



## Training Module

# WASH Capacity-Building

for State Water, Women & Child, Rural &  
Urban Development and Health Department  
Officials

Women - and Child - Responsive

Climate-Resilient Integrated Planning



DRAFT

## MODULE OVERVIEW

### Introduction

This WASH Climate Change Adaptation Training Module is developed as part of an initiative to build capacity of state level government officials in India by explaining the linkages between WASH and climate change adaptation, subsequently to reduce their states' vulnerability to climate change. It presents selected tools and methods that they can use to understand their climate risk and vulnerability, and develop strategies for reducing them by appropriately and sufficiently modifying ongoing national and state level development programs and plans.

This document provides a framework for the delivery of the module. It is also designed to be a reference resource for the learners.

### Purpose and scope of the training module

The purpose of the training module is to provide a selection of accessible resources that can be adapted and used in the delivery of training courses in climate change adaptation for officials at state and local government levels. Ultimately the module aims to influence the way that the state government departments address the challenges posed by climate change through more and better programme activities that improve climate resilience. The training module will support the mainstreaming of climate change adaptation in WASH sector programmes through such capacity building efforts.

Through a mixture of learning about climate change concepts and linkages with WASH, practical tools for mainstreaming climate change adaptation, and local examples, the module also aims to support users in finding entry points to climate change adaptation.

The training module focuses on two cross-cutting issues - gender and children. It also takes a wider approach to managing sources of climate uncertainty and risk in the WASH sector, and the approaches and tools introduced have potentially wider applicability, especially scenario- based planning. The need to mainstream and integrate other approaches such as DRR is also addressed in this module.

### Learning objectives

- Awareness and sensitization among targeted audience for climate change,
- Understand how mainstreaming provides a way for the WASH sector to engage and effectively meet the challenges presented by climate change,
- Understand how to adapt scenario-based planning,

- Identify and apply tools to integrate climate change considerations into existing national flagship programmes and state annual plans,
- Access a wide range of resources to build on the skills and knowledge developed during the workshop.

### **Expected Benefits**

- Overall sensitization of participating government departments to understand their role in CCA and knowledge in addressing these issues with more abilities.
- The capacity of governmental officials developed in understanding local issues of CCA linked to planning.
- Improved ability to collaborate with the each other both horizontally and vertically for achieving sustainable development at the state and district levels.

