs of the assigned participant trainees and finalize the same in consultation with NIUA and TUFIDCO. (NIUA will design the evaluation/testing methodology for session-wise training outcomes on the basis of a consolidated training agenda, to be shared with NIUA during the quarter preceding the quarter in which the training has to commence.)

#### **b. Roll-Out of Training Programme**

- (i) Conduct the Training Programme (maximum batch size of **30** participants) for all trainees as assigned by the **TUFIDCO**, in line with the capacity building guidelines under the AMRUT Mission. The following overall training strategy is proposed to be adopted for each trainee:

<b>Orientation and Department Specific Capsules</b>	<b>Number and Duration</b>
Orientation Capsule covering subjects as indicated by NIUA	<b>1</b> programme of <b>3</b> day duration



3.2.2.312



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Department-Specific Capsules as per the specific needs of the participants	2 programmes of 3 day duration each
<b>NOTE:</b> Each participant will receive training through a <b>total</b> of <b>3</b> training capsules of 3-days each <b>in 1 year</b>	

- (ii) Conduct training programmes (all 3 capsules) for each participant trainee with a gap of three-four calendar months between each programme.
- (iii) Conduct one Sensitization Programme for each Elected Representative **of ULBs in Tamil Nadu** during the Mission period as assigned and directed by the **TUFIDCO**. Each Sensitization Programme must include one orientation to the urban sector in the State and one exposure visit to models and best practices in the form of relevant projects within the State of Tamil Nadu or in another State. States with a larger number of elected representatives may conduct multiple programmes concurrently. The models and best practices will be identified by the Training Entity in consultation with the **TUFIDCO** and NIUA. The sensitization programme will be properly documented as per a standardized format provided by NIUA.

#### c. Evaluation and Post-Training Support

- (i) The Training Entity will collect **post-training feedback** from the trainees after the completion of each capsule, in the manner and as per formats discussed and finalized with the NIUA. The format will cover, *inter-alia*, the following aspects:
1. Feedback on quality and appropriateness of training facilities, pedagogy, curriculum and faculty,
  2. Self-assessment by trainees of their learning outcomes from each session,
  3. Self-assessment by trainees of their learning outcomes after completing 3-4 months of work and before the start of every subsequent capsule,

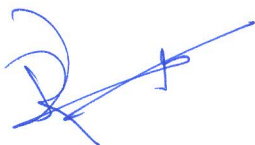



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- (ii) Make suitable adjustments and changes to the Training Programme and related activities based on the feedback received from the participants and NIUA from time to time.
- (iii) Assign Coaches (members of the faculty who impart training) to each batch of trainees, for answering specific queries and sharpening job specific knowledge and skills of trainees during the intervening period between each capsule.
- (iv) Assign a Mentor, in consultation with the **TUFIDCO**, to each group of trainees from a ULB, who will be identified from amongst the retired Central, State or Municipal services, for providing overall guidance to the assigned group of ULB staff related to job specific knowledge and skills as well as personal/career development.
- (v) Obtain from the Supervisors of the trainees, an assessment report of the trainees working under their charge, before the start of the next capsule as per a format finalized in consultation with NIUA.
- (vi) Conduct at own cost, one additional bridge/remediation capsule by making changes In training modules, training methods and trainers, in case the training impact study does not indicate any positive change in the knowledge and skill of the trainees. NIUA will make a reasonable effort to identify and highlight the concerns raised through evaluation & monitoring and share the same with the Training Entity in the shortest possible time.

#### d. Reporting Requirements

- (i). **Submit quarterly updates** to the **TUFIDCO** and NIUA as per a mutually agreed Management Information System (MIS) and the database of trainees mentioned in above Clause 9.a
- (ii). The data should include all data necessary to comply with the timelines and provisions mentioned in Clause 14.




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- (iii). Submit a detailed **Annual Training Report** including capsule-wise and participant-wise details, hurdles faced in implementation and way forward along with changes in work plan if any, to the TUFIDCO and the NIUA, such that it may be incorporated in the State Annual Action Plan (SAAP) for the subsequent year.
- (iv). Provide any additional information sought by the TUFIDCO or NIUA regarding the training programmes within 15 days of receipt of such requests.

**e. Other Responsibilities**

- i. Organize and conduct study visits of models and best practices implemented or being implemented in a ULB, for all trainees who have completed 3 capsules of classroom training. The sites for each study visit to be finalized in consultation with the **TUFIDCO** and NIUA.
- ii. The **TUFIDCO**, MOUD, CBUD and NIUA will strive to tie-up additional funding from donors and bilateral & multilateral organizations to facilitate exposure visits to overseas locations on competitive basis, such that the trainees with the best record of achievement and command of learning outcomes may receive international exposure in addition to domestic exposure. Such International exposure visits will cover subjects related to urban management in other countries.
- iii. The **TUFIDCO**, MOUD, CBUD and NIUA will assist the Training Entity in establishing collaboration with an institution/organization of repute having expertise in the relevant sectors in the countries to be visited, such that the International partner can introduce an element of classroom training/briefing during the exposure visits, in addition to site visits.
- iv. Design and conduct national/regional workshops/seminars/consultations as requested by NIUA/**TUFIDCO** periodically, independently or in collaboration with NIUA, to ensure adequate coverage of the area/subject which are necessary for developing appropriate knowledge and skills for



  
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application in the ULB. This will be in accordance with page No. 66, Annexure 7, para 9, of the AMRUT Mission guidelines.

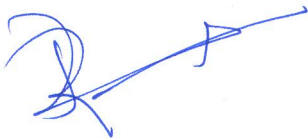
- v. Participate in national/regional workshops organized by NIUA from time to time.
- vi. Cooperate with and support the teams from NIUA or any third-party assigned by NIUA for conducting in-training and post-training monitoring and evaluations from time to time.

#### **10. The TUFIDCO agrees to the following:**

- a). Through the State Mission Management Unit (hereinafter called SMMU) created under the AMRUT Mission, provide timely details and nominations of participant trainees to the Training Entity for the roll out of training programmes and to ensure adequate participation in the training programmes.
- b). Through the SMMU, provide support to the Training Entity for undertaking the various tasks assigned under this MOU.
- c). Facilitate timely payments to the Training Entity and all other entitles/ organizations/agencies which will be involved with the Training Programme and Sensitization Programme and other related activities such as exposure visits.
- d). Ensure that the SMMU updates the database regularly for input into the MIS mentioned in Clause 9.d (i) and submits the consolidated quarterly and annual progress reports to NIUA.

#### **11. Duration of the MOU:**

The MOU shall be effective from **01.04.2017** and shall, unless terminated by the Parties in accordance with the provisions hereto or




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extended by mutual consent expressed in writing by the Parties, remain in force up to **31.03.2018** (as per the AMRUT guidelines).

**12. Non-exclusivity:** Nothing in this MOU prevents either party from entering into a similar MOU with another party, be it a **TUFIDCO** or a Training Entity.

**13. Financial Terms:**

- a. Financial norms for funding of the training programmes, national exposure visits and workshops will be as per admissible rates under the toolkit for Comprehensive Capacity Building Programme (CCBP), April 2013, p.11 & 18 of the MOUD (can be accessed at [jnnurm.nic.in](http://jnnurm.nic.in)).
- b. Payments will be linked to training outputs (number of programmes conducted) on a quarterly basis. However, as per above-mentioned Clause 9.c (vi), the Training Entity may need to conduct an additional/remedial capsule if the training outcomes are not achieved.
- c. **The Training Entity will raise invoices to the Project Director, CBUD project, along with the acceptance of the ULB/TUFIDCO for the activities completed, on a quarterly basis.**
- d. All invoices will be supported through the following:
  - i. Details of each Training Programme being claimed in terms of date, venue, number of participants, particulars of the participants (name, designation, ULB and contacts details);
  - ii. Details of cost of each training (as per permissible heads under CCBP)
- e. Applicable norms as per CCBP toolkit are indicated below:

**i. Training Programmes**




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Sr. No.	Costs	Residential (INR)		Non-residential (INR)	
		ERs & senior ULB officials	Other ULB staff	ERs & senior ULB officials	Other ULB staff
1	Lodging and/or boarding per person/ day	2700	1700	300	300
2	Reading material and training kit per person	700	700	700	700
3	Honorarium per session	1100	1100	1100	1100
4	TA for Guest faculty per programme	13750	13750	13750	13750
5	Training hall charges per day	5000	5000	5000	5000
6	Site visit/local transportation per programme	10000	10000	10000	10000
7	Institutional charges per day	5500	5500	5500	5500
8	Copier, documentation and internet charges per day	3300	3300	3300	3300
9	Administrative charge	10% of total cost	10% of total cost	10% of total cost	10% of total cost
<b>Note:</b> This is applicable to the faculty/resource person invited outside from the training institution(s) undertaking the programme.					

**ii. Coaches:** Cost of coaches will be covered by cost of training capsules.

**iii. Mentors:** Cost of mentors will **be borne by** the **TUFIDCO**,

**iv. TUFIDCO/National exposure visits:**

1. The travel costs as per State Government TA/DA Rules + lump sum allowance per day as decided by the Programme Oversight Committee under the Chairpersonship of the State Government Secretary concerned.
2. The costs associated with exposure visits, to the organizing training institute will be borne by the State.

**v. Workshops / Seminars / Consultations,** subject to approval of specific proposals by **MOUD:**




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1. The maximum support for this activity is given in the table below:

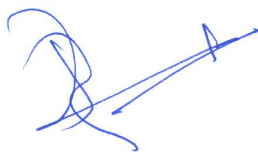
National workshop	INR <b>5 lakh</b> per event
Regional workshop	INR <b>3 lakh</b> per event
State level workshop	INR <b>2 lakh</b> per event

2. External Resource Persons/Experts: A maximum of **INR 50,000/-** per workshop including travel costs, boarding & lodging and honorarium.


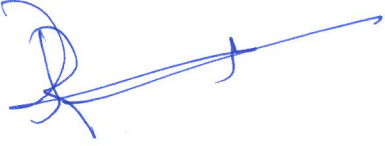
**vi. International Study Tours:** The payment for International Study Tours shall be paid based on specific proposal for each study tour and approved by the MOUD

#### 14. Expected Timelines:

Activity	Time Frame
Training Plan for roll out of first capsule to all assigned participant trainees	Within 15 days of signing of MOU
Training Plan for remaining 2 capsules for all assigned participant trainees	Within 15 days of roll out of first capsule to all assigned trainees
Finalization of training content and learning objectives for each capsule in consultation with NIUA	Before actual roll out of the capsule
Roll out of capsule 1 to assigned trainees	Within 3 months of signing of MOU
Roll out of capsule 2 to assigned trainees	Within 7 months of signing of MOU
Roll out of capsule 3 to assigned trainees	Within 11 months
Exposure visits for all assigned trainees	Within 12 months of signing of MOU
Delivery of Bridge/Remedial Capsule 4 if necessary	Within 12 months of signing of MOU
Contact programme by assigned coach	Every month after first capsule
Sub-Mission of progress in QIS format	Every 3 months after signing of MOU
Sub-Mission of annual progress report	Within 13 months of signing of MOU
<i>*All steps will be repeated on a yearly basis</i>	




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<p>For and on behalf of the <b>TUFIDCO</b> (Mission Directorate for SMART CITIES MISSION and AMRUT SCHEME)</p> <p>Signature :  Name : <b>Dr. R. MURUGAN</b> DEPUTY GENERAL MANAGER TAMIL NADU URBAN FINANCE &amp; Designation : <b>INFRASTRUCTURE DEVELOPMENT CORPN. LTD.</b> (A Govt. of Tamil Nadu Undertaking) Date : 490/1-2, Anna Salai, Nandanam, Chennai - 600 032 Stamp :</p>	<p>For and on behalf of the <b>Training Partner</b></p> <p>Signature:  Name : Designation: Date : 07 Apr 2017 Stamp : <b>Capt. Pradeep Kumar Padhy (Retd.)</b> <b>Registrar and Head (Outreach)</b> <b>TERI University</b> <b>10, Institutional Area, Vasant Kunj</b> <b>New Delhi - 110 070</b></p>
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Technology Bhavan, New Delhi  
Dated.07.03.2019.

**ORDER**

**Sub:** - Financial support for the project entitled "**Scalable synthesis of starch nanoparticles based adhesive/consolidants for conservation of cellulose based heritage objects..**" by **Dr.Udit Soni, Assistant Professor, Department of Biotechnology, TERI University, New Delhi-** Release of the first installment regarding.

Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of **Rs. 44,23,360/- (Rupees Forty-Four Lakh Twenty-Three Thousand Three Hundred and Sixty Only)** for the duration of **3 years**. The detailed breakup of the grant for general as well as capital components are given below: -

Capital Component: Rs. 25,00,000/-

General Component: Rs. 19,23,360/-

Sl. No.	Items	Recurring Head			
		Budget (in Rs.)			
		1st year	2nd year	3rd year	Total
1.	Manpower (JRF)	4,61,280	4,61,280	5,20,800	14,43,360
2.	Consumables	1,00,000	1,00,000	1,00,000	3,00,000
3.	Travel	20,000	30,000	30,000	80,000
4.	Other Costs	30,000	35,000	35,000	1,00,000
<b>Total</b>		<b>6,11,280</b>	<b>6,26,280</b>	<b>6,85,800</b>	<b>19,23,360</b>

2. The sanction of the President is also accorded to the release **Rs.6,11,280/- (Rupees Six Lakh Eleven Thousand Two Hundred and Eighty Only)** to the "**Vice Chancellor, TERI School of Advanced Studies, Plot No. 10, Vasant Kunj, New Delhi- 110070**" being the first installment of grant under "General Component" for the above mentioned project.

3. This sanction is subject to the condition that the grantee organization will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grant received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.

4. The grantee organization will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final installment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.

5. If the grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the release Capital head grant.

6. The grant-in-aid being released is subject to the condition that

- a) A transparent procurement procedure in line with Provisions of General Financial Rules 2017 will be followed by the Institute/Organization under the appropriate rules of grantee organization while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organization immediately on receipt of the grant.

*Handwritten signature*  
07/03/19

3.2.1.G.44. b). While submitting Utilization Certificate/Statement of Expenditure, the organization has to ensure submission of supporting documentary evidences with regard of the purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.

7. As per the GFR 2017 Rule 230 (8) the Grantee Institute should ensure that all the interests or other earnings against Grant-in-Aid or advances (other than reimbursement) released to any Grantee institution should be mandatorily remitted to the Consolidated Fund of India immediately after finalization of the accounts. Such advances will not be allowed to be adjusted against future releases.

8. As per the GFR 2017 Rule 230 (17) "the Grantee Institute should agree to make reservations for Scheduled Castes and Scheduled Tribes or OBC in the posts or services under its control on the lines indicated by the Government of India"

9. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e. www.bharatkosh.gov.in), immediately after finalization of accounts, as it shall not be adjusted towards future release of Grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/ Utilization Certificate for considering subsequent release of Grant/ Closure of Project accounts.

10. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

11. The account of the grantee organization shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organization is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

12. Due acknowledgement of technical support/ financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organization in bold letters in all publication/ media release as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

13. Failure to comply with the terms and conditions of the Bond will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

14. The expenditure involved is debatable to Demand No.84, Department of Science & Technology for the year 2018-19:

3425	Other Scientific Research (Major Head)
60	Others
60.200	Assistance to Other Scientific Bodies (Minor Head)
70	Innovation, Technology Development & Deployment
70.00.31	Grants-in-aid General for the year 2018-19
	Previous: TDP-NRDMS-3425.60.200.26.01.31

15. The amount of **Rs.6,11,280/- (Rupees Six Lakh Eleven Thousand Two Hundred and Eighty Only)** will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to **"Vice Chancellor, TERI School of Advanced Studies, Plot No. 10, Vasant Kunj, New Delhi- 110070"**.

The bank details for electronic transfer of funds through RTGS are given below: -

Name of A/C Name	TERI School of Advanced Studies
Bank A/C No	52142908571
Name of the Bank & branch	State Bank of India, Pragati Vihar, New Delhi
RTGS/IFSC code	SBIN0020511
MICR code	110002658

*Wishy*  
07/02/19

16. As per Rule 234 of GFR 2017, the sanction has been entered at S. No. **78** in the register of grants maintained in the Division for the scheme DDP.

17. This issues with the concurrence of IFD Vide their Concurring Dy. No **C/5698/IFD/2018-19** dated **05.03.2019**.

*Akhilesh*  
07/03/19  
(Akhilesh Mishra)  
Scientist-D  
Tel: 26590254

To

The Pay and Accounts Officer,  
Department of Science & Technology,  
New Delhi.

Copy of information and necessary action to: -

1. The Principal Director of Audit, Scientific Department, IIIrd floor, AGCR Building, I.P. Estate, New Delhi.
2. Drawing and Disbursing Officer, DST, Cash Section. (two copies)
3. **Dr.Udit Soni**,  
Assistant Professor,  
Department of Biotechnology,  
TERI University of Advanced Studies,  
Plot No. 10, Vasant Kunj,  
New Delhi- 110070
4. **Vice-Chancellor**,  
TERI University of Advanced Studies,  
Plot No. 10, Vasant Kunj,  
New Delhi- 110070
5. The Controller of Accounts, DST
6. Head(TDT),DST
7. Sanction folder (TDT).
8. File copy.

*Akhilesh*  
07/03/19  
(Dr.Akhilesh Mishra)  
Scientist-D  
Tel: 26590254



Technology Bhavan, New Delhi  
 Date.07.03.2019.

**ORDER**

**Sub:** - Financial support for the project entitled "**Scalable synthesis of starch nanoparticles based adhesive/ consolidants for conservation of cellulose based heritage objects..**" by **Dr. Udit Soni, Assistant Professor, Department of Biotechnology, TERI University, New Delhi-** Release of the first installment regarding.

Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of **Rs. 44,23,360/- (Rupees Forty-Four Lakh Twenty-Three Thousand Three Hundred and Sixty Only)** for the duration of **3 years**. The detailed breakup of the grant for general as well as capital components are given below: -

Capital Component: Rs. 25,00,000/-

General Component: Rs. 19,23,360/-

Sl. No.	Items	Non-Recurring Head			
		Budget (in Rs.)			
		1st year	2nd year	3rd year	Total
1.	Particle size analyzer zetasizer	25,00,000/-	-	-	25,00,000/-
Total		25,00,000/-	-	-	25,00,000/-

- The sanction of the President is also accorded to the release **Rs.25,00,000/- (Rupees Twenty-Five Lakh Only)** to the "**Vice Chancellor, TERI School of Advanced Studies, Plot No. 10, Vasant Kunj, New Delhi- 110070**" being the first installment of grant under "Capital Component" for the above mentioned project.
- This sanction is subject to the condition that the grantee organization will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grant received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.
- The grantee organization will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final installment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.
- If the grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the release Capital head grant.
- The grant-in-aid being released is subject to the condition that
  - A transparent procurement procedure in line with Provisions of General Financial Rules 2017 will be followed by the Institute/Organization under the appropriate rules of grantee organization while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organization immediately on receipt of the grant.

*Amish*  
 07/03/19

3.2.1.G.45 b) While submitting Utilization Certificate/Statement of Expenditure, the organization has to ensure submission of supporting documentary evidences with regard of the purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.

7. As per the GFR 2017 Rule 230 (8) the Grantee Institute should ensure that all the interests or other earnings against Grant-in-Aid or advances (other than reimbursement) released to any Grantee institution should be mandatorily remitted to the Consolidated Fund of India immediately after finalization of the accounts. Such advances will not be allowed to be adjusted against future releases.

8. As per the GFR 2017 Rule 230 (17) "the Grantee Institute should agree to make reservations for Scheduled Castes and Scheduled Tribes or OBC in the posts or services under its control on the lines indicated by the Government of India"

9. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e. www.bharatkosh.gov.in), immediately after finalization of accounts, as it shall not be adjusted towards future release of Grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/ Utilization Certificate for considering subsequent release of Grant/ Closure of Project accounts.

10. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

11. The account of the grantee organization shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organization is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

12. Due acknowledgement of technical support/ financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organization in bold letters in all publication/ media release as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

13. Failure to comply with the terms and conditions of the Bond will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

14. The expenditure involved is debatable to Demand No.84, Department of Science & Technology for the year 2018-19:

3425	Other Scientific Research (Major Head)
60	Others
60.200	Assistance to Other Scientific Bodies (Minor Head)
70	Innovation, Technology Development & Deployment
70.00.35	Grants-in-aid Capital for the year 2018-19
	Previous: TDP-NRDMS-3425.60.200.26.01.35

15. The amount of **Rs.25,00,000/- (Rupees Twenty-Five Lakh Only)** will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to **"Vice Chancellor, TERI School of Advanced Studies, Plot No. 10, Vasant Kunj, New Delhi- 110070"**.

The bank details for electronic transfer of funds through RTGS are given below: -

Name of A/C Name	<b>TERI School of Advanced Studies</b>
Bank A/C No	<b>52142908571</b>
Name of the Bank & branch	<b>State Bank of India, Pragati Vihar, New Delhi</b>
RTGS/IFSC code	<b>SBIN0020511</b>
MICR code	<b>110002658</b>

3.2.1.G.45. 16. As per Rule 234 of GFR 2017, the sanction has been entered at S. No. **79** in the register of grants maintained in the Division for the scheme DDP.

17. This issues with the concurrence of IFD Vide their Concurring Dy. No **C/5699/IFD/2018-19** dated **05.03.2019**.

*(Signature)*  
**(Akhilesh Mishra)**  
**Scientist-D**  
**Tel: 26590254**

To

The Pay and Accounts Officer,  
Department of Science & Technology,  
New Delhi.

Copy of information and necessary action to: -

1. The Principal Director of Audit, Scientific Department, IIIrd floor, AGCR Building, I.P. Estate, New Delhi.
2. Drawing and Disbursing Officer, DST, Cash Section. (two copies)
3. **Dr.Udit Soni**,  
Assistant Professor,  
Department of Biotechnology,  
TERI University of Advanced Studies,  
Plot No. 10, Vasant Kunj,  
New Delhi- 110070
4. **Vice-Chancellor**,  
TERI University of Advanced Studies,  
Plot No. 10, Vasant Kunj,  
New Delhi- 110070
5. The Controller of Accounts, DST
6. Head(TDT),DST
7. Sanction folder (TDT).
8. File copy.

*(Signature)*  
**(Dr.Akhilesh Mishra)**  
**Scientist-D**  
**Tel: 26590254**





# Public Financial Management System-PFMS

D/o Controller General of Accounts, Ministry of Finance

AdhocReports

SchemeWiseContactDetails

Home

CAM Reports

Masters

Users

Agency

Sanctions

PreSanction

Sanction Custom Fields

Printing Templates

Action Templates

Employee Info. System

Reports

Masters

My Schemes

Agencies

Scheme Allocation

Register/ Track Issue

Utilisation Certificate

OLD UC

## Payee Details

Controller: 037-SCIENCE AND TECHNOLOGY

Sanction Status: Approved

Sanction Number: DST/TDT/SHRI-04/2018 (G)

Sanction Date: 07/03/2019

Sanction Type: Transfer (DDO Bill)

Sanction Amount: 611280

IFD Number: C/5698/IFD/2018-19

IFD Date: 05/03/2019

Scheme: 1819-INNOVATION, TECHNOLOGY DEVELOPMENT AND DEPLOYMENT

PAO: 058296-PAO(DST), New Delhi

DDO: 258297-DEPARTMENT OF SCIENCE & TECHNOLOGY (INCLUDING,NCST)

Remarks: First Installment General

## Account Details:

Grant	Department (For UT Grants Only)	Function Head	Object Head	Category	Amount	External PAO	Available Budget
084 - Department of Science and Technology		3425602007000 - INNOVATION TECHNOLOGY DEVELOPMENT AND DEPLOYMENT	31 - GRANTS-IN-AID GENERAL	5 - VOTED	611280		86717507

Agency	Bank Account No	Amount	Instrument Type
TERI University	52142908571 - TERIUNIVERSITY	611,280.00	RTGS

## Payment Details

Accredited Bank: UNION BANK OF INDIA Amount: 611280

Not Payable Before: \* Required

Party Name	IFSC Code	Party Account No	Amount	Payee Remarks
TERIUNIVERSITY	SBIN0020511	52142908571	611280	Dr Udit Soni

Note: If the IFSC Code is not automatically shown it means bank A/C is not validated.If payment process is urgent please key in the IFSC Code and process payment.Please ensure IFSC Code is correct.

Back

By Speed Post

**File No. A-46020/20/2019-EA**  
 Government of India  
 Ministry of Housing and Urban Affairs  
 (Economic Division)

Nirman Bhawan, New Delhi,  
 Dated the 19<sup>th</sup> September, 2019.

To

**Prof. Atul Kumar**  
 Professor and Head, Deptt. of Energy and Environment  
 TERI School of Advanced Studies  
 10, Institutional Area, Vasant Kunj, New Delhi - 110070

**Subject:** Conducting a comprehensive study on mitigation and adaptation measures being undertaken by Ministry of Housing and Urban Affairs and quantification of their Green-House Gas (GHG) mitigation potential.

Sir,

I am directed to refer to your proposal dated 03-12-2018 on the above subject and to convey the approval of the Competent Authority in the Ministry of Housing and Urban Affairs for award of work to TERI School of Advanced Studies (TERI-SAS) on nomination basis, for conducting a comprehensive study on mitigation and adaptation measures being undertaken by Ministry of Housing and Urban Affairs and quantification of their Green-House Gas (GHG) mitigation potential as under :-

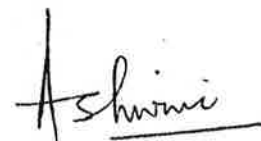
- (a) Estimation of Green House Gas (GHG) mitigation potential of all the Missions/Schemes/ Measures of the Ministry of Housing and Urban Affairs; and
- (b) Design a comprehensive framework/spreadsheet containing coefficients for calculating mitigation potential of various measures.

A copy of the sanction order dated 19-09-2019 issued by the Housing Division, Ministry of Housing and Urban Affairs for releasing the 1<sup>st</sup> Instalment of Rs.6,00,000/- (Rupees Six Lakh only) out of the total approved amount of Rs.12,00,000/- (inclusive of GST) for the above study is enclosed.

2. The break-up of the total cost (including GST) of the project is as under :-

Sl. No.	Items	Cost (Rs.)
1.	Professional Cost	8,16,949.00
2.	Stakeholder workshop, consultation and other miscellaneous expenses	2,00,000.00
3.	Goods and Services Tax (@18%)	1,83,051.00
	Total	12,00,000.00

3. The terms and conditions of the approval is enclosed at Annexure-I.
4. Kindly acknowledge receipt.



(Ashwini Kumar)  
 Additional Economic Adviser  
 Tel. No.23061379  
 Email: [kumar.ashwini@nic.in](mailto:kumar.ashwini@nic.in)

Encl: As above.

**TERMS AND CONDITIONS OF STUDY BY TERI-SAS**

(Annexure to Letter No.A-46020/20/2019-EA dated 19.09.2019)

**1. OBJECTIVE**

Objective of the proposed study is :-

- (a) Estimation of Green House Gas (GHG) mitigation potential of all the Missions/Schemes/ Measures of the Ministry of Housing and Urban Affairs; and
- (b) Design a comprehensive framework/spreadsheet containing coefficients for calculating mitigation potential of various measures.

**2. DURATION**Duration of the proposed study will be 04 (four) months from the date of release of 1<sup>st</sup> instalment .**3. CONSULTANCY CHARGES**

Sl. No.	Items	Cost (Rs.)
1.	Professional Cost	8,16,949.00
2.	Stakeholder workshop, consultation and other miscellaneous expenses	2,00,000.00
3.	Goods and Services Tax (@18%)	1,83,051.00
	<b>Total</b>	<b>12,00,000.00</b>

**4. PAYMENT**

Sl. No.	Stage	%	Amount (Rs.)
1.	At the time of Order	50%	6,00,000.00
2.	On submission of draft final report	30%	3,60,000.00
3.	On submission of Final Report	20%	2,40,000.00
	<b>Total</b>		<b>12,00,000.00</b>

\*\*\*\*\*



### 3.2.1.G.46.

Re: Project code

Devvrata Guglani

Wed 10/23/2019 5:20 PM

To: Atul Kumar <atul.kumar@terisas.ac.in>

Cc: Dhanraj Singh <dhanraj.singh@terisas.ac.in>; vikas prasad <vikas.prasad@terisas.ac.in>

Dear Sir,

Please find enclosed herewith project registration detail with TERI School Of Advanced Studies -

SNO	PROJECT CODE	SPONSOR'S NAME	PROJECT NAME	NATIONAL OR INTERNATIONAL	PROJECT INVESTIGATOR	DESIGNATION	DEPARTM
1	2019DEE04	Ministry Of Housing and Urban Affairs	Impact of Urban Infrastructure Schemes on Mitigation of Greenhouse Gas Emissions	National	Dr. Atul Kumar	Professor	Departmer Energy a Environm

Best regards,  
Devvrata Guglani

---

From: Atul Kumar <atul.kumar@terisas.ac.in>

Sent: Thursday, October 17, 2019 12:46 PM

To: Dhanraj Singh <dhanraj.singh@terisas.ac.in>; Devvrata Guglani <Devvrata.Guglani@terisas.ac.in>

Subject: RE: Project code

Devvrata You may use title given in the proposal (attached) as name of project.

With kind regards

Atul

---

From: Dhanraj Singh <dhanraj.singh@terisas.ac.in>

Sent: 17 October 2019 12:01

To: Devvrata Guglani <Devvrata.Guglani@terisas.ac.in>

Cc: Atul Kumar <atul.kumar@terisas.ac.in>

Subject: FW: Project code

fyl

---

From: Atul Kumar <atul.kumar@terisas.ac.in>

Sent: 17 October 2019 11:44

To: Dhanraj Singh <dhanraj.singh@terisas.ac.in>

Subject: Project code

Dear Dhanraj Ji

What is the project code for recently awarded project by Ministry of Housing and Urban Affairs.

With kind regards

Atul

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Atul Kumar, Ph.D.

Professor and Head

Department of Energy and Environment

TERI School of Advanced Studies (Deemed to be University)

10, Institutional Area

Vasant Kunj, New Delhi - 1100 70 (India)

Phone: +91-11-71800222, Fax: +91-11-26122874

E-mail: [atul.kumar@terisas.ac.in](mailto:atul.kumar@terisas.ac.in)

Web: [www.terisas.ac.in](http://www.terisas.ac.in)

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX



**केन्द्रीय प्रदूषण नियंत्रण बोर्ड**  
**CENTRAL POLLUTION CONTROL BOARD**  
पर्यावरण, वन एवं जलवायु परिवर्तन मंत्रालय भारत सरकार  
MINISTRY OF ENVIRONMENT, FOREST & CLIMATE CHANGE GOVT. OF INDIA

**M.K. CHOUDHURY**  
Additional Director & Head  
Environmental Training Unit

**Tel.: 011-43102454, 43102315**  
**E-mail: cpcb.etu@gmail.com**

F.No. B-13011/TERI Univ./ETU/2019-20/

Dated: 13.08.2019

To,

Dr. Kamna Sachdeva,  
Associate Professor,  
TERI School of Advanced Studies,  
10, Institutional Area, Vasant Kunj,  
NEW DELHI – 110 070

**Sub.: Sanction for conducting residential training programmes during 2019-20**

Madam,

This has reference to your e-mail, dated 28.06.2019 for conducting training programmes during the financial year 2019-20 under HRD Programme of Central Pollution Control Board (CPCB). I am directed to inform that the Competent Authority of CPCB has sanctioned 3-days residential training programme on **"Global Warming, Climate Change and Disaster Management – Future Perspective"** during December 09-11, 2019 to TERI School of Advanced Studies (TERI-SAS), Delhi for the year 2019-20 on the following terms & conditions:

1. TERI-SAS, Delhi will invite nominations from target groups (Pollution Control Boards/ Committees, Dept. of Environment, Environmental Laboratories recognised under EPA, Govt. Depts., R&D Training Institutes, NGO's, Universities etc.) and list of nominations received shall be sent to CPCB for finalization and approval.
2. The first instalment (80% of the total sanctioned budget) will be released on receipt of confirmation of dates, approval of course contents and list of participants from TERI-SAS, Delhi.
3. The second instalment (20% of the total sanctioned budget) will be released on receipt of Utilization Certificate & Statement of Expenditure, training reports & course materials in hard-bound copies and soft copy, signed attendance sheet of participants, filled-in evaluation sheets of trainees and trainers and feedback forms from the participants in original.
4. CPCB shall have the propriety and intellectual rights on the course material developed for the training programme.
5. TERI-SAS, Delhi is allowed to exceed their expenditure in some sub-budget heads, but not exceeding the total sanctioned budget for the training programme.
6. Dates are subject to mutual consent between the sponsoring (CPCB) and organizing organization.
7. Final nominations of the participants will be approved by ETU Division and the Competent Authority of CPCB.

contd..2..


..2..

8. The total sanctioned budget for 3-days residential training programme for 20 participants is ₹3,51,000/-. However, TERI-SAS, Delhi can select five additional payee participants and use the fee for its institutional development. The details of sanctioned budget are as follows:

S. No.	Budget Sub-Heads	For 3 days programme (₹)
1.	Infrastructure charges including hall & equipment charges	15,000
2.	Course material + stationary etc. @ ₹ 1000/- per participant	20,000
3.	Breakfast, lunch, tea, snacks & dinner etc. @ ₹ 600/day/person	45,000
4.	Faculty/resource persons charges	30,000
5.	Transportation (field trips/local)	20,000
6.	Accommodation @ ₹ 1000/day/person	60,000
7.	Course design and material development	20,000
8.	TA/DA for faculty (as per GoI rules)	30,000
9.	Miscellaneous Charges	20,000
	<b>TOTAL</b>	<b>2,60,000</b>
10.	Institutional Charges + Service Tax (as applicable)	91,000
	<b>TOTAL</b>	<b>3,51,000</b>

You are requested to kindly confirm the dates for conducting the above training programme and provide a list of participants to CPCB for approval and release of 1<sup>st</sup> installment of the sanctioned budget.

Yours faithfully,

  
13.8  
(M.K. Choudhury)



3.2.1.G.48.

Tele: 011-26172085

Directorate of Network  
Centric Operations  
Integrated Headquarters  
Ministry of Defence (N)  
New Delhi - 110066

OC/5106/PALLAVI

21 May 19

The Pro Vice Chancellor  
(for Gp. Capt. Rajiv Seth (Retd.), Ph.D)  
TERI School of Advanced Studies  
10, Institutional Area, Vasantkunj  
New Delhi - 110070

**RESEARCH STUDY ON 'DARK SHIP' DETECTION USING PRECISION  
ALGORITHM LEVERAGING LOGICAL ANALYSIS  
OF VARIED INPUTS (PALLAVI)**

Dear Sir,

1. Refer to the following:-

(a) TERI School of Advanced Studies research proposal for study on 'Dark Ship' detection dated 18 Dec 18.

(b) Discussions held on 15 May 19 at TERI School of Advanced Studies between IN/ DNCO and TERI representatives on the research study.

2. This is to inform you that approval of Competent Authority has been accorded to undertake the research study on 'Dark Ship' detection using PALLAVI for a duration of six months with participation of one officer from IN.

3. A financial sanction for Rs. 6,26,175.00 (Rupees Six Lakhs Twenty Six Thousand One Hundred and Seventy Five only) has been accorded towards concluding the contract for research study as against the initial proposal of 6,95,750.00 (Rupees Six Lakhs Ninety Five Thousand Seven Hundred and Fifty only).

3.2.2.333



3.2.1.G.48.

2

4. It is requested that concurrence of TERI School of Advanced Studies may be provided at an early date to progress the research study at the approved cost of Rs. 6,26,175.00 (Rupees Six Lakhs Twenty Six Thousand One Hundred and Seventy Five only). If concurred, then the supply order for commencement of the research study would be signed on a mutually convenient date.

