USAID
FROM THE AMERICAN PEOPLE

teri university

Coca-Cola®

WASH IN HIGHER EDUCATION

A STRATEGY PAPER

JUNE 2017

WASH Curriculum Development Workshop – Inaugural, 21 Jun 2017

Debating on benefits and challenges of WASH Curriculum in Higher Education

WASH Curriculum Development – Breakout Session on Health aspects of WASH

WASH Curriculum Development – Breakout Session on Economics of WASH

WASH Curriculum Development – Breakout Session on Scientific aspects of WASH

WASH Curriculum Development – Breakout Session on Social aspects of WASH

WASH Curriculum Development Workshop – Concluding Session, 23 June 2017

WASH Curriculum Development Workshop – Release of Strategy Paper

Table of Contents

EXECUTIVE SUMMARY

INCLUSION OF WASH IN HIGHER EDUCATION

INTERLINKAGE OF WASH AND SDGs

WASH IN HIGHER EDUCATION

WHY?

- Sensitize the youth about the importance of WASH.
- Enable young scholars (graduates and post graduates) to develop a holistic understanding about its needs, its place in sustainable development and apply the same towards innovative solutions.

STRATEGY PAPER: NEED FOR THIS INCLUSION

- Students become **catalyst of change in the community** through this knowledge.
- Creation of **trained manpower** who can be appointed to steer these flagship programs and bridge the shortfall of professionals with expertise in WASH to further institutional learning, developing high quality yet low-cost innovative solutions.
- Creation of a two-tier educational system, namely –
- **Centers of excellence:** create educators and leaders in this area.
- **Skilling in WASH through technical programmes:** development of programmes to develop 'on ground' field staff.

STRENGTH	WEAKNESS
• Individualism to egalitarianism • Sensitization of youth, behavioral change in community • Improving health seeking behavior • Reducing the under-five mortality rate • Inclusion of WASH in the Education Policy • Inter disciplinary team building • WASH – a technological humanist approach	• The taboo associated with WASH • Linkage between employers, educators and students • Realization of execution • Academic willingness and the right leadership to implement WASH course at academic institutions
OPPORTUNITIES	**PROBLEMS**
• Understanding the relationship between malnutrition and WASH • Creation of hubs for low cost high quality innovative solutions • Creation of a knowledge base • Creation of leaders and trained work force • Development of 'good' practices in India and its global uptake in developing nations • Discussion creates discourse	• Pedagogical approach • Breaking the myth around WASH • Standardization V. customization of the curriculum • Limited career options • Creation of transparent, 360-degree feedback mechanism • Resource management

WASH could be introduced into formal education in two formats

- Inclusion of WASH as a module in an existing course at a graduate and post-graduate level

OR

- Inclusion of WASH as a complete standalone course

STAKEHOLDER CHALLENGES

STUDENT

- Learning through interdisciplinary approach
- Sustaining satisfaction
- Employment constraints
- Language constraints and lack of reading material
- Additional burden of credit

EDUCATORS

- Finding an educator with the correct qualification and experience for an interdisciplinary approach
- Insufficient time to sensitize students on the fundamentals of WASH
- Pedagogical style
- Respecting diverse types of styles and its integration into teaching methods
- Pre-conceived notions and disciplinary bias.
- Keeping the subject relevant to the changing socio-political landscape.
- Administrative challenge of distribution of appropriate hours for each element

EMPLOYER

- Lack of awareness
- Unclear deliverables – what are the expectations, job descriptions
- Absence of an interface between employers and academic institutes

- Marketing of the course

THE WAY FORWARD

- Policy makers to adopt and implement a WASH curriculum at a school and graduate level for sensitization and post-graduate level with the intention of creating a workforce for the WASH sector.
- Top tier management in universities and academic councils to have the willingness to include WASH as part of the curriculum.
- TERI University has already developed a three-credit course (42 hours) titled 'social, economic and health dimension of WASH'. This course shall be part of the M Sc. & M Tech - Water Science and Governance programme. The university shall make this course available to all students across all specializations within the University and externally to other students, educators, professionals and members of the community.
- Other universities are encouraged to adapt/ draw inspiration from the course developed by TERI University and incorporate the same in their framework.
- Development of training programmes for educators to look at WASH holistically with an interdisciplinary lens.
- Regular stakeholder interaction to keep the WASH programme relevant.

1. WASH in India – Where are we?

1.1. Water Security in India

As per the 2011 census, 31% of the people in India lived in urban areas and the Government of India (GoI) has projected that this figure might go up to 60% by 2050. To cope with this rapid pace of urbanization, there is a continuous need for expansion of water and wastewater networks. A Discussion paper released by CUTS International in 2016 outlined that notwithstanding the richness in water resources, South Asian countries face an acute crisis of water availability. Thus, water security threatens to be a major issue in the future in India.

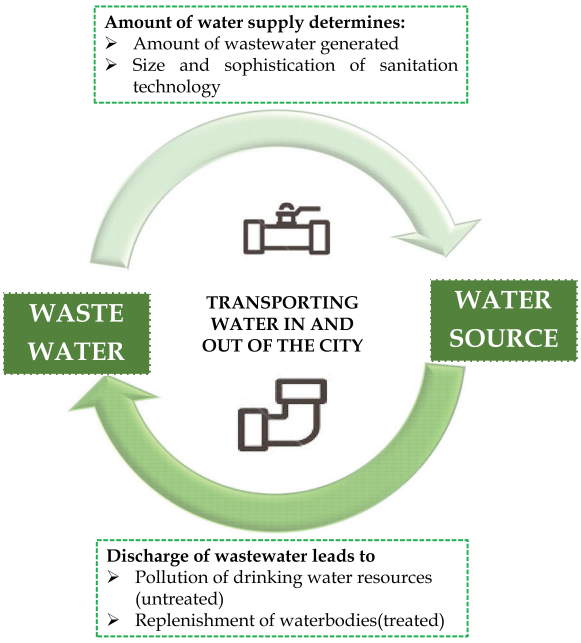


Figure 1: Transporting water in and out of the city

Until recently the government and civil society organizations (CSO) in India have focused on need based supply side interventions to enable access to safe and clean water, while treatment and management of wastewater remains a low priority. Despite having maximum number of wastewater treatment facilities, the metropolitan cities of Delhi and Mumbai still continue to discharge untreated wastewater in the river Yamuna and the Arabian Sea respectively (ENVIS, 2016). India can take cue from Australia, which had entered a prolonged period of drought in 2000, also known as the 'millennium drought'. The policy-makers and the community had come together to ensure that recycled and desalinated water are accepted as valuable resources within the framework of the entire hydrological cycle (Radcliff, 2015). They had adopted alternative water sources and had developed recycled potable water guidelines to meet their water needs.