### **Target Audience for training**

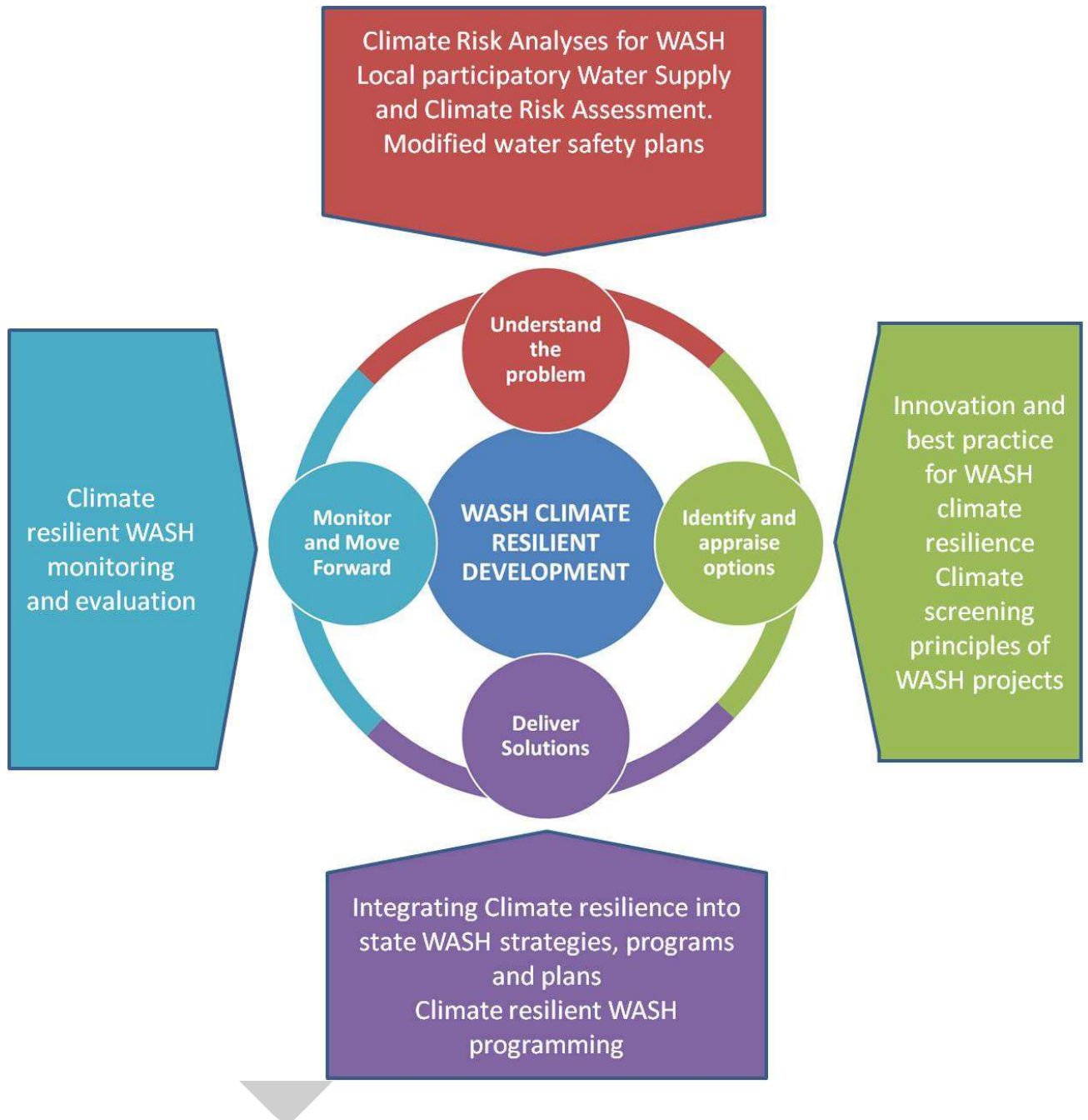
Senior level government officials from the departments of Water Supply & Sanitation, Women & Child Development, Rural & Urban Development and Health Department.

### **Training Methodology**

The content of this module will be delivered using a range of training methodologies. These include:

- Audio-visual presentations and lectures by the facilitator
- Large group discussions (in plenary)
- Small group work and discussions
- Questioning techniques
- Brainstorming
- Case studies
- Guiding questions for self-study
- Additional reading

**Framework for content delivery**



## Training Agenda and Schedule

Time	#	Day 1	#	Day 2
0900-0930	1.1	Welcome and Introductions, Workshop Overview, Expectations, Ground Rules, Domestics	2.1	Recap of previous day's learning
0930-1030	1.2	Introduction and Overview of Climate Change	2.2	Mainstreaming climate change adaptation in WASH: With focus on women and children
1030-1100		Tea/Coffee		Tea/Coffee
1100-1200	1.3	Climate Change and WASH: Context, Risks, and Impact	2.3	Way Forward: Strategic Framework for Mainstreaming DRR and CCA In WASH: Integrating knowledge, information and good practice into developmental planning
1200-1300	1.4	Considerations for WASH Climate Resilience: Considerations, Strategies, and Principles in Climate Change-induced uncertainty		
1300-1400		Lunch		Lunch
1400-1530	1.5	Scenario-based planning: Applying a 'climate lens' to WASH strategies and plans through a step-wise approach	2.4	Group-work Presentation on mainstreaming DRR and CCA in existing WASH developmental planning
1530-1600		Tea/Coffee		Tea/Coffee
1600-1700	1.6	Good Practices, Wash Innovations and Case Studies: Practical Interventions and WASH Technologies	2.5	Action Planning: Developing a Local Adaptation Plan of Action
1700-1715	1.7	Daily review	2.6	Course Closure and Departure

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## 1. Session 1: INTRODUCTION AND OVERVIEW OF CLIMATE CHANGE

**Time: 60 mins**

### **Session Overview**

This session introduces the concepts of climate change and climate variability. It explores the effects of climate change, with particular emphasis on how climate change is affecting women and children in India.

### **Key Learning Objectives:**

- Describe climate change, its causes and main effects
- Understand the impact of climate change in India
- Describe how climate change is affecting the sectors of Health, Nutrition, WASH, Education, Livelihoods and food security, Child Protection, and Natural resource management.
- Understand climate change related vulnerability of children and women.