Thanking You,

Yours Sincerely,



(KM Ramakrishnan)  
Commodore (NCO)

3.2.2.335





Work-plan

SAC/EPISA/SUFALAM/WP-04/2019

Comparative Evaluation of Crop classification methods of Kharif Bajra,  
Maize with respect to Uttar Pradesh state

Under the project  
Space Technology Utilization for Food Security, Agricultural Assessment  
and Monitoring  
(SUFALAM)  
DOS-Funded  
(2019-2021)

Agriculture and Land Eco-system Division  
Biological & Planetary Sciences and Applications Group  
Earth, Ocean, Atmosphere, Planetary Sciences & Applications Area  
SPACE APPLICATIONS CENTRE, ISRO  
Ahmedabad 380015

In collaboration with

TERI School of Advanced Studies, New Delhi

## 7. Budget: Total - 13.2 lakhs

S.No	Item Description	BE 2019-20	BE (2020-21)	Total
1	Salary (*Research Fellow – 1)	5.0	5.0	10.0
2	Travel	0.5	0.5	1.0
3	Institutional overhead (@20%)	1.1	1.1	2.2
	<b>Total</b>	<b>6.6</b>	<b>6.6</b>	<b>13.2</b>

\*Research Fellow should work both at TERI, RRSC-N, ISRO, New Delhi and SAC, ISRO depending on the project work needs and schedule

**N.B. No publication, media release / patenting etc. from TERI School of Advanced Studies out of this collaborative project work will be made without prior approval from SAC, ISRO, Ahmedabad**

**Dr. Saroj Maity**

Sci./Eng. – SF

AED/BPSG/EPSA

(Point of contact at SAC)

**Dr. Bimal K. Bhattacharya**

Head, AED/BPSG/EPSA

**Dr. Raj Kumar**

Deputy Director, EPSA, SAC

*Neeti 26/08/2019*  
**Dr Neeti**  
 Assistant Professor, Dept of Nat. Res.  
 (Point of Contact at TERI School of  
 Advanced Studies, New Delhi)

*26/8/2019*  
**HOD, Dept. of Natural Resources**  
**TERI School of Advanced Studies**

*[Signature]*  
**Registrar,**

TERI School of Advanced Studies

*26 Aug 2019*  
**Capt. Pradeep K Padhy (Retd.)**  
 Registrar  
 TERI School of Advanced Studies  
 10, Institutional Area, Vasant Kunj  
 New Delhi-110 070



SPEED POST

20190503

B-12015/102/2019-AS/

June 10, 2019

Dr. Kavita Sardana

Assistant Professor

Department of Policy Studies TERI School of Advanced Studies

Plot No. 10, Institutional Area, Vasant Kunj, New Delhi 110070

**Sub: Award of project on "Meta-analysis for Environmental Damage Assessment"- reg.**

Madam,

This has reference to your proposal dated May 31, 2019 on "Meta-analysis for Environmental Damage Assessment" submitted in pursuant to decisions taken during first meeting of Expert Group on Environment Damage Assessment dated May 16, 2019, constituting a sub-committee for conducting meta-analysis of existing literature with following members,

Advisor: Prof. MN Murty, Rtd, Institute of Economic Growth, Delhi

Members:

Prof. Haripriya Gundimeda, Professor, IIT Mumbai

Dr. Sukanya Das, Associate Professor, TERI School of Advanced Studies

Dr. Kavita Sardana, Assistant Professor, TERI School of Advanced Studies

As informed, it was agreed in the meeting of sub - committee dated May 28, 2019 to conduct desktop studies for (i) Abatement cost assessment for source pollutants (ii) Health damage assessment (iii) Translating health damage assessment for ambient quality to penalty on source. Further, it is understood that considering the time constraint, it is proposed to hire services of three Research Assistants for three months to assist in literature review and prepare interim and final reports with following budget requirements,

Description	Months	Unit	Rate	Amount (INR)
Researcher Allowance	3	3	46800	
Research Assistant @ (INR 36000+30%HRA)				

Sub-total				4,21,200
Travel				25,000
Total				
Contingency (2.5%)				11155
Institutional overhead (10%)				44620
Grand Total				5,01,975

Further, the timeline and deliverables shall be as follows,


Activity	Timeline
Date of submission of proposal	May 31, 2019
Hiring Research Assistant	Contingent on release of funds from CPCB
Interim report submission	July 5, 2019
Final report Submission	September 1, 2019

In view of above, I am directed to communicate that the approval is accorded to TERI-SAS to conduct the above mentioned study on "Meta-analysis for Environmental Damage Assessment" at a cost of Rs. 5,01,975/- (Rupees Five Lacs One Thousand Nine Hundred and Seventy Five only) excluding taxes.

#### Terms of Reference

1. Meta- analysis of existing literature shall be conducted for abatement cost assessment for source pollutants (industrial and non-industrial sources), health damage assessment and translating health damage assessment for ambient quality (air, water, soil, etc.) to penalty on source.
2. Interim report shall be submitted by July 5, 2019 and final report by September 01, 2019.
3. The invoice to be submitted after completion of study.

Yours faithfully,

  
(Garima Sharma)

Assistant Secretary & Sc. 'D'

FW: Award of project on "Meta-analysis for Environmental Damage Assessment"  
3.2.1.G.50.

Dhanraj Singh

Wed 6/12/2019 10:22 AM

To: Devratha Guglani <Devratha.Guglani@terisas.ac.in>;

Cc: vikas prasad <vikas.prasad@terisas.ac.in>; Kavita Sardana <kavita.sardana@terisas.ac.in>; Sukanya Das <sukanya.das@terisas.ac.in>;

1 attachments (866 KB)

kavita001.PDF;

Dear Devrath/Vikas,

Please create project code as well as new file and maintain PI and Co PI status as per instructions given under.

Best regards,

Dhanraj Singh

---

**From:** Kavita Sardana

**Sent:** 12 June 2019 08:27

**To:** Dhanraj Singh <dhanraj.singh@terisas.ac.in>

**Cc:** Sukanya Das <sukanya.das@terisas.ac.in>

**Subject:** Fw: Award of project on "Meta-analysis for Environmental Damage Assessment"

Mr. Dhanraj

Please find the enclosed copy of grant award letter from CPCB with myself as PI and Dr. Sukanya Das as the CO-PI of this project.

Regards

Kavita

---

**From:** CPCB parivesh <[public.complaint.as@gmail.com](mailto:public.complaint.as@gmail.com)>

**Sent:** 11 June 2019 12:21:27

**To:** Kavita Sardana

**Subject:** Award of project on "Meta-analysis for Environmental Damage Assessment"

Please find enclosed a copy of letter on above mentioned subject for your kind information.

Regards

Public Complaint Cell

MS Section

CPCB, Delhi





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भारतीय आयुर्विज्ञान अनुसंधान परिषद  
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य एवं परिवार  
कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research  
Department of Health Research, Ministry of Health  
and Family Welfare, Government of India  
Dated: 08/08/2019

File no: 5/7/56/MH/Adhoc/2019-0835/RBMCH

सेवा में,

✓ Vice Chancellor  
TERI School of Advanced Studies  
Plot No. 10, Institutional Area,  
Vasant Kunj,  
New Delhi-110070

विषय: Dr. Chandan Kumar -के अधीन परियोजना "Prevalence, Procreation, Persecution, and Prevention regarding Caesarean-Section Deliveries/Births in South Asia : A Systematic Review and Meta-Analysis", under Dr Chandan Kumar" शीर्षक पर नई अनुसंधान प्रस्ताव के लिए बजट की मंजूरी

महोदय/महोदया,

परिषद के महानिदेशक उपर्युक्त अनुसंधान योजना को नीचे दिए गए पैरा 4 में विनिर्दिष्ट कुल अवधि तक के अधीन शुरू में कृ. 1 वर्ष की अवधि के लिए विस्तार की मंजूरी प्रदान करते हैं।

- 1) परिषद के महानिदेशक.02/09/2019 to 01/09/2020--तक की अवधि के लिए संलग्न विवरण के अनुसार रु0 18,14,308 /- (Eighteen Lakhs Forteen Thousand Three Hundred Eight Only) के बजट के आबंटन की मंजूरी प्रदान करते हैं। सहाय्यार्थ अनुदान निम्नलिखित शर्तों के अधीन दिया जाएगा :
- 2) अनुदान का भुगतान संस्थान प्रमुख को एकमुश्त में किया जाएगा। अनुदान की प्रथम किश्त का भुगतान सामान्यतः स्टॉफ की नियुक्ति की सूचना परिषद को प्राप्त हो जाने पर की जाएगी। परियोजना में नियुक्त स्टॉफ को भुगतान बजट विवरण में निर्दिष्ट के अनुसार किया जायेगा।
- 3) परियोजना के स्टॉफ को मेजबान संस्थान के नियमों और प्रक्रिया के अनुसार नियुक्त किया जाएगा। परियोजना के कर्मचारियों से शपथ का भाग - लिया जाएगा। कर्मचारियों को अनुदान की राशि तब तक जारी नहीं की जाएगी जब तक कि इस कार्यालय को संस्थान के प्रमुख से अपेक्षित शपथ (भाग-प्) प्राप्त नहीं हो जाता है।
- 4) अनुदान की परवर्ती किश्तों के भुगतान की मांग परिषद को संलग्न निर्धारित प्रपत्र में प्रस्तुत की जानी चाहिए। योजना की अनुमोदित अवधि 3 वर्ष है। योजना पर पिछले वर्ष किए गए कार्य की समीक्षा के बाद ही योजना की वार्षिक विस्तार किया जाएगा।
- 5) किए गए अनुसंधान कार्यों का पूर्ण विवरण बताते हुए परियोजना के 10 माह पूरे हो जाने के उपरांत संलग्न निर्धारित प्रोफार्मा में वार्षिक प्रगति रिपोर्ट की 15 प्रतियां परिषद को प्रस्तुत की जाए। समया से रिपोर्ट प्रस्तुत न किए जाने पर परियोजना समाप्त की जा सकती है।
- 6) The institute shall utilize the Grant as per the provisions laid down in the GFRs 2017 and T.A Rules.

कृपया इस पत्रा की प्राप्ति की पावती भेजी जाए।

*(Handwritten Signature)*

(हरजीत कौर बजाज)  
प्रशासन अधिकारी  
कृते महानिदेशक

बजट विवरण की प्रति सहित प्रतिलिपि सूचनार्थ हेतु अग्रेषित-

1. डॉ० चंदन कुमार Assistant Professor, Department of Policy Studies, TERI School of Advanced Studies Plot No. 10, Institutional Area, Vasant Kunj, New Delhi-110070
2. लेखा - अनुभाग को सूचनार्थ हेतु
3. बजट विवरण की एक प्रति बजट अनुभाग (वित्त), को परिषद का बजट संकलित करने के लिए।
4. IRIS Cell- ID. 2019-0835
5. Shri Birender Singh Sr. T O. RBMH, ICMR

प्रशासन अधिकारी  
कृते महानिदेशक

**STATEMENT****Date of Start.02-09-2019****Duration 2 Years****RFC NO:****RBMH/Adhoc/16/2019-20 dt: 07/08/2019**

Project entitled "Prevalence, Procreation, Persecution, and Prevention regarding Caesarean-Section Deliveries/Births in South Asia : A Systematic Review and Meta-Analysis" under Dr Chandan Kumar"

**1<sup>st</sup> year Budget**  
**02-09-2019 to 01-09-2020**

Sl. No.	Item	1 <sup>st</sup> Year
<b>A</b>	<b>Staff</b>	
	Scientest- B (2 Post) 48,000 + 6300 (30 HRA) = 54,300 x 2 per months with 10% (Rs. 2100) increment in 2 <sup>nd</sup> Year	13,03,200
	<b>Sub Total</b>	<b>13,03,200</b>
<b>B</b>	<b>Contingency Recurring</b>	
	1)Stationery	25,000
	2)Report Printing	—
	3)Dissemination and publication charges	1,00,000
	<b>Sub Total</b>	<b>1,25,000</b>
<b>C</b>	<b>Non Recurring Equipment</b>	
	1)Data Storage (External hard disk)	18,000
	2)STATA, NVivo Software Licence	3,43,108
	<b>Sub Total</b>	<b>3,61,108</b>
<b>D</b>	<b>Travel</b>	<b>25,000</b>
	<b>Grand Total</b>	<b>18,14,308</b>

**(Rupees Eighteen Lakhs Fourteen Thousand Three Hundred Eight Only)**

  
 (हरजीत कौर बजाज)  
 प्रशासन अधिकारी  
 कृते महानिदेशक



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भारतीय आयुर्विज्ञान अनुसंधान परिषद  
स्वास्थ्य अनुसंधान विभाग, स्वास्थ्य एवं परिवार  
कल्याण मंत्रालय, भारत सरकार

Indian Council of Medical Research  
Department of Health Research, Ministry of Health  
and Family Welfare, Government of India

File no: 5/7/56/MH/Adhoc/2019-0835/RBMCH

Dated: 08/08/2019

विषय: Dr. Chandan Kumar के अधीन परियोजना "Prevalence, Procreation, Persecution, and Prevention regarding Caesarean-Section Deliveries/Births in South Asia : A Systematic Review and Meta-Analysis", under Dr Chandan Kumar" शीर्षक अनुसंधान योजना की सहायतार्थ अनुदान की पहली किश्त का भुगतान।

#### ज्ञापन

इस कार्यालय के दिनांक : 08/08/2019 के समसंख्यक पत्र सं० 5/7/56/MH/Adhoc/2019-0835/RBMCH

का अवलोकन करें।

परिषद के महानिदेशक उपरोक्त अनुसंधान योजना के संबंध में व्यय करने के लिए अनुदान की First किश्त के रूप में 1<sup>st</sup> Final ₹0 18,14,308 /- (Eighteen Lakhs Forteen Thousand Three Hundred Eight Only) ₹0 के भुगतान की मंजूरी प्रदान करते हैं। ₹0 18,14,308 /- की इस राशि को चालू वित्त वर्ष में उपरोक्त अनुसंधान योजना के लिए किए गए

₹0 18,14,308 /- के प्रावधान के नाम डाली जाए।

निदेशक TERI School of Advanced Studies Plot No. 10, Institutional Area, Vasant Kunj, New Delhi-110070 को RTGS (Mandate From and Chancel Cheqe) द्वारा भुगतान करने के लिए इसके साथ ₹0 18,14,308 /- ₹0 का औपचारिक बिल।

RFC NO: RBMH/Adhoc/16/2019-20 dt: 07/08/2019

*(Handwritten signature)*

(हरजीत कौर बजाज)  
प्रशासन अधिकारी  
कृते महानिदेशक

लेखा अनुभाग- भा.आ.अ.प.  
प्रतिलिपि

- 1 Vice Chancellor TERI School of Advanced Studies Plot No. 10, Institutional Area, Vasant Kunj, New Delhi-110070
- 2 डॉ० चंदन कुमार Assistant Professor, Department of Policy Studies, TERI School of Advanced Studies Plot No. 10, Institutional Area, Vasant Kunj, New Delhi-110070
- 3 बजट विवरण की एक प्रति बजट अनुभाग (वित्त), को परिषद का बजट संकलित करने के लिए ।
- 4 IRIS Cell- ID. 2019-0835
- 5 Shri Birender Singh Sr. T O. RBMH, ICMR

प्रशासन अधिकारी  
कृते महानिदेशक





**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाइट/ Website : www.pcra.org



दिनांक 25/01/2017

संख्या: पीसीआरए/अनु.एवंविकास/78

रजिस्ट्रार - टीईआरआई यूनीवर्सिटी  
 प्लॉट संख्या 10, इन्स्टीट्यूसनल एरिया  
 वसंत कुंज  
 नई दिल्ली - 110 070

**विषय: प्रस्तावित परियोजना का अनुदान पत्र**

महोदय,  
 हमें आपके द्वारा प्रस्तावित अनुसंधान एवं विकास परियोजना "हवा भाप गैसीकरण के माध्यम से हाइड्रोजन संवर्धन द्वारा पूरित डाउन-ड्राफ्ट बायोमास गैसीफायर प्रणाली का डिजाइन, विकास और परीक्षण" (Design, development and testing of a down draft gasifier system completed by hydrogen enrichment thru air stream gasification) जो 80<sup>वीं</sup> स्क्रीनिंग कमीटी मीटिंग (एस.सी.एम) में अनुमोदित की गई है, हेतु अनुदान सहायता की स्वीकृति करने में प्रसन्नता हो रही है।

परियोजना का अनुदान स्वीकृति पत्र और उसकी एक प्रति इस पत्र के साथ संलग्न है। आप द्वारा स्वीकृति के रूप में संलग्न प्रति के प्रत्येक पृष्ठ पर परियोजना- प्रभारी/प्रधान अन्वेषक द्वारा हस्ताक्षर करके वापिस पीसीआरए को भिजवाने की कृपा करें।

धन्यवाद,

भवदीय

सुरेन्द्र प्रताप

निदेशक अनु. एवं विकास  
 पेट्रोलियम संरक्षण अनुसंधान संघ

*Singh*



**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
 (MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)  
 दूरभाष/ Tel. : बोर्ड/EPABX : 26198856 फैक्स/ Fax : 26109668  
 ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



### Format for Sanction Letter

Doc. No. : R&D/QAF/10  
 Rev. No. : 01  
 Eff. Date: 15th Oct 2013

Ref. No.: PCRA/R&D/78

Date: 25/01/2017  
 25/01/2017

Kind Attn.: Dr. Priyanka Kaushal  
 Assistant Professor,  
 Department of Energy and Environment  
 TERI University (TU)  
 New Delhi - 110070

**Subject: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Dear Madam,

Please refer to the subject project proposal submitted by you to PCRA for grant-in-aid. The 80<sup>th</sup> Screening Committee in its meeting held on 15.02.2016 had technically approved the proposal with the following comments:

1. TU to submit a revised proposal reducing the manpower cost.
2. The revised proposal to clearly mention total project cost, contribution sought from PCRA, institution contribution and industry contribution.
3. Contractual manpower should not be more than two personnel.

Based on your revised proposal of March 11, 2016, complying the above requirements, we are pleased to convey approval of PCRA for grant in aid to TERI University (TU) to undertake the project titled "Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification".

- 1 PCRA will provide a total grant of Rs 21.78 lakhs. (Rs. Twenty One Lakh Seventy Eight Thousand only) in instalments. No cost escalation will be allowed.

The head wise / item wise break up of the sanctioned amount from PCRA is enclosed in Annexure - D.

- 2 First instalment of grant-in-aid of Rs 5,44,500/- (Rs. Five Lakh Forty Four Thousand Five Hundred only) (less TDS, if applicable) will be released initially against your invoice.
- 3 You will be required to ensure completion of project within thirty months. Tenure of project will be calculated from the date of release of first instalment of grant-in-aid.
- 4 The terms and conditions for award of grant for the project are enclosed as Annex-A.

- 5 The final project details is attached as Annex-B & the physical and financial milestones along with target dates is enclosed as Annex-C.
- 6 We are sending herewith two copies of this letter in original. Please sign the duplicate copy and return it to us as a token of acceptance of the project with the above terms and conditions.

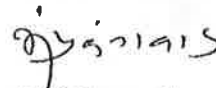
Kindly arrange to send the following for release of 1st instalment advance grant-in-aid :

- i. Signed duplicate copy as acceptance of the terms and conditions.
- ii. Invoice for 1st instalment amount.
- iii. RTGS / NEFT details for e-payment in PCRA format (available in PCRA website).
- iv. Certified copy of PAN issued by Income Tax Department.
- v. TDS exemption certificate from IT Dept., if applicable.

In case of change in Project-in-charge, for any reason, necessary prior information to be provided to PCRA.

Thanking you,

Yours faithfully.



M P Bangwal

Additional Director (R&D)

Petroleum Conservation Research Association (PCRA)





 <b>PCRA</b>	<b><u>Format for Sanction Letter</u></b>	Doc. No. : R&D/QAF/10
		Rev. No. :
		Eff. Date: Proposed

Annexure - A

### TERMS & CONDITIONS

1. Periodic progress reports and expenditure statements in respect of above project against PCRA share shall be submitted to PCRA on quarterly basis without fail. Please note that these documents must reach PCRA office within 30 days on completion of each quarter. The progress report should clearly indicate targets mentioned in Annexure – C as completed / in progress / yet to take off.
2. In addition, details of institution contribution, if any, for the project, to be mentioned in the periodic expenditure statements separately.
3. Subsequent payments of instalments will be released as per Annexure – C attached on receipt of progress report & expenditure statements. However, the last 10% of the PCRA grant shall be released on submission and acceptance of final report. Tax deduction at source will be made as per the provisions of the Income Tax Act. If your organization is exempted from TDS, please submit valid certificate from IT authorities before or at the time of raising invoice. The institution has to return back the amount left unutilized out of total released amount, if any, after completion of project. TDS amount deducted, if any, will be considered as released amount to the institution. Institution may claim for the TDS deduction certificate, if any TDS is deducted.
4. Please note that the interest earned by your institute / organization on the funds sanctioned and paid by PCRA will be treated as amount paid by PCRA and must be shown as such in the accounts of the project. Also the interest earned on such amount should be reported regularly to PCRA.
5. The institute will prepare one film of about 10-15 minutes and a brochure within the above PCRA grant for dissemination of project findings for the benefit of masses.
6. PCRA reserves the right to seek any information/visit the actual site/laboratory at any point of time. A team of PCRA / member of screening committee and the institute officials may review the status of the project from time to time. One of our officials may also associate with the project as co-investigator at the discretion of PCRA. Nomination, if any, may be indicated later on.
7. You will submit draft technical completion report regarding the project to PCRA (one hard copy and one soft copy) within one month of completion of the project. The report should contain all relevant data, designs, detailed drawings, bills of materials, vendors for each item, approximate cost of each item, operation and maintenance procedures etc. as applicable.

*Srinivas*



### Format for Sanction Letter


Doc. No. : R&amp;D/QAF/10

Rev. No. :

Eff. Date: Proposed

8. Also you will be required to make a presentation about the project work to the Screening Committee of PCRA for its review, comments and approval of the project, upon completion of project and submission of draft completion report. After incorporating comments of the Screening Committee of PCRA, if any, in the draft report, final technical report (both hard and soft copy) will be submitted to PCRA within one month of the date of Screening Committee meeting.
9. For commercialization / popularization of the technology, you may organize a meeting with the help of PCRA and make a detailed presentation / hold discussions with them about the new technology.
10. You will send the report to relevant agencies who can take corrective actions based on finding of the report along with your recommendation, under intimation to PCRA.
11. On completion of the project, R&D institute & PCRA would pass on the technology and assist in implementing the project who may desire to use the technology at their own cost. However, in case any revenues are generated this should be shared equally with PCRA. Technology transfer fee, license fee and royalty if any shall be equally shared between PCRA & the institute. Quantum of such fee to be approved by PCRA.
12. In the draft technical completion report, following shall be indicated by the research institute:
  - i. Energy already saved at the time of writing the report & value thereof in MTOE.
  - ii. Average Energy being saved per day at the time of writing report & value thereof.
  - iii. Estimate of energy saving in next one year & futuristic view
13. If any research paper/article is published in national or international magazine or journal etc, it shall be in the joint name with PCRA & only after obtaining written consent of PCRA.
14. If any application is to be made for receiving any award or any award is to be received based on this work, it shall be in joint name with PCRA & with the written consent of PCRA.
15. CA audited head wise expenses for annual expenditure statement (clearly indicating actual expenses incurred against PCRA grant issued / to be issued and also clearly indicating any advance paid for future job / future material supply for the project against PCRA grant issued / to be issued) and CA audited annual utilisation certificate incurred up to 31st March of each financial year shall be submitted by 30th April to PCRA. CA audited accounts means the accounts audited by authorized chartered accountant / statutory auditors and not by internal auditors or accounts heads. Audited statement should accompany copies of documentary evidence of any work order issued and Invoice / bill specially for capital & high value items. Because expenses statement also shall be submitted to PCRA immediately after completion of the project followed by



 <b>PCRA</b>	<b><u>Format for Sanction Letter</u></b>	Doc. No. : R&D/QAF/10 Rev. No. : Eff. Date: Proposed
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audited accounts. In addition, proof of beneficiary contribution for the project, if any, duly audited by Chartered Accounts and verified by Research Institutes are required to be provided to PCRA in respect of each beneficiary.

16. The Institute will maintain separate audited accounts for the project. The accounts of the grantee institution will be open to inspection by the sanctioning authority / audit whenever the institution is called upon to do so.

17. If expenditure statement and utilization certificate against the project is not audited by CA because of audit by CAG, then documentary proof of audit by CAG to be submitted to PCRA by 30<sup>th</sup> April for previous financial year up to 31<sup>st</sup> March and internal audited statement as per clause 14 above to be submitted.

18. For individual capital items procured from PCRA grant-in-aid for above Rs. five lakhs, if the Research Institute sells the items before 5 years after completion of the project, the realization value (sale proceeds) will be paid back to PCRA.

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## Project Proposal

*Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification resulting in substantial improvement in the efficiency of the gas engine.*

Dr. Priyanka Kaushal  
TERI University, Delhi

Date: March 11<sup>th</sup>, 2016

*Priyanka*

**Title of the project:**

Design, development and testing of a down draft biomass gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the efficiency of the gas engine.

**Name of the Institution with address and contact nos.:**

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**Objectives of the project:**

The overall objective of the project is "To arrive at a design configuration and testing of biomass based down draft gasifier system complemented by Hydrogen enrichment through air- steam gasification" resulting in substantial improvement in the conversion efficiency of the natural gas engine.

**The specific objectives of the project are:**

- To come up with a design configuration and development of a woody biomass based down draft biomass gasifier systems to produce a clean combustible gas (suitable for engine applications) and customizing the reactor for a specific rated capacity.
- To integrate air-steam gasification system and optimizing the reactor design in order to maximize the calorific value of the producer gas and minimize the impurities such as tar and particulate matter. Air steam gasification is chosen with a purpose to enhance the (engine) efficiency.
- To develop a complete package which includes simple cleaning and cooling components connected to an internal combustion engine coupled (to replace diesel) with an alternator
- To analyse the gas quality, i.e. tar and particulate matter, System optimization for reduction of impurities (tar and particulate matter), Testing the overall performance of the system with an engine, Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.

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- Overall performance analysis of the reactor

#### Background and scope of work:

Globally 1.3 billion people are without access to electricity, 84 % of these people live in rural areas. In India about 289 million of people, account for 25 % population don't have access to electricity [1]. In the past six decades, India's energy need was increased 16 times and the installed electricity capacity by 84 times [2]. With the economy projected to grow at 8 % to 9 % per annum and the improving standards of millions of population, the energy demand is likely to grow significantly. Biomass is a potential renewable source for power generation [3]. Biomass gasification is one of the potential options for decentralized and distributed generation (DDG) of electricity [4]. Electricity generation through biomass combustion and gasification was considered as a potential source to meet the rural energy needs [5]. Deployment of biomass gasification technology can address three specific issues for the growth they are efficient utilization of local energy resources, creating employment opportunities for local community and to strengthen the local economy [6]. In specific the scenario in the island states such as A&N Islands which largely depends on Diesel fuel to meet their electricity needs. Diesel power accounts for 94% of the total power generation while remaining 6% is met through Hydel and Solar power generation. The cost of power generation through diesel based power plants are to the tune of 20 Rs/kWh which is highly expensive. In order to mitigate the use of diesel in the existing power plants, biomass provides can provide an alternate cheaper option which indeed is also available in abundance on the islands.

According to a study, the estimated potential availability is 5 MW, 2 MW & 1.5 MW of Agro fuel based power generation at South Andaman, Little Andaman and Car Nicobar respectively. It was observed that coconut is one of the main plantations and according to estimates 280 million nuts processed in the copra processing units annually. The potential for power generation from coconut shell is estimated as 4 MW generation capacities through Bio Mass using Coconut waste, etc., in South Andaman 2 MW generation capacity through Biomass in Little Andaman, 1.5 MW generation capacities through Biomass in Car Nicobar. Apart from coconut shell other loose biomass such as coir pith, Lantana (a Weed), rice husk and other forestry residues are available in abundance.

Lack of efficient biomass conversion technologies to generate electricity through gasification route has resulted in under utilization of the availability of bio-resources. To utilize these resources, in the existing designs of gasifier which indeed resulted in technical challenges. Usage of low bulk density fuel would result in chocking of fuel flow inside the reactor, resulting in intermittent gas production, High tar & dust content in the producer gas. Since in traditional downdraft gasifier are designed for certain bulk density of the fuel. In view of this there exists an opportunity to come up with a design configuration with two stage biomass gasifier concept to adopt the variety of biomass for power generation purpose. Also, hydrogen enrichment in the producer through air, steam gasification would contribute to improvement in the volumetric and overall efficiency of energy conversion. Development of such reliable technology package indeed enable adoption of decentralized, distributed generation power generation through biomass in A&N islands.

#### Background of the research carried out so far by the organization/other organizations in India.

Several premier institutions and research labs such as the Indian institute of science, Bangalore, Indian Institute, Anna university, National Institute of Technology, agricultural universities, across India are engaged in the development of biomass gasifier systems for power generation, hydrogen enrichment through steam gasification as well as development of thermal gasifiers to meet the process heat requirements in the industry. Relevant recent research work carried out by these organisations in the area of biomass gasification is summarised in the following section.

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Anji reddy Bhavanam and R. C. Sastry reviewed various aspects of the research and development in biomass gasification in downdraft fixed bed reactors like advances in downdraft gasification systems, and the effect of various parameters like equivalence ratio, operating temperature, moisture content, superficial velocity, gasifying agents, residence time on the composition of producer gas, yield and conversion. Khardiwar et al experimented with gasification of agriculture residues, where soyabean, pigeon pea and their mix was briquetted for feeding. Using air gasification, the conversion efficiency obtained was maximum for soybean briquette of 56%, with the average Low Heating Value of producer gas reaching  $4.4 \text{ MJ/m}^3$ . Hydrogen composition of the producer gas obtained reached a maximum of 16.1% for pigeon pea briquette, where the LHV of gas was  $4.57 \text{ MJ/m}^3$  and flame temperatures was  $634^\circ\text{C}$ . These values showed promising results for replacement of agro-residues based biomass with wood and coal.

Abeenash V.N. and E. Natarajan investigated air and steam gasification and compared the results obtained from both methods. Initially, with air gasification the  $\text{H}_2$  yield obtained was around 25%, but drastically increased to 55% when steam was introduced. The range of temperature corresponding to maximum  $\text{H}_2$  was between  $700\text{--}800^\circ\text{C}$ . With sawdust as feed, the LHV of gas with a gasification air ratio of 0.2 was approximately  $8 \text{ MJ/m}^3$  and with a steam ratio of 0.2, it increased to  $11 \text{ MJ/m}^3$ .

K. Sandeep and S. Dasappa experimented with an open-top downdraft biomass gasifier developed at IISc Bengaluru, implementing Oxy-steam gasification and evaluating the performance characteristics using parameters such as Equivalence Ratio (ER), Steam Biomass Ratio (SBR) and fuel moisture content. The hydrogen percentage in the gas increases within SBR. The feed was dry Casuarina wood. The highest  $\text{H}_2$  yield of 51.7% was obtained at an SBR in 2.5 with gas LHV at  $7.5 \text{ MJ/m}^3$  and the ER takes a high value of 0.3. The gasification efficiency obtained was also high at 69.5%.

M. Campoy et al experimentally measured the gas composition for different steam-biomass and stoichiometric ratios. The procedure was carried out for Fluidized Bed Gasifier (FBG). About 8 kg of the bed material is loaded and the bed is subsequently heated with hot air and electric heater to  $700^\circ\text{C}$ . Biomass undergo complete oxidation under excess oxygen condition. A mixture of fuel air-steam is preheated to  $400^\circ\text{C}$  and fed into FBG. Biomass, air, steam and oxygen flow rates were variable parameters for the test, which was conducted in a maintained near adiabatic environment. A reported maximum of 27.5%  $\text{H}_2$  when S/B ratio is varied from 0 to 0.56 indicates a positive relationship. The gas yield obtained was around  $0.98 \text{ m}^3/\text{kg}$ , the Low Heating Value (LHV) was calculated to be  $8.84 \text{ MJ/m}^3$ , where the High Heating Value (HHV) of the fuel was  $17.1 \text{ MJ/kg}$ , resulting in a conversion efficiency of over 50% [12]. A variation from 19.7%  $\text{H}_2$  content to a maximum of 46.8%  $\text{H}_2$  has been reported [17].

Franco et al experimented similarly on Fluidized Bed Gasification with pine, holm-oak and eucalyptus as feed, with holm-oak having a High Heating Value of  $19.5 \text{ MJ/kg}$ . The reaction took place at around  $700\text{--}900^\circ\text{C}$  maintaining the free board temperature at  $750^\circ\text{C}$ . The steam-biomass ratio was varied from 0.4-0.85. The wood feed rate varied from  $5.7\text{--}11.5 \text{ g/min}$ , with emphasis on selecting particle size ranging from  $1250\text{--}2000 \mu\text{m}$  for reducing variations in mass flow rate. Furthermore, a rapid quenching system was employed to recover tars and condensable liquids from the product gas. Gas composition obtained contained around 42%  $\text{H}_2$ , 30%  $\text{CO}$ , 5%  $\text{CH}_4$  and a low  $\text{N}_2$  content of 7% [11].

*Srinivas*

Pine wood with a High Heating Value of 20.54 MJ/kg, used as feed material in self-heating downdraft gasifier delivers a 29.92% H<sub>2</sub> rich composition and only 1.57% inert N<sub>2</sub>, with the gas Low Heating Value reaches 9.39 MJ/m<sup>3</sup>. The setup comprising of a downdraft gasifier, air intake equipment, provisions for gas cleaning, blower, flow meters and off-gas burner formed the complete gasification system. The gasifier is 1.3 m in height with an internal diameter of 35 cm. An air pre-heater is arranged near the neck of the gasifier below which a novel steam generating device is placed that produces steam at 1 atm and 100-120 °C. Before gas sampling and measurements, spray towers with steel springs are employed for gas cleaning that reduce gas temperature to 30 °C and remove 80-90 weight % of tar. A flow meter measures the gas yield. The composition is analysed using Kechuang GC-9800T thermal conductivity detector (TCD) and hydrogen flame ionization detector (FID) [14]. On comparing compositions obtained from steam-air and air gasification, there is a visible difference, with the H<sub>2</sub> range lying between 11.81% and 15.2% [13] [16]. The difference between the average values of H<sub>2</sub> content in producer gas obtained by steam-air and air gasification in producer gas is around 18%, from which it is inferred that the former is a more effective gasification method. As a further consequence of this method, the producer gas obtained has less inert gas percentage, with as low as 1.57% of N<sub>2</sub> in some cases [15].

**Domestic fixed bed down draft design of biomass gasifier technology:** Downdraft biomass gasifier are preferred for engine applications over any other type of gasifiers. A line diagram of the general scheme of a fixed bed down draft woody biomass gasifier based power system, explaining the working arrangement is shown in Figure 1. In the traditional downdraft gasifier the hot combustible gas coming out the gasifier carries impurities such as particles and tar vapors, which needs to be cleaned in the cleaning train before supplied to the IC engine for power generation. Hence an exhaustive cooling and cleaning train which consists of a series of filters such as gravity filters, wet scrubbers, cyclone separators and bag house filters. A paper filter is used as a safety filter to ensure that the clean gas with permissible levels of tar and dust particulate supplied to the engine.