India however, has vast geographical and climatic challenges where a *'one-size-fits-all strategy'* shall not work. Innovation is needed not just at a technological level but also at a policy level to ensure adoption of recycle and reuse of wastewater. According to the World Health Organisation (WHO), poor water quality due to indiscriminate discharge and poor sanitation standards has high health impacts in both the short and long term. It is anticipated that water and sanitation safety plans will be able to mitigate WASH related episodes (WHO). **However, trained manpower with understanding of cross sectoral issues is needed to develop individual city safety plans related to water and sanitation.**

While extensive work has been undertaken in cleaning up of rivers, lakes, and other manageable hydrological systems, it is felt that there is a dearth of professionals who can steer these movements with both precision and accuracy, with sustainable development as the key objective.

1.2. Sanitation in India

India contributes to 17.5 per cent of the world's population but tops the global list of open defecation (Figure 2). A World Bank study indicates that inadequate sanitation costed India economic losses equivalent to 6.4% of GDP in 2006 (World Bank, 2006). According to a survey by the National Sample Survey Office (NSSO), the country's sanitation infrastructure has seen a slight improvement in the last decade. However, as per the findings of the survey around 55.4 per cent of the people in villages are still opting for open defecation in the absence of water supply and proper drainage in the toilets.

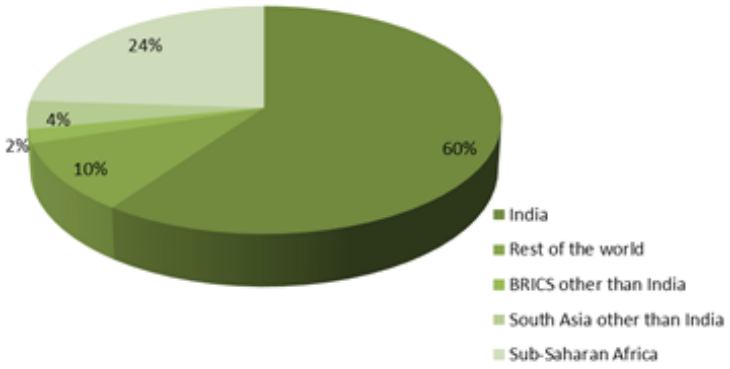


Figure 2: Open defecation in India compared to other countries/regions of the world (%) Source: WHO-UNICEF Joint Monitoring Program, 2015

Post-independence, public engineering departments (or their equivalents) in most states were responsible for rural sanitation. However, their primary task continued to be the management of rural water supply rather than sanitation which was given low priority. India launched the *Integrated Low-Cost Sanitation Scheme* (ILCS) in 1980 and the *Central Rural Sanitation Scheme* (CRSP) in 1986, with the focus on development of basic toilet infrastructure. The beneficiaries were decided based on their income status with preference to households below the poverty line (India Sanitation Coalition, 2017).

In 1999, the *Total Sanitation Campaign* (TSC) was started as a demand-led program with a focus on *Information, Education and Communication* (IEC), and for capacity building at a systemic level. The *Nirmal Bharat Abhiyan* (NBA) was launched in 2012 to replace the TSC. The focus was here on the principle of *community-led total sanitation* (CLTS) in rural areas. In 2003, GoI raised the bar by introducing *Nirmal Gram Puraskar* (NGP) as a part of TSC, a reward for the panchayats that had become *open-defecation free* (ODF). The assumptions in all the schemes were that people who have toilets would use them. However, without effective behavior change to match construction, many of these toilets fell into disuse and ruin (TARU, 2008).

The Swachh Bharat Mission (SBM) was later launched by the GoI on October 2, 2014 as a flagship programme to eliminate open defecation by October 2019. The task appears

to be ambitious becaus e of the multi-dimensionality of the problem. Its success would heavily depend on proper programme and resource management as well as the seamless coordination between various stakeholders.

The SBM has two sub-missions, the Swachh Bharat Mission-Gramin (SBM-G) for rural areas and the Swachh Bharat Mission-Urban (SBM-U) for urban areas. The Ministry of Drinking Water and Sanitation and the Ministry of Urban Development are the nodal ministries of GoI for implementing the SBM-G and SBM-U, respectively. SBM-G aims at construction of 111 million toilets at the cost of Rs. 136,000 crores by October 2019. It has brought a paradigm shift in the rural sanitation coverage which has increased from 41.5% in 2014 to 64% in 2017. To meet the 2019 target, 22.2 million toilets must be constructed per year. However, in 2016 - 2017, 21 million toilets were made. A total of 25.5 million have been made since October 2014 (India Sanitation Coalition, 2017).

Figure 3:Total number of rural toilets constructed from the FY 2001-02 to FY 2015-16 Source: MDWS (2017)

The situation is not too assuring even in urban India. With 11% of the world's urban population, India accounts for 43% of global urban open defecation (WHO-UNICEF JMP, 2015). Small cities in India contribute to more than 91% of total urban open defecation in the country. The Pune Declaration titled "Provision of Universal Sanitation in India" which resulted in the National Urban Sanitation Policy (NUSP) in 2008 was the turning point from where urban sanitation in India started receiving attention. NUSP sets out a vision of totally sanitized, healthy and environmental outcomes for all their citizens with a special focus on urban poor and women. City Sanitation Plans (CSPs) mandated under the NUSP were developed by many cities. Urban sanitation has three interconnected

pieces: toilets, drains and solid waste, with each having their own value chain. In urban areas, cities with slums and unplanned colonies that are not connected to sewage treatment plants still have instances of open defecation.