### **Key Learning Points:**

- Climate change presents one of the greatest development challenges of our time.
- Economic damage caused by extreme weather events has increased substantially over the last few decades in India.
- India has reasons to be concerned about the impacts of climate change.
- Climate change is affecting the sectors of Health, Nutrition, WASH, Education, Livelihoods and food security, Child Protection, and Natural resource management.
- While climate change affects everyone, it is not gender or age neutral. It magnifies existing inequalities, reinforcing the disparity for children and women in their vulnerability to climate change, and their capability to cope with it.
- The 2008 National Action Plan on Climate Change (NAPCC) drawn up by the Government of India fails to recognise the gender dimensions of climate change, either explicitly or implicitly.
- However, state Governments are now beginning to reflect greater gender sensitivity in their SAPCCs.

### **Session Content:**

#### **1.1 What is climate change?**

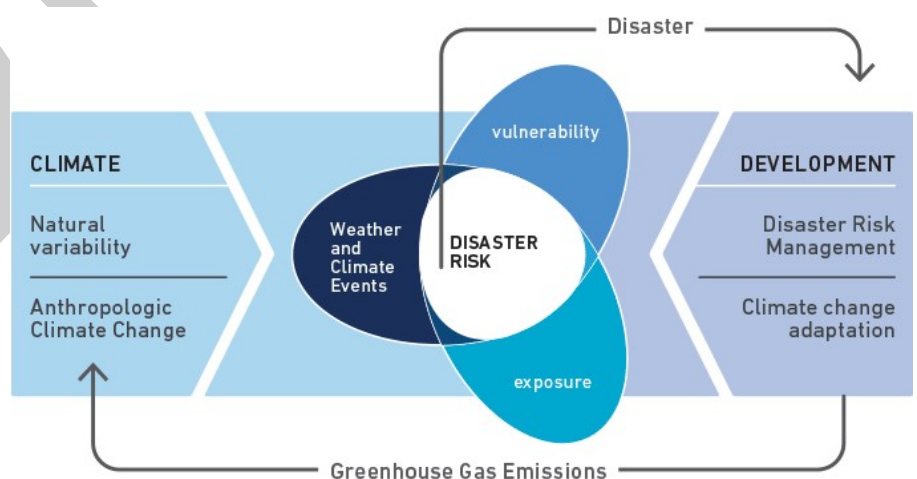
The United Nations Framework Convention on Climate Change (UNFCCC) defines climate change as a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

Changes to the composition of the global atmosphere occurs when greenhouses gases (GHGs) are emitted into the atmosphere in greater volumes than occurs naturally from the planet's processes, and when the planet's processes to sequester or 'sink' GHGs (to prevent it reaching the atmosphere) are hampered. Emissions of GHGs from burning fossil fuels, and reduction of sinks through deforestation and cultivation of land are human activities that directly alter the composition of the global atmosphere. Indirect impacts are through feedback loops, where warming caused by these human activities reduces the ability of oceans to sequester due to increased surface temperatures, and reduced coverage of ice sheets (melted by warmer temperatures) increasing warming further through reduced surface area for reflecting back solar heat.

Climate change presents one of the greatest development challenges of our time, and it is now clear that the eradication of poverty and inequality cannot be achieved without also addressing the causes and consequences of climate change. At the global level this requires a twin-track approach, of both curbing the actions that are causing climate change, and learning to live with the now unavoidable climatic changes that are and will continue to unfold. To curb further climate change requires mitigation actions that reduce greenhouse gases (GHGs) in the atmosphere; primarily by reducing the volume of GHGs emitted into the atmosphere through the burning of fossil fuels. Large scale decarbonisation of economies is required in order to deliver the scale of mitigation required to slow down climate change, limiting global warming to "well below 2°C" as agreed last year in the UNFCCC Paris agreement; and crucially also to create space for some increase in emissions from developing countries in order to support poverty reduction and address global inequality.

Even with concerted action on mitigation, adapting to climate change is now unavoidable as significant changes are already locked into the climate system caused by the excess of GHGs built up in the atmosphere since industrialisation. Those climatic changes are undermining livelihoods, degrading vital natural resources, and putting lives at risks through increasing frequency and severity of climate-related disasters. In this way climate change is undermining development opportunities, setting back progress already made, and actually exacerbating poverty and inequality.