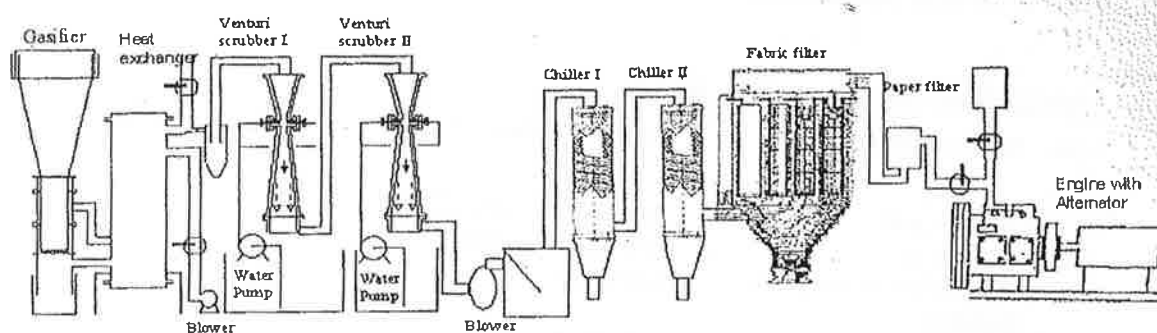


Figure 1: General scheme of biomass gasifier based power system

Past field experiences of biomass based distributed generation (DG) systems in the rural settings have not only established their benefits and technical viability, but had also helped in identifying the technological aspects where more work has to be done in order to make such systems more reliable and operator-friendly, such as:

- Biomass type and quality (Fixed bed design more sensitive to the bulk density of the fuel)
- Technology standardization and reliability testing (simple & rugged) to reduce downtime
- Continuous operation applications

- Waste water generation and disposal
- Scope to improve the engine efficiency through gas enrichment through steam air gasification route

In order to address the above mentioned points, TERI, subsequently engaged in evolving a design for two stage biomass gasifier design using wood as fuel. Thereafter TERI has now developed expertise & experience in developing wood based two-stage gasifier for power generation. The development of two stage gasifier system was done in collaboration with DTU and TERI. The design was evolved based picking up the silent features of DTU and TERI design of gasifiers, the two stage gasifier reactor produces clean producer gas, thus minimizing the need for maintenance and other day-to-day operational problems. This project thus, builds upon the past achievements of the TERI-SDC collaboration.

#### Description of the improved two stage biomass gasifier system

The two-staged process is characterized by having pyrolysis and gasification in separate reactors with an intermediate high-temperature tar-cracking zone. This allows for a very fine control of the process temperatures, resulting in extremely low tar concentrations in the producer gas. The line diagram and functional arrangement of the two stage gasifier system is shown in the figure 2. It is indeed evident from the figure that

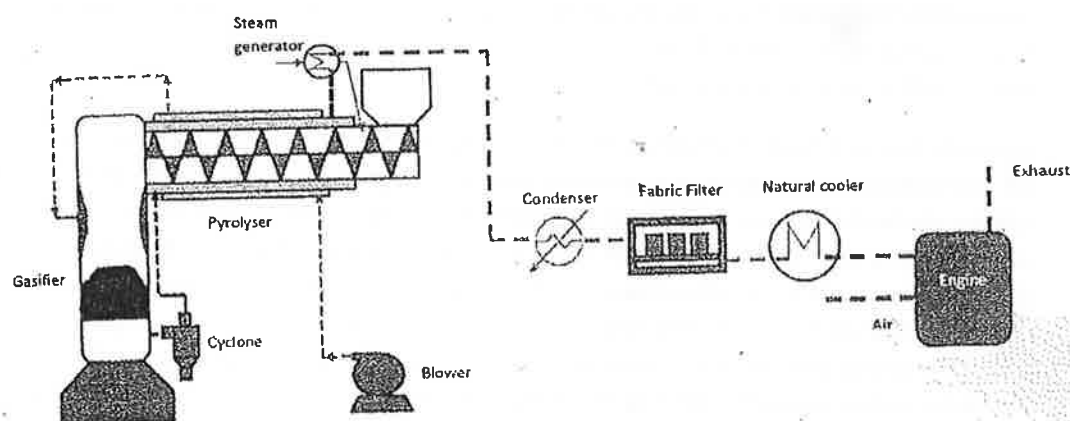


Figure 2: Two stage gasifier system

Table 1: Results of two stage gasifier system

S.No.	Key Parameters	Desirable Target
1	Tar (Raw gas)	Less than 25 mg/Nm <sup>3</sup>
2	Tar (Raw gas)	Less than 1 kg/kWh
3	Specific fuel consumption (kg/kWh)	Up to 30%
4	Input fuel moisture	Upto 2"
5	Fuel size	8-10%
6	Auxiliary electrical power	Without water scrubbing
7	Cooling cleaning system	Semi-automatic
8	Operational Controls	No

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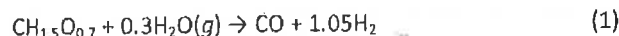


## i. Scope of Proposed work, brief description of

## a) Research, b) Trial run plans, c) Engineering and d) Design

Although many institutions across the globe engaged in gasifier technology development with an emphasis to improve the gas quality suit engine requirements and to make the system more reliable [8, 9]. In the past, most of the research work is largely focussed around reducing the impurities in the gas considering the economical long term operation of the engine. Since tar and particulate matter acts as a deterrent for engine performance, hence detrimental contaminants in the gas has to be minimised in order to reduce the operation and maintenance cost of the such power plants.

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained. In the air, steam gasification steam will react with carbon monoxide to produce hydrogen and carbon dioxide. The principle gas-phase reaction in the steam gasification system is the water gas-shift reaction:



Improving hydrogen content in the gas will improve the energy density. In addition, enriched hydrogen gas, which is indeed called as syngas open up more endues applications apart from efficiency improvement in the engine. They are

- Research opportunities such as hydrogen generation from biomass,
- Generation of liquid fuels from the syngas, which indeed can be compressed in a cylinder for use in automobiles
- Hydrogen enriches syngas can be used in hydrogen fuel cells
- Enriched syngas will open up Gas to liquid route generation of liquid fuels for automobile applications

The first and foremost step in order to open up these opportunitiles is to generate a hydrogen enriched producer gas that constitutes minimum impurities and high energy content. Considering the challenges confronted in the past i.e.

1. Low calorific value of the producer gas
2. Low engine efficiency resulting in de-rating of the engines
3. Impurities and the inert gases

This proposal was carefully carved to address the above mentioned challenges, with an objective to improve the resource use efficiency address each of the challenges mentioned above. The detailed approach adopted to overcome the challenges mentioned with a threefold strategy they are:

- Improving the energy density through steam gasification
- Higher adiabatic flame temperature
- Higher engine efficiencies (volumetric & overall efficiencies)

#### Energy density

However, currently there is a shift in focus towards improving efficiency of such systems. Since on the volume basis around 50% of  $N_2$  and 10-12%  $CO_2$  are the inert constituents of Producer gas which is not contributing to heating value. High volumes of inert gasses result in low calorific value, low

adiabatic flame temperatures and poor efficiencies of IC engines. Though Oxygen gasification, yields higher energy density fuel, but is not an economically viable option. Hence the focus shifted to steam gasification, steam-air gasification. With lower amounts of inert gas percentage, more combustible gas percentage and a higher heating value is obtained.

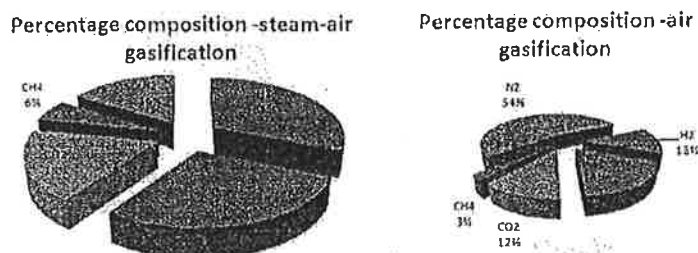


Figure 3: Comparison of inert gas percentages in steam-air and air gasification

Further authors tried to compile the gas composition using air, steam gasification in the table 2 below reported several authors. Careful analysis of the gas composition reported in the literature with air, steam gasification suggest that nitrogen content can be minimised to an extent of 1.57 % by volume to the current level of 50% by volume. This is due to the enrichment of hydrogen and Carbon monoxide composition in the producer gas from the current levels of  $H_2$  18% & CO 16% on a volume basis to  $H_2$  46.8 % & CO 20% on a volume basis. This also results in reduction of nitrogen since nitrogen is calculated by difference as illustrated in the table given below;

Table 2: Variations in the gas composition reported in the literature.

Reference	$H_2$	CO	$CO_2$	$CH_4$	$N_2$
M. Campoy et al [12]	27.5	28.5	14.6	7.7	21.7
Salami et al [7]	19.7	16.8	15.5	4	44
Franco et al[11]	42	30	16	5	7
Lv et al[6]	30	33	16	6	15
Subbaiah et al	23.8	18.46	23.5	4.07	30.17
Lv et al[15]	29.91	42.65	22.29	3.58	1.57
Lv et al [14]	30.81	39.26	17.41	8.2	4.32
Turn et al [17]	46.8	20.2	22.3	8.3	2.4

#### Adiabatic flame temperature

A comparison between steam-air and air oxidation can be drawn for inert gas percentage as well, where in the latter,  $N_2$  percentages are obtained as high as 64% against 44% maximum in steam-air oxidation. It is evident from this analysis theoretically there is a significant improvement in energy density in the volume of charge admitted into the engine cylinder which intern increase the adiabatic flame temperature and the power output from the engine. The calculations suggest that the energy content in the gas improves  $33.94 \text{ MJ/m}^3$  to  $61.01 \text{ MJ/m}^3$  which certainly is a significant improvement which is shown in the figure 5 given below.

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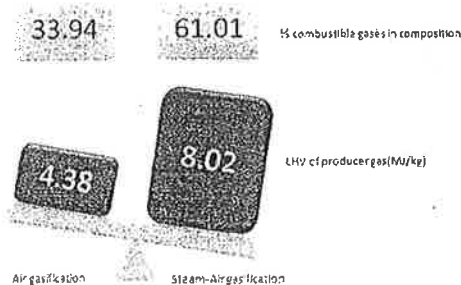


Figure 4: Effect of Combustible gas % in steam-air and air gasification

Subsequently, using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated from different observations. Figure 2 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature. Using the gas compositions, theoretical maximum adiabatic flame temperature (TMAFT) was calculated for different observations. Figure 3 shows the effect of hydrogen percentage on TMAFT. Quite clearly an increase in the percentage of  $H_2$  positive aspects the flame temperature.

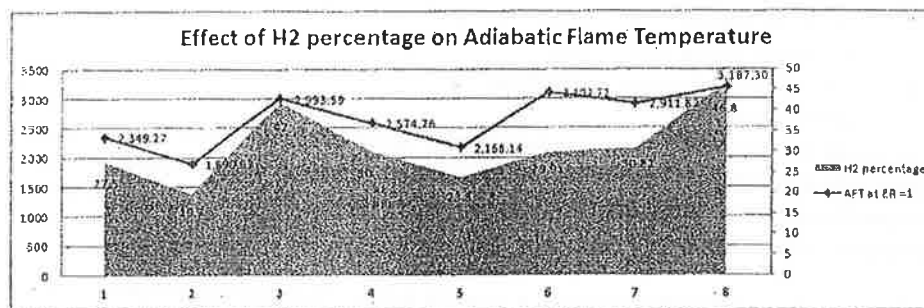


Figure 5: Effect of H2% on Adiabatic Flame Temperature °C

#### Engine performance

Using the Low Heating Value of producer gas thermal efficiency of the gas engine can be calculated. Other parameters include the capacity and performance characteristics of the engine. A three cylinder natural gas engine having a 3.8 L displacement running at 1500 RPM with an intake air fuel ratio of 1.3 produces a volumetric efficiency of around 0.8. Furthermore, the actual gas intake volume is calculated to be 0.0165 m<sup>3</sup>/s. The thermal power generated from producer gas with LHV of 8.84 MJ/m<sup>3</sup> is around 146.11 kW, which is further used to derive the mechanical power of the engine at 43.8 kW. For a cos phi rating of 0.814, the electric power in kVA is 35.68. The effect of higher gas LHV is observable on mechanical and electric power of the engine. Figure no displays the relationship for different observations.



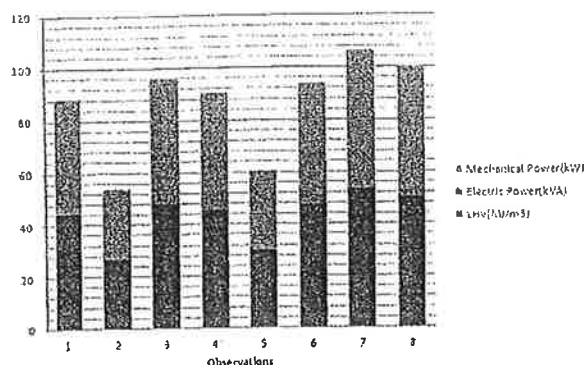


Figure 6: Influence of LHV on Mechanical and Electral Power

#### Research Plan:

To create a baseline data with existing setup "Air and Steam Gasification". A research plan has been developed based on experimental study to assess biomass flow, combustion zone temperature, and air flow, CHNO analysis of biomass, gas composition, gas chromatography, tar content and calorific value.

Parametric analysis shall be conducted

- (I) Measure the effect on gas composition and quality by varying the influencing parameters such as Steam/air ratio,
- (II) Study the influence of residence time by varying the position of steam injection inside the reactor,
- (III) Effect of reactor bed temperature etc.
- (IV) Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
- (V) This study shall also provide insights into the utilization of waste heat streams for steam generation.

It is proposed to conduct the experiments at our facility at Gual Phari, The proposed test rig is equipped with essential instrumentation and control, such as an array of thermocouples along with micro-Gas Chromatograph (GC) and other gas analysis equipment which are essential for conducting the proposed study.

The effect of various influencing factors, i.e. Reactor temperature, steam to biomass ratio (S/B), equivalence ratio (ER) and biomass particle size of gas composition, gas yield, steam decomposition, low heating value (LHV) and carbon conversion efficiency of steam gasification shall be studied

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6. Work Plan (should include stage wise detailed activities to be undertaken)

The proposed research shall be conducted in two steps, i.e.

**Step 1:** Is to introduce the steam injection into the first stage, also to optimize the steam injection point Integrate the steam generator into the existing system, the residence time and the utilization of the waste heat.

1. To optimize the steam, biomass ratio, residence time to optimize the hydrogen production in the producer gas. To conduct parametric studies by varying the steam, biomass ratio and observe the composition and calorific value of the gas.
2. To analyse the gas quality, i.e. tar and particulate matter in the producer gas at optimum hydrogen production and to if in case the tar and particulate matter is on the higher side efforts shall be taken to reduce the tar and particulate matter at the source.

**Step 2:** Is to develop a simple, clean and cooling cleaning system Integration of the complete package and testing the overall performance of the system.

1. This would involve the development of cleaning and cooling system, integration of the complete system with suitable rated engine.
2. The complete system shall be tested for its performance and also to quantify the efficiency improvement due to hydrogen enrichment.

**Step 3:** Testing, report writing, publication Mass balance, energy balance of the system to assess the performance of the system.

1. Study the influence of residence time by varying the position of steam Injection inside the reactor, Effect of reactor bed temperature etc.
2. Detailed mapping of mass and energy balance of the system to identify the inefficiency areas and waste heat streams in the system will be carried out.
3. This study shall also provide insights into the utilization of waste heat streams for steam generation.
4. To report techno-economic and cost-benefit assessment of the hydrogen enrichment vis-à-vis without hydrogen enrichment.

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7. Activity Time Schedule (Bar Chart indicating time duration required for completion of each of work plan stages/activities)

Time line	Time line 1 <sup>st</sup> year						Time line 1 <sup>st</sup> year						Time line 2 <sup>nd</sup> year						Time line 2 <sup>nd</sup> year					
Months	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6	1	2	3	4	5	6
Procurement of steam generator & integration with the system	■	■																						
To optimize the steam, biomass ratio, residence time to optimize the hydrogen production			■	■	■	■																		
To conduct parametric studies (variation/steam to biomass/ratio, gas; composition, calorific value etc.							■	■	■	■	■													
To analyse the gas quality, i.e. tar and particulate matter									■	■	■	■												
System optimization for reduction of impurities (tar and particulate matter)													■	■	■									
Procurement of at suitable engine Integration of the complete package. Testing the overall performance of the system with an engine																■	■	■						
Performance analysis mass balance, energy balance efficiency improvement due to hydrogen enrichment.																			■	■	■	■	■	■
Comparative study with and without the hydrogen enrichment, techno-economic analysis highlighting benefits, Fuel saving and payback period etc																			■	■	■	■	■	■
Publications												■	■											■
Report writing																								■



### 8. Expected benefits (quantitative and qualitative):

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar islands for island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

### 9. Likely potential end users with full address, mobile numbers, emails and applications:

### 10. Cost estimates:

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital items	450000	150000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities			0	
v. Consultancy			0	
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

\*TERI University & TERI contribution is in kind that includes expenditure towards infrastructure, building, instrumentation, Test rig and manpower that includes Technicians and Interns (TERI University contribution)

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11. Justification of the expenditure for additional:  
Budget for salaries/wages

Designation (number of persons)	Monthly emolument (person months)	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Research associate (1)	35000 (12)	420000	210000	840000
Research Assistant (1)	18000 (10)	432000	216000	648000
<b>Total</b>		<b>852000</b>	<b>426000</b>	<b>1278000</b>

Budget for permanent equipment

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Gasifier, blower and other associated system components (including accessories), their modifications in the field	350000	150000	600000
Steam generator and cleaning cooling system	100000	0	100000
<b>Total</b>	<b>450000</b>	<b>150000</b>	<b>600000</b>

Budget for consumable materials

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Fuel, hardware, spares etc.	50000	50000	100000

Budget for travel

Description	1 <sup>st</sup> year (Rupees)	2 <sup>nd</sup> year (Rupees)	Total (Rupees)
Travel	50,000	50,000	1,00,000

*Swigank*

## Year wise break-up of funds for the project

Items	(Cost in Rupees)			
	Year 1	Year 2	Year 3	Total
i. Capital Items	500000	200000		600000
ii. Chemical/ raw materials	50000	50000		100000
iii. Consumables	50000	50000		100000
iv. Utilities				0
v. Consultancy				0
vi. Travel	50000	50000		100000
vii. Stationery			0	
viii. Manpower*	852000	426000		1278000

## 12. Who are the identified potential beneficiaries (By name, address &amp; telephone nos.)

The proposed technology innovation shall strengthen the Government of India's commitment of installing 10 GW-equivalent of bio-energy capacity by 2022. This technology can be promoted in 18,000 (not feasible to be connected through the grid) un-electrified villages located in remote areas would be electrified using non-conventional sources of energy on a decentralised basis under Deendayal Upadhyaya Gram Jyoti Yojana (DDUGJY) and also in Andaman and Nicobar Islands for Island electrification. This technology can be promoted for captive power generation in industries when grid supply is not available (since many industrial centres face 5-8 hours of power cuts every day).

## 13. How much is the proposing institute willing to contribute towards the project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work. The in-kind contribution from TERI, if quantified, it is around 1000,000 (10 Lakhs) rupees.

## 14. How much is the proposing institute willing to contribute towards beneficiaries.

The current proposal is a research, develop and demonstrate proposal hence during this phase of the project the question is not applicable.



15. By the time project completion report is submitted how much energy would have been actually saved.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy/fossil fuel saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

16. What is the value of such energy that would be saved till completion of the project.

The current proposal is a research develop and demonstrate proposal, hence during the project duration quantification of energy saving is not feasible. However the project once developed and disseminated has huge potential for energy saving in the future. This is because one of the concept/solution proposed here is to replace diesel grid with biomass fired grid.

17. What are the existing equipment & instruments which proposing institute is going to utilize for the proposed project.

TERI's existing gasification infrastructure that includes gasifier test bed, analytical laboratories, other equipment's such as online gas analyser, gas chromatograph, CHNO, tar sampling apparatus, rotatory evaporators and basic laboratory equipment's will be utilised in the proposed research work.

18. Confirm that detailed justification of manpower cost, i.e. nos. of man-days & rate of man-days are indicated.

Since the project involves product development which requires engagement of experienced staff in designing and experimentation. Details are given in page number 12.

19. Confirm that items, which are to be purchased, are listed with an estimated cost of each.

Yes. Details are given in page number 13.

20. Letters from at least two potential beneficiaries (with telephone nos, mobile nos, email) needs to be enclosed indicating their willingness to implement the outcome of the project in their premises. Sharing of cost, whatever may be agreed, also to be indicated.

NA



15

21. Out of the total cost of project, please indicate how much value of material is actually going to be used in the premises for energy Efficiency.

100% of the project cost is utilized for product development which has energy efficiency as co-benefit.

*Pringank*

**DECLARATION**

I hereby declare that

- i) I have not undertaken this project earlier with any other organization
- ii) I have not taken any financial help for this project from any other institution
- iii) In case of receipt of grant-in-aid from PCRA, financial help shall not be taken from any other govt. organization against this project.
- iv) Patent search is the responsibility of the institution.
- v) The research lab under this institution is recognized by Govt./DSIR.



Principal, Investigator Signature

Date March 7<sup>th</sup>, 2016

TERI University





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*Singhania*


**पीसीआरए**

# **पेट्रोलियम संरक्षण अनुसंधान संघ** **PETROLEUM CONSERVATION RESEARCH ASSOCIATION**

(तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
(MINISTRY OF PETROLEUM & NATURAL GAS, GOVT. OF INDIA)

दूरभाष/ Tel. : बोर्ड/ EPABX : 26198856 फैक्स/ Fax : 26109668  
ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



## **Annexure - C**

### **Physical & Financial Milestones for R&D**

**Project: Design, development and testing of a down draft biomass gasifier system completed by Hydrogen enrichment through air-steam gasification**

Sl No.	Target	Period (in month nos)		Amount to be released at the end of period upon completion of target.		
		From	To	PCRA (Rs. in lakhs)	Institute / Beneficiary (Rs. in lakhs)	Total (Rs. in lakhs)
1	At the beginning of the project	N.A.	N.A.	5.445	NA	
2	a) Procurement of Steam Generator & Integration with the system b) To optimize the steam, biomass ratio, residence time for Hydrogen production.	Start of project (0)	6			
3	a) To conduct parametric studies (variation/steam to biomass/rati, gas; composition, calorific value etc. b) To analyse the gas quality, i.e Tar and Particulate matters. c) Publications & report writing.	6	12	9.075	NA	
4	a) System optimization for reduction of impurities (Tar & Particulate Matters) b) Procurement of suitable engine integration of the complete package & testing of the overall performance of the	12	18	2.00	NA	

	system with an engine.					
5	a) Balance work of Procurement of suitable engine integration of the complete package & testing of the overall performance of the system with an engine on in 19 <sup>th</sup> Month. b) Performance analysis mass balance, energy balance efficiency improvement due to Hydrogen enrichment. c) Comparative studies with and without Hydrogen enrichment, techno-economic analysis highlighting benefits, fuel saving and Payback period etc. d) Publications & report writing	18	24	3.082	NA	
6	a) Presentation in SCM for approval of DCR, compliance of SC comments if any, submission of final completion report.	NA	NA	2.178	NA	2.178
TOTAL :				21.78	NA	21.78

Institute to return back the unutilized sanctioned amount, if any, after completion of project. Interest earned on sanctioned money, if any, will be considered as additional sanctioned money. TDS deducted amount, if any, will be considered as grant-in-aid. Amount will be released only after completion of target and utilization of previous installments with actual expenditure and committed / Tender raised / order placed values. Amount will be released only after expiry of period against the target.

*Singh*





**पी सी आर ए**

**पेट्रोलियम संरक्षण अनुसंधान संघ**  
**PETROLEUM CONSERVATION RESEARCH ASSOCIATION**  
 (तेल एवं प्राकृतिक गैस मंत्रालय, भारत सरकार)  
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ई-मेल/ E-mail : pcra@pcra.org वेबसाईट/ Website : www.pcra.org



Annexure - D

HEAD WISE PROJECT COST

Sl. No	Activity	PCRA (Rs. in lakhs)	Industry / Beneficiary (Rs. in lakhs)	Institute (Rs. in lakhs)	Total (Rs. in lakhs)
1	Capital items	6.00	0	0	6.00
2	Chemical / Raw materials	1.00	0	0	1.00
3	Consumables	1.00	0	0	1.00
4	Utilities	0	0	0	0
5	Travel	1.00	0	0	1.00
6	Stationery	0	0	0	0
7	Manpower	12.78	0	0	12.78
8	Workshop / Seminar	0	0	0	0
9	Other research expenditure (Survey vehicles charges, driver charges etc.)	0	0	0	0
	<b>Total :</b>	<b>21.78</b>	<b>0</b>	<b>0</b>	<b>21.78</b>

*Signature*



Government of India  
Department of Atomic Energy (DAE)  
Board of Research in Nuclear Sciences (BRNS)

**Dr. Debanik Roy**  
Programme Officer (NRFCC)

BRNS Secretariat, 1st Floor,  
CC, BARC, Trombay,  
Mumbai-400085 Phone:  
+91-2225593946  
Fax: 2225593946  
Email: deroy@barc.gov.in

No: 36(4)/14/20/2017-BRNS/36191

Date: 04/12/2017

**OFFICE MEMORANDUM**

Sub: R/P entitled "Spatial distribution of uranium and associated water quality parameters in five districts of UP" under Dr. Chander Kumar Singh, Asst. Professor, Dept. of Energy and Environment,, TERI University, Vasant Kunj, Institutional Area, New Delhi, Delhi-110070 bearing sanction 36(4)/14/20/2017-BRNS with NRFCC, BRNS.

On the recommendations of the Board of Research in Nuclear Sciences (BRNS), I am pleased to convey the administrative approval and sanction of the President of India for the captioned project for **2 years** beginning from financial year **2017-2018** with a total grant of **Rs. 27,51,800/- (Rupees twenty seven lakh fifty one thousand eight hundred only)** for the project as under :

Item of expenditure	Year 1 (2017-2018)	Year 2 (2018-2019)
Equipments	1050000	0
Staff Salary - JRF (1)	300000	300000
Technical Assistance	196000	196000
Consumables	80000	80000
Travel - PI	40000	40000
Travel - PC/DC	25000	25000
Contingencies	35000	35000
Overheads	126825	48075
<b>Total(INR)</b>	<b>1852825</b>	<b>724075</b>

Note: \* GPS, Laser / LED fluorimeter, Radiation survey meter, Water quality sensors

JRF salary calculated @25,000/- p.m. for first two years and on redesignation by committee on in third year as SRF @ 28,000/- p.m. RA salary calculated @ 36,000/- p.m.

Please note that as per the government orders under **Direct Benefit Transfer (DBT) scheme**, the staff salary has to be transferred to his/her bank account. Accordingly, Aadhar Number (UID) of the appointed staff, Bank Account details and the Mobile number linked to the bank account should be obtained and it should be intimated to this office.

Overheads calculated @ 7.5% of the other heads except contingency. The remaining 7.5% towards overheads (Rs. 1,74,900/-) shall be released only on meeting the requirements specified (See Annex-B).

- I am also pleased to convey the sanction of the President of India to incur an expenditure of **Rs. 18,52,825/- (Rupees eighteen lakh fifty two thousand eight hundred twenty five only)** towards grant for the year 2017-2018.
- The expenditure involved is debitable to: **04 3401 00 004 27 0231**.
- This issues with the concurrence of Scientific Secretary, BRNS and IFA.

Signature By :  
**Dr. Debanik Roy**

Pay & Accounts Officer, DAE, Mumbai - 400 001.

Copy forwarded to:

1. Director of Audit, Scientific Department, AEAP, OYC, CSM Marg, Mumbai-400 001.
2. Joint Secretary (R&D), DAE, Anushakti Bhavan, CSM Marg, Mumbai-400 001.
3. Registrar, TERI University, Vasant Kunj, Institutional Area, New Delhi, Delhi, 110070..
4. Principal Investigator(PI): Dr. Chander Kumar Singh, Asst. Professor, Dept. of Energy and Environment,, TERI University, Vasant Kunj, Institutional Area, New Delhi, Delhi, 110070.

A. First year grant is being released in full along with this Sanction Letter through Pay & Accounts Officer, Department of Atomic Energy, Anushakti Bhavan, CSM Marg, Mumbai-400 001 directly. You may await a Money transfer (MT) through ECS and The amount would be credited electronically to A/C No: 52142908571, A/C Name: TERI University, IFSC: SBHY0020511, (20511) Pragati Vihar, Delhi Branch, Ground Floor, Core 6, Scope Complex, Lodhi Road, New Delhi-110003.

i) Acceptance of this sanction and the MT for the amount sanctioned for the first financial year may please be acknowledged (Form-I).

ii) A sticker of the BRNS LOGO (Copy Enclosed) should be pasted on all the items procured under the project.

iii) THIS SANCTION IS FURTHER SUBJECT TO THE CONDITIONS STIPULATED IN ANNEX (ENCLOSED), WHICH MAY BE GONE THROUGH CAREFULLY.

B. Second year Sanction Letter will be issued automatically in the month of April/May of the 2nd financial year, however, the grant will be released (unspent balance of previous year and Interest earned will be adjusted) after the PI submits the following documents to the Programme Officer NRFCC:

a) Claim in Form-II quoting the reference of the sanction issued for the first year.

b) Utilisation Certificate (UC) as on 31st March of the preceding financial year in Form-III duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.

c) Statement of Accounts (SA) as on 31st March of the preceding financial year should be updated on the website. Interest earned in previous year should be reflected in the Statement of Accounts. A printout of the same should be sent to BRNS after it is duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.

d) Copy of appointment order and joining report of the staff appointed for the project along with minutes of the Selection Committee, should be uploaded in a single pdf file under the file head "Staff Appointment Details". In addition, the details of the appointed staff should also be updated in the available menu.

e) The inventory of equipment also should be updated in the menu, besides uploading the purchase order of the items costing more than 1 Lakh.

f) A One Page report on the progress of work during first year.

C. Third and subsequent years (if any) the Sanction Letter and the grant will be released on fulfillment of the following requirements:

i) Renewal/ Extension Application: Principal Investigator (PI) is required to upload by January 15 a pdf copy of duly signed renewal/ extension application in the prescribed form-(PRA) after logging into his/her account at <https://bms.res.in>. All applications received shall be examined by experts from the field and PIs may be invited to a Technical Programme Discussion Meeting (TPDM). Renewal of the project will be based on the recommendations of the TPDM, Advisory Committee and the Board.

ii) Sanction Letter: If the progress is found to be satisfactory the renewal sanction for the year will be issued in the beginning of that financial year in April/May.

iii) Claim: On receipt of the renewal sanction, the PI shall claim the funds sanctioned by submitting the following documents to Programme Officer NRFCC, BRNS Secretariat, First Floor, Central Complex, BARC, Trombay, Mumbai-400 085:

a) Claim in Form-II quoting reference of the renewal sanction.

b) Utilisation Certificate (UC) as on 31st March of the preceding financial year in Form-III duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant. should be reflected in the Statement of Accounts.

c) Statement of Accounts (SA) as on 31st March of the preceding financial year including the amount of Interest earned in previous year and duly audited by the Internal Auditor of the University/ Institution or a Chartered Accountant.



### 3.2.1.G.53.

- d) Copy of appointment order and joining report of the staff appointed for the project along with minutes of the Selection Committee.
- e) An inventory of equipment and the copy of Purchase order of equipments costing more than 1 Lakh.
- D. At the end of Terminal Year the Settlement Grant and the Balance 7.5% Overheads will be released on fulfillment of the following requirements:
- a) Claim Form-II if any,
- b) The final Consolidated Statement of Accounts (SA) and Consolidated Utilization Certificate duly audited by an external Chartered Accountant or the Statutory (Govt.) Auditor. It is mandatory to include the amount of bank interest earned on the grant released into the SA.
- c) Final Consolidated Progress Report and a brief report as per format given in Form-VII .
5. AAO (Cheque), DAE, Anushakti Bhavan, CSM Marg, Mumbai - 400 001 – With a request that the amount granted for the first year of the project may be released.
6. Member Secretary (NRFCC) : Dr. Vivekanand Kain, [vivkain@barc.gov.in](mailto:vivkain@barc.gov.in); Ph:+91-2225595067
7. Project Collaborator (PC): Shri Sunil K. Sahoo, Health Physics Division Bhabha Atomic Research Centre Trombay,Mumbai - 400 085, Email : [nupbarc@gmail.com](mailto:nupbarc@gmail.com), Mobile :2225598267

You or your nominee may please be the DAE representative for selection of Research Fellow/ Research Associate for the project.

  
Dr. Debanik Roy

Note:

1. Please quote the Sanction Number 36(4)/14/20/2017-BRNS in all your correspondence with BRNS



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10, Institutional Area  
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Web www.teriuniversity.ac.in

**Gp. Capt. Rajiv Seth (Retd.), Ph.D.**  
**Pro Vice Chancellor**

April 18, 2017

Dr. Rajendra Dobhal  
Director General  
Uttarakhand State Council for Science and Technology  
Vigyan Dham, Jhajra, Dehradun

**Subject: Regarding release of grant of first year to TERI University, New Delhi worth Rs. 20.60 lakh**  
DST sanction letter No.182 (WTI) dated 16/03/2017 Project  
**Title: Modelling for Enhancing Water Quality in Uttarakhand using Geospatial Technology**

Dear Dr. Dobhal,

This is with reference to the above referred project recently sanctioned under Water Technology Initiative (WTI) programme of DST, Govt. of India, New Delhi to UCOST, Dehradun in collaboration with TERI University, New Delhi and DAV (PG) College, Dehradun.

The grant worth Rs. 50,46,400/- for a period of three years has been sanctioned by DST to UCOST, with a share worth Rs 43,16,800/- from DST and Collaborator's (UCOST's) share of Rs 7,29,600/-. The amount worth Rs. 25,26,800/- as first year share of the project has been sanctioned by DST and Rs. 2,43,300/- as Collaborator share from UCOST has been sanctioned.

The budget component of the work to be undertaken by TERI University, New Delhi with Co-PI, Dr. Vinay S.P. Sinha formulated under the project during first year is as under:

S. No.	Head	Amount sanctioned & Released by DST to UCOST	Amount sanctioned by UCOST	Amount Requested to UCOST Being release grant to TERI University, New Delhi
1.	Equipments (I) Subsurface Ground Water Modeling S/W (II) Satellite Data (III) Workstation Machine	Rs. 16.000 lakhs	NIL	Rs. 16.000 lakhs [for all (I)-(III)]
2.	Manpower (02 JRF) @ Rs. 25,000/- PM + 20% HRA)	Rs. 6.768 lakhs	Rs. 0.432 lakhs	Rs. 3.60 lakhs (for one JRF)
3.	Contingencies	-	Rs. 1.00 lakh	Rs. 0.25 lakh

Contd...2.

4.	Travel	-	Rs. 1.00 lakh	Rs. 0.50 lakh
5.	Consumables	Rs. 1.50 lakh	NIL	NIL
6.	Overhead	Rs. 1.00 lakh	-	Rs. 0.25 lakh
	<b>Total</b>	<b>Rs. 25.268</b>	<b>Rs. 2.432 lakh</b>	<b>Rs. 20.60 lakh</b>

In order to start the work as early as possible and to attain project objectives within time frame, it is requested to kindly release the above grant worth Rs. 20.60 lakhs (Rupees Twenty lakhs sixty thousand only) in favour of "The Registrar, TERI University, New Delhi" at the earliest. The audited Utilization Certificate (UC) and statement of expenditure (SE) as per norms along with report of work carried out during first year will be submitted as per requirement.

The detail of the account is given below and payment shall be made in favour of **THE REGISTRAR.**

Organisation Name as per Bank records: TERI University

Bank Account No: 52142908571

IFSC Code: SBHY0020511

MICR Code: 110004005

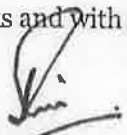
Bank Name: State Bank of Hyderabad

Bank Branch Address: Pragati Vihar, Ground Floor, Core 6, Scope Complex, Lodi Road, New Delhi-110003

Unique Agency code of the Organization and Institute: TERI UNIVERSITY

Looking forward for continued collaboration and association.

Thanks and with regards,

  
Gp Capt Rajiv Seth (Retd). PhD  
Pro Vice Chancellor

Encls: Sanction letter for grant, P.D. WTI/DST dated 16.3.17

Gp Capt. Rajiv Seth (Retd), P.D.