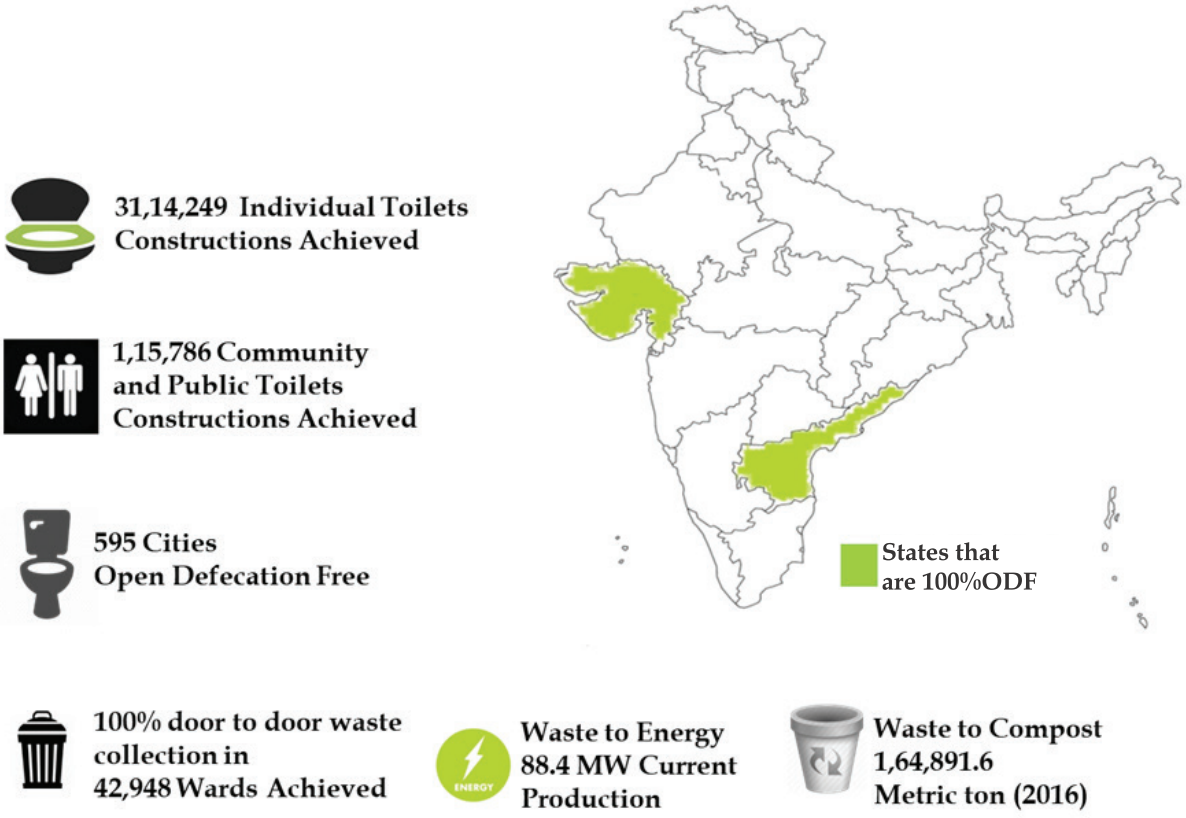
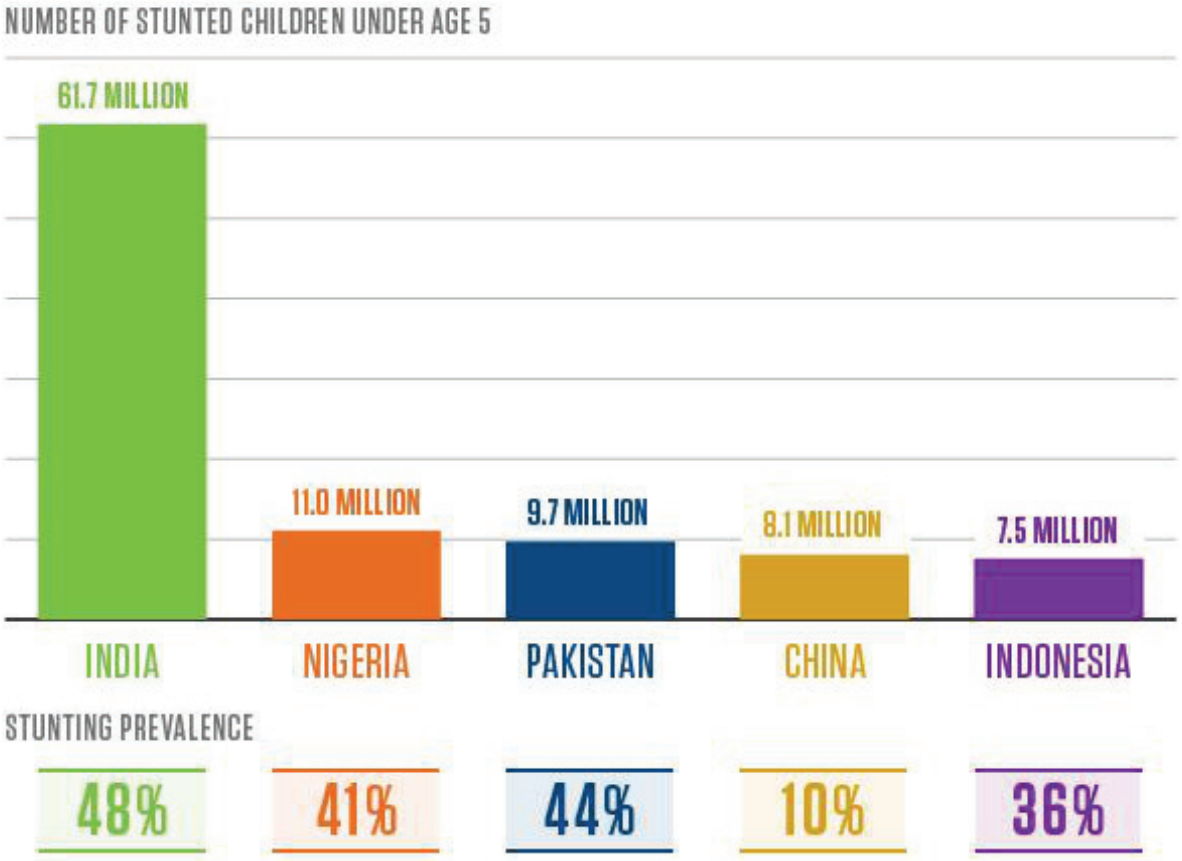


Figure 4: Snapshot of the SBM (U) progress. Source: (MOUD 2017)

1.3. Impact on health

In recent years, researchers have attributed a proportion of the diarrheal disease burden to poor WASH. There is a strong and growing consensus among stakeholders that WASH is an essential component of strategies to reduce undernutrition, and that efforts should be concentrated on the first 1000 days— from conception to a child's second birthday. Furthermore, inadequate food hygiene practices can also lead to elevated levels of microbial contamination of food. WASH plausibly affects maternal and newborn health through multiple direct and indirect mechanisms as WASH coverage in childbirth settings in low and middle-income countries continues to be extremely low. Although the evidence base remains largely qualitative in nature, it is increasingly accepted that inadequate access to WASH can expose vulnerable groups—particularly women and girls—directly to violence. This may cause psychosocial stress due to the perceived threat of such violence or the threat of being unable to meet the basic needs.

FOUR OF THE TOP FIVE COUNTRIES WITH THE LARGEST NUMBER OF THE WORLD'S STUNTED CHILDREN ARE IN ASIA.