In addition to causing climate change, there are of course other negative consequences of burning fossil fuels and reducing sinks, such as air pollution, degraded land, and resource scarcity. Tackling the causes of climate change will have numerous co-benefits for everyone. For the purposes of climate change work it is important to focus on the causes and consequences of climate change as a political-economy problem not as an environmental problem. This is because climate change is not caused by 'natural' or



For the purposes of climate change work it is important to focus on the causes and consequences of climate change as a political-economy problem not as an environmental problem. This is because climate change is not caused by 'natural' or

environmental processes, but by human economic activities that fail to ‘cost in’ economic, social, cultural, and environmental losses caused by increased risk and instability, with particularly devastating consequences for the most vulnerable across the world.

## 1.2 India: Climate Change Background Context

In India, climate change is increasing the probability, frequency and intensity of extreme events, as well as spurring the emergence of new hazards and vulnerabilities with differential spatial and socioeconomic impacts. Monsoon seasons have become unpredictable and this is having a severe impact on rain-fed agriculture. The majority of Indian people depend on climate-sensitive sectors such as agriculture, forestry and fisheries for food and livelihoods. As such, the impacts of climate change are expected to reduce the resilience and coping capacities of poor and vulnerable communities even further.

India is highly vulnerable to changing trends of the climate. Agriculture production is impacted negatively due to high incidence of shifting cultivation. The high prevalence of natural disasters (floods, cyclones and droughts etc.) and changes in trends of meteorological parameters are likely to impact forests and livelihoods of dependent communities.

Between one quarter and one half of the urban population in India is poor. Large differentials exist within any urban population, not only in terms of the impacts of climate change, but also in relation to the potential to cope with these impacts and to recover afterwards – and this is influenced by age, gender and other factors. According to the Planning Commission of India, secondary cities in India (also known as Tier II cities, based on their population) are especially vulnerable to the impacts of climate change, because they are becoming hubs of livelihood opportunities, attracting rapid economic growth and high levels of migration from neighbouring areas. However, these cities are unprepared for the challenges posed by climate change, in combination with such socioeconomic trends. Urban poor are forced to live in slums built on marginal lands and often lack access to basic services, thereby increasing their vulnerability to the impacts of climate change and disaster events, such as heavy rain, water-logging and floods.

Economically, India has been a fastest growing country of the last decade; the gross domestic product (GDP) grew 7.6 % in 2015-16, up from 7.2 % a year ago. The recurrent disasters disrupt the lives and property of the people in the country and affect the economic growth adversely, which essentially requires preparedness to address the adverse impacts of disasters and climate change.

### How Climate Change is Intensifying Disasters in India

There is considerable evidence that economic damage caused by extreme weather events has increased substantially over the last few decades. For a country like India, with over 70 percent of its population relying directly or indirectly on agriculture for their livelihoods, the impact of extreme weather events is critical. People often live in areas of high ecological vulnerability and relatively low levels of resource productivity and have limited and insecure

rights over productive natural resources. These combined factors are significant forces contributing to vulnerability to natural disasters (Baumann et al., 2003).

Changes in the precipitation patterns and any intensification of the monsoons will contribute to flood disasters and land degradation and will thus have far-reaching consequences for the entire economy (Stern, 2006). In the last decade, India has been repeatedly battered by successive monsoons, flooding and droughts. For example, the state of Odisha has experienced floods in 49 of the last 100 years, droughts in 30 and cyclones in 11 years. The occurrence of droughts, floods and cyclones in a single year is not unusual. In addition, the number of villages in India experiencing drought is increasing (Tompkins, 2002). India's water supply depends not only on monsoon rains but also on glacial melt water from the Hindu Kush and the Himalayas. Rising temperatures will cause snowlines to retreat further, increasing the risk of floods during the summer monsoon season (Greenpeace India, 2010).