Pro Vice Chancellor

TERI University

10, Institutional Area, Vasant Kunj

New Delhi - 110 070



No. BT/PR24047/BPA/118/364/2017

GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY

Block 2, 6-8th Floors  
CGO Complex, Lodhi Road,  
New Delhi- 110 003  
Dated: 21/08/2018

**ORDER**

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**" for a period of 3 Year 0 Month at a total cost of Rs. **5258600** (Rupees Fifty Two Lakhs Fifty Eight Thousand Six Hundred Only) on the terms and conditions detailed here under:-

**2 The Project :**

**2.1 Title :** Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas

**2.2 Details of the Investigators:**

**Dr. Anandita Singh**

Professor  
Department of Biotechnology  
The Energy And Resources  
Institute, New Delhi  
TERI- UNIVERSITY, 10 Institutional  
Area, Vasant Kunj, New Delhi-  
110070, New Delhi, Delhi, 110070

**CO-PI:**

**Dr. Shashi Bhushan Tripathi**

Fellow  
Biotechnology and Management of Bioresources  
The Energy And Resources Institute, New Delhi  
IHC, Lodhi Road, New Delhi - 110003, Delhi

**2.3 Objectives:**

1. Analysis of natural variation in sub-genome specific SOC1 promoter homeologs (Least Fractionated, Moderately Fractionated 1 and Most Fractionated 2) from select Brassica species of India
2. Analysis of diversification of promoter activity in homeologs derived from diploid (B. rapa-AA genome; and B. nigra-BB genome) and amphidiploid (B. juncea-AABB genome) species of Brassica via comparative expression studies of associated SOC1 transcripts
3. Molecular characterization of SOC1 promoter(s) homeologs from B. juncea
4. Functional characterization of select B. juncea SOC1 promoter homeologs



**2.4 Time Schedule:**

The duration of the project is 3 Year 0 Month from the date of this sanction order.

**2.5 Project Cost:**

The total cost of the project is Rs. **5258600/-** (Rupees Fifty Two Lakhs Fifty Eight Thousand Six Hundred Only) as per details given below:

Budget Head	Year I	Year II	Year III	Total (Rs.)
Equipment	800000.00			<b>800000.00</b>
Manpower	780000.00	780000.00	873600.00	<b>2433600.00</b>
Contingency	50000.00	50000.00	50000.00	<b>150000.00</b>
Consumables	600000.00	600000.00	600000.00	<b>1800000.00</b>
Travel	25000.00	25000.00	25000.00	<b>75000.00</b>
<b>Total (Rs.)</b>	<b>2255000.00</b>	<b>1455000.00</b>	<b>1548600.00</b>	<b>5258600.00</b>

**2.6 Equipment**

The details of the equipment sanctioned for the implementation of the project at  
**Annexure-I**

**2.7 Manpower:**

The details of the manpower sanctioned for the implementation of the project at  
**Annexure-II**

**3. Head of Account:**

The **Non-Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2018-2019
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.35	Grants for creation of capital assets

The **Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2018-2019
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.31	Grants-in-Aid General

#### 4. Terms & Conditions:

No utilization Certificate is pending with the implementing Institute. All the Utilization certificate due for rendition have been received and accepted by the head of the Division/Competent Authority.

In case the whole or a part of the amount of the grant in aid is being refunded, an interest at the rate of ten percent per annum thereon shall be recovered.

The Non-recurring amount should be utilized within 18 months from the date of Sanction order.

**If project involves transgenic work, therefore IBSC clearance is required before initiating the study. A copy of the same should be forwarded to the department. Investigators should follow biocontainment guidelines 2017-2018 available at <http://www.dbtindia.nic.in/wp-content/uploads/Regulations-Guidelines-for-Recombinant-DNA-Research-and-Biocontainment-2017.pdf>**

- 4.1 The other terms and conditions governing this sanction are attached at Annexure- III.
- 4.2 A Memorandum of Agreement (MoA) will be signed between the Department of Biotechnology and the grantee institution on Non-Judicial stamp paper Rs. 100/- in the enclosed format and the second release/installment will be made only after signing of MoA by the grantee institutions and its acceptance by DBT. In case of NGO or Private Institution, MOA signed is mandatory first release. A format of the MoA is enclosed in Annexure-IV
- 4.3 The Institute/Agency will keep the whole of the grant in a Bank Account earning interest, and the interest so earned should be reported to DBT in the Utilisation Certificate and Statement of Expenditure. The Interest so earned will be treated as created to the institute/Agency and shall be adjusted towards further installment of the grant and or at the time of Final Settlement of Accounts.
5. No International Travel will be undertaken from the sanctioned project grant unless specified otherwise.
6. The Registrar, The Energy And Resources Institute, New Delhi, New Delhi, Delhi would be responsible for submission of Statements of Expenditure (SoE), utilization certificates (UC), Assets Certificates, Manpower staffing & expenditure details in prescribed DBT formats to DBT in respect of grants released in this project from time to time.
7. PI's of DBT sponsored projects can consider appointment of JRF from Category-II merit list of DBT-BET exam so that candidates can be paid fellowships at par with NET/GATE/BET qualified candidates as per DST OM No. A.SR/S9/Z-09/2012 dated 21 Oct 2014. However, there is no compulsion on PI's to select candidates for JRF in their projects from Category-II of DBT-BET.
8. As per Rule 236 (1) of GFR 2017, the accounts of all Grantee Institutions or Organisations shall be open to inspection by the sanctioning authority and audit, both by the Comptroller and Auditor General of India under the provision of CAG(DPC) Act 1971 and internal audit by the Principal Accounts Office of the Ministry or Department, whenever the Institution or Organisation is called upon to do so.
9. If the Research Project involves biological resource, the obligations under the Biological Diversity Act 2002 as applicable shall be complied with by the Project Investigator, the details of such obligations can be accessed at [www.nbaindia.org](http://www.nbaindia.org)
10. This issues under the power delegated to this Department and with the concurrence of IFD vide their **SAN No 102/IFD/SAN/1660/2018-2019 dated 20/08/2018.**
11. This sanction order has been noted at serial no. 76 in the Register of Grants.

  
Dr. Sanjay Kalia  
(Scientist 'E')




To,

The Pay & Accounts Officer,  
Department of Biotechnology,  
New Delhi - 110 003.

**Copy to:**


- 1 The Principal Director of Audit (Scientific Departments), DACR Building, New Delhi- 110 002.
- 2 The Registrar, The Energy And Resources Institute, New Delhi, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110003, Delhi
- 3 Dr. Anandita Singh, Professor, Department of Biotechnology, The Energy And Resources Institute, New Delhi, TERI- UNIVERSITY, 10 Institutional Area, Vasant Kunj, New Delhi- 110070, New Delhi - 110070, Delhi
- 4 Dr. Shashi Bhushan Tripathi, Fellow, Biotechnology and Management of Bioresources, The Energy And Resources Institute, IHC, Lodhi Road, New Delhi - 110003, Delhi
- 5 Cash Section, DBT (2 copies).
- 6 Sanction Folder.
- 7 File Copy.

  
**Dr. Sanjay Kalia**  
(Scientist 'E')

## Annexure -I

Details of the Equipment sanctioned for the implementation of the project titled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**":

The Energy And Resources Institute, New Delhi			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	Referigerated water bath	1	200000.00
2.	PCR	1	600000.00
Total			800000.00


  
Dr. Sanjay Kalia  
(Scientist 'E')

## Annexure -II

Details of the manpower sanctioned for the implementation of the project titled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**":

Head	No. of Position	Year I	Year II	Year III	Total (Rs.)
Junior Research Fellow The two JRFs will undertake the workplan of the four objective of isolation and characterization of cis elements of orthologs and paralogs of SOC1 from Brassica species	2	780000.00	780000.00		1560000.00
Senior Research Fellow The two SRFs will undertake the workplan of the four objective of isolation and characterization of cis elements of orthologs and paralogs of SOC1 from Brassica species	2			873600.00	873600.00
<b>Total(Rs.)</b>		<b>780000.00</b>	<b>780000.00</b>	<b>873600.00</b>	<b>2433600.00</b>

Emoluments detail of research personal(s) mentioned in table(s) of Annexure-II shall be applicable only if candidate(s) met educational qualification and eligibility criteria as per DST OM No.SR/S9/Z-09/2012 dated 21.10.2014.

  
Dr. Sanjay Kalia  
(Scientist 'E')



FILE NO. EMR/2016/005382  
**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**  
(a statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 18-Sep-2018

**ORDER**

Subject: Financial Sanction of the research project titled "**Gene regulation by DNA methylation in Bacillus anthracis (Sterne)**" under the guidance of Dr. Ramakrishnan Sitaraman, Biotechnology, TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 - Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned project at a total cost of **Rs. 3812800/- (Rs. Thirty Eight Lakh Twelve Thousand Eight Hundred Only)** with break-up of **Rs. 500000/- under Capital (Non-recurring)** head and **Rs. 3312800/- under General (Recurring)** head for a duration of 36 months. The items of expenditure for which the total allocation of **Rs. 3812800/-** has been approved are given below:

The following budget may be considered for **TERI University, Plot No. 10, Institutional Area, Vasant Kunj**

S. No	Head	Total (in Rs.)
<b>A</b>	<b>Non-recurring</b>	
1	Equipment -> Deep freezer (-80 degrees)	500000
<b>A'</b>	<b>Total (Non-Recurring)</b>	<b>500000</b>
<b>B</b>	<b>Recurring Items</b>	
1	Recurring - I : (Manpower) Recurring - II : ( Consumables, Travel, Contingencies)	1216800 1750000
2	Recurring - III : (Overhead Charges)	346000
<b>B'</b>	<b>Total (Recurring)</b>	<b>3312800</b>
<b>C</b>	<b>Total cost of the project (A' + B')</b>	<b>3812800</b>

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 500000/-** (Rupees Five Lakh only) under 'Grants for creation of capital assets' and **Rs. 990000/-** (Rupees Nine Lakh Ninety Thousand only) under 'Grants-in-aid General' to **Registrar, TERI School of Advanced Studies, TERI University, Plot No. 10, Institutional Area, Vasant Kunj** being the first installment of the grant for the year 2018-2019 for implementation of the said research project.

3. The expenditure involved is debitable to **Fund for Science & Engineering Research (FSER)**

**This release is being made under Core Research Grant. (PAC Biophysics, Biochemistry, Molecular Biology & Microbiology)**

4. The Sanction has been issued to TERI University, Plot No. 10, Institutional Area, Vasant Kunj with the approval of the competent authority under delegated powers on **14 September, 2018** and vide Diary No. **SERB/F/7046/2018-2019** dated **17 September, 2018**

Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.

8. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

9. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.

10. The release amount of **Rs. 1490000/-** (Rupees Fourteen Lakh Ninety Thousand only) will be drawn by the Under Secretary of the SERB and will be **disbursed by means of RTGS transaction as per their Bank details given below:**

Account Name	TERI School of Advanced Studies
Account Number	52142908571
Bank Name & Branch	State Bank of India Branch: (20511) Pragati Vihar, New Delhi Address: Scope Complex, Ground Floor, Core 6, Lodhi Road, New Delhi - 110003

### 3.2.1.G.56.

IFSC/RTGS Code	SBIN0020511
Email id of A/C Holder	dhanraj.singh@terisas.ac.in
Email id of PI	rkraman@terisas.ac.in

11. The institute will furnish to the SERB, New Delhi, separate Utilization certificate(UCs) financial year wise to the SERB for Recurring (Grants-in-aid General) & Non-Recurring (Grants for creation of capital assets) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

12. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.

13. The project File no. EMR/2016/005382 may also be mentioned in all research communications arising from the above project with due acknowledgement of SERB.

14. The manpower sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship and salary of supporting staff if any beyond the duration of the project

15. As this is the first grant being released for the project, no previous U/C is required.

16. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "FUND FOR SCIENCE AND ENGINEERING RESEARCH" payable at New Delhi.

17. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

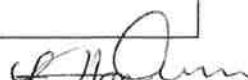
18. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

  
(Dr. Harish Kumar)  
Scientist E  
ms\_bb@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<b>Dr. Ramakrishnan Sitaraman</b> <b>Biotechnology</b> TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 Email: rkraman@terisas.ac.in Mobile: 919971005164 (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a> .)
5.	<b>Registrar, TERI School of Advanced Studies,</b> <b>TERI University, Plot No. 10, Institutional Area, Vasant Kunj</b>  (Receipt of Grant may be intimated by name to the undersigned)

  
(Dr. Harish Kumar)  
Scientist E  
ms\_bb@serbonline.in

3.2.1.G.56.

From: Ramakrishnan Sitaraman

Sent: Wednesday, July 4, 2018 9:39:58 AM

To: Dhanraj Singh

Subject: FW: SERB File Number: EMR/2016/005382 Urgent message from Dr. Harish Kumar, DST

From: Dr. Harish Kumar <ms\_bb@serbonline.in>

Sent: 27 June 2018 11:40

To: "info@serbonline.in"@imsva02.cdacnoida.in

Subject: SERB File Number: EMR/2016/005382 Urgent message from Dr. Harish Kumar, DST



## Science and Engineering Research Board

(Statutory Body Established Through an Act of Parliament : SERB Act 2008)

Department of Science and Technology, Government of India

From: Dr. Harish Kumar

Dear Dr. Sitaraman,

You are requested to re-submit the RTGS details corresponding to your file no : EMR/2016/005382

The finance has returned the file seeking updated renamed institute RTGS details to enable us to process it in finance.

\*\*\*\*\* LEGAL DISCLAIMER \*\*\*\*\*

**Please do not reply to this mail !!**

[ SERB is now on Social-Media. Kindly follow us on Twitter: @serbonline <https://www.twitter.com/serbonline>]

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3.2.1.G.56.

3.2.2.387



**The Memorandum of Agreement entered into between the Water Resources Department, Government of Arunachal Pradesh and TERI University, New Delhi for the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh**

THIS AGREEMENT made on 18<sup>th</sup> day of May, 2017 between the Water Resources Department Government of Arunachal Pradesh and TERI University, a deemed to be University under section 3 of the UGC Act, 1956, having its registered office at Plot No. 10, Institutional Area, Vasant Kunj, New Delhi – 110070

TERI University hereby agrees to undertake the preparation of State Specific Action Plan for Water Sector – Arunachal Pradesh as per the requirements contained in the ToR (Annexure 1) for a total sum of Rs. 30,00,000 (Rupees Thirty Lakhs).

Both the parties agree to the following:

**1. Time Schedule:**

TERI University undertakes to complete the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh as per the following time schedule:

Stage	Time Frame
Stage I: Status Report on Water Resources, Availability, Development and Management	Six months from the date of signing of the MoU
Stage II: Preparation of Interim Report	Three Months from the date of submission of the Status Report on Water Resources, Availability, Development and Management
Stage III: Preparation of State Specific Action Plan	Three Months from the date of the submission of Interim Report

**2. Payment Terms and Schedule:**

The Water Resources Department, Government of Arunachal Pradesh agrees to pay TERI University a total amount of Rs. 30,00,000 (Rupees Thirty Lakh) for the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh. The payment will be released in three installments as per the following schedule:

Stage	Funds to be released
Stage: 1: On signing of the MoU	40% of the total amount (Rs. 12,00,000)
Stage 2: On submission of the Status Report on Water Resources, Availability, Development and Management	30% of the total amount (Rs. 9,00,000)

Stage 3: On submission of the Interim Report in presence of State Screening Committee with PPT	20% of the total amount (Rs. 6,00,000)
Stage 4 : Final Report submission	10% of the total amount (Rs. 300,000)

In addition, the Water Resources Department, Government of Arunachal Pradesh will facilitate and bear the cost of local lodging/boarding and local travel.

### 3. Other Terms:

The Water Resources Department, Government of Arunachal Pradesh will extend all help in collecting the relevant data needed for the preparation of the State Specific Action Plan for Water Sector – Arunachal Pradesh from different government departments/statutory authorities and other institutions.

### 4. Arbitration:

All differences and disputes arising between the Water Resources Department, Government of Arunachal Pradesh, and TERI University on any matter connected with this Agreement or in regard to the interpretation of the contents thereof shall be referred to the sole arbitrator appointed jointly by the Chief Engineer (Western Zone), Water Resources Department, Government of Arunachal Pradesh and the Registrar, TERI University in accordance with the Arbitration and Conciliation Act, 1996.

(Er. L. Angu)

Chief Engineer(W/Z)  
Water Resources Department  
Itanagar, Arunachal Pradesh

On behalf of Govt. of Arunachal Pradesh

Vinay Shanker Sinha  
18/05/2017

Dr. Vinay S.P. Sinha

Associate Professor  
TERI University  
Vasant Kunj, New Delhi

On behalf of TERI, University



**NATIONAL MISSION ON HIMALAYAN STUDIES (NMHS)**  
**G.B. Pant National Institute of Himalayan Environment and Sustainable Development**  
**(GBPNIHESD)**  
**Kosi-Katarmal, Almora - 263643, Uttarakhand, India**

Ref. No.: GBPNI/NMHS-2018-19/MG 2

Date: 21-01-2019

**To,****Dr. V.S.P. Sinha**

TERI School of Advanced Studies  
 10-Institutional Area, Vasant Kunj  
 New Delhi 110070

**Subject:** Approval of the Medium Grant (MG) for the project entitled "**Water Resource Management through Spring and Catchment Rejuvenation in Uttarakhand for Improving Water Security**"

Sir,

I am directed to convey the approval of the Competent Authority for the above-mentioned project at a total cost of **Rs. 1,37,68,867.00 (Rupees: One Crore Thirty Seven Lakh Sixty Eight Thousand Eight Hundred Sixty Seven Only)** for a period of three years, as per the break-up given below:-

Head	1 <sup>st</sup> year (in Rs.)	2 <sup>nd</sup> year (in Rs.)	3 <sup>rd</sup> year (in Rs.)	Total grant
<b>A. Recurring</b>				
<b>(i) Salary:</b> 02 RA-II @ Rs.38,000/- + HRA @ 24% per month for three years. 01 JPF @ 16,000/- + HRA @ 16% or minimum @ Rs.3,600/- per month for first two years and Rs.18,000/-+ HRA @ 16% or minimum @ Rs.3,600/- per month for third year. 01 Field Assistant @ Rs.10,000/- per month fix for three years.	1486080.00	1486080.00	1510080.00	<b>4482240.00</b>
<b>(ii) Travel(Domestic):</b>	450000.00	450000.00	500000.00	<b>1400000.00</b>
<b>(iii) Consumables:</b>	300000.00	300000.00	250000.00	<b>850000.00</b>
<b>(iv) Contingency:</b>	250000.00	250000.00	250000.00	<b>750000.00</b>

<b>(v) Activities &amp; other project cost:</b> Climate modeling, water balance study, Inventory survey and stakeholder meetings, Geological investigation, Structural investigation, Physico-chemical soil survey, Vegetation survey, LULC Mapping, Flow measurement, Isotope sampling, Sensitivity survey, setting-up the pilot and implementation of research outcome of Hydro-geological analysis for spring rejuvenation, FGDs and stakeholder consultation, Monitoring and evaluation, Participatory resource mapping for springshed management, Site specific technical solutions for water harvesting, Comprehensive springshed rejuvenation framework and Trainings/workshop.	950000.00	2450000.00	2000000.00	<b>5400000.00</b>
<b>(vi) Institutional charges/ Overhead :</b>	150000.00	150000.00	200000.00	<b>500000.00</b>
<b>B. Non Recurring</b>				
<b>(i) Equipment:</b> Satellite data (NRSC), Carto DEM, Flow meters- 2 nos, System/ Data logger.	386627.00	Nil	Nil	<b>386627.00</b>
<b>Grand Total A+B</b>	<b>3972707.00</b>	<b>5086080.00</b>	<b>4710080.00</b>	<b>13768867.00</b>

2. The approval of the project is subject to incorporation of following points:

- The proposed model should be checked and authenticated; on completion it should be handed over to NMHS-PMU along with imparting training to PMU Scientists on the model;
- Geo-tagging of treatment sites should be done, specifying the inventor details of springs with details of districts.
- A report based on baseline data should be submitted by the project proponent in the **1st quarter of the project** since the initiation of the project, and quantification of improvement in economic status of beneficiaries against baseline should be specified. The PI must also submit the baseline data, past work done and **all the supporting data generated** under the NMHS Project along with the quarterly progress report to NMHS-PMU.
- A Certificate should be provided that this work is not the repeat of earlier work (as a mandatory exercise).
- The roles and responsibilities of each implementing partners should be delineated properly with their budget. The budget allocations to partners should be done in accordance with the MoEF&CC guidelines (Max. 30% for salary, 30% for equipment and 5% contingency). The same should be communicated to NMHS-PMU, before start of the project.
- The Periodic Progress Report of the NMHS Project needs to be submitted and updated on the Online Portal of the NMHS (<http://nmhsportal.org>) by the PI/ Project Proponent **on Quarterly basis** consistently. Monitoring indicators for the project should be able to quantify the difference made on ground.
- On completion of the study, a Seminar/ Conference/ Workshop should essentially be organized by the PI/ Proponent to discuss and disseminate the findings among the experts and concerned beneficiaries/stakeholders.

3. The Project Objectives, Quantifiable Deliverables and Monitoring Indicators are as follows:



### 3.2.1.G.58.

Project Objectives	Quantifiable Deliverables	Monitoring Indicators
<ul style="list-style-type: none"> <li>Generating future climatic projections with high resolution regional climate model</li> <li>To identify regional and local water imbalance and water stress index</li> <li>To quantify water availability at regional and local level</li> <li>Inventory preparation, Protection, Restoration and Rejuvenation of springs by piloting solutions for selected springs</li> <li>Recommendation for community based solutions for sustainable water management and use</li> <li>Recommendation for water harvesting techniques and spring-shed management</li> <li>Action plan for land and water resources management for selected spring-sheds and catchments</li> </ul>	<ul style="list-style-type: none"> <li>Development of spring-shed management framework</li> <li>Integrated Geospatial Climate Modelling (IGCM) for sustainable water resources management, applicable for entire Uttarakhand State.</li> <li>04 spring-sheds for pilot intervention for restoration and rejuvenation activities.</li> <li>New recharge structures to increase the water flow at least 15-25% in the selected spring shed.</li> <li>Relief from water drudgery particularly for women (Approx. 1000 no.) residing in the selected spring shed.</li> <li>01 Report on Implementation oriented Action Plan for spring-shed management.</li> </ul>	<ul style="list-style-type: none"> <li>Future Climatic projection Model Developed at regional scale (No)</li> <li>Number of spring-shed treated/demonstrated (Nos.)</li> <li>Increased the water flow at selected site (%)</li> <li>Number of beneficiaries (Nos.)</li> <li>No. of documents prepared and published (Nos.)</li> <li>No. of databases developed</li> <li>No. of policy documents/research paper/repot prepared and published (Nos.)</li> </ul>

4. Sanction of the Competent Authority is also hereby conveyed for the release of **Rs. 39,72,707.00 (Rupees Thirty Nine Lakh Seventy Two Thousand Seven Hundred Seven Only)** towards Grants-in-Aid to **Registrar, TERI School of Advanced Studies, 10-Institutional Area, Vasant Kunj, New Delhi 110070** for the aforementioned NMHS-MG project for the Financial Year 2018-19 Plan/recurring being the 1<sup>st</sup> installment of grants as per the following break-up.

Expenditure Head	Amount (INR)
<b>A : Recurring (as Above)</b>	
(i) Salary	1486080.00
(ii) Travel	450000.00
(iii) Consumables:	300000.00
(iv) Contingency:	250000.00
(v) Activities & other project cost(as above):	950000.00
(vi) Institutional charges/Overhead:	150000.00
<b>B. Non Recurring</b>	
(i) Equipment(as above):	386627.00
<b>Total A+B</b>	<b>3972707.00</b>

5. The Grants-in-Aid will be regulated in accordance with the provisions contained in the guidelines of the Ministry of Environment, Forest & Climate Change, New Delhi. The Grants-in-aid is also subject to Chapter 9 of the General Financial Rules (GFRs), 2017, as amended from time-to-time, read with Government of India's decisions incorporated there under and any other guidelines which may be issued in this regard, and in particular to the following conditions:-

- I. A separate ledger is maintained for the purchasing of equipments/Instruments as per the provision of GFRs.

- II. Engagement of staff as per the provision of GFRs and MoEF&CC guidelines given in **Appendix A**. The emoluments for the retired persons hired for the project should not exceed **Rs. 30,000/- consolidated (fixed) per month** as stipulated in the MoEF&CC guidelines.
- III. Expenditure on items other than salary is incurred keeping in view the austerity measures issued on the subject, and GFR is followed by the Institute as well as regional office and other agencies receiving funds.
- IV. All account maintained by the concerned Organization will be subject to audit by the C&AG or internal auditors. On termination of the project, statements of accounts duly certified by the Competent Authority of the Organization shall be submitted and the unspent balance, if any, in the funds sanctioned will be refunded to G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand.
- V. No cash payment is made exceeding Rs. 20,000/- to anybody for any expenditure. The taxes and dues are recovered and deposited in Government Account as per law.
- VI. The 2<sup>nd</sup> installment will be considered only after the expenditure of 80% of the 1<sup>st</sup> installment released and on submission of the latest UC as per GFR format along with the Statement of Expenditure (item-wise) and signed duly by the Competent Authority. The UC shall also be verified and signed by the Chartered Accountant/Finance Officer along with the cash flow statement.
- VII. The UC shall be submitted along with up-to-date physical progress report (annual/ half yearly/quarterly) indicating progress made against each objective and quantifiable deliverables, both online on NMHS web portal <http://nmhsportal.org> and offline hardcopy *via* speed post, certified by the authorized person, along with data, photographs/satellite pictures, etc.
- VIII. Assets acquired wholly or substantially out of Government grants shall not be disposed of without obtaining the prior approval of the sanctioning authority of Grants-in-aid, and a separate sheet should be enclosed with details of Assets with cost.
- IX. The accounts of concerned Organization shall be audited by C&AG or by any person/agency authorized by it on its behalf in accordance with the provisions laid down in Section 14 of the C&AG (DPC) Act, 1971 as amended from time-to-time.
- X. The internal audit party of the Principal Accounts Office of the Ministry or Department may also inspect the accounts whenever it is called upon to do so.
- XI. The Grants-in-aid will be spent exclusively in pursuance of the objectives for the project entitled **"Water Resource Management through Spring and Catchment Rejuvenation in Uttarakhand for Improving Water Security"** as given above and for the purpose it is being sanctioned.
- XII. The Grants-in-aid is subject to the Economy Instruction(s) issued from time-to-time by the Ministry of Finance or by the Competent Authority.
- XIII. The sanction of the NMHS grant is subject to compliance with the Terms and Conditions given in **Annexure-I** and duly signing of the Bond with NMHS-PMU in the prescribed format (**Appendix B**). Compliance of all conditions mentioned in the Bond and **Annexure I** must be ensured.
- XIV. On the basis of the Terms and Conditions given in **Annexure-I**, action is being taken up for the drawal of the sanctioned amount of the first installment of the first year's grant during the Financial Year 2018-19.
- XV. The sanction of the grant is subject to the whole details with nature of work of this project under "National Mission on Himalayan Studies (NMHS)" clearly mentioned in the website/all knowledge products of the Grantee.

- XVI. A **separate saving bank account** is to be opened for NMHS Project as per the provision Direct Beneficiary Account (DBA) as laid out by the Govt. of India, with facilitation of the audit of accounts as and when required. The interest earned out of the NMHS project Grant should be reported clearly in the latest Utilization Certificate (UC).
- XVII. The Project commissioned under "National Mission Himalayan Studies-Medium Grant" would be for the **tenure of three years w.e.f. 01.02.2019**. If the project proponent/ lead agency is able to produce the desired results after mid-term evaluation/ assessment in terms of measurable and quantifiable deliverables on the ground, the extension can be given for maximum up to 2 years.
- XVIII. As per the directive of the Govt. of India, the implementing agency should be registered online on **Public Financial Management System (PFMS)**. After registration on the PFMS (accessible at <https://pfms.nic.in/Users/LoginDetails/NewlayoutLogin.aspx>), please provide the Unique Code for further needful.
- XIX. The amount of **Rs. 39,72,707.00 (Rupees: Thirty Nine Lakh Seventy Two Thousand Seven Hundred Seven Only)** will be drawn by the Drawing and Disbursing Officer, G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora (U.K.) and disbursed to **Registrar, TERI School of Advanced Studies, 10-Institutional Area, Vasant Kunj, New Delhi 110070** through bank by ECS. The Grantee will open a **new saving Bank Account** in a nationalized bank and send the following details to NMHS-PMU for release of the NMHS Grant.
- |                |   |
|----------------|---|
| Bank Name      | - |
| Account No.    | - |
| IFSC Code      | - |
| Account Holder | - |
6. The amount will be debited in the Major Head 3435.03.104.11.04.31 Grant-in-Aid-General-NMHS.
7. **Please send your acceptance with the Terms and Conditions of this NMHS Grant sanction letter so that aforementioned grant could be transferred to the Head of Implementing Agency through Bank transfer on the designated account.**
8. Please note that following documents must be submitted before the start of the project activities.
1. **Quotations for the equipments/instruments to be procured.**
  2. **Roles and responsibilities of the partners with the budget allocated to each of them.**
  3. **Original copy of Bond duly signed by authorized person of grantee (Rs. 100 stamp paper)**

**Encl.: Annexure-I**  
**Appendix- A**  
**Appendix- B**

Yours Sincerely,



(Kireet Kumar)  
 Scientist 'G' & Nodal Officer  
 NMHS-PMU, GBPNIHESD

***Copy to:***

1. Registrar, TERI School of Advanced Studies, 10-Institutional Area, Vasant Kunj, New Delhi 110070
2. Dr. Subrata Bose, Director, Mountain Division, CS-I, 2<sup>nd</sup> Floor, Vayu Wing, Indira Paryavaran Bhavan, Ministry of Environment Forest & Climate Change, Govt. of India, Jorbagh Road, New Delhi-110003
3. PS to Director, G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand-263643
4. Finance Officer, G.B. Pant National Institute of Himalayan Environment and Sustainable Development, Kosi-Katarmal, Almora, Uttarakhand-263643
5. Principal Director of Audit, Scientific Department, AGCR Building, IP Estate, New Delhi
6. Guard File – NMHS.



Work-plan

SAC/EPISA/SUFALAM/WP-04/2019

Comparative Evaluation of Crop classification methods of Kharif Bajra,  
Maize with respect to Uttar Pradesh state

Under the project  
Space Technology Utilization for Food Security, Agricultural Assessment  
and Monitoring  
(SUFALAM)  
DOS-Funded  
(2019-2021)

Agriculture and Land Eco-system Division  
Biological & Planetary Sciences and Applications Group  
Earth, Ocean, Atmosphere, Planetary Sciences & Applications Area  
SPACE APPLICATIONS CENTRE, ISRO  
Ahmedabad 380015

In collaboration with

TERI School of Advanced Studies, New Delhi

## 7. Budget: Total - 13.2 lakhs

S.No	Item Description	BE 2019-20	BE (2020-21)	Total
1	Salary (*Research Fellow – 1)	5.0	5.0	10.0
2	Travel	0.5	0.5	1.0
3	Institutional overhead (@20%)	1.1	1.1	2.2
	<b>Total</b>	<b>6.6</b>	<b>6.6</b>	<b>13.2</b>

\*Research Fellow should work both at TERI, RRSC-N, ISRO, New Delhi and SAC, ISRO depending on the project work needs and schedule

**N.B. No publication, media release / patenting etc. from TERI School of Advanced Studies out of this collaborative project work will be made without prior approval from SAC, ISRO, Ahmedabad**

**Dr. Saroj Maity**

Sci./Eng. – SF

AED/BPSG/EPSA

(Point of contact at SAC)

**Dr. Bimal K. Bhattacharya**

Head, AED/BPSG/EPSA

**Dr. Raj Kumar**

Deputy Director, EPSA, SAC

*Neeti 26/08/2019*  
**Dr Neeti**  
 Assistant Professor, Dept of Nat. Res.  
 (Point of Contact at TERI School of  
 Advanced Studies, New Delhi)

*26/8/2019*  
**HOD, Dept. of Natural Resources**  
**TERI School of Advanced Studies**

*[Signature]*  
**Registrar,**

TERI School of Advanced Studies

*26 Aug 2019*  
**Capt. Pradeep K Padhy (Retd.)**  
 Registrar  
 TERI School of Advanced Studies  
 10, Institutional Area, Vasant Kunj  
 New Delhi-110 070

No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi – 110 003.

Dated: 20<sup>th</sup> May, 2016.

### ORDER

Sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the implementation of the Project proposal entitled "Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*" by Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 at a total cost of Rs. 88.00 lakhs (Rupees Eighty eight Lakhs only) as a part of his Ramalingaswami Fellowship 2014-15 w.e.f. 1<sup>st</sup> February, 2016 on the terms and conditions detailed as per under:-

#### 2.0 The Project

2.1 Project Title: "Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*."

#### 2.2 Investigator

Name of the Awardee : Dr. Chaithanya Madhurantakam  
Assistant Professor  
Department of Biotechnology  
TERI University, 10, Institutional Area,  
Vasant Kunj, New Delhi-110070

#### Objectives

1. Crystal structure determination of MmaA1 methyl transferase.
2. Structure based inhibitor design against MmaA1

#### 2.3 Time Schedule

The duration of the fellowship is 5 years w.e.f. 1<sup>st</sup> February, 2016.

#### 2.4 Fellowship Amount

	(Rs. in Lakhs)					
	1 <sup>st</sup> Yr.	2 <sup>nd</sup> Yr.	3 <sup>rd</sup> Yr.	4 <sup>th</sup> Yr.	5 <sup>th</sup> Yr.	Total
Fellowship@ Rs.85,000/ p.m (consolidated)	10.20	10.20	10.20	10.20	10.20	51.00
Research/Contingency grant	10.00	7.50	5.00	5.00	5.00	32.50
HRA @ Rs. 7,500 p.m. consolidated	0.90	0.90	0.90	0.90	0.90	4.50
<b>Total</b>	<b>21.10</b>	<b>18.60</b>	<b>16.10</b>	<b>16.10</b>	<b>16.10</b>	<b>88.00</b>

2.5 The contingency/research grant may be utilized for the purchase of consumables, minor equipment, international and domestic travel, engaging manpower and other contingent expenditure to be incurred in connection with the implementation of the project.

- a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
- b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement



shall be limited to the IIRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.

4. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.

5. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

6. **Budget Head**

The expenditure involved is debitable to

Demand No. 79

3425

3425.60

3425.60.200

3425.60.200.29

3425.60.200.29.17

3525.60.200.29.17.31

**Department of Biotechnology**

Other Scientific Research (2016-2017)

Other (Sub Major Head)

Assistance to other Scientific Bodies (Minor Head)

Biotechnology Research and Development

Assistance for Research and Development

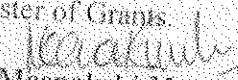
Grants-in-aid General

7. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.

8. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070 is requested to furnish to this Department 'Utilization Certificate' and an audited 'Statement of Expenditure' at the end of the year.

9. This issues under the powers delegated to this Department and with the concurrence of IFD vide their SAN No. 102/IFD/SAN/738/2016-17 dated:20-5-2016.

10. This sanction order has been noted at Serial No. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'



No. BT/RLF/Re-entry/47/2014  
Government of India  
Ministry of Science & Technology  
Department of Biotechnology

Block No. 2, 6-8<sup>th</sup> Floors  
CGO Complex, Lodi Road,  
New Delhi - 110 003.

Dated: 20<sup>th</sup> May 2016.