1 IN 4
GLOBAL SHARE OF CHILDREN UNDER 5 WHO ARE STUNTED

860K
ANNUAL DEATHS OF CHILDREN UNDER 5 FROM MALNUTRITION

2.5 BILLION
PEOPLE LACK ACCESS TO IMPROVED SANITATION

Sources: Unicef, *Improving Child Nutrition: The Achievable Imperative for Global Progress* (New York: Unicef, 2013); World Health Organization, *Safer Water, Better Health: Costs, Benefits, and Sustainability of Interventions to Protect and Promote Health* (Geneva: WHO, 2008); and United Nations, "We Can End Poverty: Millennium Development Goals and Beyond 2015," accessed at www.un.org/millenniumgoals/environ.shtm, on July 29, 2014.

1.4. Mapping WASH to SDGs

1 NO POVERTY	➢ Access to two of the most fundamental basic services water and sanitation.
2 ZERO HUNGER	➢ Linkage between WASH and malnourishment
3 GOOD HEALTH AND WELL-BEING	➢ Improving global health, including reducing infant mortality, reducing water-related diseases.
4 QUALITY EDUCATION	➢ Better adoption of WASH improves school attendance ➢ Creates agents of change
5 GENDER EQUALITY	➢ Improved health seeking behaviour ➢ Improving women safety
8 DECENT WORK AND ECONOMIC GROWTH	➢ Improves dignity of labor of sanitary workers ➢ Creation of job opportunities in WASH
9 INDUSTRY, INNOVATION AND INFRASTRUCTURE	➢ Low cost, high quality innovation in WASH infrastructure ➢ Social innovation & engineering
10 REDUCED INEQUALITIES	➢ Increasing inclusiveness
11 SUSTAINABLE CITIES AND COMMUNITIES	➢ Creation of smart cities and villages
13 CLIMATE ACTION	➢ Increases adaptive capacity and community resilience ➢ Reduction in exposure after climate extreme like floods
16 PEACE, JUSTICE AND STRONG INSTITUTIONS	➢ Influencing and shaping institutional learning
17 PARTNERSHIPS FOR THE GOALS	➢ Creating an enabling environment for collaboration

2. WASH in Education – its Relevance

Marion Talbot in his paper 'Sanitation and Sociology' (1896) quoted an eminent Sanitarian who said that "the relation between sociology and hygiene are extremely intimate, - a fact which seems not sufficiently appreciated by students of either subject". The GoI through its various programmes under SBM has set out several targets; such as - India to become open defecation free by 2019. Being one of the key agendas, the government called upon the public and private sector to collaborate to bring about a behavioral change through sustainable and scalable solutions. To achieve this, over the past two years several demand and supply side interventions have been executed – such as construction of toilets in both rural and urban households, and outreach activities focusing on behavioral changes to create a conducive environment for sanitation.

However, much remains to be done to improve institution learning and improve our education with respect to WASH in education in both the formal and informal space.

2.1. Background and Objective of the Strategy Paper

Education for sustainable development across sectors is the need of the hour. WASH was a crucial element in the Millennium Development Goals (MDG) and it continues to find a place of strategic importance in the 2030 Sustainable Development Goals (SDG). Flagship programs of the current Government like SBM, AMRUT, SMART cities etc. pivot around WASH. Despite this, WASH remains a big challenge. This is mainly due to lack of trained manpower who can be appointed to steer these programs from the forefront.

Both the private and the public sector, have through their corporate social responsibility initiatives and other mentorship and management initiatives, tried to create a knowledge base for community education and subsequent last mile behavioral change to be effective across India. Insights from a recent Report titled, 'Swachh Bharat – Vision to Mission' in April 2017 by India Sanitation Coalition & Sustainable Sanitation Alliance clearly emphasized the need for SBM to be a ***people's movement***. With the initial focus on supply side interventions such as construction of toilets, there was an urgent need for community – led approaches through IEC to bring about behavioral change; in addition to the much-needed government enforcement to improve the usage of existing toilets.

This Report further recommended a stronger knowledge management base through creation of **Rapid Action Learning Units (RALU)** as a means of institutional learning at the district, state and national level. To support and further this agenda; stakeholders from the Government, development organizations, civil society and academic institution strongly believed in laying down a foundation for both institutional learning and community education, through formal higher education system – especially degree programmes.

For India to be truly successful with respect to SBM, there is an urgent need for holistic learning and understanding of WASH. Water, sanitation and hygiene due to their interdependent nature, are grouped together to represent a growing sector. While the work in each of these areas is separate, their inter-dependency needs that all disciplinary boundaries collapse. For example, without toilets, water sources become contaminated; without clean water, basic hygiene practices are not possible (UNICEF, n.d.).

A need for a WASH curriculum in higher education was realized in order to:

1. Sensitize the youth about the importance of WASH.
2. Enable young scholars (graduates and post graduates) to develop a holistic understanding about its needs, its place in sustainable development and apply the same towards innovative solutions.

This paper further aims to present a ***case for inclusion of WASH in higher education curriculum***. The expected outcomes through this inclusion are:

1. Students become catalyst of change in the community through this knowledge.
2. Creation of trained manpower who can be appointed to steer these flagship programs and bridge the shortfall of professionals with expertise in WASH
3. Further institutional learning, developing high quality yet low-cost innovative solutions and bringing about last mile changes at both the rural and urban areas of India.
4. Creation of a two-tier educational system, namely –
    a. ***Centers of excellence:*** create educators and leaders in this area.
    b. ***Skilling in WASH through technical programmes:*** development of programmes to develop 'on ground' field staff.

Mary Douglas (1966) an anthropologist, in her paper 'Purity and danger – an analysis on the concepts of Pollution and taboo' defined dirt as 'a matter out of place'. She believed that 'dirt offends against order. Eliminating it is not a negative movement, but a positive effort to organize the environment'. Hence, the concept of cleanliness must be looked at from four lenses: social, bio – cultural, economic and technological perspective. It is only when WASH becomes a 'site' where all sciences meet, will India as a society move from fatalism (where we believe that a matter out of place is not dirt) to truly egalitarian where everyone consciously and positively organizes their environment (Figure 5).

At present, different elements of WASH are being treated as standalone components in various courses across the science and social science landscape. Very few academic

institutions impart holistic learning at post graduate level. Interdisciplinary educational institutions such as TISS and TERI University have started offering courses such as water management with special focus in technology and governance.

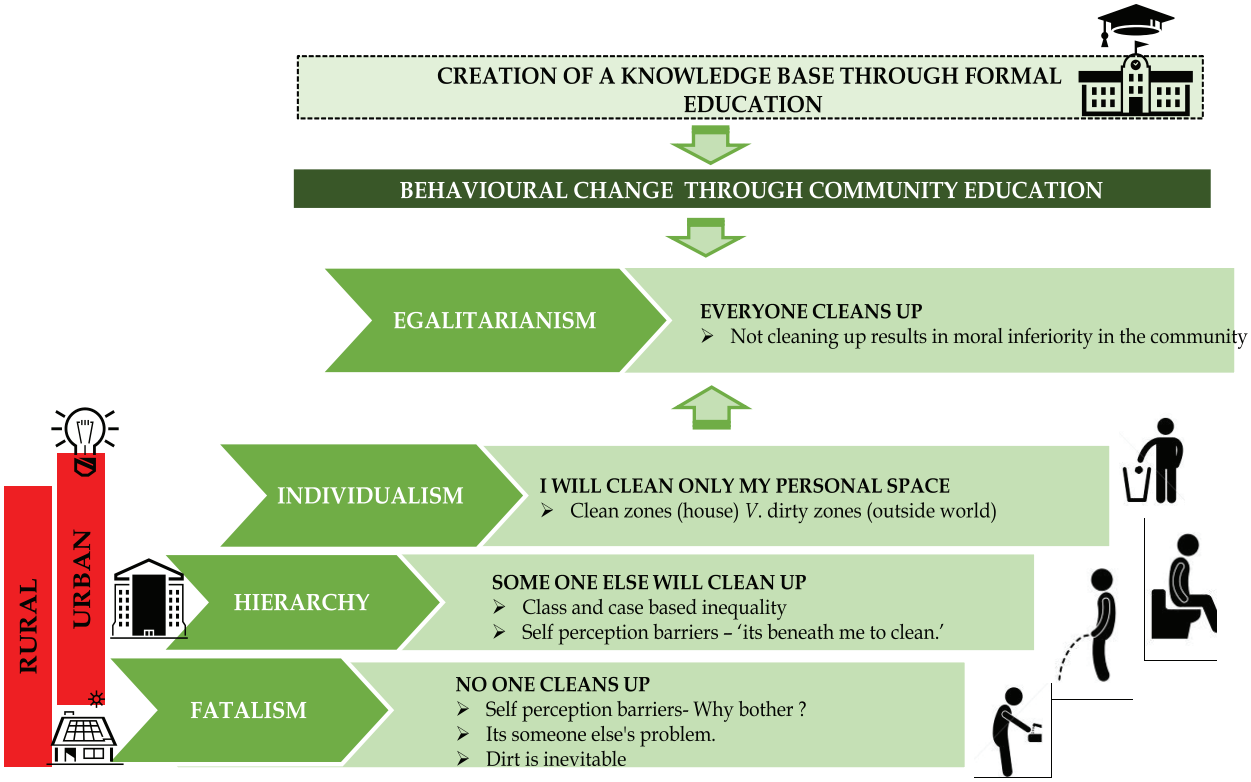


Figure 5:WASH and behavioral change: Where do we stand?

The current scenario of higher education in the areas of water, sanitation and hygiene both nationally and internationally are illustrated in Annexure 1[1] .

2.2. Vision - Inclusion of WASH Curriculum in Higher Education

At present, the centralized system of water distribution, sewage collection and treatment has not been able to keep pace with rapid urbanization. In order for WASH demands to be addressed at a local level - planning, development and management of facilities will need to be understood in context with the local socio – economic landscape. A WASH curriculum would help the budding professionals across levels, to develop the right skills and attributes in order to 'ask the right questions' and seek the right solutions while thinking beyond their discipline.

Furthermore, there is a growing demand for the establishment of on-site sanitation and treatment facilities and decentralized facilities which will enable the reuse of treated wastewater for non-potable water use. Pan India, there are several geographical locations

[1] This table as displayed in Annexure 1 is merely indicative. Courses as shown in this table have been examined by TERI University for the purpose of this Strategy paper

that have high density population without any sewage system. Building conveyance systems in such areas becomes extremely difficult and thus, having an on-site wastewater treatment facility is the most feasible solution from a planning, execution, heath and socio-economic perspective. However, if decentralized systems were to be adopted, they would have to be operated and maintained at local levels by the community. For such a 'buy in' by the community they must be educated about the importance of WASH.

It was hence envisioned that the inclusion of WASH in formal higher education, will help students in understanding the multiple dimensions of WASH.

Thus, the course framework designed must aim to blend 'theory and praxis' so that the bio- cultural needs of a community can be planned effectively using appropriate technology to create 'innovative and sustainable solutions', while keeping the principles of social justice and equity, participation and efficiency at the epicenter (Figure 6: Key elements of WASH).

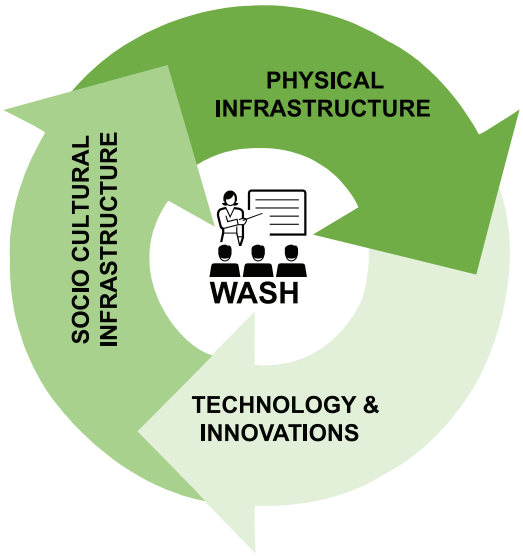


Figure 6: Key elements of WASH

The course structure was ideated upon keeping in mind three types recipients of this knowledge:

1. Youth, sensitizing them 'agents of behavioral change'
2. Young professionals envisaging WASH as an area of specialization enabling them to support government initiatives like SBM, AMRUT and Smart Cities' Mission
3. Potential educators and trainers to impart knowledge through formal and informal channels.

The curriculum will enable these types of recipients to address the needs of different sections of society especially women and help them overcome gender specific WASH insecurities. This would result in improving health seeking behavior at both the community and individual level.

2.3. Process – Curriculum development in WASH

To develop a WASH curriculum, TERI University under took a one year study. The efforts put in by the faculty members and researchers can be categorized into three stages:

- Need assessment through semi structured interviews with senior faculty members from various Universities across India.

Key Findings:

- Not all disciplines need a standalone course on WASH
- The curriculum should be different for different levels of education like graduate and post-graduate
- Program-specific modules can be created and integrated with existing courses like B.Sc Home Science, Sociology , Social Work, Anthropology, Economics, Geography and professional courses like Medicine and Architecture (Urban Planning)

- **Desk review** of various course curriculum of existing graduate and post-graduate degree programmes associated to water management, health and sanitation in India and globally. Annexure 1[2] illustrates the courses examined during the desk review.