**ORDER**

In continuation of this Department's sanction order of even number dated: 20<sup>th</sup> May, 2016 sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Power Rules, 1978, for the release of an amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** to The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 being the first installment of Ramalingaswami Re-entry Fellowship (2014-15) awarded to Dr. Chaithanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070 for the implementation of the project proposal entitled "**Structural studies on proteins involved in synthesis and processing of mycolic acids in *Mycobacterium tuberculosis*.**" as per the details given below:-

**Fellowship Amount**

(Rs. in Lakhs)

S.No.	Head	Released Amount*
1.	Fellowship	10.20 @ Rs.85,000/ p.m (consolidated)
2.	Contingency/Research Grant	10.00
3.	HRA	0.90 Rs. 7,500/- p.m consolidated
	<b>Total</b>	<b>21.10</b>

\* **The release is made under recurring heads**

2. The other terms and conditions of the grant shall remain unaltered.
3. The Accounts of the grantee institution shall be open to inspection by the sanctioning authority/ audit.
4. It is certified that this being the first release no UC/SE pertaining to grants released under this programme is pending with the institute.
5.
  - a) If the host institute is providing free accommodation, no House Rent Allowance (HRA) is admissible and same needs to be refunded to the department.
  - b) If the host institute is deducting HRA and license fee for the accommodation provided, then the same may be recovered from the HRA being paid to the fellow. However, reimbursement shall be limited to the HRA being paid by DBT. Excess recovery, if any, has to be made by the host institute directly from the fellow.
6. As regards the medical benefits, host institute may consider giving medical benefits from their own resources at level of Scientist 'D' as applicable to their regular faculty.
7. The amount of **Rs. 21.10 lakhs (Rupees Twenty One Lakhs Ten Thousand only)** will be drawn by Drawing and Disbursing Officer, DBT from the Pay and Accounts Officer, DBT and disbursed to **The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070** and disbursed through RTGS as per following details.

**BANK ACCOUNT DETAILS**

(i) Bank Name	:	STATE BANK OF Hyderabad
(ii) Bank Account No.	:	52142908571
(iii) IFSC Code	:	SBHY0020511
(iv) 9 digit MICR Code	:	110004005

8. As per Rule 211 (1) of GFR, the Accounts of all grantee institution shall be open to inspection by the sanctioning authority/ audit, whenever the institution is called upon to do so.

9. In case the whole or a part of the amount of the grant-in-aid is being refunded, an interest at the rate of ten per cent per annum thereon shall be recovered.

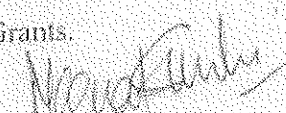
**10. Budget Head**

The expenditure involved is debitable to

Demand No.79	:	<b>Department of Biotechnology</b>
3425	:	Other Scientific Research (2016-2017)
3425.60	:	Other (Sub Major Head)
3425.60.200	:	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	:	Biotechnology Research and Development
3425.60.200.29.17	:	Assistance for Research and Development
3425.60.200.29.17.31	:	Grants-in-aid General

11. This issue under the powers delegated to this Department and with the concurrence of IFD vides their SAN No. 102/IFD/SAN/739/2016-17 dated:20-5-2016.

12. This sanction has been noted at serial no. 30 in the Register of Grants.


  
(Meenakshi Munshi)  
Director/Scientist 'F'

To,

The Pay & Accounts Officer  
Department of Biotechnology  
New Delhi -110003

**Copy forwarded for information/ necessary action to:**

1. The Principal Director of Audit (Scientific Departments), AGCR Building, IP Estate, New Delhi - 110 002.
2. Cash Section, DBT (2 copies)
3. IFD, DBT
4. Dr. Chaitanya Madhurantakam, Assistant Professor, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi-110070.
5. The Registrar, TERI University, 10, Institutional Area, Vasant Kunj, Nw Delhi-110070.
6. Sanction Folder

  
(Meenakshi Munshi)  
Director/Scientist 'F'



FILE NO. EMR/2016/007813

**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**

(a statutory body of the Department of Science & Technology, government of India)  
5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 28-Jun-2018

**ORDER**

Subject: Financial Sanction of the research project titled "**Understanding the role of MIR160 and AUXIN RESPONSE FACTORS in establishment of root system architecture for improvement of crop Brassicas**" under the guidance of Dr. Anandita Singh, Biotechnology, TERI School of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi, DELHI-110003 and by Dr. Chaithanya Madhurantakam, Associate Professor, Department Of Biotechnology, TERI School Of Advanced Studies - Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned project at a total cost of **Rs. 3648480/- (Rs. Thirty Six Lakh Forty Eight Thousand Four Hundred and Eighty Only)** with break-up of **Rs. 0/- under Capital (Non-recurring) head** and **Rs. 3648480/- under General (Recurring) head** for a duration of 36 months. The items of expenditure for which the total allocation of **Rs. 3648480/-** has been approved are given below:  
The following budget may be considered for **TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi**

S. No	Head	Total (in Rs.)
<b>A</b>	<b>Non-recurring</b>	
1	Equipment	0
A'	Total (Non-Recurring)	0
<b>B</b>	<b>Recurring Items</b>	
1	Recurring - I : (Manpower)	1216800
	Recurring - II : ( Consumables, Travel, Contingencies)	2100000
2	Recurring - III : (Overhead Charges)	331680
B'	Total (Recurring)	3648480
<b>C</b>	<b>Total cost of the project (A' + B')</b>	<b>3648480</b>

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 1216160/-** (Rupees Twelve Lakh Sixteen Thousand One Hundred and Sixty only) under 'Grants-in-aid General' to **Registrar, TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi** being the first installment of the grant for the year 2018-2019 for implementation of the said research project.

3. The expenditure involved is debitable to **Fund for Science & Engineering Research (FSER)**  
**This release is being made under Core Research Grant. (PAC Plant Sciences)**

4. The Sanction has been issued to **TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi** with the approval of the competent authority



under delegated powers on **07 June, 2018** and vide Diary No. **SERB/F/2604/2018-2019**  
**3.2.1.G.61** dated **25 June, 2018**

5. Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).
6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.
7. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.
8. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.
9. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.
10. The release amount of **Rs. 1216160/-** (Rupees Twelve Lakh Sixteen Thousand One Hundred and Sixty only) will be drawn by the Under Secretary of the SERB and will be disbursed by means of RTGS transaction as per their Bank details given below:

<b>Account Name</b>	<b>TERI School of Advanced Studies</b>
<b>Account Number</b>	<b>52142908571</b>
<b>Bank Name &amp; Branch</b>	<b>State Bank of India Pragati Vihar, Scope Complex, Lodhi Road, New Delhi 110003, INDIA</b>
<b>IFSC/RTGS Code</b>	<b>SBIN0020511</b>
<b>Email id of A/C Holder</b>	<b>registrar@terisas.ac.in</b>
<b>Email id of PI</b>	<b>asingh@teri.res.in</b>

11. The institute will furnish to the SERB, New Delhi, separate Utilization certificate(UCs) financial year wise to the SERB for Recurring (Grants-in-aid General) & Non-Recurring (Grants for creation of capital assets) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.
12. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.
13. The project File no. EMR/2016/007813 may also be mentioned in all research communications arising from the above project with due acknowledgement of SERB.
14. The manpower sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship and salary of supporting staff if any. beyond the duration of the project
15. As this is the first grant being released for the project, no previous U/C is required.



**3.2.1.G16.** The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "FUND FOR SCIENCE AND ENGINEERING RESEARCH" payable at New Delhi.

17. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

18. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

921541

(Dr. Shilpi Paul)

Scientist E

ms\_ps@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<b>Dr. Anandita Singh</b> <b>Biotechnology</b> <b>TERI School of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi, DELHI-110003</b> <b>Email: asingh@teri.res.in</b> <b>Mobile: 99119891510730</b>  <b>Dr. Chaithanya Madhurantakam</b> <b>Department Of Biotechnology</b> <b>TERI School Of Advanced Studies</b> (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a> .)
5.	<b>Registrar,</b> <b>TERI School Of Advanced Studies, 10, Vasant Kunj, Institutional Area, New Delhi</b>  (Receipt of Grant may be intimated by name to the undersigned)

921541

(Dr. Shilpi Paul)

Scientist E

ms\_ps@serbonline.in

No. BT/PR17441/BPA/118/191/2016  
GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY

Block 2, 6-8th Floors  
CGO Complex, Lodhi Road,  
New Delhi- 110 003  
Dated: 27/01/2018

**ORDER**

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled: "**Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection**" for a period of 3 Year 0 Month at a total cost of Rs. **6757400** (Rupees Sixty Seven Lakhs Fifty Seven Thousand Four Hundred Only) on the terms and conditions detailed here under:-

**2 The Project :**

**2.1 Title :** "Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection"

**2.2 Details of the Investigators:**

**Dr. Shashi Bhushan Tripathi**  
Associate Professor  
Department of Biotechnology  
TERI School of Advanced Studies  
10 Institutional Area, Vasant Kunj,  
New Delhi, Delhi, 110070

**CO-PI:**

**Dr. Madan Singh Negi**  
Fellow  
Biotechnology and Management of Bioresources  
The Energy And Resources Institute, New Delhi  
IHC Complex, Lodhi Road, New Delhi - 110003, Delhi

**2.3 Objectives:**

1. To evaluate different Bhut Jolokia accessions for their restoration ability
2. To transfer male sterile (S) cytoplasm from CMS line, CCA-4261, to Bhut Jolokia to develop a CMS line with genotype S/rfrf
3. To Transfer of rf allele from CCA-4261 to Bhut Jolokia to develop the maintainer line with genotype s/rfrf
4. To transfer the Rf allele from Pusa Jwala to Bhut Jolokia to develop a restorer line with genotype s/RfRf



**2.4 Time Schedule:**

The duration of the project is 3 Year 0 Month from the date of this sanction order.

**2.5 Project Cost:**

The total cost of the project is Rs. **6757400/-** (Rupees Sixty Seven Lakhs Fifty Seven Thousand Four Hundred Only) as per details given below :

Budget Head	Year I	Year II	Year III	Total (Rs.)
Equipment	467000.00			<b>467000.00</b>
Manpower	916800.00	916800.00	916800.00	<b>2750400.00</b>
Travel	30000.00	30000.00	30000.00	<b>90000.00</b>
Consumables	1000000.00	1000000.00	1000000.00	<b>3000000.00</b>
Contingency	50000.00	50000.00	50000.00	<b>150000.00</b>
Overhead	100000.00	100000.00	100000.00	<b>300000.00</b>
<b>Total (Rs.)</b>	<b>2563800.00</b>	<b>2096800.00</b>	<b>2096800.00</b>	<b>6757400.00</b>

**2.6 Equipment:**

The details of the equipment sanctioned for the implementation of the project at **Annexure-I**

**2.7 Manpower:**

The details of the manpower sanctioned for the implementation of the project at **Annexure-II**

**3. Head of Account:**

The **Non-Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
<b>3425</b>	Other Scientific Research 2017-2018
<b>3425.60</b>	Others (Sub Major Head)
<b>3425.60.200</b>	Assistance to other Scientific Bodies (Minor Head)
<b>3425.60.200.29</b>	Biotechnology Research and Development, Human Resource Development, Research Resources and Facilities
<b>3425.60.200.29.17</b>	Assistance for Research and Development
<b>3425.60.200.29.17.35</b>	Grants for creation of capital assets



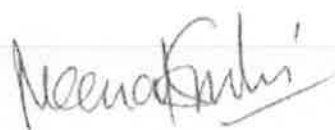
The **Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2017-2018
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development, Human Resource Development, Research Resources and Facilities
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.31	Grants-in-aid General

#### 4. Terms & Conditions:


Considering the time bound nature of the project, the project will be monitored by the Task Force /Committee constituted by DBT. IN addition, the PI will submit half yearly progress report as per format in Annexure-V

- 4.1 The other terms and conditions governing this sanction are attached at Annexure- III.
- 4.2A Memorandum of Agreement (MoA) will be signed between the Department of Biotechnology and the grantee institution on Non-Judicial stamp paper Rs. 100/- in the enclosed format and the second release/installment will be made only after signing of MoA by the grantee institutions and its acceptance by DBT. In case of NGO or Private Institution, MOA signed is mandatory first release. A format of the MoA is enclosed in Annexure-IV
- 4.3The Institute/Agency will keep the whole of the grant in a Bank Account earning interest, and the interest so earned should be reported to DBT in the Utilisation Certificate and Statement of Expenditure. The Interest so earned will be treated as created to the institute/Agency and shall be adjusted towards further installment of the grant and or at the time of Final Settlement of Accounts.
- 5.No International Travel will be undertaken from the sanctioned project grant unless specified otherwise.
- 6.The Registrar, TERI School of Advanced Studies, New Delhi, Delhi would be responsible for submission of Statements of Expenditure (SoE), utilization certificates (UC), Assets Certificates, Manpower staffing & expenditure details in prescribed DBT formats to DBT in respect of grants released in this project from time to time.
- 7.PI's of DBT sponsored projects can consider appointment of JRF from Category-II merit list of DBT-BET exam so that candidates can be paid fellowships at par with NET/GATE/BET qualified candidates as per DST OM No. A.SR/S9/Z-09/2012 dated on 21 Oct 2014. However, there is no compulsion on PI's to select candidates for JRF in their projects from Category-II of DBT-BET.
- 8.As per Rule 236 (1) of GFR 2017, the accounts of all Grantee Institutions or Organisations shall be open to inspection by the sanctioning authority and audit, both by the Comptroller and Auditor General of India under the provision of CAG(DPC) Act 1971 and internal audit by the Principal Accounts Office of the Ministry or Department, whenever the Institution or Organisation is called upon to do so.





- 9.If the Research Project involves biological resource, the obligations under the Biological Diversity Act 2002 as applicable shall be complied with by the Project Investigator, the details of such obligations can be accessed at [www.nbaindia.org](http://www.nbaindia.org)
- 10.This issues under the power delegated to this Department and with the concurrence of IFD vide their SAN No.**102/IFD/SAN/4045/2017-2018** dated **January, 24 2018**.
- 11.This sanction order has been noted at serial no. 126 in the Register of Grants.

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

To,  
The Pay & Accounts Officer,  
Department of Biotechnology,  
New Delhi - 110 003.

**Copy to:**

- 1 The Principal Director of Audit (Scientific Departments), DACR Building, New Delhi- 110 002.
- 2 The Registrar, TERI School of Advanced Studies, Plot No-10, Institutional Area, Vasant Kunj, New Delhi - 110070, Delhi
- 3 Dr. Madan Singh Negi, Fellow, Biotechnology and Management of Bioresources, The Energy And Resources Institute, New Delhi, IHC Complex, Lodhi Road, New Delhi - 110003, Delhi
- 4 Dr. Shashi Bhushan Tripathi, Associate Professor, Department of Biotechnology, TERI School of Advanced Studies, 10 Institutional Area, Vasant Kunj, New Delhi - 110070, Delhi
- 5 Cash Section, DBT (2 copies).
- 6 Sanction Folder.
- 7 File Copy.

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

Details of the Equipment sanctioned for the Implementation of the project titled "Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection":

The Energy And Resources Institute, New Delhi			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	Thermal Cycler with accessories	1	467000.00
Total			467000.00

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

## Annexure -II

Details of the manpower sanctioned for the implementation of the project titled "**Development of a CMS/Rf system in Bhut Jolokia using marker assisted selection**":

Head	No. of Position	Year I	Year II	Year III	Total (Rs.)
Senior Research Fellow @ Rs.28000 + 30% HRA	1	436800.00	436800.00	436800.00	1310400.00
Technical Assistant @ Rs. 20000 p.m.	2	480000.00	480000.00	480000.00	1440000.00
<b>Total(Rs.)</b>		<b>916800.00</b>	<b>916800.00</b>	<b>916800.00</b>	<b>2750400.00</b>

Emoluments detail of research personal(s) mentioned in table(s) of Annexure-II shall be applicable only if candidate(s) met educational qualification and eligibility criteria as per DST OM No.SR/S9/Z-09/2012 dated 21.10 2014.

  
(Dr. Meenakshi Munshi)  
Scientist 'G'

Administrative Sanction

File No. DBT-NER/AGRI/33/2016  
GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY  
(NER - BPMC)

\*\*\*\*\*

Block-2, 7<sup>th</sup> Floor,  
CGO Complex, Lodhi Road  
New Delhi-110003

Dated: 22/3 /2018

ORDER

Sanction of the President is hereby accorded under Rule 18 of the Delegation of Financial Powers Rules, 1978 for the implementation of a network project under 'DBT's NER-Banana Program for the NE' by Dr. S. Uma, National Research Centre for Banana, Tiruchirappalli; Dr. Ashok Bhattacharyya, Assam Agricultural University, Jorhat, Assam; Dr. Rakhi Chaturvedi, Indian Institute of Technology, Guwahati, Assam; Dr. K. Soorianathasundram, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu; Dr. C. K. Narayan, Indian Institute of Horticultural Research, Bengaluru and Dr. Rajappa Joga, ICAR Research Complex for NEH Region Umiam, Meghalaya at a total cost of ₹ 3039.40 Lakhs (Rupees Thirty Crore Thirty Nine Lakhs and Forty Thousand only) for a period of three years on the terms and conditions detailed as under:

**2.0 The Project:**

Group	Title	Co-ordinator Name	Associate Co-ordinator Name
Group - 1	Banana Biodiversity	Dr. S. Uma National Research Centre for Banana, Tiruchirappalli	Dr Robert Singh Thangjam Mizoram University, Aizawl, Mizoram
Group - 2	Pathogen Detection and Control	Dr. Ashok Bhattacharyya Assam Agricultural University, Jorhat, Assam	Dr. R. Thangavelu National Research Centre for Banana, Tiruchirappalli, Tamil Nadu
Group - 3	Tissue Culture	Dr. Rakhi Chaturvedi Indian Institute of Technology, Guwahati, Assam	Dr. M. S. Saraswathi National Research Centre for Banana, Tiruchirappalli, Tamil Nadu



Group – 4	Value Addition	<b>Dr. K. Soorianathasundram</b> Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu	<b>Dr. Rajlakshmi Devi</b> Institute of Advanced Study in Science and Technology (IASST), Guwahati, Assam
Group – 5	Post Harvest Loss	<b>Dr. C. K. Narayan</b> Indian Institute of Horticultural Research, Bengaluru	
Group – 6	Down Streaming & Processing	<b>Dr. Rajappa Joga</b> ICAR Research Complex for NEH Region Umiam, Meghalaya	<b>Dr Akshaya Padmakar Gupte</b> N.V. Patel College of Pure and Applied Sciences, Gujarat

## 2.1 Project Title:

Project Title	
Group 1: Banana Biodiversity	
Sub-Title	<b>App. No. 2:</b> Genome Characterization of Banana/Plantain Genetic Resources of North-eastern Region and their Utilization in Multicenter Planning for Commercial Improvement
	<b>App. No. 3:</b> Exploration of Banana Biodiversity and its Biotechnological Research in Nagaland
	<b>App. No. 7:</b> Diversity Assessment, Germplasm Conservation and Database Development on Bananas resources of North Eastern India
	<b>App. No. 40:</b> Whole genome and transcriptome study of stress-tolerant banana cultivars
	<b>App. No. 75:</b> Collection, evaluation, documentation and conservation of banana genetic resources from north eastern region
	<b>App. No. 90:</b> Consortium for managing Indian banana genetic resources
Group 2: Pathogen Detection and Control	
Sub-Title	<b>App. No. 6:</b> Exploring diversity, genomic and transcriptome profiling and phytosemiochemicals of banana pest complex in NER region- An ecological and molecular approach
	<b>App. No. 9:</b> Screening of Banana germplasm from the NE for Fusarium wilt resistance and molecular characterization in contrasting genotypes
	<b>App. No. 11:</b> Harnessing the potential of endophytes against root knot nematode, <i>Meloidogyne incognita</i> in banana

W/

### 3.2.1.G.63.

- NERIST, Arunachal Pradesh (PI: Dr. Ramalingam J)**  
 Sub Project Title: Collection, evaluation, documentation and conservation of banana genetic resources from north eastern region (App. No. 75)  
 1. Survey and collection of accessions from NER and sucker multiplication.  
 2. Tissue culture multiplication of selected accessions.  
 3. Development of a digital database.  
 4. Training workshop and Co-ordination meetings.
- Nagaland University, Lumami, Nagaland (PI: Dr. Maibam Romeo Singh)**  
 1. Survey and collection of accessions from NER and sucker multiplication.  
 2. In vitro cryo-conservation of selected accessions.
- NBPGR, New Delhi (PI: Dr. Anuradha Agrawal)**  
 1. In vitro cryo-conservation of selected accessions.
- ICAR Banana, Tiruchirapalli (PI: Dr M S Saraswathi)**  
 1. In vitro cryo-conservation of selected accessions.
- ICAR Banana, Guwahati (PI: Dr. Bhaben Tanti)**  
 1. In vitro cryo-conservation of selected accessions.
- ICAR Banana, Thangjam Robert Singh)**  
 1. In vitro cryo-conservation of selected accessions.
- ICAR Banana, ploid level and cytogenetical studies of**

### TERI, New Delhi (PI: Dr Shashi Bhushan Tripathi)

1. Genotyping-by-sequencing (GBS) of all accessions.
2. Analysis of genetic diversity.
3. Capacity building programmes for NER researchers on high throughput molecular markers.

### 2.3.1.6 Sub Project Title: Consortium for managing Indian banana genetic resources (App. No. 90)

#### NRC Banana, Tiruchirapalli (PI: Dr. Uma S)

1. Gap identification of Indian Musa Germplasm and target collection at national and International level
2. Evolutionary studies on banana for its improvement
3. Identification and utilization of parthenocarpic genes in banana
4. Prototype development for QPM production of NE variety
5. Development of Indian banana genetic resource database

#### P.S.G. College of Technology, Coimbatore (PI: Dr. Selvi Subramanian)

1. Comparative genomic analyses on banana genomes vs available transcriptome data on seedlessness to identify genetic factors regulating parthenocarpic banana fruit development
2. Identification of genetic factors regulating parthenocarpy in banana

#### NEIST, Arunachal Pradesh (PI: Dr. S. Sureshkumar Singh)

1. To perform field survey for documentation and taxonomic diversity and distribution, traditional knowledge & economic importance of wild and cultivated banana varieties of Arunachal Pradesh.
2. Ecological studies of soil microflora associated with wild species.

#### Utkal University, Odisha (PI: Dr. Anath Bandhu Das)

1. Understanding the origin of Indian bananas through FISH/GISH techniques.

#### Tripura University, Tripura (PI: Dr. Sukhen Das)

1. Collection, field conservation and characterization of identified germplasm accessions at Tripura
2. Molecular characterization of germplasm collected at Tripura
3. Multiplication and evaluation of selected germplasm accession for various agro-ecological zones of Tripura

## 2.5. 17 Gauhati University, Guwahati (PI: Dr. Bhaben Tanti)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Nanodrop	6.87
2	Deep Freezer (-86 degree)	3.91
3	Horizontal Laminar Air Flow	1.05
4	Digital Hot Air Oven	0.28
5	Water Bath (Serological)	0.26
6	Air Curtain	0.20
7	Vortex Mixture	0.18
Total		12.75

## 2.5. 18 TERI, New Delhi (PI: Dr. Shashi Bhushan Tripathi)

(₹ in lakhs)

S. No.	Item	Grant , Recommended
1	-20° C deep freezer	0.94
Total		0.94

## 2.5. 19 NRC Banana, Tiruchirapalli (PI: Dr. M. S. Saraswathi)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Laminar Air Flow	1.05
2	Air curtain 3 ft	0.20
Total		1.25

## 2.5. 20 NBPGR, New Delhi (PI: Dr. Anuradha Agrawal)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Water Purification System	8.00
Total		8.00

## 2.5. 21 NRC Banana, Tiruchirapalli (PI: Dr. Uma S)

(₹ in lakhs)

S. No.	Item	Grant Recommended
1	Flowcytometer setup with all accessories	23.00
Total		23.00

N /



**2.6.17 Gauhati University, Guwahati (PI: Dr. Bhaben Tanti)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 20 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 20 % HRA for 3 <sup>rd</sup> yr	3.60	3.60	4.03	11.23
Total			3.60	3.60	4.03	11.23

**2.6.18 TERI, New Delhi (PI: Dr. Shashi Bhushan Tripathi)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 30 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 30 % HRA for 3 <sup>rd</sup> yr	3.90	3.90	4.37	12.17
Total			3.90	3.90	4.37	12.17

**2.6.19 NRC Banana, Tiruchirapalli (PI: Dr. M. S. Saraswathi)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 20 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 20 % HRA for 3 <sup>rd</sup> yr	3.60	3.60	4.03	11.23
Total			3.60	3.60	4.03	11.23

**2.6.20 NBPGR, New Delhi (PI: Dr. Anuradha Agrawal)**

(₹ in lakhs)

S. No.	Position (No.)	Consolidated Emolument	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	Total
1	JRF/SRF (1)	JRF @ ₹ 25,000/- + 30 % HRA for the 1 <sup>st</sup> & 2 <sup>nd</sup> yr SRF @ ₹ 28,000/- + 30 % HRA for 3 <sup>rd</sup> yr	3.90	3.90	4.37	12.17
Total			3.90	3.90	4.37	12.17



2.8.16 Nagaland University, Lumami, Nagaland (PI: Dr. Maibam Romeo Singh)  
(₹ in lakhs)

S. No	Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> year	Total
	<b>Non-Recurring</b>				
1.	(Equipments & accessories)	2.70	0.00	0.00	2.70
	<b>Recurring</b>				
2.	Manpower	3.30	3.30	3.70	10.30
3.	Consumables	1.50	1.50	2.00	5.00
4.	Travel	0.50	0.50	0.50	1.50
5.	Contingency	0.50	0.50	0.50	1.50
6.	Overhead Charge	0.50	0.50	0.50	1.50
	<b>Recurring Total</b>	<b>6.30</b>	<b>6.30</b>	<b>7.20</b>	<b>19.80</b>
	<b>TOTAL (NR + R)</b>	<b>9.00</b>	<b>6.30</b>	<b>7.20</b>	<b>22.50</b>

2.8.17 Gauhati University, Guwahati (PI: Dr. Bhaben Tanti)

(₹ in lakhs)

S. No	Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> year	Total
	<b>Non-Recurring</b>				
1.	(Equipments & accessories)	12.75	0.00	0.00	12.75
	<b>Recurring</b>				
2.	Manpower	3.60	3.60	4.03	11.23
3.	Consumables	5.00	2.00	1.00	8.00
4.	Travel	0.50	0.50	0.50	1.50
5.	Contingency	0.50	0.50	0.50	1.50
6.	Overhead Charge	1.00	1.00	1.00	3.00
	<b>Recurring Total</b>	<b>10.60</b>	<b>7.60</b>	<b>7.03</b>	<b>25.23</b>
	<b>TOTAL (NR + R)</b>	<b>23.35</b>	<b>7.60</b>	<b>7.03</b>	<b>37.98</b>

2.8.18 TERI, New Delhi (PI: Dr. Shashi Bhushan Tripathi)

(₹ in lakhs)

S. No	Head	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> year	Total
	<b>Non-Recurring</b>				
1.	(Equipments & accessories)	0.94	0.00	0.00	0.94
	<b>Recurring</b>				
2.	Manpower	3.90	3.90	4.37	12.17
3.	Consumables	2.70	2.70	2.60	8.00
4.	Travel	0.50	0.50	0.50	1.50
5.	Contingency	0.50	0.50	0.50	1.50
6.	Overhead Charge	0.50	0.50	0.50	1.50
	<b>Recurring Total</b>	<b>8.10</b>	<b>8.10</b>	<b>8.47</b>	<b>24.67</b>
	<b>TOTAL (NR + R)</b>	<b>9.04</b>	<b>8.10</b>	<b>8.47</b>	<b>25.61</b>

No. BT/PR24047/BPA/118/364/2017

GOVERNMENT OF INDIA  
MINISTRY OF SCIENCE & TECHNOLOGY  
DEPARTMENT OF BIOTECHNOLOGY

Block 2, 6-8th Floors  
CGO Complex, Lodhi Road,  
New Delhi- 110 003  
Dated: 21/08/2018

**ORDER**

Sanction of the President is hereby accorded, under Rule 18 of the Delegation of Financial Powers Rules, 1978, for the implementation of the project entitled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**" for a period of 3 Year 0 Month at a total cost of Rs. **5258600** (Rupees Fifty Two Lakhs Fifty Eight Thousand Six Hundred Only) on the terms and conditions detailed here under:-

**2 The Project :**

**2.1 Title :** Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas

**2.2 Details of the Investigators:**

**Dr. Anandita Singh**

Professor  
Department of Biotechnology  
The Energy And Resources  
Institute, New Delhi  
TERI- UNIVERSITY, 10 Institutional  
Area, Vasant Kunj, New Delhi-  
110070, New Delhi, Delhi, 110070

**CO-PI:**

**Dr. Shashi Bhushan Tripathi**

Fellow  
Biotechnology and Management of Bioresources  
The Energy And Resources Institute, New Delhi  
IHC, Lodhi Road, New Delhi - 110003, Delhi

**2.3 Objectives:**

1. Analysis of natural variation in sub-genome specific SOC1 promoter homeologs (Least Fractionated, Moderately Fractionated 1 and Most Fractionated 2) from select Brassica species of India
2. Analysis of diversification of promoter activity in homeologs derived from diploid (B. rapa-AA genome; and B. nigra-BB genome) and amphidiploid (B. juncea-AABB genome) species of Brassica via comparative expression studies of associated SOC1 transcripts
3. Molecular characterization of SOC1 promoter(s) homeologs from B. juncea
4. Functional characterization of select B. juncea SOC1 promoter homeologs



**2.4 Time Schedule:**

The duration of the project is 3 Year 0 Month from the date of this sanction order.

**2.5 Project Cost:**

The total cost of the project is Rs. **5258600/-** (Rupees Fifty Two Lakhs Fifty Eight Thousand Six Hundred Only) as per details given below:

Budget Head	Year I	Year II	Year III	Total (Rs.)
Equipment	800000.00			<b>800000.00</b>
Manpower	780000.00	780000.00	873600.00	<b>2433600.00</b>
Contingency	50000.00	50000.00	50000.00	<b>150000.00</b>
Consumables	600000.00	600000.00	600000.00	<b>1800000.00</b>
Travel	25000.00	25000.00	25000.00	<b>75000.00</b>
<b>Total (Rs.)</b>	<b>2255000.00</b>	<b>1455000.00</b>	<b>1548600.00</b>	<b>5258600.00</b>

**2.6 Equipment**

The details of the equipment sanctioned for the implementation of the project at  
**Annexure-I**

**2.7 Manpower:**

The details of the manpower sanctioned for the implementation of the project at  
**Annexure-II**

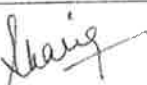
**3. Head of Account:**

The **Non-Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2018-2019
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.35	Grants for creation of capital assets

The **Recurring** expenditure involved is debitable to:

Demand No. 85	Department of Biotechnology
3425	Other Scientific Research 2018-2019
3425.60	Others (Sub Major Head)
3425.60.200	Assistance to other Scientific Bodies (Minor Head)
3425.60.200.29	Biotechnology Research and Development
3425.60.200.29.17	Assistance for Research and Development
3425.60.200.29.17.31	Grants-in-Aid General



**4. Terms & Conditions:**

No utilization Certificate is pending with the implementing Institute. All the Utilization certificate due for rendition have been received and accepted by the head of the Division/Competent Authority.

In case the whole or a part of the amount of the grant in aid is being refunded, an interest at the rate of ten percent per annum thereon shall be recovered.

The Non-recurring amount should be utilized within 18 months from the date of Sanction order.

**If project involves transgenic work, therefore IBSC clearance is required before initiating the study. A copy of the same should be forwarded to the department. Investigators should follow biocontainment guidelines 2017-2018 available at <http://www.dbtindia.nic.in/wp-content/uploads/Regulations-Guidelines-for-Recombinant-DNA-Research-and-Biocontainment-2017.pdf>**

- 4.1 The other terms and conditions governing this sanction are attached at Annexure- III.
- 4.2 A Memorandum of Agreement (MoA) will be signed between the Department of Biotechnology and the grantee institution on Non-Judicial stamp paper Rs. 100/- in the enclosed format and the second release/installment will be made only after signing of MoA by the grantee institutions and its acceptance by DBT. In case of NGO or Private Institution, MOA signed is mandatory first release. A format of the MoA is enclosed in Annexure-IV
- 4.3 The Institute/Agency will keep the whole of the grant in a Bank Account earning interest, and the interest so earned should be reported to DBT in the Utilisation Certificate and Statement of Expenditure. The Interest so earned will be treated as created to the institute/Agency and shall be adjusted towards further installment of the grant and or at the time of Final Settlement of Accounts.
5. No International Travel will be undertaken from the sanctioned project grant unless specified otherwise.
6. The Registrar, The Energy And Resources Institute, New Delhi, New Delhi, Delhi would be responsible for submission of Statements of Expenditure (SoE), utilization certificates (UC), Assets Certificates, Manpower staffing & expenditure details in prescribed DBT formats to DBT in respect of grants released in this project from time to time.
7. PI's of DBT sponsored projects can consider appointment of JRF from Category-II merit list of DBT-BET exam so that candidates can be paid fellowships at par with NET/GATE/BET qualified candidates as per DST OM No. A.SR/S9/Z-09/2012 dated 21 Oct 2014. However, there is no compulsion on PI's to select candidates for JRF in their projects from Category-II of DBT-BET.
8. As per Rule 236 (1) of GFR 2017, the accounts of all Grantee Institutions or Organisations shall be open to inspection by the sanctioning authority and audit, both by the Comptroller and Auditor General of India under the provision of CAG(DPC) Act 1971 and internal audit by the Principal Accounts Office of the Ministry or Department, whenever the Institution or Organisation is called upon to do so.
9. If the Research Project involves biological resource, the obligations under the Biological Diversity Act 2002 as applicable shall be complied with by the Project Investigator, the details of such obligations can be accessed at [www.nbaindia.org](http://www.nbaindia.org)
10. This issues under the power delegated to this Department and with the concurrence of IFD vide their **SAN No 102/IFD/SAN/1660/2018-2019 dated 20/08/2018.**
11. This sanction order has been noted at serial no. 76 in the Register of Grants.

  
**Dr. Sanjay Kalia**  
 (Scientist 'E')




To,

The Pay & Accounts Officer,  
Department of Biotechnology,  
New Delhi - 110 003.

**Copy to:**


- 1 The Principal Director of Audit (Scientific Departments), DACR Building, New Delhi- 110 002.
- 2 The Registrar, The Energy And Resources Institute, New Delhi, Darbari Seth Block, IHC Complex, Lodhi Road, New Delhi - 110003, Delhi
- 3 Dr. Anandita Singh, Professor, Department of Biotechnology, The Energy And Resources Institute, New Delhi, TERI- UNIVERSITY, 10 Institutional Area, Vasant Kunj, New Delhi- 110070, New Delhi - 110070, Delhi
- 4 Dr. Shashi Bhushan Tripathi, Fellow, Biotechnology and Management of Bioresources, The Energy And Resources Institute, IHC, Lodhi Road, New Delhi - 110003, Delhi
- 5 Cash Section, DBT (2 copies).
- 6 Sanction Folder.
- 7 File Copy.

  
**Dr. Sanjay Kalia**  
(Scientist 'E')

## Annexure -I

Details of the Equipment sanctioned for the implementation of the project titled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**":

The Energy And Resources Institute, New Delhi			
SNo.	Name of Equipment	No.	Cost(Rs.)
1.	Referigerated water bath	1	200000.00
2.	PCR	1	600000.00
Total			800000.00


  
Dr. Sanjay Kalia  
(Scientist 'E')

## Annexure -II

Details of the manpower sanctioned for the implementation of the project titled "**Isolation and comparative analysis of promoter homeologs of flowering time gene SOC1: Discovering novel promoters involved in floral transition in Indian Brassicas**":

Head	No. of Position	Year I	Year II	Year III	Total (Rs.)
Junior Research Fellow The two JRFs will undertake the workplan of the four objective of isolation and characterization of cis elements of orthologs and paralogs of SOC1 from Brassica species	2	780000.00	780000.00		1560000.00
Senior Research Fellow The two SRFs will undertake the workplan of the four objective of isolation and characterization of cis elements of orthologs and paralogs of SOC1 from Brassica species	2			873600.00	873600.00
<b>Total(Rs.)</b>		<b>780000.00</b>	<b>780000.00</b>	<b>873600.00</b>	<b>2433600.00</b>

Emoluments detail of research personal(s) mentioned in table(s) of Annexure-II shall be applicable only if candidate(s) met educational qualification and eligibility criteria as per DST OM No.SR/S9/Z-09/2012 dated 21.10.2014.