Key Findings

- Limited options for an interdisciplinary WASH program available globally
- The programs are mainly offered at masters level and primarily have a scientific focus
- WASH in India is being offered as certificate or diploma programs by few institutes.
- Apart from Engineering, WASH is near absent in existing programs offered by universities.
- Need to break out of silos by adopting interdisciplinary curriculum
- Community involvement and scaling up of solutions can happen only through formal education

- **WASH curriculum development workshop at TERI University**. This workshop had equal representation of key stakeholders ranging from academic institutions, development and donor agencies, government, private sector and young scholars. The primary aim of the workshop was to develop a consensus on the operational framework of the WASH curriculum, to develop different modules suited to different fields of specialization in addition to developing a standalone interdisciplinary course for WASH which may be adopted in suitable higher education programs.

- It was during the **breakout sessions** during the WASH curriculum development workshop that a suggestive curriculum framework emerged. The stakeholders were divided into four different groups that represented the four core areas of

[2] This table as displayed in Annexure 1 is merely indicative. Courses as shown in this table have been examined by TERI University for the purpose of this Strategy paper

WASH; namely, health and nutrition, science and engineering, economics and social sciences.

2.4. SWOP Analysis of integrating WASH in Higher Education

STRENGTH	WEAKNESS
➢ Individualism to egalitarianism	➢ The taboo associated with WASH
➢ Sensitization of youth, behavioral change in community	➢ Linkage between employers, educators and students
➢ Improving health seeking behavior	➢ Realization of execution
➢ Reducing the under-five mortality rate	➢ Academic willingness and the right leadership to implement WASH course at academic institutions
➢ Inclusion of WASH in the Education Policy	
➢ Inter disciplinary team building	
➢ WASH – a technological humanist approach	
OPPORTUNITIES	**PROBLEMS**
➢ Understanding the relationship between malnutrition and WASH	➢ Pedagogical approach
➢ Creation of hubs for low cost high quality innovative solutions	➢ Breaking the myth around WASH
➢ Creation of a knowledge base	➢ Standardization V. customization of the curr iculum
➢ Creation of leaders and trained work force	➢ Limited career options
➢ Development of 'good' practices in India and its global uptake in developing nations	➢ Creation of transparent, 360-degree feedback mechanism
➢ Discussion creates discourse	➢ Resource management

3. Curriculum & Pedagogy

The deliberations during the WASH curriculum development workshop at TERI University revealed that WASH could be introduced into formal education in two formats

- Inclusion of WASH as a module in an existing course at a graduate and post-graduate level

  or

- Inclusion of WASH as a complete standalone course

3.1. Suggested curriculum framework

The **breakout sessions** during the WASH curriculum development workshop constructed the following suggestive curriculum framework for 4 core thematic areas namely health and nutrition, science and engineering, economics and social sciences.

NAME – DEGREE PROGRAMME	NEED FOR WASH	MODULE/ COURSE INCLUSION	FOCUS AREAS	TRAINING METHODOLOGY	LEARNING OUTCOMES
Science and engineering	*Community, water, sanitation and hygiene*				
In all programs of Engineering, as it is a cross-cutting issue ➢ Life Science ➢ Physical Science ➢ Agricultural Science ➢ Home Science	YES	➢ Core course in graduate level ➢ Course/ module in post graduate level ➢ Maximum 02 credits	➢ Centralised and decentralised technology ➢ Value chain (containment, transportation, treatment, disposal)	➢ Classroom based ➢ Experiential and project based for example, Adopting a local area and working on identification of	➢ Creating responsible citizens ➢ Generating awareness ➢ Adopting interdisciplinary approach ➢ Understanding of conservation of resources

NAME – DEGREE PROGRAMME	NEED FOR WASH	MODULE/ COURSE INCLUSION	FOCUS AREAS	TRAINING METHODOLOGY	LEARNING OUTCOMES
			➢ Environment Sanitation: (diseases, hygiene, vectors, infectious diseases, vector control, preventive measures, disinfection, traditional knowledge) ➢ Solid waste management (recycle and reuse) ➢ Operation and maintenance ➢ Risk assessment	WASH issues and formulation of solutions	➢ Developing management, governance, operation and maintenance skills ➢ Developing consciousness about water scarcity ➢ Generating interest through internship opportunity in local bodies ➢ Developing future entrepreneurs
Economics	*Water, sanitation and hygiene*				
Urban	YES	Course	➢ Natural monopoly, risk finance ➢ Fiscal decentralization, micro-finance, informal markets	➢ Collaborative teaching among different universities to reduce the cost of course incurred by one university	➢ Exposure to different aspects of governance ➢ Exposure to ground level conditions

NAME – DEGREE PROGRAMME	NEED FOR WASH	MODULE/ COURSE INCLUSION	FOCUS AREAS	TRAINING METHODOLOGY	LEARNING OUTCOMES
Economics	*Water, sanitation and hygiene*				
			➢ Property regimes (land & water) ➢ Political economy Economic regulation	➢ Case-study based & internship in local bodies/ NGOs/ development sector entities, workshops facilitates by practitioners from relevant backgrounds, institutions with requisite expertise	➢ Learning from the experiences shared by practitioners at workshops ➢ Hands-on approach to solving issues from governance perspective through case studies, internships and mentoring by domain practitioners ➢ Exposure to techno-economic issues linked to governance
Peri-Urban	YES	Course	➢ Value chain analysis of sanitary system (including septage management) ➢ MIS/ monitoring evaluation and learning ➢ Infrastructure financing ➢ Incentivizing and behavioral economics ➢ Fiscal decentralization ➢ Informal markets ➢ Property regimes (land and water) ➢ Political economy		

NAME – DEGREE PROGRAMME	NEED FOR WASH	MODULE/ COURSE INCLUSION	FOCUS AREAS	TRAINING METHODOLOGY	LEARNING OUTCOMES
Economics	*Water, sanitation and hygiene*				
Rural	YES	Course	➢ Value chain analysis of sanitary system (including septage management) ➢ MIS/ Monitoring Evaluation and Learning ➢ Incentivizing and behavioral economics ➢ Fiscal Decentralization ➢ Micro-finance ➢ Property regimes (land & Water) ➢ Political Economy		

NAME – DEGREE PROGRAMME	NEED FOR WASH	MODULE/ COURSE INCLUSION	FOCUS AREAS	TRAINING METHODOLOGY	LEARNING OUTCOMES
Social Science	*Water, sanitation and hygiene*				
Psychology	Yes 1. Behavioral psychology	Module	➢ Behavioral perspective and WASH ➢ ICTs	➢ Lecture and practical ➢ Surveys ➢ Perception mapping ➢ Experiments	➢ Graduate courses – sensitization ➢ Development of an analytical framework
Social Anthropology	Yes 1. Sociology of health 2. Sociology of exclusion and inclusive policy. 3. Sociology of gender 4. Ecological anthropology 5. Theories of Development	Module	➢ Evolution of sanitation ➢ Specific thinkers ➢ Social movements ➢ Policy for marginalized section on accessibility ➢ Discrimination and WASH ➢ WASH as a right's based perspective ➢ Sustainable development	➢ Lecture and practical ➢ Fieldwork ➢ Case study ➢ Videography ➢ Ethnographic film	

Urban and rural planning	Yes 1. Urban and Rural Service 2. Social Infrastructure	Module	➢ Sanitation legislation ➢ Provision of water ➢ Wastewater management ➢ Design of toilets ➢ Planning approach ➢ Participatory approach techniques for WASH ➢ Sanitation plan ➢ Policy and programmes – like National Urban Sanitation Policy	➢ Lecture and practical ➢ Fieldwork ➢ Case studies	
Health geography	Yes	Module	➢ Access and provision to health services ➢ Disease epidemiology	➢ Lecture and practical ➢ Fieldwork ➢ Case studies	
Social work	Yes	Module			
Philosophy	Yes 1. Ethics	Module	➢ Social ethics ➢ Value education	➢ Lecture	

NAME – DEGREE PROGRAMME	NEED FOR WASH	MODULE/ COURSE INCLUSION	FOCUS AREAS	TRAINING METHODOLOGY	LEARNING OUTCOMES
Health and Nutrition	*Water, sanitation and hygiene*				
Medical Science (Community medicine)	Yes. 1. Economic aspects of WASH	Module ➢ Community Medicine, ➢ Gynecology, ➢ Pediatrics and ➢ Internal Medicine	➢ Economic impacts of WASH and related diseases ➢ Impact assessment ➢ Mathematical model for predicting under different scenarios ➢ Cost effectiveness ➢ Cost benefit analysis ➢ Actuarial costs ➢ Financing mechanisms Economics of implementation of WASH	➢ Class room teaching ➢ Project based and experiential learning ➢ Case study learning	➢ Able to analyze the data an conduct cost benefit and effectiveness analysis to feed into the policy making ➢ Decision making at both micro and macro level
Preventive and social medicine urban/rural	Yes	Course ➢ Vocational Training	➢ Economic aspects ➢ Social aspects ➢ Environmental health		➢ Informed prescription, decision making ➢ Establish protocols

			➢ Technical aspects ➢ Legal aspects		
Climate change and health	Yes	Module	➢ Water quality – impacted by climate change ➢ Drainage, extreme events, precipitation ➢ Wastewater treatment ➢ Adaptation and health resilience		➢ Building resilience and adaptation capacity ➢ Reduction in loss of life ➢ Morbidity
Nutrition and WASH	Yes	Module ➢ Impact of WASH on nutrition	➢ Processing of food in hygienic manner and sanitary condition ➢ Worm infestation impacting nutritional status ➢ Storage and usage of food ➢ Feco-oral transmission ➢ Hygiene practices		➢ Healthy living practices ➢ MMR and IMR decreases

3.2. Challenges - Stakeholder perspective

STAKEHOLDER	CHALLENGES
STUDENT	➢ Learning through interdisciplinary approach
	➢ Sustaining satisfaction
	➢ Employment constraints
	➢ Language constraints and lack of reading material
	➢ Additional burden of credit
EDUCATOR	➢ Finding an educator with the correct qualification and experience for an interdisciplinary approach
	➢ Insufficient time to sensitize students on the fundamentals of WASH
	➢ Pedagogical style
	➢ Respecting diverse types of styles and its integration into teaching methods
	➢ Pre-conceived notions and disciplinary bias.
	➢ Keeping the subject relevant to the changing socio-political landscape.
	➢ Administrative challenge of distribution of appropriate hours for each element
EMPLOYER	➢ Lack of awareness
	➢ Unclear deliverables – what are the expectations, job descriptions
	➢ Absence of an interface between employers and academic institutes
	➢ Marketing of the course

4. A Way Forward

1. Formulation of policies to adopt and implement WASH curriculum at school and graduate level for sensitization of students and post-graduate level with the intention of creating a workforce for the WASH sector.

2. Top tier management in universities and academic councils to have the willingness to include WASH as part of the curriculum.

3. TERI University has already developed a three-credit course (42 hours) titled 'Social, economic and health dimensions of WASH'. This course shall be part of the M Sc. & M Tech - Water Science and Governance programme. The university shall make this course available to all students across all specializations within the University and externally to other students, educators, professionals and members of the community.

4. Other universities are encouraged to adapt/ draw inspiration from the course developed by TERI University and incorporate the same in their framework.

5. Development of training programmes for educators to look at WASH holistically with an interdisciplinary lens.

6. Regular stakeholder interaction to keep the WASH programme relevant.

Annexure 1

Current scenario of WASH in Higher Education

National Programmes at a Graduate and Post-graduate level

LEVEL	WATER	SANITATION	HEALTH
GRADUATION)	➢ *Indian Institute of Technology (IIT):* Diploma, B.Sc., B. E, B. Tech in Civil Engineering/ Environmental Engineering ➢ Modules in other technical courses like Chemical Engineering, Biotechnology, B.Arch ➢ *National Institute of Technology (NIT):* Diploma, B.Sc., B. E, B. Tech in Civil Engineering, Environmental Engineering. ➢ Selective modules in other technical courses like Chemical Engineering, Biotechnology, B.Arch ➢ *State & autonomous universities:* Civil Engineering, Environmental Engineering	➢ *IIT's, NIT's, state & autonomous universities:* Module in the technical courses like Civil Engineering, Biotechnology, Environmental Engineering	➢ *Public Health Foundation of India (PHFI):* Diploma and Certificate courses in health ➢ *Delhi University:* Modules in selective graduate courses ➢ *Indira Gandhi National Open University (IGNOU):* Diploma in nutrition and health ➢ *All India Institute of Hygiene and Public Health (AIIHPH):* Courses on health ➢ *J.D. Birla Institute of Home Science:* Modules in courses offered ➢ *National Institute of Nutrition:* Courses on public health ➢ *Medical colleges:* Courses on community medicine