  
Dr. Sanjay Kalia  
(Scientist 'E')

FILE NO. EMR/2016/005382  
**SCIENCE & ENGINEERING RESEARCH BOARD(SERB)**  
(a statutory body of the Department of Science & Technology, government of India)

5 & 5A, Lower Ground Floor  
Vasant Square Mall  
Plot No. A, Community Centre  
Sector-B, Pocket-5, Vasant Kunj  
New Delhi-110070

Dated: 18-Sep-2018

**ORDER**

Subject: Financial Sanction of the research project titled "**Gene regulation by DNA methylation in Bacillus anthracis (Sterne)**" under the guidance of Dr. Ramakrishnan Sitaraman, Biotechnology, TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 - Release of 1st grant.

Sanction of **Science and Engineering Research Board (SERB)** is hereby accorded to the above mentioned project at a total cost of **Rs. 3812800/- (Rs. Thirty Eight Lakh Twelve Thousand Eight Hundred Only)** with break-up of **Rs. 500000/- under Capital (Non-recurring)** head and **Rs. 3312800/- under General (Recurring)** head for a duration of 36 months. The items of expenditure for which the total allocation of **Rs. 3812800/-** has been approved are given below:

The following budget may be considered for **TERI University, Plot No. 10, Institutional Area, Vasant Kunj**

S. No	Head	Total (in Rs.)
<b>A</b>	<b>Non-recurring</b>	
1	Equipment -> Deep freezer (-80 degrees)	500000
<b>A'</b>	<b>Total (Non-Recurring)</b>	<b>500000</b>
<b>B</b>	<b>Recurring Items</b>	
1	Recurring - I : (Manpower) Recurring - II : ( Consumables, Travel, Contingencies)	1216800 1750000
2	Recurring - III : (Overhead Charges)	346000
<b>B'</b>	<b>Total (Recurring)</b>	<b>3312800</b>
<b>C</b>	<b>Total cost of the project (A' + B')</b>	<b>3812800</b>

2. Sanction of the **SERB** is also accorded to the payment of **Rs. 500000/-** (Rupees Five Lakh only) under 'Grants for creation of capital assets' and **Rs. 990000/-** (Rupees Nine Lakh Ninety Thousand only) under 'Grants-in-aid General' to **Registrar, TERI School of Advanced Studies, TERI University, Plot No. 10, Institutional Area, Vasant Kunj** being the first installment of the grant for the year 2018-2019 for implementation of the said research project.

3. The expenditure involved is debitable to **Fund for Science & Engineering Research (FSER)**

**This release is being made under Core Research Grant. (PAC Biophysics, Biochemistry, Molecular Biology & Microbiology)**

4. The Sanction has been issued to TERI University, Plot No. 10, Institutional Area, Vasant Kunj with the approval of the competent authority under delegated powers on **14 September, 2018** and vide Diary No. **SERB/F/7046/2018-2019** dated **17 September, 2018**

Sanction of the grant is subject to the conditions as detailed in Terms & Conditions available at website ([www.serb.gov.in](http://www.serb.gov.in)).

6. Overhead expenses are meant for the host Institute towards the cost for providing infrastructural facilities and general administrative support etc. including benefits to the staff employed in the project.

7. While providing operational flexibility among various subheads under head Recurring-II, it should be ensured that not more than Rs. 1.5 lakh each should be spent for travel and contingency.

8. As per rule 211 of GFR, the accounts of project shall be open to inspection by sanctioning authority/audit whenever the institute is called upon to do so.

9. The sanctioned equipment would be procured as per GFR and its disposal of the same would be done with prior approval of SERB.

10. The release amount of **Rs. 1490000/-** (Rupees Fourteen Lakh Ninety Thousand only) will be drawn by the Under Secretary of the SERB and will be **disbursed by means of RTGS transaction as per their Bank details given below:**

Account Name	TERI School of Advanced Studies
Account Number	52142908571
Bank Name & Branch	State Bank of India Branch: (20511) Pragati Vihar, New Delhi Address: Scope Complex, Ground Floor, Core 6, Lodhi Road, New Delhi - 110003



### 3.2.1.G.65.

IFSC/RTGS Code	SBIN0020511
Email id of A/C Holder	dhanraj.singh@terisas.ac.in
Email id of PI	rkraman@terisas.ac.in

11. The institute will furnish to the SERB, New Delhi, separate Utilization certificate(UCs) financial year wise to the SERB for Recurring (Grants-in-aid General) & Non-Recurring (Grants for creation of capital assets) and an audited statement of accounts pertaining to the grant immediately after the end of each financial year.

12. The institute will maintain separate audited accounts for the project. A part or whole of the grant must be kept in an interest earning bank account which is to be reported to SERB. The interest thus earned will be treated as credit to the institute to be adjusted towards further installment of the grant.

13. The project File no. EMR/2016/005382 may also be mentioned in all research communications arising from the above project with due acknowledgement of SERB.

14. The manpower sanctioned in the project, if any is co-terminus with the duration of the project and SERB will have no liability to meet the fellowship and salary of supporting staff if any beyond the duration of the project

15. As this is the first grant being released for the project, no previous U/C is required.

16. The institute may refund any unspent balance to SERB by means of a Demand Draft favoring "FUND FOR SCIENCE AND ENGINEERING RESEARCH" payable at New Delhi.

17. The organization/institute/university should ensure that the technical support/financial assistance provided to them by the Science & Engineering Research Board, a statutory body of the Department of Science & Technology (DST), Government of India should invariably be highlighted/ acknowledged in their media releases as well as in bold letters in the opening paragraphs of their Annual Report.

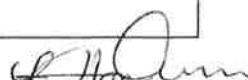
18. In addition, the investigator/host institute must also acknowledge the support provided to them in all publications, patents and any other output emanating out of the project/program funded by the Science & Engineering Research Board, a statutory body of Department of Science & Technology (DST), Government of India.

  
(Dr. Harish Kumar)  
Scientist E  
ms\_bb@serbonline.in

To,  
Under Secretary  
SERB, New Delhi

Copy forwarded for information and necessary action to: -

1.	The Principal Director of Audit, A.G.C.R. Building, IIIrd Floor I.P. Estate, Delhi-110002
2.	Sanction Folder, SERB, New Delhi.
3.	File Copy
4.	<b>Dr. Ramakrishnan Sitaraman</b> <b>Biotechnology</b> TERI University, Plot no. 10, institutional area, vasant kunj, New delhi, Delhi-110070 Email: rkraman@terisas.ac.in Mobile: 919971005164 (Start date of the project may be intimated by name to the undersigned. For guidance, terms & Conditions etc. Please visit <a href="http://www.serb.gov.in">www.serb.gov.in</a> .)
5.	<b>Registrar, TERI School of Advanced Studies,</b> <b>TERI University, Plot No. 10, Institutional Area, Vasant Kunj</b>  (Receipt of Grant may be intimated by name to the undersigned)

  
(Dr. Harish Kumar)  
Scientist E  
ms\_bb@serbonline.in

3.2.1.G.65.

**From:** Ramakrishnan Sitaraman

**Sent:** Wednesday, July 4, 2018 9:39:58 AM

**To:** Dhanraj Singh

**Subject:** FW: SERB File Number: EMR/2016/005382 Urgent message from Dr. Harish Kumar, DST

**From:** Dr. Harish Kumar <ms\_bb@serbonline.in>

**Sent:** 27 June 2018 11:40

**To:** "info@serbonline.in"@imsva02.cdacnoida.in

**Subject:** SERB File Number: EMR/2016/005382 Urgent message from Dr. Harish Kumar, DST



## Science and Engineering Research Board

(Statutory Body Established Through an Act of Parliament : SERB Act 2008)

Department of Science and Technology, Government of India

From: Dr. Harish Kumar

Dear Dr. Sitaraman,

You are requested to re-submit the RTGS details corresponding to your file no : EMR/2016/005382

The finance has returned the file seeking updated renamed institute RTGS details to enable us to process it in finance.

\*\*\*\*\* LEGAL DISCLAIMER \*\*\*\*\*

**Please do not reply to this mail !!**

[ SERB is now on Social-Media. Kindly follow us on Twitter: @serbonline <https://www.twitter.com/serbonline> ]

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\*\*\*\*\*

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3.2.1.G.65.

3.2.2.426

Dhanraj Singh

m: Chaithanya Madhurantakam  
06 March 2019 15:51  
To: Dhanraj Singh; Devvrata Guglani  
Cc: Pradeep Padhy; Leena Srivastava  
Subj: Reg: ICMR project funding  
Attachments: view\_crp\_budget\_institutewise.pdf

Dear Colleagues,

To update, the final fund sanctioned by ICMR is 38,69,650.00 INR.

I am attaching the pdf document indicating the break up of overall fund over 3 year time period.  
Starting date of the project has been decided by ICMR as 15-12-2018.

So far we have received the first instalment of 18,40,000 INR of 1<sup>st</sup> year from sanctioned 21,81,250.00 INR for the first year.  
Copying this mail to you all as you were earlier kept in loop for ICMR project.

Best regards  
Chaithanya

(38,69,650 INR)  
ICMR - project funding  
A. Chaithanya Madhurantakam  
06/03/2019  
15:51 PM



## TERI University

### ctioned Budget (in Rs.)

Year	Manpower	Equipment	Recurring	Travel	Overhead Charges	Total
Year : 1	<u>0</u>	<u>1500000.00</u>	<u>625000.00</u>	<u>25000.00</u>	<u>31250.00</u>	<b>2181250.00</b>
Year : 2	<u>217000.00</u>	<u>0</u>	<u>600000.00</u>	<u>25000.00</u>	<u>42100.00</u>	<b>884100.00</b>
Year : 3	<u>241000.00</u>	<u>0</u>	<u>500000.00</u>	<u>25000.00</u>	<u>38300.00</u>	<b>804300.00</b>
Year : 4	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<b>0.00</b>
<b>Total Budget (in Rs) :</b>						<b>38,69,650.00</b>

INDIAN COUNCIL OF MEDICAL RESEARCH  
ANSARI NAGAR NEW DELHI- 110029

No. IIC/12(18)/2018

Dated 27-12-18

Subject: Payment of 1<sup>st</sup> installment of the 1<sup>st</sup> year grant-in-aid for the project entitled "Structural characterization of a non-specific acid phosphatase HppA from Helicobacter pylori"

Memorandum

The Director General, ICMR sanctions the grant of Rs. 18,40,625/- (Rupees Eighteen lakh forty thousand six hundred twenty five only) being the 1<sup>st</sup> installment of the 1<sup>st</sup> year grant for the period from 15-12-2018 to 14-06-2019 towards expenditure in connection with the above-mentioned project

The amount of Rs. 18,40,625/- may be debited from the sanctioned budget of Rs. 21,81,250/- for the captioned project for the year 2018-19.

A formal bill for Rs. 18,40,625/- is sent herewith to release the payment by cheque/demand draft in drawn in favour of TERI University, 10, Institutional Area, Vasant Kunj, New Delhi. This issues with the concurrence of the Finance Divn., vide RFC No. ISRM/Ad-hoc/5/2018-19 dated 19.11.2018.

STAFF:

Contingencies	Rs. 12,500.00
Non-recurring (equipment) AKTA Prime plus	Rs. 15,00,000.00
Recurring	Rs. 3,00,000.00
(i) Consumables including chemicals & (ii) Crystallization screen/tools & kits	
Travel	Rs. 12,500.00
Overhead Charges @5%	Rs. 15,625.00
<b>TOTAL</b>	<b>Rs. 18,40,625.00</b>



Administrative Officer  
for Director General

Accounts V. ICMR

- Copy to:
1. Dr. Chaithanya Madhurantakam, Associate Professor & Head, Department of Biotechnology, TERI University, 10, Institutional Area, Vasant Kunj, New Delhi - 110070
  2. Vice-Chancellor, Teri University, 10, Institutional Area, Vasant Kunj, New Delhi - 110070.
  3. IRIS ID : 2017-0325

**ORDER**

**Sub:** - Financial support for the project entitled "**Scalable synthesis of starch nanoparticles based adhesive/consolidants for conservation of cellulose based heritage objects..**" by **Dr.Udit Soni, Assistant Professor, Department of Biotechnology, TERI University, New Delhi-** Release of the first installment regarding.

Sanction of the President is hereby accorded to the approval to the above mention project at a total cost of **Rs. 44,23,360/- (Rupees Forty-Four Lakh Twenty-Three Thousand Three Hundred and Sixty Only)** for the duration of **3 years**. The detailed breakup of the grant for general as well as capital components are given below: -

Capital Component: Rs. 25,00,000/-

General Component: Rs. 19,23,360/-

Sl. No.	Items	Recurring Head			
		Budget (in Rs.)			
		1st year	2nd year	3rd year	Total
1.	Manpower (JRF)	4,61,280	4,61,280	5,20,800	14,43,360
2.	Consumables	1,00,000	1,00,000	1,00,000	3,00,000
3.	Travel	20,000	30,000	30,000	80,000
4.	Other Costs	30,000	35,000	35,000	1,00,000
<b>Total</b>		<b>6,11,280</b>	<b>6,26,280</b>	<b>6,85,800</b>	<b>19,23,360</b>

2. The sanction of the President is also accorded to the release **Rs.6,11,280/- (Rupees Six Lakh Eleven Thousand Two Hundred and Eighty Only)** to the "**Vice Chancellor, TERI School of Advanced Studies, Plot No. 10, Vasant Kunj, New Delhi- 110070**" being the first installment of grant under "General Component" for the above mentioned project.

3. This sanction is subject to the condition that the grantee organization will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grant received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.

4. The grantee organization will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final installment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.

5. If the grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the release Capital head grant.

6. The grant-in-aid being released is subject to the condition that

- A transparent procurement procedure in line with Provisions of General Financial Rules 2017 will be followed by the Institute/Organization under the appropriate rules of grantee organization while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organization immediately on receipt of the grant.

*Handwritten signature*  
 07/03/19

3.2.1.G.67. b). While submitting Utilization Certificate/Statement of Expenditure, the organization has to ensure submission of supporting documentary evidences with regard of the purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.

7. As per the GFR 2017 Rule 230 (8) the Grantee Institute should ensure that all the interests or other earnings against Grant-in-Aid or advances (other than reimbursement) released to any Grantee institution should be mandatorily remitted to the Consolidated Fund of India immediately after finalization of the accounts. Such advances will not be allowed to be adjusted against future releases.

8. As per the GFR 2017 Rule 230 (17) "the Grantee Institute should agree to make reservations for Scheduled Castes and Scheduled Tribes or OBC in the posts or services under its control on the lines indicated by the Government of India"

9. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e. www.bharatkosh.gov.in), immediately after finalization of accounts, as it shall not be adjusted towards future release of Grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/ Utilization Certificate for considering subsequent release of Grant/ Closure of Project accounts.

10. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

11. The account of the grantee organization shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organization is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

12. Due acknowledgement of technical support/ financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organization in bold letters in all publication/ media release as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

13. Failure to comply with the terms and conditions of the Bond will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

14. The expenditure involved is debatable to Demand No.84, Department of Science & Technology for the year 2018-19:

3425	Other Scientific Research (Major Head)
60	Others
60.200	Assistance to Other Scientific Bodies (Minor Head)
70	Innovation, Technology Development & Deployment
70.00.31	Grants-in-aid General for the year 2018-19
	Previous: TDP-NRDMS-3425.60.200.26.01.31

15. The amount of **Rs.6,11,280/- (Rupees Six Lakh Eleven Thousand Two Hundred and Eighty Only)** will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to "**Vice Chancellor, TERI School of Advanced Studies, Plot No. 10, Vasant Kunj, New Delhi- 110070**".

The bank details for electronic transfer of funds through RTGS are given below: -

Name of A/C Name	TERI School of Advanced Studies
Bank A/C No	52142908571
Name of the Bank & branch	State Bank of India, Pragati Vihar, New Delhi
RTGS/IFSC code	SBIN0020511
MICR code	110002658

*Wishy*  
07/02/19



16. As per Rule 234 of GFR 2017, the sanction has been entered at S. No. **78** in the register of grants maintained in the Division for the scheme DDP.

17. This issues with the concurrence of IFD Vide their Concurring Dy. No **C/5698/IFD/2018-19** dated **05.03.2019**.

*Akhilesh*  
07/03/19  
(Akhilesh Mishra)  
Scientist-D  
Tel: 26590254

To

The Pay and Accounts Officer,  
Department of Science & Technology,  
New Delhi.

Copy of information and necessary action to: -

1. The Principal Director of Audit, Scientific Department, IIIrd floor, AGCR Building, I.P. Estate, New Delhi.
2. Drawing and Disbursing Officer, DST, Cash Section. (two copies)
3. **Dr.Udit Soni**,  
Assistant Professor,  
Department of Biotechnology,  
TERI University of Advanced Studies,  
Plot No. 10, Vasant Kunj,  
New Delhi- 110070
4. **Vice-Chancellor**,  
TERI University of Advanced Studies,  
Plot No. 10, Vasant Kunj,  
New Delhi- 110070
5. The Controller of Accounts, DST
6. Head(TDT),DST
7. Sanction folder (TDT).
8. File copy.

*Akhilesh*  
07/03/19  
(Dr.Akhilesh Mishra)  
Scientist-D  
Tel: 26590254

F. No. DST/TMD-EWO/WTI/2K19/EWFH/2019/328(C)

Government of India  
Ministry of Science & Technology  
Department of Science & Technology  
TMD (Energy, Water & Others)

Technology Bhavan, New Delhi  
Dated: 11.12.2020

**Sanction Order**

Subject: Financial support for Technology Development stream WTI project titled "Water Energy Food Nexus (WEFN) Through Solar-Green House Based Hydroponic Solutions with Android Mobile Application of Vegetable Market for Rural farmers and Urban Users" submitted by Dr. Rajendra Dobhal, Uttarakhand State Council for Science and Technology (UCOST), Govt. of Uttarakhand, Dehradun (Uttarakhand) and partnering organizations TERI School of Advanced Studies (TERI-SAS), New Delhi; D.A.V. (P.G.) College, Dehradun; G. B. Pant University of Agriculture & Technology (GBPUAT), Pant nagar, Dehradun.

PC/PI	<b>Dr. Rajendra Dobhal</b>	Uttarakhand State Council for Science & Technology (UCOST), Dehradun
PI	<b>Dr. Shashi Bhushan Tripathi</b>	TERI School of Advanced Studies (TERI-SAS), New Delhi
Co-PI	<b>Dr. Prashant Singh</b>	D.A.V. (P.G.) College, Dehradun
Co-PI	<b>Prof. Rajeev Kumar Srivastava</b>	G. B. Pant University of Agriculture & Technology (GBPUAT), Pant nagar, Dehradun
Co-PI	<b>Dr. Vinay S P Sinha</b>	TERI School of Advanced Studies (TERI-SAS), New Delhi
Co-PI	<b>Dr. Som Mondal</b>	TERI School of Advanced Studies (TERI-SAS), New Delhi
Co-PI	<b>Dr. Ashutosh Mishra</b>	Uttarakhand State Council for Science & Technology (UCOST), Dehradun

Sanction of the President is hereby accorded to the approval of the above mentioned project titled with a total cost of ₹ 3,02,42,080/- (Rupees Three crore two lakh forty two thousand eighty only) with the first installment of total ₹ 2,21,92,520/- (Rupees Two crore twenty one lakh ninety two thousand five hundred twenty only) to Uttarakhand State Council for Science & Technology (UCOST), Dehradun and partnering organizations as per the following breakup :

**General Component: ₹ 2,21,82,080/-**

**Capital Component: ₹ 80,60,000/-**

Abbreviations :	
UCOST	Uttarakhand State Council for Science & Technology (UCOST), Dehradun
TERISAS	TERI School of Advanced Studies (TERI-SAS), New Delhi
D.A.V. (P.G.)	D.A.V. (P.G.) College, Dehradun
GB PANT	G. B. Pant University of Agriculture & Technology (GBPUAT), Pant nagar, Dehradun

*N. K. Singh*  
SCT

### 3.2.1.G.68.

	Concluded budget	1st year	2nd Year	Total amount
A	Capital			
	UCOST	8060000	0	8060000
	TERISAS	0	0	0
	D.A.V. (P.G.)	0	0	0
	GB PANT	0	0	0
	<b>Sub total</b>	<b>8060000</b>	<b>0</b>	<b>8060000</b>
B	General			
	UCOST	5529760	3384000	8913760
	TERISAS	2101560	2964360	5065920
	D.A.V. (P.G.)	6241200	1441200	7682400
	GB PANT	260000	260000	520000
	<b>Sub total</b>	<b>14132520</b>	<b>8049560</b>	<b>22182080</b>
	<b>Grand Total A +B</b>	<b>22192520</b>	<b>8049560</b>	<b>30242080</b>

Sl.No	Budget items	1st year	2nd Year	Total
A	Capital – Permanent Equipment			
	UCOST			
	Temperature regulated (Energy Efficient) Green-Building; High end Workstation (Computer) for lab ; ESP-8266 (2 set x 15 no.s); Raspbian Jessie and Raspberry Pi3 (2 set x 1 no.s) ; pH sensor-for nutrient control; Microcontroller-for controlling lighting (2 set x 30 no.s); Electrical conductivity (2 set x 10 no.s); Lumens meter (2 set x 10 no.s) ; ARM 7 Microcontroller (2 set x 10 no.s) ; Water level sensors (2 set x 15 no.s); Photo resistor or LDR (2 set x 30 no.s); DC motors with propellers (2 set x 10 no.s) ; DC water pump (2 set x 10 no.s)	8060000	0	8060000
	TERISAS	0	0	0
	D.A.V. (P.G.)	0	0	0
	GB PANT	0	0	0
	<b>Sub total</b>	<b>8060000</b>	<b>0</b>	<b>8060000</b>
B	General – recurring head			
1	Manpower			
	UCOST			
	JRF @ 31000/- + 16%HRA	431520	431520	863040
	Technical Assistant @12000	144000	144000	288000
	Research Associate -I @ 47000/- + 16% HRA	0	654240	654240
	Research Associate -I @ 47000/- + 16% HRA (place of work - UCOST & TERI-SAS)	654240	654240	1308480
	<b>Sub total UCOST</b>	<b>1229760</b>	<b>1884000</b>	<b>3113760</b>
	TERISAS			
	SRF @ 35000/- + 16%HRA (place of work - UCOST & TERI-SAS)	487200	0	487200
	Research Associate -I @ 47000/- + 24% HRA	699360	699360	1398720

*Neelesh*  
Sr. E  
3.2.2.434



3.2.1.G.68.

	(place of work - UCOST & TERI-SAS)			
	<b>Sub total TERI SAS</b>	<b>1186560</b>	<b>699360</b>	<b>1885920</b>
	D.A.V. (P.G.)			
	SRF @ 35000/- + 16%HRA (place of work - UCOST & DAV(PG)C)	487200	487200	974400
	Technical Assistant	144000	144000	288000
	<b>Sub total D.A.V. (P.G.)</b>	<b>631200</b>	<b>631200</b>	<b>1262400</b>
	GB PANT	0	0	0
	<b>Total manpower</b>	<b>3047520</b>	<b>3214560</b>	<b>6262080</b>
2	<b>Other Cost</b>			
	UCOST	3500000	700000	4200000
	TERISAS	450000	1800000	2250000
	D.A.V. (P.G.)	5200000	300000	5500000
	GB PANT	0	0	0
	<b>Total-other cost</b>	<b>9150000</b>	<b>2800000</b>	<b>11950000</b>
3	<b>Consumables</b>			
	UCOST	300000	300000	600000
	TERISAS	0	0	0
	D.A.V. (P.G.)	150000	250000	400000
	GB PANT	135000	135000	270000
	<b>Total - consumables</b>	<b>585000</b>	<b>685000</b>	<b>1270000</b>
4	<b>Travel</b>			
	UCOST	50000	50000	100000
	TERISAS	200000	200000	400000
	D.A.V. (P.G.)	100000	100000	200000
	GB PANT	50000	50000	100000
	<b>Total - Travel</b>	<b>400000</b>	<b>400000</b>	<b>800000</b>
5	<b>Contingencies</b>			
	UCOST	50000	50000	100000
	TERISAS	50000	50000	100000
	D.A.V. (P.G.)	50000	50000	100000
	GB PANT	50000	50000	100000
	<b>Total - contingencies</b>	<b>200000</b>	<b>200000</b>	<b>400000</b>
6	<b>Overhead</b>			
	UCOST	400000	400000	800000
	TERISAS	215000	215000	430000
	D.A.V. (P.G.)	110000	110000	220000
	GB PANT	25000	25000	50000
	<b>Total - overheads</b>	<b>750000</b>	<b>750000</b>	<b>1500000</b>
	<b>Total (General) A</b>			
	UCOST	5529760	3384000	8913760
	TERISAS	2101560	2964360	5065920
	D.A.V. (P.G.)	6241200	1441200	7682400
	GB PANT	260000	260000	520000
	<b>Total (General) A</b>	<b>14132520</b>	<b>8049560</b>	<b>22182080</b>
	<b>Grand Total (A+B)</b>	<b>22192520</b>	<b>8049560</b>	<b>30242080</b>

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2. The sanction of the President is also accorded to the release of ₹ 80,60,000/- (*Rupees Eighty lakh sixty thousand only*) to Uttarakhand State Council for Science & Technology (UCOST), Dehradun and **partnering organizations** being the first instalment of grant under “Capital Component” for implementation of the above mentioned project.

3. This sanction is subject to the condition that the grantee organisation will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grants received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.

4. The grantee organisation will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final instalment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.

5. If the grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the released Capital head grant.

6. The grant-in-aid being released is subject to the condition that

a. A transparent procurement procedure in line with the Provisions of General Financial Rules 2017 will be followed by the Institute/Organisation under the appropriate rules of the grantee organisation while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organisation immediately on receipt of the grant:

b. While submitting Utilisation Certificate/Statement of Expenditure, the organisation has to ensure submission of supporting documentary evidences with regard to purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.

7. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings, against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e., [www.Bharatkosh.gov.in](http://www.Bharatkosh.gov.in)), immediately after finalization of accounts, as it shall not be adjusted towards future release of grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/Utilization Certificate for considering subsequent release of grant/closure of project accounts. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

8. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

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9. In case the scheme provides for payment of honorarium / remuneration / fellowship / scholarship to the PI, a para may suitably be incorporated in the DSO to the effect that "PI is not drawing any emoluments/ salary/fellowship from any other project either supported by DST or by any other funding agency.

10. The account of the grantee organisation shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organisation is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

11 Due acknowledgement of technical support / financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organisation in bold letters in all publications / media releases as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

12. Failure to comply with the terms and conditions of the Bond will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

13. The expenditure involved is debitable to-

Demand No 87	Department of Science and Technology for the year 2020-21
3425	Other Scientific Research (Major Head)
60	Others
60.200	Assistance to Other Scientific Bodies (Minor head)
70	Innovation, Technology Development and Deployment
70.00.35	<b>Grants for creation of Capital assets for the year 2020-21</b>
	<b>(Previous: TDP-3425.60.200.26.01.35- (SERI/WTI)</b>

14. The amount of ₹ 80,60,000/- (*Rupees Eighty lakh sixty thousand only*) will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to **Uttarakhand State Council for Science & Technology (UCOST), Dehradun**. The bank details for electronic transfer of funds through RTGS are given below:-

Name of the Account Holder	Director General, UCOST Dehradun
Name of the bank	Union Bank of India
Branch Address	Prem Nagar, Dehradun
IFSC code	UBIN0560260
Account Number	518502010003914

15. As per Rule 234 of GFR 2017, this sanction has been entered at **S. No. 272 (TMD,EWO)** in the register of grants maintained in the Division for the scheme (ITDD).

16. As per Rule 237 of GFR 2017, Time Schedule for submission of annual accounts - The dates prescribed for submission of the annual accounts for Audit leading to the issue of Audit Certificate by the Comptroller and Auditor General of India and for submission of annual report and audited accounts to the nodal Ministry for timely submission to the Parliament are listed below:-

- Approved and authenticated annual accounts to be made available by the Autonomous Body to the concerned Audit Office and commencement of audit of annual accounts-30th June
- Issue of the final SAR in English version with audit certificate to Autonomous Body/ Government concerned -31st October
- Submission of the Annual Report and Audited Accounts to the Nodal for it to be laid on the Table of the Parliament -31st December

*Neelima Agarwal*  
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17. The organization/Institute/University should ensure that the technical support/financial assistance provided to them by the Department of Science and Technology should invariably be highlighted/acknowledged in their media releases as well as in bold letters in the opening paragraph of their Annual Report.
18. It is important that the information and knowledge generated through the use of these funds are made publicly available as soon as possible. In order to achieve the aforementioned objectives, each institution is encouraged to set up its own inter-operable institutional open access repository ("IR") for its research papers and review articles published in peer reviewed journals. The Ministry of Science and Technology has set up a central harvester ([www.sciencecentral.in](http://www.sciencecentral.in)) that will harvest the full text and metadata of these publications. Kindly update the findings accordingly.
19. The organization named **Uttarakhand State Council for Science & Technology (UCOST), Dehradun** and partnering organizations agrees to make reservations for Scheduled Castes and Scheduled Tribes or OBC in the posts or services under its control on the lines indicated by the Government of India.
20. The goods (consumables/equipment) available in GeM portal are to be procured mandatorily online through GeM only.
21. This is to inform that continuation of this project beyond 31/03/2021 will be subject to appraisal and approval of the continuation of the Umbrella Scheme "Innovation, Technology Development and Deployment" under which the project is funded.
22. This issues with the concurrence of IFD Vide their **Concurrence Dy. No. 3653 dated. 10.12.2020**

*Neelima Alam*  
(Dr. Neelima Alam)

Scientist-E

Email: [neelima.alam@nic.in](mailto:neelima.alam@nic.in)

To

The Pay and Accounts Officer, DST, New Delhi.

Copy for information and necessary action to:

1. Cash Section (3 copies) for preparing the bill and remitting the amount to the above grantee.
2. Accounts Section, DST, New Delhi.
3. IFD, Department of Science & Technology, New Delhi.
4. Director of Audit (CW & M-II), AGCR Building, IP Estate, New Delhi.
5. **a. Dr. Rajendra Dobhal – PI**  
Director General, Department of Bio-technology  
Uttarakhand State Council for Science & Technology  
Vigyan Dham, Jhajra, Via Premnagar, Dehra Dun- 248 007, Uttarakhand  
Telephone & Mobile No.: +91-9458151777  
E-mail: [drdobhal@gmail.com](mailto:drdobhal@gmail.com); [dg@ucost.in](mailto:dg@ucost.in) & [ucost@ucost.in](mailto:ucost@ucost.in)

**b. Dr. Shashi Bhushan Tripathi – PI**

Associate Professor, Department of Biotechnology

TERI School of Advanced Studies

Plot No. 10, Institutional Area, Vasant Kunj, New Delhi 110 070

Telephone & Mobile No.: +91-11-71800222/(91)-9811870528; Fax +91 11 26122874

*Neelima Alam*  
Sc. E

E-mail: [shashi.tripathi@terisas.ac.in](mailto:shashi.tripathi@terisas.ac.in)

**c. Dr. Ashutosh Mishra – Co-PI**

Senior Scientific Officer (I/c)

Uttarakhand State Council for Science & Technology

Vigyan Dham, Jhajra, Via Premnagar, Dehra Dun- 248 007, Uttarakhand

Telephone & mobile No.: 0135-2102769 / +91-9997373734

E-mail: [mishraashu3@rediffmail.com](mailto:mishraashu3@rediffmail.com)

**d. Dr. Prashant Singh – Co-PI**

Associate Professor, Department of Chemistry

D.A.V. (P.G.) College, Dehradun – 248 001

Telephone & mobile No.: 0135-2743555(Off.)/ +91-9458150994; Fax: 0135-2780382

E-mail: [prashantraj86@yahoo.com](mailto:prashantraj86@yahoo.com)

**e. Dr. Vinay S P Sinha – Co-PI**

Associate Professor, Department of Natural Resources

TERI School of Advanced Studies

Plot No. 10, Institutional Area, Vasant Kunj, New Delhi 110 070

Telephone & mobile No.: +91-11-71800222/+91-9873570794; Fax +91 11 26122874

E-mail: [sinhav@terisas.ac.in](mailto:sinhav@terisas.ac.in)

**f. Dr. Som Mondal – Co-PI**

Assistant Professor, Dept. of Energy & Environment

TERI School of Advanced Studies

Plot No. 10, Institutional Area, Vasant Kunj, New Delhi 110 070

E-mail: [som.mondal@terisas.ac.in](mailto:som.mondal@terisas.ac.in)

**g. Prof. Rajeev Kumar Srivastava – Co-PI**

Professor, Dept. of Environment Science

G B Pant University of Agriculture & Technology

Pant Nagar, Udham Singh Nagar, Uttarakhand-263145

E-mail: [rajeevsrivastava08@gmail.com](mailto:rajeevsrivastava08@gmail.com)

6. Sanction folder
7. Office Copy
8. Head- TMD (E,W & Others)

  
(Dr. Neelima Alam)  
Scientist-E



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**F. No. DST/TMD-EWO/WTI/2K19/EFWFH/2019/328(G)**  
**Government of India**  
**Ministry of Science & Technology**  
**Department of Science & Technology**  
**TMD (Energy, Water & Others)**

Technology Bhavan, New Delhi  
Dated: 11.12.2020

**Sanction Order**

Subject: Financial support for Technology Development stream WTI project titled "Water Energy Food Nexus (WEFN) Through Solar-Green House Based Hydroponic Solutions with Android Mobile Application of Vegetable Market for Rural farmers and Urban Users" submitted by Dr. Rajendra Dobhal, Uttarakhand State Council for Science and Technology (UCOST), Govt. of Uttarakhand, Dehradun (Uttarakhand) and partnering organizations TERI School of Advanced Studies (TERI-SAS), New Delhi; D.A.V. (P.G.) College, Dehradun; G. B. Pant University of Agriculture & Technology (GBPUAT), Pant nagar, Dehradun.

PC/PI	<b>Dr. Rajendra Dobhal</b>	Uttarakhand State Council for Science & Technology (UCOST), Dehradun
PI	<b>Dr. Shashi Bhushan Tripathi</b>	TERI School of Advanced Studies (TERI-SAS), New Delhi
Co-PI	<b>Dr. Prashant Singh</b>	D.A.V. (P.G.) College, Dehradun
Co-PI	<b>Prof. Rajeev Kumar Srivastava</b>	G. B. Pant University of Agriculture & Technology (GBPUAT), Pant nagar, Dehradun
Co-PI	<b>Dr. Vinay S P Sinha</b>	TERI School of Advanced Studies (TERI-SAS), New Delhi
Co-PI	<b>Dr. Som Mondal</b>	TERI School of Advanced Studies (TERI-SAS), New Delhi
Co-PI	<b>Dr. Ashutosh Mishra</b>	Uttarakhand State Council for Science & Technology (UCOST), Dehradun

Sanction of the President is hereby accorded to the approval of the above mentioned project titled with a total cost of ₹ 3,02,42,080/- (Rupees Three crore two lakh forty two thousand eighty only) with the first installment of total ₹ 2,21,92,520/- (Rupees Two crore twenty one lakh ninety two thousand five hundred twenty only) to Uttarakhand State Council for Science & Technology (UCOST), Dehradun and partnering organizations as per the following breakup :

**General Component: ₹ 2,21,82,080/-**

**Capital Component: ₹ 80,60,000/-**

Abbreviations :	
UCOST	Uttarakhand State Council for Science & Technology (UCOST), Dehradun
TERISAS	TERI School of Advanced Studies (TERI-SAS), New Delhi
D.A.V. (P.G.)	D.A.V. (P.G.) College, Dehradun
GB PANT	G. B. Pant University of Agriculture & Technology (GBPUAT), Pant nagar, Dehradun

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	Concluded budget	1st year	2nd Year	Total
A	Capital			
	UCOST	8060000	0	8060000
	TERISAS	0	0	0
	D.A.V. (P.G.)	0	0	0
	GB PANT	0	0	0
	<b>Sub total</b>	<b>8060000</b>	<b>0</b>	<b>8060000</b>
B	General			
	UCOST	5529760	3384000	8913760
	TERISAS	2101560	2964360	5065920
	D.A.V. (P.G.)	6241200	1441200	7682400
	GB PANT	260000	260000	520000
	<b>Sub total</b>	<b>14132520</b>	<b>8049560</b>	<b>22182080</b>
	<b>Grand Total A +B</b>	<b>22192520</b>	<b>8049560</b>	<b>30242080</b>

Sl.No	Budget items	1st year	2nd Year	Total
A	Capital – Permanent Equipment			
	UCOST			
	Temperature regulated (Energy Efficient) Green-Building; High end Workstation (Computer) for lab ; ESP-8266 (2 set x 15 no.s); Raspbian Jessie and Raspberry Pi3 (2 set x 1 no.s); pH sensor- for nutrient control; Microcontroller- for controlling lighting (2 set x 30 no.s); Electrical conductivity (2 set x 10 no.s); Lumens meter (2 set x 10 no.s) ; ARM 7 Microcontroller (2 set x 10 no.s) ; Water level sensors (2 set x 15 no.s); Photo resistor or LDR (2 set x 30 no.s); DC motors with propellers (2 set x 10 no.s) ; DC water pump (2 set x 10 no.s)	8060000	0	8060000
	TERISAS	0	0	0
	D.A.V. (P.G.)	0	0	0
	GB PANT	0	0	0
	<b>Sub total</b>	<b>8060000</b>	<b>0</b>	<b>8060000</b>
B	General – recurring head			
1	Manpower			
	UCOST			
	JRF @ 31000/- + 16%HRA	431520	431520	863040
	Technical Assistant @12000	144000	144000	288000
	Research Associate -I @ 47000/- + 16% HRA	0	654240	654240
	Research Associate -I @ 47000/- + 16% HRA (place of work - UCOST & TERI-SAS)	654240	654240	1308480
	<b>Sub total UCOST</b>	<b>1229760</b>	<b>1884000</b>	<b>3113760</b>
	TERISAS			
	SRF @ 35000/- + 16%HRA (place of work - UCOST & TERI-SAS)	487200	0	487200
	Research Associate -I @ 47000/- + 24% HRA (place of work - UCOST & TERI-SAS)	699360	699360	1398720



	Sub total TERI SAS	1186560	699360	1885920
	D.A.V. (P.G.)			
	SRF @ 35000/- + 16%HRA (place of work - UCOST & DAV(PG)C)	487200	487200	974400
	Technical Assistant	144000	144000	288000
	Sub total D.A.V. (P.G.)	631200	631200	1262400
	GB PANT	0	0	0
	Total manpower	3047520	3214560	6262080
2	Other Cost			
	UCOST	3500000	700000	4200000
	TERISAS	450000	1800000	2250000
	D.A.V. (P.G.)	5200000	300000	5500000
	GB PANT	0	0	0
	Total-other cost	9150000	2800000	11950000
3	Consumables			
	UCOST	300000	300000	600000
	TERISAS	0	0	0
	D.A.V. (P.G.)	150000	250000	400000
	GB PANT	135000	135000	270000
	Total - consumables	585000	685000	1270000
4	Travel			
	UCOST	50000	50000	100000
	TERISAS	200000	200000	400000
	D.A.V. (P.G.)	100000	100000	200000
	GB PANT	50000	50000	100000
	Total - Travel	400000	400000	800000
5	Contingencies			
	UCOST	50000	50000	100000
	TERISAS	50000	50000	100000
	D.A.V. (P.G.)	50000	50000	100000
	GB PANT	50000	50000	100000
	Total - contingencies	200000	200000	400000
6	Overhead			
	UCOST	400000	400000	800000
	TERISAS	215000	215000	430000
	D.A.V. (P.G.)	110000	110000	220000
	GB PANT	25000	25000	50000
	Total - overheads	750000	750000	1500000
	Total (General) A			
	UCOST	5529760	3384000	8913760
	TERISAS	2101560	2964360	5065920
	D.A.V. (P.G.)	6241200	1441200	7682400
	GB PANT	260000	260000	520000
	Total (General) A	14132520	8049560	22182080
	Grand Total (A+B)	22192520	8049560	30242080

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2. The sanction of the President is also accorded to the release of ₹ 1,41,32,520/- (*Rupees One crore forty one lakh thirty two thousand five hundred twenty only*) to **Uttarakhand State Council for Science & Technology (UCOST), Dehradun and partnering organizations** being the first instalment of grant under "General Component" for implementation of the above mentioned project.
3. This sanction is subject to the condition that the grantee organisation will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grants received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.
4. The grantee organisation will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final instalment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.
5. If the grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the released Capital head grant.
6. The grant-in-aid being released is subject to the condition that
  - a. A transparent procurement procedure in line with the Provisions of General Financial Rules 2017 will be followed by the Institute/Organisation under the appropriate rules of the grantee organisation while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organisation immediately on receipt of the grant:
  - b. While submitting Utilisation Certificate/Statement of Expenditure, the organisation has to ensure submission of supporting documentary evidences with regard to purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.
7. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings, against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e., [www.Bharatkosh.gov.in](http://www.Bharatkosh.gov.in)), immediately after finalization of accounts, as it shall not be adjusted towards future release of grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/Utilization Certificate for considering subsequent release of grant/closure of project accounts. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.
8. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

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9. In case the scheme provides for payment of honorarium / remuneration / fellowship / scholarship to the PI, a para may suitably be incorporated in the DSO to the effect that "PI is not drawing any emoluments/ salary/fellowship from any other project either supported by DST or by any other funding agency.

10. The account of the grantee organisation shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organisation is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

11 Due acknowledgement of technical support / financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organisation in bold letters in all publications / media releases as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

12. Failure to comply with the terms and conditions of the Bond will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

13. The expenditure involved is debitable to-

Demand No 87	Department of Science and Technology for the year 2020-21
3425	Other Scientific Research (Major Head)
60	Others
60.200	Assistance to Other Scientific Bodies (Minor head)
70	Innovation, Technology Development and Deployment
<b>70.00.31</b>	<b>Grants-in-aid General for the year 2020-21</b>
	<b>(Previous: TDP-3425.60.200.26.01.31- (SERI/WTI)</b>

14. The amount of ₹ 1,41,32,520/- (*Rupees One crore forty one lakh thirty two thousand five hundred twenty only*) will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to **Uttarakhand State Council for Science & Technology (UCOST), Dehradun.** The bank details for electronic transfer of funds through RTGS are given below:-

Name of the Account Holder	Director General. UCOST Dehradun
Name of the bank	Union Bank of India
Branch Address	Prem Nagar, Dehradun
IFSC code	UBIN0560260
Account Number	518502010003914

15. As per Rule 234 of GFR 2017, this sanction has been entered at **S. No. 271 (TMD,EWO)** in the register of grants maintained in the Division for the scheme (ITDD).

16. As per Rule 237 of GFR 2017, Time Schedule for submission of annual accounts - The dates prescribed for submission of the annual accounts for Audit leading to the issue of Audit Certificate by the Comptroller and Auditor General of India and for submission of annual report and audited accounts to the nodal Ministry for timely submission to the Parliament are listed below:-  
 (i) Approved and authenticated annual accounts to be made available by the Autonomous Body to the concerned Audit Office and commencement of audit of annual accounts-30th June  
 (ii) Issue of the final SAR in English version with audit certificate to Autonomous Body/ Government concerned -31st October  
 (iii) Submission of the Annual Report and Audited Accounts to the Nodal for it to be laid on the Table of the Parliament -31st December

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17. The organization/Institute/University should ensure that the technical support/financial assistance provided to them by the Department of Science and Technology should invariably be highlighted/acknowledged in their media releases as well as in bold letters in the opening paragraph of their Annual Report.
18. It is important that the information and knowledge generated through the use of these funds are made publicly available as soon as possible. In order to achieve the aforementioned objectives, each institution is encouraged to set up its own inter-operable institutional open access repository ("IR") for its research papers and review articles published in peer reviewed journals. The Ministry of Science and Technology has set up a central harvester ([www.sciencecentral.in](http://www.sciencecentral.in)) that will harvest the full text and metadata of these publications. Kindly update the findings accordingly.
19. The organization named **Uttarakhand State Council for Science & Technology (UCOST), Dehradun** and partnering organizations agrees to make reservations for Scheduled Castes and Scheduled Tribes or OBC in the posts or services under its control on the lines indicated by the Government of India.
20. The goods (consumables/equipment) available in GeM portal are to be procured mandatorily online through GeM only.
21. This is to inform that continuation of this project beyond 31/03/2021 will be subject to appraisal and approval of the continuation of the Umbrella Scheme "Innovation, Technology Development and Deployment" under which the project is funded.
22. This issues with the concurrence of IFD Vide their **Concurrence Dy. No. 3652 dated. 10.12.2020**

*Neelima Alam*  
(Dr. Neelima Alam)

Scientist-E

Email: [neelima.alam@nic.in](mailto:neelima.alam@nic.in)

To

The Pay and Accounts Officer, DST, New Delhi.

Copy for information and necessary action to:

1. Cash Section (3 copies) for preparing the bill and remitting the amount to the above grantee.
2. Accounts Section, DST, New Delhi.
3. IFD, Department of Science & Technology, New Delhi.
4. Director of Audit (CW & M-II), AGCR Building, IP Estate, New Delhi.
5. **a. Dr. Rajendra Dobhal – PI**  
Director General, Department of Bio-technology  
Uttarakhand State Council for Science & Technology  
Vigyan Dham, Jhajra, Via Premnagar, Dehra Dun- 248 007, Uttarakhand  
Telephone & Mobile No.: +91-9458151777  
E-mail: [drdobhal@gmail.com](mailto:drdobhal@gmail.com); [dg@ucost.in](mailto:dg@ucost.in) & [ucost@ucost.in](mailto:ucost@ucost.in)

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Associate Professor, Department of Biotechnology

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*Neelima Alam*  
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**c. Dr. Ashutosh Mishra – Co-PI**

Senior Scientific Officer (I/c)

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E-mail: [prashantraj86@yahoo.com](mailto:prashantraj86@yahoo.com)

**e. Dr. Vinay S P Sinha – Co-PI**

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**f. Dr. Som Mondal – Co-PI**

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Plot No. 10, Institutional Area, Vasant Kunj, New Delhi 110 070

E-mail: [som.mondal@terisas.ac.in](mailto:som.mondal@terisas.ac.in)

**g. Prof. Rajeev Kumar Srivastava – Co-PI**

Professor, Dept. of Environment Science

G B Pant University of Agriculture & Technology

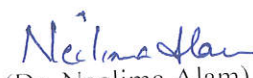
Pant Nagar, Udham Singh Nagar, Uttarakhand-263145

E-mail: [rajeevsrivastava08@gmail.com](mailto:rajeevsrivastava08@gmail.com)

6. Sanction folder

7. Office Copy

8. Head- TMD (E.W & Others)

  
(Dr. Neelima Alam)  
Scientist-E



3.2.1.G.68.

Government of India  
Ministry of Science & Technology  
Department of Science & Technology  
NGP Division (earlier NRDMS)

Technology Bhavan,  
New Mehrauli Road,  
New Delhi-110016  
Dated: 27.10.2020

**ORDER**

**Subject-Technical Coordination for the "Urban Governance "and "Geo-Spatial "components of the network project titled "Solutions for Indoor Tracking and Navigation for Urban Governance" by Dr. Abhijit Datey, Department of Energy and Environment, TERI School of Advanced Studies, Institutional Area, Vasant Kunj, New Delhi.**

Sanction of the President is hereby accorded to the approval of Rs. 5,00,000/- (Rupees Five Lakh only) for implementation of the project entitled "Solutions for Indoor Tracking and Navigation for Urban Governance" by Dr. Abhijit Datey, Department of Energy and Environment, TERI School of Advanced Studies, Institutional Area, Vasant Kunj, New Delhi over a duration of 24 months. The detailed breakup of the grant for General Components is Rs.5,00,000/- respectively.

Following is the detailed costs break up of project budget:

S.N.	Item	BUDGET		(in Rupees)
		1st Year	2nd Year	Total
1.	Organisational expenses	2,50,000/-	2,50,000/-	5,00,000/-
	<b>Total</b>	<b>2,50,000/-</b>	<b>2,50,000/-</b>	<b>5,00,000/-</b>

2.The sanction of the President is also accorded to the release of Rs.2,50,000/- (Rupees Two Lakh Fifty Thousand only) to Department of Energy and Environment, TERI School of Advanced Studies, Institutional Area, Vasant Kunj, New Delhi as the first instalment of grant under "General Head" for the above mentioned project.

3. This sanction is subject to the condition that the grantee organisation will furnish to the Department of Science & Technology, Utilization Certificate (UC) in the Performa prescribed as per GFR 2017 and audited statement of expenditure (SE) at the end of the project.

4. The grantee organization will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final instalment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.

5.The account of the grantee organization shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organization is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

6. The grant-in-aid being released is subject to the condition that

(a) A transparent procurement procedure in line with the Provisions of General Financial Rules 2017 will be followed by the Institute/Organisation under the appropriate rules of the grantee organisation while procuring capital assets sanctioned for the above

*Shubha Pandey*  
SHUBHA PANDEY  
Scientist 'D'  
विज्ञान और प्रौद्योगिकी विभाग  
DEPARTMENT OF SCIENCE & TECHNOLOGY  
New Delhi-110016

**3.2.1.G.69.**

mentioned project and a certificate to this effect will be submitted by the Grantee organisation immediately on receipt of the grant:

(b) While submitting Utilisation Certificate/Statement of Expenditure, the organisation has to ensure submission of supporting documentary evidences with regard to purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.

7. As per the GFR 2017 Rule 230 (8) the grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings, against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e., [www.Bharatkosh.gov.in](http://www.Bharatkosh.gov.in)), immediately after finalization of accounts, as it shall not be adjusted towards future release of grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/Utilization Certificate for considering subsequent release of grant/closure of project accounts. GI should also follow Rule 230(17) of GFR-2017 concerning reservation of SC/ST/OBC, if applicable.

8. As per rule of GFR 2017, it is mandatory for the grantee organization to purchase the equipment through the Government e-marketplace (gem), to the extent availability there as the project involves Government funding.

9. Grantee organization is to adhere to the instructions of the Department of Expenditure guidelines for the travel budget head.

10. Continuation of the project beyond 31/03/2021 will be subject to appraisal and approval of the continuation of the Umbrella Scheme "Innovation, technology Development and Deployment" under which the project is funded.

11. The expenditure involved is debit to Demand No.87, Department of Science & Technology for the year 2020-21:

3425	:	Other Scientific Research (Major Head)
60	:	Others
60.200	:	Assistance to Other Scientific Bodies (Minor Head)
70	:	Innovation, Technology Development & Deployment
70.00.31	:	Grant in aid for the year 2020-21 (Plan Expenditure-General)
(Previous: TDP-NRDMS-3425.60.200.26.01.31)		

12. The amount of Rs. 2,50,000/- (Rupees Two Lakh Fifty Thousand only) will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to Department of Energy and Environment, TERI School of Advanced Studies, Institutional Area, Vasant Kunj, New Delhi. The bank details for electronic transfer of funds through RTGS are given below:-

1. Name of the Account Holder: TERI School of Advanced Studies
2. Name of the Bank: State Bank of India, (20511) Pragati Vihar, Scope Complex, Ground Floor, Core 6, Lodi Road, New Delhi- 110003
3. Bank Account Number: 52142908571
4. IFSC Code: SBIN0020511
5. MICR Code: 110002658

13. As per Rule 234 of GFR 2017, this sanction has been entered at S. No. 91 in the register of grants maintained in the Division for the scheme Innovation, Technology Development and Deployment.

Dr. Shubha Pandey  
DEPT. OF SCIENCE & TECHNOLOGY  
Institutional Area, Vasant Kunj, New Delhi- 110003



3.2.1.G.69.

14. The NGO Darpan ID for the TERI School of Advanced Studies (TERI SAS) is following DL/2016/0111354.

15. This issues with the concurrence of IFD Vide their Concurrence Dy. No. 2335 IFD 2020-21 dated the 09.10.2020.

*Shubha Pandey*

(Dr. SHUBHA PANDEY)  
Scientist "D"/NGP Division

डॉ. शुभा पाण्डेय / Dr. SHUBHA PANDEY  
वैज्ञानिक 'डी' / Scientist 'D'  
विज्ञान और प्रौद्योगिकी विभाग  
DEPTT. OF SCIENCE & TECHNOLOGY  
भारत सरकार / Govt. of India

To  
PAO, DST, New Delhi

Copy for information and necessary action to:-

1. Director of Audit (CW & M-II), Indraprastha Estate, AGCR Building, New Delhi
2. Copy with a spare copy of the sanction to the Drawing and Disbursing Officer, DST, Cash Section for making necessary payment.
3. IFD Division, DST, New Delhi.
4. Accounts Section, DST, New Delhi.
5. Sanction Folder.
6. Dr. Abhijit Datey, Department of Energy and Environment, TERI School of Advanced Studies, Institutional Area, Vasant Kunj, New Delhi.
7. The Head, NGP Division, DST, New Delhi

*Shubha Pandey*

(Dr. SHUBHA PANDEY)  
Scientist "D"/NGP Division

डॉ. शुभा पाण्डेय / Dr. SHUBHA PANDEY  
वैज्ञानिक 'डी' / Scientist 'D'  
विज्ञान और प्रौद्योगिकी विभाग  
DEPTT. OF SCIENCE & TECHNOLOGY  
भारत सरकार / Govt. of India



No. DST/TMD-EWO/WTI/2K19/EFWH/2019/201(G)  
 Government of India  
 Ministry of Science & Technology  
 Department of Science & Technology  
 TMD (Energy, Water & Others)

Technology Bhavan, New Delhi  
 Dated: 28.10.2020

**Sanction Order**

**Subject: Financial support for Convergent Solution/Technology Assessment stream WTI project titled "Demonstration of sustainable mitigation of groundwater arsenic in arsenic-polluted Gangetic River aquifers of Bihar, Uttar Pradesh and West Bengal, India" submitted by Dr. Abhijit Mukherjee, IIT KHARAGPUR, West Bengal as lead PI and partnering organizations Mahavir Cancer Sansthan and Research Centre (MCSRC) Patna; A.N.College, Patna; TERI School of Advanced Studies (TERI SAS), NewDelhi.**

Lead PI	Dr. Abhijit Mukherjee	IIT Kharagpur, West Bengal
Co-PI	Dr. Ashok Ghosh	Mahavir Cancer Sansthan and Research Centr (MCSRC) Patna
Co-PI	Dr. Nupur Bose	A.N.College, Patna
Co-PI	Dr. Chander Kumar Singh	TERI School of Advanced Studies (TERI SAS) NewDelhi

Sanction of the President is hereby accorded to the approval of the above mentioned Convergent Solution/Technology Assessment stream WTI project at a total cost of ₹ 2,48,47,822/- (*Rupees Two crore forty eight lakh forty seven thousand eight hundred twenty two only*), to **IIT KHARAGPUR, West Bengal as lead organization and other partnering organizations Mahavir Cancer Sansthan and Research Centre (MCSRC) Patna; A.N.College, Patna; TERI School of Advanced Studies (TERI SAS), New Delhi** for a duration of 3 years. The detailed breakup of the grant for Capital and General Components for each organizations are givenbelow:

**General Component: ₹ 1,76,18,880/-**

**Capital Component: ₹ 72,28,942/-**

**Compiled budget**

		Amount is in INR			
S.No	Item Head	1st Year	2nd Year	3rd Year	Total (Rs.)
A	Non-recurring(Capital Items)				
1	<b>Permanent Equipment</b>				
	IIT Kharagpur	3500000	1800000	200000	5500000
	AN College, Patna	30000	0	0	30000
	MCSRC Patna	400000	0	0	400000
	TERISAS, New Delhi	12,98,942	0	0	1298942
	<b>Sub total Capital</b>	<b>5228942</b>	<b>1800000</b>	<b>200000</b>	<b>7228942</b>
B	Recurring Items (General)				

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### 3.2.1.G.70.

1	Manpower				
	IIT Kharagpur	7,51,680	7,51,680	7,51,680	2255040
	AN College, Patna	4,31,520	4,31,520	4,87,200	1350240
	MCSRC Patna	4,31,520	4,31,520	4,87,200	1350240
	TERISAS, New Delhi	4,61,280	4,61,280	5,20,800	1443360
	<b>Sub total - Manpower</b>	<b>20,76,000</b>	<b>20,76,000</b>	<b>22,46,880</b>	<b>63,98,880</b>
2	Consumables				
	IIT Kharagpur	15,00,000	9,00,000	4,50,000	28,50,000
	AN College, Patna	2,00,000	1,00,000	30,000	3,30,000
	MCSRC Patna	4,50,000	3,60,000	2,70,000	10,80,000
	TERISAS, New Delhi	3,75,000	3,50,000	0	7,25,000
	<b>Sub total - Consumables</b>	<b>25,25,000</b>	<b>17,10,000</b>	<b>7,50,000</b>	<b>49,85,000</b>
3	Contingencies				
	IIT Kharagpur	3,75,000	4,25,000	1,25,000	9,25,000
	AN College, Patna	50,000	50,000	50,000	1,50,000
	MCSRC Patna	1,00,000	50,000	50,000	2,00,000
	TERISAS, New Delhi	75,000	75,000	0	1,50,000
	<b>Sub total - Contingencies</b>	<b>6,00,000</b>	<b>6,00,000</b>	<b>2,25,000</b>	<b>14,25,000</b>
4	Travel				
	IIT Kharagpur	50,000	2,50,000	1,50,000	4,50,000
	AN College, Patna	1,25,000	1,25,000	1,25,000	3,75,000
	MCSRC Patna	1,25,000	1,25,000	1,25,000	3,75,000
	TERISAS, New Delhi	1,50,000	1,75,000	75,000	4,00,000
	<b>Sub total - Travel</b>	<b>4,50,000</b>	<b>6,75,000</b>	<b>4,75,000</b>	<b>16,00,000</b>
5	Other cost				
	IIT Kharagpur	50,000	3,00,000	50,000	4,00,000
	AN College, Patna	75,000	1,50,000	75,000	3,00,000
	MCSRC Patna	2,00,000	2,00,000	2,00,000	6,00,000
	TERISAS, New Delhi	85,000	1,25,000	2,00,000	4,10,000
	<b>Sub total - Other cost</b>	<b>4,10,000</b>	<b>7,75,000</b>	<b>5,25,000</b>	<b>17,10,000</b>
	<b>Sub total General -IIT Kharagpur</b>	<b>27,26,680</b>	<b>26,26,680</b>	<b>15,26,680</b>	<b>68,80,040</b>
	<b>Sub total General - AN College, Patna</b>	<b>8,81,520</b>	<b>8,56,520</b>	<b>7,67,200</b>	<b>25,05,240</b>
	<b>Sub total General - MCSRC Patna</b>	<b>13,06,520</b>	<b>11,66,520</b>	<b>11,32,200</b>	<b>36,05,240</b>
	<b>Sub total General - TERISAS, New Delhi</b>	<b>11,46,280</b>	<b>11,86,280</b>	<b>7,95,800</b>	<b>31,28,360</b>
	<b>Total cost (A+B) - IIT Kharagpur</b>	<b>62,26,680</b>	<b>44,26,680</b>	<b>17,26,680</b>	<b>123,80,040</b>
	<b>Total cost (A+B) - AN College, Patna</b>	<b>9,11,520</b>	<b>8,56,520</b>	<b>7,67,200</b>	<b>25,35,240</b>
	<b>Total cost (A+B) - MCSRC, Patna</b>	<b>17,06,520</b>	<b>11,66,520</b>	<b>11,32,200</b>	<b>40,05,240</b>
	<b>Total cost (A+B) - TERISAS, New Delhi</b>	<b>24,45,222</b>	<b>11,86,280</b>	<b>7,95,800</b>	<b>44,27,302</b>
	<b>Total overall cost</b>	<b>112,89,942</b>	<b>76,36,000</b>	<b>44,21,880</b>	<b>233,47,822</b>
	Overheads - IIT Kharagpur	3,00,000	2,50,000	2,50,000	8,00,000

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### 3.2.1.G.70.

	Overheads - AN College, Patna	80,000	35,000	35,000	1,50,000
	Overheads - MCSRC, Patna	1,35,000	70,000	70,000	2,75,000
	Overheads - TERISAS, New Delhi	1,35,000	70,000	70,000	2,75,000
	<b>Total overall Overheads</b>	<b>6,50,000</b>	<b>4,25,000</b>	<b>4,25,000</b>	<b>15,00,000</b>
	<b>Sub total General + overheads</b>	<b>67,11,000</b>	<b>62,61,000</b>	<b>46,46,880</b>	<b>176,18,880</b>
	IIT Kharagpur	30,26,680	28,76,680	17,76,680	76,80,040
	AN College, Patna	9,61,520	8,91,520	8,02,200	26,55,240
	MCSRC Patna	14,41,520	12,36,520	12,02,200	38,80,240
	TERISAS, New Delhi	12,81,280	12,56,280	8,65,800	34,03,360
D	<b>Grand Total</b>	<b>119,39,942</b>	<b>80,61,000</b>	<b>48,46,880</b>	<b>248,47,822</b>
	IIT Kharagpur	65,26,680	46,76,680	19,76,680	131,80,040
	AN College, Patna	9,91,520	8,91,520	8,02,200	26,85,240
	MCSRC Patna	18,41,520	12,36,520	12,02,200	42,80,240
	TERISAS, New Delhi	25,80,222	12,56,280	8,65,800	47,02,302

### Organization wise budget breakup :

#### 1. IIT Kharagpur, WestBengal

		Amount is in INR			
S.No	Item Head	1st Year	2nd Year	3rd Year	Total (Rs.)
A	<b>Non-recurring(Capital Items)</b>				
1	<b>Permanent Equipment</b>				
	water level loggers - no.s 10 @ 40000, Multiparameter probes, Field pumps and small	14,00,000	0	0	14,00,000
2	Fabricated systems - Fabrication of sensors	500000	500000	200000	12,00,000
3	Civil work - Drilling				
	30 wells (multiple depths)	1600000	10,00,000	0	26,00,000
	Completion of drinking water wells	0	3,00,000	0	3,00,000
	<b>Sub total (Capital items)</b>	<b>35,00,000</b>	<b>18,00,000</b>	<b>2,00,000</b>	<b>55,00,000</b>
B	<b>Recurring Items (General)</b>				
1	<b>Manpower</b>				
a	Scientific Administrative Assistant/Field worker @ 18000/- + 8% HRA	233280	233280	233280	6,99,840
b	Laboratory Assistant/Technician/Project Assistant/Technical Assistant/Field Assistant @ 20000/- + 8% HRA - NO.s 2	518400	518400	518400	15,55,200
	<b>Sub total Manpower</b>	<b>751680</b>	<b>751680</b>	<b>751680</b>	<b>22,55,040</b>
2	<b>Consumables</b>				
	Telemetry based groundwater level monitoring system, chemicals, gas cylinders, Analysis Cost	15,00,000	9,00,000	4,50,000	28,50,000

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### 3.2.1.G.70.

	<b>Sub total - Consumables</b>	<b>15,00,000</b>	<b>9,00,000</b>	<b>4,50,000</b>	<b>28,50,000</b>
3	Contingencies				
	IC columns, labour charge, logistics, HDPE bottles, labels, notebooks	<b>375000</b>	<b>425000</b>	<b>125000</b>	<b>9,25,000</b>
4	<b>Travel</b>				
	Field travel, Specialized lab visit, Conferences and outreach	<b>50,000</b>	<b>2,50,000</b>	<b>1,50,000</b>	<b>4,50,000</b>
	<b>Sub total - Travel</b>	<b>50,000</b>	<b>2,50,000</b>	<b>1,50,000</b>	<b>4,50,000</b>
5	Other cost(Outsource work/Survey) - partner workshops, stakeholder workshops, field training	50000	300000	50000	400000
	<b>Sub total (General)</b>	<b>27,26,680</b>	<b>26,26,680</b>	<b>15,26,680</b>	<b>68,80,040</b>
C	Total cost (A+B)	62,26,680	44,26,680	17,26,680	123,80,040
	Overheads	3,00,000	2,50,000	2,50,000	8,00,000
	Sub total General + Overheads	30,26,680	28,76,680	17,76,680	76,80,040
D	<b>Grand Total</b>	<b>65,26,680</b>	<b>46,76,680</b>	<b>19,76,680</b>	<b>131,80,040</b>

## 2. AN college, Patna:

		Amount is in INR			
S.No	Item Head	1st Year	2nd Year	3rd Year	Total (Rs.)
A	Non-recurring(Capital Items)				
1	Permanent Equipment - Cell phones (2 Nos.)	30000	0	0	30000
	<b>Sub total (Capital items)</b>	<b>30000</b>	<b>0</b>	<b>0</b>	<b>30000</b>
B	Recurring Items (General)				
1	Manpower (JRF+Staff)				
	JRF @ 31000/- + 16% HRA for first two years and SRF @ 35000/- + 16% HRA for third year	<b>431520</b>	<b>431520</b>	<b>487200</b>	<b>1350240</b>
2	Consumables				
	Supplies, Chemicals (microbiological tests) Arsenic Field Test Kits, stationery items	200000	100000	30000	330000
	<b>Sub total - consumables</b>	<b>200000</b>	<b>100000</b>	<b>30000</b>	<b>330000</b>
3	Contingencies	50000	50000	50000	150000
4	Travel	125000	125000	125000	375000
5	Other cost(Outsource work/Survey) - Community survey and behavioral study	75000	150000	75000	300000
	<b>Sub total (General)</b>	<b>881520</b>	<b>856520</b>	<b>767200</b>	<b>2505240</b>
C	Total cost (A+B)	911520	856520	767200	2535240
	Overhead (20%)	80000	35000	35000	150000
	Sub total - General + Overheads	961520	891520	802200	2655240
D	<b>Grand Total</b>	<b>991520</b>	<b>891520</b>	<b>802200</b>	<b>2685240</b>

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### 3. Mahavir Cancer Sansthan and Research Centre (MCSRC) Patna

S.No	Item Head	Amount is in INR			Total (Rs.)
		1st Year	2nd Year	3rd Year	
A	Non-recurring(Capital Items)				
1	Permanent Equipment				
	Digital camera (1 no.), GPS system (3 units), Field Test kits	4,00,000	0	0	400000
	<b>Sub total (Capital items)</b>	<b>4,00,000</b>	<b>0</b>	<b>0</b>	<b>400000</b>
B	Recurring Items (General)				
1	Manpower (JRF+Staff)				
	JRF @ 31000/- + 16% HRA for first two years and SRF @ 35000/- + 16% HRA for third year	431520	431520	487200	1350240
2	Consumables - glasswares and reagents	4,50,000	3,60,000	2,70,000	10,80,000
3	Contingencies	1,00,000	50,000	50,000	2,00,000
4	Travel	1,25,000	1,25,000	1,25,000	3,75,000
5	Other cost(Outsource work/Survey) - Community training	2,00,000	2,00,000	2,00,000	6,00,000
	Sub total (General)	13,06,520	11,66,520	11,32,200	36,05,240
C	Total cost (A+B)	17,06,520	11,66,520	11,32,200	40,05,240
	Overhead	1,35,000	70,000	70,000	2,75,000
	Sub total General + overheads	14,41,520	12,36,520	12,02,200	38,80,240
D	Grand Total	18,41,520	12,36,520	12,02,200	42,80,240

### 4. TERI School of Advanced Studies, NewDelhi

S.No	Item Head	Amount is in INR			Total (Rs.)
		1st Year	2nd Year	3rd Year	
A	Non-recurring(Capital Items)				
1	Permanent Equipment				
	Konica Minolta Spectrophotometer, Field oriented spectrophotometer for reliable color measurement, Oakton multiparameter: pH & EC meter (no.s 2), Hach Field Based Dissolved Oxygen Meter (no.s 2), Hach Field ORP Meter	1298942	0	0	1298942
	<b>Sub total (Capital items)</b>	<b>1298942</b>	<b>0</b>	<b>0</b>	<b>1298942</b>
B	Recurring Items (General)				
1	Manpower (JRF+Staff)				
	JRF @ 31000/- + 24% HRA for first two years and SRF @ 35000/- + 24% HRA for third year	461280	461280	520800	1443360
2	Consumables				

### 3.2.1.G.70.

	Glassware, reagents Arsenic Field kits (No.s 15 ) Standards for ICPMS, AR grade acids				
	<b>Sub total</b>	<b>375000</b>	<b>350000</b>	<b>0</b>	<b>725000</b>
3	Contingencies				
	Field Staff - Rs.60000/- Field Staff would be hired during the testing campaign to be conducted across different villages for almost 100days per year for 2 years @Rs. 300/per day during the duration of entire project	60000	60000	0	120000
	Transport of samples to Lab at TERISAS from the field site, HDPE bottles, Wheaton specialized vials, books, xerox, labels, polybags	33825	33825	0	67650
	<b>Sub total - contingencies</b>	<b>75000</b>	<b>75000</b>	<b>0</b>	<b>150000</b>
4	Travel – Field and workshops travel	<b>150000</b>	<b>175000</b>	<b>75000</b>	<b>400000</b>
5	Other cost(Outsource work/Survey)				
	Socioeconomic survey (baseline) (midline ) (endline)	<b>85000</b>	<b>125000</b>	<b>200000</b>	<b>410000</b>
	<b>Sub total (General)</b>	<b>1146280</b>	<b>1186280</b>	<b>795800</b>	<b>3128360</b>
C	Total cost (A+B)	2445222	1186280	795800	4427302
	Overhead (20%)	135000	70000	70000	275000
	Sub total - General + overheads	1281280	1256280	865800	3403360
D	Grand Total	2580222	1256280	865800	4702302

- The sanction of the President is also accorded to the release of ₹ 67,11,000/- (**Rupees Sixty seven lakh eleven thousand only**) to IIT Kharagpur, West Bengal and partnering organizations Mahavir Cancer Sansthan and Research Centre (MCSRC) Patna; A.N.College, Patna; TERI School of Advanced Studies (TERI SAS), New Delhi being the first instalment of grant under "General Component" for implementation of the above mentioned project.
- This sanction is subject to the condition that the grantee organisation will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grants received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.
- The grantee organisation will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division. The subsequent/final instalment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS.
- If the grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the released Capital head grant.

*Neha*  
sc-E



### 3.2.1.G.70.

6. The grant-in-aid being released is subject to the condition that

a. A transparent procurement procedure in line with the Provisions of General Financial Rules 2017 will be followed by the Institute/Organisation under the appropriate rules of the grantee organisation while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organisation immediately on receipt of the grant:

b. While submitting Utilisation Certificate/Statement of Expenditure, the organisation has to ensure submission of supporting documentary evidences with regard to purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.

7. The grantee organization will maintain separate audited account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during F.Y. 2017-18 and onwards, all interests and other earnings, against released Grant shall be remitted to Consolidated Fund of India (through Non-Tax Receipt Portal (NTRP), i.e., [www.Bharatkosh.gov.in](http://www.Bharatkosh.gov.in)), immediately after finalization of accounts, as it shall not be adjusted towards future release of grant. A certificate to this effect shall have to be submitted along with Statement of Expenditure/Utilization Certificate for considering subsequent release of grant/closure of project accounts. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

8. DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.

9. In case the scheme provides for payment of honorarium / remuneration / fellowship / scholarship to the PI, a para may suitably be incorporated in the DSO to the effect that "PI is not drawing any emoluments/ salary/fellowship from any other project either supported by DST or by any other funding agency.