POST-GRADUATION	➢ *IIT's, NIT's, State & Autonomous Institutions:* M.E, MTech, M.Phil., M.Sc. in Civil Engineering, Environment Engineering ➢ *Jawaharlal Nehru University (JNU):* Modules in Environmental Studies ➢ *TISS:* PG Diploma in Water, Sanitation and Hygiene. ➢ *TERI University:* M SC. & M Tech in Water Science & Governance	➢ *IIT's, NIT's, State & Autonomous Institutions:* Modules in other courses like Sanitation Biology, Civil Engineering, Environmental Engineering	➢ *TISS:* Masters of Health Administration, Public Health and Policy, Rural Development ➢ *National Institute of Health and Family Welfare (NIHFW):* PG Diploma on Public Health Management ➢ *PHFI:* Post Graduate Diploma program in Public Health and Nutrition

International Programmes

INTERNATIONAL INSTITUTION	COURSE
Center for Global Safe Water at Emory University (CGSW)	Certificate in Water, Sanitation, and Hygiene (WASH)
University of Queensland Australia - Chemical engineering department	Course on Water Supply, Sanitation, and Hygiene
Cranfield University	MSc Community Water and Sanitation
University of Leeds	MSc. Water, Sanitation and Health Engineering
IHE Delft Institute for Water Education	Urban Water and Sanitation programme
University of Copenhagen	Master of Disaster Management – Short Course on Water Supply and Sanitation in Emergencies

References

1. Census of India. (2011). Office of the Registrar General and Census Commissioner, Ministry of Home affairs, Government of India.
2. Coffey, D., Gupta, A., Hathi, P., Khurana, N., Spears, D., Srivastav, N. and Vyas, S. (2014). *Sanitation Quality Use Access and Trends*. New Delhi: RICE Institute.
3. CEPT University (2015). Innovative Sanitation Financing: To make Indian cities open defecation free.
4. Das, S.P (2016). Interrogating South Asia's Hydro Politics: Implications for Water Security and Hydro-Power Cooperation in the Sub-Continent. Discussion Paper CUTS International http://www.cuts-citee.org/sdip/pdf/Discussion_paper-Interrogating_South_Asias_Hydro_Politics.pdf (last accessed 21 June 2017)
5. Douglas, M. (1966). Purity and danger; an analysis of concepts of pollution and taboo. New York, Praeger.
6. NVIS Centre on Hygiene, Sanitation, Sewage Treatment Systems and Technology. 2016. National status of wastewater generation & treatment. http://www.sulabhenvis.nic.in/Database/STST_wastewater_2090.aspx (last accessed 23 June 2017)
7. *Plan Documents | Ministry of Drinking Water and Sanitation*, GOI. [online] Available at: http://www.mdws.gov.in/documents/plan-documents (last accessed on 20 June 2017)
8. *Ministry of Urban Development, Goverment of India*. [online] Available at: http://www.moud.gov.in/ (last accessed on 21 June 2017)
9. Nirmal Gram Purushkar awarded panchayats, A status study. (2008). New Delhi: Taru Leading Edge.
10. Progress on Sanitation and Drinking Water-2015. Update and MDG Assessment. (2015). WHO-UNICEF Joint Monitoring Program.
11. Rohilla, S., Luthra, B., Padhi, S., Yadav, A., Varma, R. and Watwani, J. (2016). *Urban Shit: Where does it all go? Down to Earth*.
12. Radcliffe. J.C (2015) Water recycling in Australia – during and after the drought. Environ. Sci.: Water Res. Technol., 1, 554.
13. Swachh Bharat: Vision to Mission. (2017) India Sanitation Coalition & Sustainable Sanitation Alliance. [online] Available at: http://www.susana.org. (last accessed 21 June 2017)
14. Talbot, M. (1896) Sanitation and Sociology. American Journal of Sociology 2:1, 74-81
15. The Economic Impact of Inadequate Sanitation in India. (2006). New Delhi: World Bank.

Contributors

1	Mr. Depinder Kapur	Senior WASH Expert	NIUA
2	Dr. Arun Kumar Sharma	Professor	UCMS
3	Dr. Bhawna Bali	Assistant Professor	TERI University
4	Dr. Debjani Ghosh	Associate Professor	NIUA
5	Dr. Girija Bharat	Director, WASH Consultant	Mu Gamma Consultants
6	Dr. Kamna Sachdeva	Assistant Professor	TERI University
7	Dr. M. V Shiju	Associate Professor	TERI University
8	Dr. Montu Bose	Assistant Professor	TERI University
9	Dr. Nirupam Datta	Assistant Professor	TERI University
10	Dr. Paramita Datta Dey	Senior Research Officer	NIUA
11	Dr. Renu Khosla	Managing Director	CURE
12	Dr. Smriti Das	Associate Professor	TERI University
13	Dr. Sudeshna Chatterjee	CEO	Action for Children's Environment
14	Dr. Sukanya Das	Assistant Professor	TERI University
15	Dr. Swarup Datta	Assistant Professor	TERI University
16	Dr. Vinay Prasad Sinha	Associate Professor	TERI University
17	Dr. Wangshimenla Jamir	Associate Professor	Department of Geography, University of Nagaland
18	Mr. A K Sengupta	Retd. Director General	Sulab Academy
19	Mr. Alok Dasgupta	Head, Technical Cell	CURE
20	Mr. Md. Baquir	Research Scholar	Aligarh Muslim University
21	Mr. Pranjal Deekshit	Assistant Professor	TISS, Mumbai
22	Mr. Rakesh Mehrotra	Associate Professor	Department of Civil Engineering, DTU
23	Mr. Roopak Varshney	Research Scholar	Aligarh Muslim University
24	Mr. Sampath Gopalan	Technical Expert	WASH Institute
25	Mr. V R Raman	Head of Policy	Water Aid
26	Ms. Fawzia Tarannum	Lecturer	TERI University
27	Ms. Kangkanika Neog	Research Associate	CEEW
28	Ms. Ranjana Ray Chaudhuri	Lecturer	TERI University
29	Prof. Anwar Khursheed	Professor	ZHCET, Aligarh Muslim University
30	Prof. Arun Kansal	Dean Research and Relationship	TERI University
31	Prof. Ashish Saxena	Professor and Head	Department of Sociology, Allahabad University
32	Prof. Prateek Sharma	Dean Academic	TERI University
33	Prof. Shyamala Mani	Professor	NIUA
34	Prof. V K Srivastava	Chairman	Department of Anthropology, Delhi University
35	Prof. V. K Minocha	Professor and Principal	Govt. Engg College, Jaffarpur

teri university

For more information, please contact

TERI University
Plot No. 10, Institutional Area, Vasant Kunj
New Delhi - 110 070 India
T +91 11 71800222 (25 lines), F +91 11 26122874
E registrar@teriuniversity.ac.in

www.teriuniversity.ac.in