10. The account of the grantee organisation shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organisation is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

11 Due acknowledgement of technical support / financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organisation in bold letters in all publications / media releases as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

12. Failure to comply with the terms and conditions of the Bond will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

13. The expenditure involved is debitable to-

Demand No 87	Department of Science and Technology for the year 2020-21
3425	Other Scientific Research (Major Head)
60	Others
60.200	Assistance to Other Scientific Bodies (Minor head)
70	Innovation, Technology Development and Deployment



14. The amount of ₹ 67,11,000/- (**Rupees Sixty seven lakh eleven thousand only**) to IIT Kharagpur, West Bengal and partnering organizations will be drawn by the Drawing and Disbursing Officer, DST and will be disbursed to IIT Kharagpur, West Bengal. The bank details for electronic transfer of funds through RTGS are given below:-

Name of the Account Holder	IIT Research Scheme
Name of the bank	Canara Bank
Branch Address	SRIC, IIT Kharagpur
IFSC code	SYNB0009556
Account Number	95562010000790

15. As per Rule 234 of GFR 2017, this sanction has been entered at **S.No. 210** (TMD,EW) in the register of grants maintained in the Division for the scheme (ITDD).
16. As per Rule 237 of GFR 2017, Time Schedule for submission of annual accounts - The dates prescribed for submission of the annual accounts for Audit leading to the issue of Audit Certificate by the Comptroller and Auditor General of India and for submission of annual report and audited accounts to the nodal Ministry for timely submission to the Parliament are listed below:-  
 (i) Approved and authenticated annual accounts to be made available by the Autonomous Body to the concerned Audit Office and commencement of audit of annual accounts-30th June  
 (ii) Issue of the final SAR in English version with audit certificate to Autonomous Body/ Government concerned -31st October  
 (iii) Submission of the Annual Report and Audited Accounts to the Nodal for it to be laid on the Table of the Parliament -31st December
17. The organization/Institute/University should ensure that the technical support/financial assistance provided to them by the Department of Science and Technology should invariably be highlighted/acknowledged in their media releases as well as in bold letters in the opening paragraph of their Annual Report.
18. It is important that the information and knowledge generated through the use of these funds are made publicly available as soon as possible. In order to achieve the aforementioned objectives, each institution is encouraged to set up its own inter-operable institutional open access repository ("IR") for its research papers and review articles published in peer reviewed journals. The Ministry of Science and Technology has set up a central harvester ([www.sciencecentral.in](http://www.sciencecentral.in)) that will harvest the full text and metadata of these publications. Kindly update the findings accordingly.
19. The organization named **IIT Kharagpur, West Bengal** and partnering institutes agrees to make reservations for Scheduled Castes and Scheduled Tribes or OBC in the posts or services under its control on the lines indicated by the Government of India.
20. The goods (consumables/equipment) available in GeM portal are to be procured mandatorily online through GeM only.

21. This is to inform that continuation of this project beyond 31/03/2021 will be subject to appraisal and approval of the continuation of the Umbrella Scheme "Innovation,



**3.2.1.G.70.**

Technology Development and Deployment" under which the project is funded.

22. This issues with the concurrence of IFD Vide their **Concurrence Dy. No.2653**  
**dated.28.10.2020**

*Neelima Alam Sc.E*  
(Dr. Neelima Alam)  
Scientist-E

Email: [neelima.alam@nic.in](mailto:neelima.alam@nic.in)

डॉ. नीलिमा आलम / Dr. NEELIMA ALAM  
वैज्ञानिक 'ई' / Scientist 'E'  
विज्ञान और प्रौद्योगिकी विभाग  
DEPTT. OF SCIENCE & TECHNOLOGY  
भारत सरकार / Govt. of India  
नई दिल्ली-110016 / New Delhi-110016

To  
The Pay and Accounts Officer, DST, New Delhi.  
Copy for information and necessary action to:

1. Cash Section (3 copies) for preparing the bill and remitting the amount to the above grantee.
2. Accounts Section, DST, New Delhi.
3. IFD, Department of Science & Technology, New Delhi.
4. Director of Audit (CW & M-II), AGCR Building, IP Estate, New Delhi.
5. **a. Dr. Abhijit Mukherjee**

Associate Professor  
Department of Geology and Geophysics,  
IIT Kharagpur, West Bengal, 721301  
Email : [amukh2@gmail.com](mailto:amukh2@gmail.com)  
Phone : 9007228876

**b. Dr. Nupur Bose**

Associate Professor and Head Geography  
A N College, Patna, Bihar  
Boring Rd, Sri Krishna Puri, Bihar, 800013  
Email : [nupur.bose@gmail.com](mailto:nupur.bose@gmail.com)  
Phone : 9835466868

**c. Prof. Ashok Ghosh**

Professor and Head, Research, Mahavir Cancer Institute and Research Centre  
Phulwari Sharif, Patna, Bihar, 801505  
Email :  
[ashok.ghosh51@gmail.com](mailto:ashok.ghosh51@gmail.com) Phone  
: 9334205809

**d. Dr. Chander Kumar Singh**

Assistant Professor, Energy and Environment  
TERI SCHOOL OF ADVANCED STUDIES (TERI SAS)  
Plot No. 10, Vasant Kunj Institutional Area, Vasant Kunj, Institutional Area  
New Delhi, 110070  
Email : [chanderkumarsingh@gmail.com](mailto:chanderkumarsingh@gmail.com)  
Phone : 9650210123

6. Sanction folder
7. Office Copy
8. Head- TMD (E,W&Others)

*Neelima Alam Sc.E*

डॉ. नीलिमा आलम / Dr. NEELIMA ALAM  
वैज्ञानिक 'ई' / Scientist 'E'  
विज्ञान और प्रौद्योगिकी विभाग  
DEPTT. OF SCIENCE & TECHNOLOGY  
भारत सरकार / Govt. of India  
नई दिल्ली-110016 / New Delhi-110016

(Dr. Neelima Alam)  
Scientist-E

3.2.1.G.70.

By Speed Post

**File No. A-46020/20/2019-EA**  
 Government of India  
 Ministry of Housing and Urban Affairs  
 (Economic Division)

Nirman Bhawan, New Delhi,  
 Dated the 19<sup>th</sup> September, 2019.

To

**Prof. Atul Kumar**  
 Professor and Head, Deptt. of Energy and Environment  
 TERI School of Advanced Studies  
 10, Institutional Area, Vasant Kunj, New Delhi - 110070

**Subject:** Conducting a comprehensive study on mitigation and adaptation measures being undertaken by Ministry of Housing and Urban Affairs and quantification of their Green-House Gas (GHG) mitigation potential.

Sir,

I am directed to refer to your proposal dated 03-12-2018 on the above subject and to convey the approval of the Competent Authority in the Ministry of Housing and Urban Affairs for award of work to TERI School of Advanced Studies (TERI-SAS) on nomination basis, for conducting a comprehensive study on mitigation and adaptation measures being undertaken by Ministry of Housing and Urban Affairs and quantification of their Green-House Gas (GHG) mitigation potential as under :-

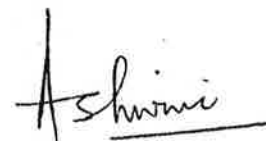
- (a) Estimation of Green House Gas (GHG) mitigation potential of all the Missions/Schemes/ Measures of the Ministry of Housing and Urban Affairs; and
- (b) Design a comprehensive framework/spreadsheet containing coefficients for calculating mitigation potential of various measures.

A copy of the sanction order dated 19-09-2019 issued by the Housing Division, Ministry of Housing and Urban Affairs for releasing the 1<sup>st</sup> Instalment of Rs.6,00,000/- (Rupees Six Lakh only) out of the total approved amount of Rs.12,00,000/- (inclusive of GST) for the above study is enclosed.

2. The break-up of the total cost (including GST) of the project is as under :-

Sl. No.	Items	Cost (Rs.)
1.	Professional Cost	8,16,949.00
2.	Stakeholder workshop, consultation and other miscellaneous expenses	2,00,000.00
3.	Goods and Services Tax (@18%)	1,83,051.00
	Total	12,00,000.00

3. The terms and conditions of the approval is enclosed at Annexure-I.
4. Kindly acknowledge receipt.



(Ashwini Kumar)  
 Additional Economic Adviser  
 Tel. No.23061379  
 Email: [kumar.ashwini@nic.in](mailto:kumar.ashwini@nic.in)

Encl: As above.



**TERMS AND CONDITIONS OF STUDY BY TERI-SAS**

(Annexure to Letter No.A-46020/20/2019-EA dated 19.09.2019)

**1. OBJECTIVE**

Objective of the proposed study is :-

- (a) Estimation of Green House Gas (GHG) mitigation potential of all the Missions/Schemes/ Measures of the Ministry of Housing and Urban Affairs; and
- (b) Design a comprehensive framework/spreadsheet containing coefficients for calculating mitigation potential of various measures.

**2. DURATION**Duration of the proposed study will be 04 (four) months from the date of release of 1<sup>st</sup> instalment .**3. CONSULTANCY CHARGES**

Sl. No.	Items	Cost (Rs.)
1.	Professional Cost	8,16,949.00
2.	Stakeholder workshop, consultation and other miscellaneous expenses	2,00,000.00
3.	Goods and Services Tax (@18%)	1,83,051.00
	<b>Total</b>	<b>12,00,000.00</b>

**4. PAYMENT**

Sl. No.	Stage	%	Amount (Rs.)
1.	At the time of Order	50%	6,00,000.00
2.	On submission of draft final report	30%	3,60,000.00
3.	On submission of Final Report	20%	2,40,000.00
	<b>Total</b>		<b>12,00,000.00</b>

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### 3.2.1.G.71.

Re: Project code

Devvrata Guglani

Wed 10/23/2019 5:20 PM

To: Atul Kumar <atul.kumar@terisas.ac.in>

Cc: Dhanraj Singh <dhanraj.singh@terisas.ac.in>; vikas prasad <vikas.prasad@terisas.ac.in>

Dear Sir,

Please find enclosed herewith project registration detail with TERI School Of Advanced Studies -

SNO	PROJECT CODE	SPONSOR'S NAME	PROJECT NAME	NATIONAL OR INTERNATIONAL	PROJECT INVESTIGATOR	DESIGNATION	DEPARTM
1	2019DEE04	Ministry Of Housing and Urban Affairs	Impact of Urban Infrastructure Schemes on Mitigation of Greenhouse Gas Emissions	National	Dr. Atul Kumar	Professor	Departmer Energy a Environm

Best regards,  
Devvrata Guglani

---

From: Atul Kumar <atul.kumar@terisas.ac.in>

Sent: Thursday, October 17, 2019 12:46 PM

To: Dhanraj Singh <dhanraj.singh@terisas.ac.in>; Devvrata Guglani <Devvrata.Guglani@terisas.ac.in>

Subject: RE: Project code

Devvrata You may use title given in the proposal (attached) as name of project.

With kind regards

Atul

---

From: Dhanraj Singh <dhanraj.singh@terisas.ac.in>

Sent: 17 October 2019 12:01

To: Devvrata Guglani <Devvrata.Guglani@terisas.ac.in>

Cc: Atul Kumar <atul.kumar@terisas.ac.in>

Subject: FW: Project code

fyl

---

From: Atul Kumar <atul.kumar@terisas.ac.in>

Sent: 17 October 2019 11:44

To: Dhanraj Singh <dhanraj.singh@terisas.ac.in>

Subject: Project code

Dear Dhanraj Ji

What is the project code for recently awarded project by Ministry of Housing and Urban Affairs.

With kind regards

Atul

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

Atul Kumar, Ph.D.

Professor and Head

Department of Energy and Environment

TERI School of Advanced Studies (Deemed to be University)

10, Institutional Area

Vasant Kunj, New Delhi - 1100 70 (India)

Phone: +91-11-71800222, Fax: +91-11-26122874

E-mail: [atul.kumar@terisas.ac.in](mailto:atul.kumar@terisas.ac.in)

Web: [www.terisas.ac.in](http://www.terisas.ac.in)

XXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXXX

DST/IMRCD/India-EU/Water Call 2/SARASWATI 2.O/2018/C  
DEPARTMENT OF SCIENCE & TECHNOLOGY  
GOVERNMENT OF INDIA  
(International Multilateral Regional Cooperation Division)

Technology Bhavan,  
New Mehrauli Road  
New Delhi-110016  
Dated: 11-March-2020

**ORDER**

Sanction of President is accorded for incurring an expenditure not exceeding Rs. 9,37,59,880/ ( Rupees Nine Crore Thirty seven Lakh fifty nine thousand eight hundred eighty only ) for a duration of 4 years implementation of India- EU Water Research Project – **SARASWATI 2.O - "Identifying best available technologies for decentralized wastewater treatment and resource recovery for India"**- Indian project **Coordinator** Prof. Makarand Madhao Ghangrekar Professor, Indian Institute of Technology, Kharagpur . The detailed break of grant as well as General and Capital Component give below:

General Component: Rs. 4,11,59,880/-

Capital Component: Rs. 5,26,00,000/-

2. The Project is between **Indian Project Partners: SARASWATI 2.O (India Project Partners: Dr. Makarand Madhao Ghangrekar Professor, Indian Institute of Technology, Kharagpur (Lead Coordinator) Co-PI: Prof. Brajesh Kr. Dubey, Prof. Pulak Mishra, Indian Institute of Technology Kharagpur; Prof. A. A. Kazmi, Prof. Vinay Kr. Tyagi, Indian Institute of Technology Roorkee; Prof. Ligy Philip, Indian Institute of Technology Madras; Prof. Manaswini Behera & Prof. P. Bhunia, Prof. Rajesh Roshan Dash Indian Institute of Technology Bhubaneswar; Prof. Anju Singh, National Institute of Industrial Engineering (NITIE) Mumbai; Dr. Vivekanand, Prof. A. B. Gupta, Malaviya National Institute of Technology Jaipur (MNIT) Jaipur; Prof. Sukanya Das TERI School of Advanced Studies (TERI, SAS), New Delhi.**

**European Project Partners: Dr. Markus Starkl (BOKU University) (Lead Coordinator) (Others: Dr. Ralph Lindeboom, Dr. Bart De Schutter, Dr. Edo Abraham, Dr. David Weissbrodt (TU Delft), Dr. Isabel Martín, Dr. Carlos Aragón (CENTA Sevilla), Dr. Taavo Tenno, Dr. Ivar Zekker (UT), Dr. Siegfried E. Vlaeminck, Dr. Marc Spiller (UA), Prof. Augusto Medina, Douglas Thompson, Tanvir Singh Badwal (SPI), Prof. Norbert Brunner, Mr. Vijay Mishra, Mr. Nitin Jain, Mrs. Neha Unawane (CEMDS), Dipl.-Ing. Franz Urstöger, Ing. Roland Großberger (SFCU), Peter Taarnhoj (Biokube Tappernoje), Dr. Paal Jahre Nilsen (Cambi), Prof. Jack Gilron, Prof. (Em) Yoram Oren, Prof. Zeev Ronen's (BGU)).**

3. Following is the budget allocation for the partnering institution for India-EU Water Research Project:

(i). IIT Kharagpur- Prof. M. M. Ghangrekar

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
A.	Non-Recurring					
1	Lab Equipment (water quality analyser, peristaltic pump, electrodes, hardware for automation)	25,00,000	0	0	0	25,00,000
2	Pilot Plant Construction Cost (Anaerobic digester-Photoheterotrophic Bioreactor (PHBR)- 100m <sup>3</sup> /d; Anaerobic digestion-electrically conductive biofilter followed by sand filtration and UV/electrochemical disinfection- 100m <sup>3</sup> /d; Ultrasonic treatment of sludge- 5-200 Kg sludge)	1,00,00,000	30,00,000	0	0	1,30,00,000



3.2.1.G.72.

	<b>Total A</b>	1,25,00,000	30,00,000	0	0	155,00,000
<b>B.</b>	<b>Recurring</b>					
1	Manpower (RA-I/PM-1, JRF-1 @ 31000 per month + 8% HRA month for 1 <sup>st</sup> & 2 <sup>nd</sup> year and SRF @ Rs. 35,000 per month + 8% HRA for 3 <sup>rd</sup> year and 4 <sup>th</sup> year; Project Asst.-1 @ Rs. 22,000 per month)	12,74,880	12,74,880	13,26,720	13,26,720	52,03,200
2	Consumables	2,00,000	3,00,000	3,50,000	3,50,000	12,00,000
3	International mobility travel cost (No. of visits - Faculty-3; Research Fellow-1)	2,00,000	4,50,000	0	2,00,000	8,50,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	2,00,000	3,00,000	3,00,000	3,00,000	11,00,000
5	Organising Training/Awareness & User Interaction	4,00,000	1,00,000	0	1,00,000	6,00,000
6	Contingency	50,000	50,000	50,000	50,000	2,00,000
7	Overhead as per DST norms	1,00,000	1,00,000	50,000	50,000	3,00,000
	<b>Total B</b>	24,24,880	25,74,880	20,76,720	23,76,720	94,53,200
	<b>Grand Total (A+B)</b>	1,49,24,880	55,74,880	20,76,720	23,76,720	2,49,53,200

(ii). IIT Roorkee - Prof. A A Kazmi

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
<b>A.</b>	<b>Non-Recurring</b>					
1	Equipment (DO, pH, Conductivity Units, Data Acquisition Systems)	8,50,000	0	0	0	8,50,000
2	Pilot Plant Construction Cost (low capacity SBR- 100m <sup>3</sup> /d; Enhanced Sludge digestion- 8Kg/d including infrastructure)	70,00,000	10,00,000	0	0	80,00,000
	<b>Total A</b>	78,50,000	10,00,000	0	0	88,50,000
<b>B.</b>	<b>Recurring</b>					
1	Manpower (JRF-2 @ 31000 per month + 8% HRA month for 1 <sup>st</sup> & 2 <sup>nd</sup> year and SRF @ Rs. 35,000 per month + 8% HRA for 3 <sup>rd</sup> year and 4 <sup>th</sup> year; Project Asst.-1 @ Rs. 22,000 per month)	10,67,520	10,67,520	11,71,200	11,71,200	44,77,440

3.2.1.G.72.

2	Consumables	2,00,000	3,00,000	3,00,000	3,00,000	11,00,000
3	International mobility travel cost (No. of visits- Faculty-2; Research Fellow-1)	1,50,000	3,00,000	1,50,000	0	6,00,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	2,00,000	1,50,000	1,50,000	1,50,000	6,50,000
5	Contingency	50,000	50,000	50,000	50,000	200,000
6	Overhead as per DST norms	75,000	50,000	50,000	25,000	2,00,000
	<b>Total B</b>	17,42,520	19,17,520	18,71,200	16,96,200	72,27,440
	<b>Grand Total (A+B)</b>	95,92,520	29,17,520	18,71,200	16,96,200	16,077,440

(iii). IIT Madras - Prof. Ligy Philip

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
<b>A.</b>	<b>Non-Recurring</b>					
1	Equipment - Accessories (water quality analyser, COD digester, hardware for automation)	25,00,000	0	0	0	25,00,000
2	Pilot Plant Construction (IEMB reactor-4-8 m3/d & online monitoring systems)	75,00,000	0	0	0	75,00,000
	<b>Total A</b>	1,00,00,000	0	0	0	1,00,00,000
<b>B.</b>	<b>Recurring</b>					
1	Manpower (JRF-2 @ 31000 per month + 24% HRA month for 1st & 2 year and SRF @ Rs. 35,000 per month + 24% HRA for 3 <sup>rd</sup> year and 4 <sup>th</sup> year)	9,22,560	9,22,560	10,41,600	10,41,600	39,28,320
2	Consumables	2,00,000	3,00,000	3,00,000	2,00,000	10,00,000
3	International mobility travel cost (No. of visits - Faculty-1; Research Fellow-1)	1,50,000	3,00,000	0	0	4,50,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	1,25,000	2,00,000	2,00,000	1,50,000	6,75,000
5	Contingency	50,000	50,000	50,000	50,000	2,00,000
6	Overhead as per DST norms	75,000	50,000	50,000	25,000	2,00,000
	<b>Total B</b>	15,22,560	18,22,560	16,41,600	14,66,600	64,53,320

3.2.1.G.72.

Grand Total (A+B)	1,15,22,560	18,22,560	16,41,600	14,66,600	1,64,53,320
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(iv). IIT Bhubaneswar - Prof. M. Behera

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
A.	Non-Recurring					
1	Equipment - Accessories (Centrifuge with rotor, nitrite analyser)	3,50,000	0	0	0	3,50,000
2	Pilot Plant Construction (UASB reactor, De- ammonification-pisci culture pond- 100 m <sup>3</sup> /d.)	5,50,000	10,00,000	0	0	65,00,000
	Total A	58,50,000	10,00,000	0	0	68,50,000
B.	Recurring					
1	Manpower (JRF-1 @ 31000 per month + 16% HRA month for 1 <sup>st</sup> & 2 <sup>nd</sup> year and SRF @ Rs. 35,000 per month + 16% HRA for 3 <sup>rd</sup> year and 4 <sup>th</sup> year; Project Asst.-1 @ Rs. 22,000 per month)	6,95,520	6,95,520	7,51,200	7,51,200	28,93,440
2	Consumables	1,50,000	2,00,000	2,00,000	1,00,000	6,50,000
3	International mobility travel cost (No. of visits- Faculty-1; Research Fellow-1)	1,50,000	3,00,000	0	0	4,50,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	75,000	75,000	75,000	75,000	300,000
5	Contingency	50,000	50,000	50,000	50,000	200,000
6	Overhead as per DST norms	75,000	50,000	50,000	25,000	200,000
	Total B	11,95,520	13,70,520	11,26,200	10,01,200	46,93,440
	Grand Total (A+B)	70,45,520	23,70,520	11,26,200	10,01,200	1,15,43,440

(v). National Institute of Industrial Engineering (NITIE) Mumbai - Prof. Anju Singh

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
A.	Non-Recurring					
1	Equipment - Accessories (Water quality analyser, microbial lab equipment)	5,00,000	0	0	0	5,00,000



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2	Pilot Plant Construction Cost (Rotating biological contractor (RBC), Electro Chemical Disinfection, UV, Chlorination, Ultra Sound and Automation Controls)- 100 m <sup>3</sup> /d; Disinfection using sand filter plus UV and Ultrasound-100 m <sup>3</sup> /d)	60,00,000	10,00,000	0	0	70,00,000
	<b>Total A</b>	65,00,000	10,00,000	0	0	75,00,000
B.	<b>Recurring</b>					
1	Manpower (JRF-2 @ 31000 per month + 24% HRA month for 1st & 2 year and SRF @ Rs. 35,000 per month + 24% HRA for 3 <sup>rd</sup> year and 4 <sup>th</sup> year)	9,22,560	9,22,560	10,41,600	10,41,600	39,28,320
2	Consumables	1,50,000	2,00,000	2,50,000	2,00,000	8,00,000
3	International mobility travel cost (No. of visits- Faculty 2: Research Fellow-1)	1,50,000	4,50,000	0	0	6,00,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	1,00,000	1,50,000	1,50,000	1,00,000	5,00,000
5	Contingency	50,000	50,000	40,000	40,000	180,000
6	Overhead as per DST norms	75,000	50,000	50,000	25,000	200,000
	<b>Total B</b>	14,47,560	18,22,560	15,31,600	14,06,600	62,08,320
	<b>Grand Total (A+B)</b>	79,47,560	28,22,560	15,31,600	14,06,600	1,37,08,320

(vi). Malaviya National Institute of Technology Jaipur - Dr. Vivekanand

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
A.	<b>Non-Recurring</b>					
1	Equipment - Accessories (MBS Multireader/Incubator)	5,00,000	0	0	0	5,00,000
2	Pilot Plant Construction Cost (BioKube Mars packaged wastewater treatment plant-2 Units- 7.5 m <sup>3</sup> /d - 15 m <sup>3</sup> /d)	34,00,000	0	0	0	34,00,000
	<b>Total A</b>	39,00,000	0	0	0	39,00,000
B.	<b>Recurring</b>					
1	Manpower ( SRF @ Rs. 35,000 per month + 16% HRA and Project Asst.-1 @ Rs. 22,000 per month (3 Years) )	4,87,200	7,51,200	7,51,200	7,51,200	27,40,800
2	Consumables	1,50,000	2,00,000	2,00,000	2,00,000	7,50,000

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3	International mobility travel cost (No of visits- Faculty 1; Research Scholars 1)	1,50,000	3,00,000	0	0	450,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	1,00,000	1,00,000	1,00,000	1,00,000	400,000
5	Contingency	50,000	50,000	50,000	50,000	200,000
6	Overhead as per DST norms	50,000	50,000	25,000	25,000	150,000
	<b>Total B</b>	9,87,200	14,51,200	11,26,200	11,26,200	46,90,800
	<b>Grand Total (A+B)</b>	48,87,200	14,51,200	11,26,200	11,26,200	85,90,800

(vii). TERI School of Advanced Studies (TERI, SAS), New Delhi- Dr. Sukanya Das

S.No.	Head of Account	1 <sup>st</sup> Year	2 <sup>nd</sup> Year	3 <sup>rd</sup> Year	4 <sup>th</sup> Year	Total
<b>A.</b>	<b>Recurring</b>					
1	Manpower (JRF-1 @ 31000 per month + 24% HRA month for 2 year & 3 <sup>rd</sup> year and SRF @ Rs. 35,000 per month + 24% HRA for 4 <sup>th</sup> year )	0	4,61,280	4,61,280	5,20,800	14,43,360
2	Consumables	1,00,000	1,50,000	0	0	2,50,000
3	International mobility travel cost (No. of visits - Faculty 1)	0	1,50,000	0	0	1,50,000
4	Domestic mobility Travel cost for field work incl. DST/EC Review Meetings etc., attending seminars, symposia etc.	1,50,000	100,000	75,000	75,000	4,00,000
5	Contingency	30,000	30,000	30,000	0	90,000
6	Overhead as per DST norms	25,000	25,000	25,000	25,000	100,000
	<b>Grand Total</b>	3,05,000	9,16,280	5,91,280	6,20,800	24,33,360

Total Budget for 4 years : **Rs. 9,37,59,880/-**. First installment release of Rs. 5,62,25,240 (General Rs. 96,25,240/- and Capital Rs. 4,66,00,000/-)

4. Sanction of the President is also accorded for release of 1st instalment amounting of Rs. 4,66,00,000/- (Rs. Four Crore Sixty Six Lakh Only ) and payment of this amount may be made to DDO, DST by means of electronic transfer to the following account of Indian Institute of Technology-KHARAGPUR Lead Coordinator- Dr. Makarand Madhao Ghangrekar Professor, Indian Institute of Technology, Kharagpur.

1.	Name /Designation of account holder	<b>IIT Research Scheme</b>
2.	Name of bank and branch	<b>Syndicate Bank, SRIC – IIT, Kharagpur Branch, IIT, Kharagpur -721,302 West Bengal</b>
3.	Bank Account No.	<b>95562010000790</b>
4.	IFSC Code	<b>SYNB0009556</b>
5.	MICR Code	<b>721025103</b>



### 3.2.1.G.72.

Condition for placing of grant amount:

5. The grantee organization will maintain separate bank account for the project and the entire amount of grant will be kept in an interest bearing bank account. For Grants released during FY 2017-18 and onwards, all interests and other earnings, against released Grant shall be remitted to Consolidated Fund of India (through Non-tax Receipt Portal (NTRP), i.e., [www.Bharatkosh.gov.in](http://www.Bharatkosh.gov.in)), immediately after finalization of accounts, as it shall not be adjusted towards future release of Expenditure/Utilization Certificate for considering subsequent release of grant/closure of project accounts.

Conditions for submission of SE/UC and Progress report:

6. (a) The grantee organisation will furnish to the Department of Science & Technology, financial year wise Utilization Certificate (UC) in the proforma prescribed as per GFR 2017 and audited statement of expenditure (SE) along with up to date progress report at the end of each financial year duly reflecting the interest earned / accrued on the grants received under the project. This is also subject to the condition of submission of the final statement of expenditure, utilization certificate and project completion report within one year from the scheduled date of completion of the project.
- (b) While submitting Utilisation Certificate/Statement of Expenditure, the organisation has to ensure submission of supporting documentary evidences with regard to purchase of equipment/capital assets as per the provisions of GFR 2017. Subsequent release of grants under the project shall be considered only on receipt of the said documents.
- (c) a transparent procurement procedure in line with the Provisions of General Financial Rules 2017 will be followed by the Institute/ Organisation under the appropriate rules of the grantee organisation while procuring capital assets sanctioned for the above mentioned project and a certificate to this effect will be submitted by the Grantee organisation immediately on receipt of the grant;
7. The Lead Coordinating Institute IIT, Bombay will disburse the funds to different partner institutions as per allocation indicated above in Para 3 above, obtain UC/SE from respective partners and submit consolidated SE/UC to DST. The project coordinating institute will ensure that PI/Co-PI/ agencies from Aaranyak (ARNK), Guwahati, are registered in NGO Darpan Portal and their PAN verified before any release/disbursement to them. The lead coordinator is empowered to manage the scientific, technical and financial issues under the project for better and effective implementation of the project. In case, any partners withdraw in the mid course of the project period, the lead coordinator will take the responsibility to complete that component.
8. The grantee organisation (IIT Bombay) will have to enter & upload the Utilization Certificate in the PFMS portal besides sending it in physical form to this Division after closure of every financial year i.e 31<sup>st</sup> of March every year. The subsequent/final instalment will be released only after confirmation of the acceptance of the UC by the Division and entry of previous Utilization Certificate in the PFMS. The Sanction of the above amount is subject to terms and condition as contained in the Annexure.
9. In the event grant has been released under capital head through separate sanction order under the same project for purchase of equipment(s), separate SE/UC has to be furnished for the released Capital head grant.

Conditions of Assets (if any) :

10. (a) DST reserves sole rights on the assets created out of grants. Assets acquired wholly or substantially out of government grants (except those declared as obsolete and unserviceable or condemned in accordance with the procedure laid down in GFR 2017), shall not be disposed of without obtaining the prior approval of DST.
- (b) The equipment/instrument shall have to be purchased within twelve months from the date of release of the capital grant. Fresh permission shall have to be sought from DST, in the event, the Institute fails to purchase the equipment/instrument within the prescribed period of twelve months from the date of release of sanctioned amount.
- (c) Good (consumables/equipment) available in GeM portal are to be procured mandatorily online through Gem only as per the provisions of Rule 149 of GFR"

Conditions for International Visits :

11. All project related visits to be undertaken by the Scientists from in connection with the implementation of the project shall require prior approval from this Department separately on a case to case basis before any expenditure is incurred in this regard.



### 3.2.1.G.72.

12. As per MoF instructions, it has been decided that in all cases of air travel, both domestic and international, where the Government of India bears the cost of air passage, the officials concerned may travel only by Air India. For travel to stations not connected by Air India, the officials may travel by Air India to the hub/point closest to their eventual destination, beyond which they may utilize the services of another airline which should also preferable be an alliance partner of Air India. The tickets are to be booked in terms of guidelines issued under DoE OM No.19024/22/2017-E.IV dated 19th July, 2017.

#### Other Conditions:

13. The account of the grantee organisation shall be open to inspection by the sanctioning authority and audit (both by C&AG of India and Internal Audit by the Principal Accounts Office of the DST), whenever the organisation is called upon to do so, as laid down under Rule 236(1) of General Financial Rules 2017.

14. Due acknowledgement of technical support / financial assistance resulting from this project grant should mandatorily be highlighted by the grantee organisation in bold letters in all publications / media releases as well as in the opening paragraphs of their Annual Reports during and after the completion of the project.

15. The data sharing among the partnering and any other institutions needs to be accomplished without compromising on the national integrity, security, business opportunities and IPR norms.

#### 16. IPR management and other related conditions:

The intellectual property rights (IPR) and Inventorships management need to be managed jointly by Indian and European partners in respect of patents and other business opportunities. The IPR management is subject to provisions contained in IPR Annex to the Agreement on Scientific and Technological Cooperation between the European Community and the Government of the Republic of India signed on 30 November 2007, came into force 17 May 2010 and renewed on 17 May 2015. Consortium partner must take measures to implement the principles set out in DST Guidelines on Intellectual Property Management Plan For The India-EU Water Projects IPR annexed to this Sanction Order.

Other terms and conditions for effective implementation of the project are indicated in the attached annex- Implementation Guidelines.

17. Failure to comply with the terms and conditions of this sanction order will entail full refund with interest in terms of Rule 231 (2) of GFR 2017.

18. The expenditure involved is debit to Demand No. 86 Department of Science & Technology for the financial year 2018-19:

3425	:	Other Scientific Research (Major Head)
60	:	Others
60.798	:	International Cooperation (Minor Head)
14	:	Research & Development
14.00.35	:	Grants-in-aid General for the year 2019-20
		(Previous : ICD-3425.60.798.12.00.35)

19. This issues with the concurrence of IFD vide their Dy. No. C/6199/IFD2019-20, dated: 11.March.2020.

20. As per Rule 234 of GFR 2017, this sanction has been entered at S. No. 17 in the register of grants maintained in the Division.



(Ashwani Kumar)  
Under Secretary to Govt. of India

To

The Pay & Accounts Officer,  
Deptt. Of Science & Technology, New Delhi.

**3.2.1.G.72.-**

1. Office of the Principal Director of Audit, Scientific Deptts. IP Estate, N Delhi- 110002.
2. Cash Section (3 copies), Department of Science & Technology (DST).
3. I.F. Division/Accounts Section, DST.
4. Director, Indian Institute of Technology-Kharagpur
5. Registrar, Indian Institute of Technology-Kharagpur
6. Dr. Makarand Madhao Ghangrekar Professor, Indian Institute of Technology, Kharagpur
7. Director, Indian Institute of Technology-Roorkee
8. Registrar Indian Institute of Technology-Roorkee
9. Prof. A. A. Kazmi, Indian Institute of Technology-Roorkee.
10. Director Indian Institute of Technology Madras
11. Registrar, Indian Institute of Technology Madras
12. Prof. Ligy Philip, Indian Institute of Technology Madras.
13. Director Indian Institute of Technology Bhubaneswar
14. Registrar, Indian Institute of Technology Bhubaneswar
15. Prof. Manaswini Behera Indian Institute of Technology Bhubaneswar
16. Director, National Institute of Industrial Engineering (NITIE) Mumbai
17. Prof. Anju Singh, National Institute of Industrial Engineering (NITIE) Mumbai
18. Director, Malaviya National Institute of Technology Jaipur (MNIT) Jaipur
19. Registrar, Malaviya National Institute of Technology Jaipur (MNIT) Jaipur
20. Dr. Vivekanand, Malaviya National Institute of Technology Jaipur (MNIT) Jaipur
21. Vice Chancellor TERI University, New Delhi
22. Registrar, TERI University, New Delhi
23. Prof. Sukanya Das TERI School of Advanced Studies (TERI, SAS), New Delhi.
24. Sanction Folder.



(Ashwani Kumar)  
Under Secretary to Govt. of India

Expenditure Statement to be submitted while seeking concurrence Dy.

No. of IFD

GIA-17

1. Name of the Major Scheme: Research & Development
2. Name of the Sub-scheme: S & T Cooperation with other countries
3. Serial No. of the sanction as entered in the register of grants for the sub-scheme:
4. Provision in BE 2017-18 for the sub-scheme: (Rs. in Thousands)

General	Capital	DTE	FTE	OAE	OE Prof. Services	Adv. & Pub.	Contri- bution	Loans & Adv.	Total
875000	140000		42500	5000	7500				1070000

5. Expenditure as on date for the sub-scheme:

General	Capital	DTE	FTE	OAE	OE	Adv. & Pub.	Contri- bution	Loans & Adv.	Total
57838870									57838870

6. Available funds under the scheme:

General	Capital	DTE	FTE	OAE	OE	Adv. & Pub.	Contri- bution	Loans & Adv.	Total
32161130									32161130

7. Amount proposed to be released in the sanction:

General	Capital	DTE	FTE	OAE	OE	Adv. & Pub.	Contri- bution	Loans & Adv.	Total
46600000									46600000

Signature of the Programme Officer with date  
3.2.2.474