Currently, as much as 68 percent of India is drought-prone and 12 percent (more than 40 million hectares) is flood-prone. India has a long coastline of about 7,516 kilometres of flat coastal terrain and shallow continental shelf with high population density and is extremely vulnerable to cyclones and its associated hazards like storm tide, high velocity wind and heavy rains. Although the frequency of tropical cyclones in the North Indian Ocean, including the Bay of Bengal and the Arabian Sea, is the lowest in the world (7 percent of the global total), their impact on the east coast of India is more devastating in relative terms (Mittal, 2010). About 8 percent of the area in the country is prone to cyclone related disasters. The number of storms with more than 100 millimetres of rainfall in a day is reported to have increased by 10 percent per decade (UNEP, 2009).

India has reasons to be concerned about the impacts of climate change. Its large population depends on climate-sensitive sectors like agriculture and forestry for livelihoods. Any adverse impact on water availability due to recession of glaciers, decrease in rainfall and increased flooding in certain pockets would threaten food security, cause degradation of natural ecosystems, including species that sustain the livelihoods of rural households, and adversely impact the coastal system due to sea level rise and increased frequency of extreme events. Apart from these, achievement of vital national development goals related to other systems such as habitats, health, energy demand, and infrastructure investments would be adversely affected.

## Climate Projection

Climate change may further complicate the unsustainable consumption of groundwater for irrigation and other uses in some locations, such as the Indian states of Rajasthan, Punjab, and Haryana. By the 2070s, the top cities with the most people at risk (including all environmental and socioeconomic factors) to coastal flooding are expected to be Kolkata,

Mumbai, etc. Scientists estimate that over 70,000 people will be displaced from the Sundarbans due to sea level rise by the year 2030.<sup>1</sup>

### Unavoidable projected impacts

According to the IPCC scenarios there are several projected impacts that, even with adaptation, appear unavoidable. These include:

- Coral bleaching
- Species range shifts and possible extinctions
- Water scarcity and drought risk in some regions of the dry tropics and sub-tropics
- Increase risk of wildfires
- Coastal damage from floods combined with sea-level rise.

Source: [https://www.wmo.int/pages/themes/climate/climate\\_projections.php](https://www.wmo.int/pages/themes/climate/climate_projections.php)

## 1.3 Key sectors for mainstreaming CCA

### 1.3.1 Health

Disasters frequently cause the destruction of health facilities and the paralysis of health services through physical damage to buildings and equipment, the direct loss of health staff, and lack of awareness of procedures and resources to maintain operations in different circumstances, in which demand for healthcare is greater and more urgent. Secondary disasters can occur when people's health is negatively affected by overcrowding in temporary shelters, inadequate post-disaster responses in sanitation, water supply and quality, and solid waste disposal.

Climate change is increasing the number and intensity of extreme weather events, leading to more frequent destructive impacts such as those described above, as well as heat stress and pneumonia in unprecedented hot and cold spells. Changes in climate also act as a multiplier of existing health risks caused by climate-sensitive diseases. Water-borne diseases such as bacterial and parasitic infections are more likely as a result of more extensive and longer periods of flooding and drought.

Vector-borne and rodent-borne diseases such as malaria and dengue will increase in warmer, wetter conditions, and will affect new areas as global temperatures rise.

Climate change also causes various psychological impacts like acute or traumatic effects of extreme weather events; threats to emotional well-being; and chronic social and community effects of heat, drought, migrations, and climate-related conflicts.

<sup>1</sup> Gupta Joydeep, How climate change will impact South Asia – latest IPCC report published at the thirdpole.net understanding Asia water crisis on 2014 available at <http://www.thethirdpole.net/how-climate-change-will-impact-south-asia-latest-ipcc-report/>

Mainstreaming DRR and CCA in health and care means considering disaster and climate change risks and including various measures to address them, in health and care programming.

### 1.3.2 Nutrition

Climate change threatens to reverse improvements made in childhood nutrition whilst at the same time good nutrition and health is a vital component of a resilient population. Mapping how climate change is and will change local food and nutrition insecurity is also an important element the government will need to get to grips with.

Mainstreaming DRR and CCA would have to consider adaptation policies in the agriculture sector to include nutritional analysis and that meet the nutritional needs of children, to map climate change and food insecurity trends and hotspots, and develop an early warning system for early action in the near-term, and information to inform policy makers about longer term anticipated trends.

### 1.3.3 WASH

In places where water and sanitation services have not been constructed with resilience in mind, hazards can destroy or paralyze them. Earthquakes, landslides, floods and storms, for example, can damage wells, tanks, piped water distribution systems, and water tanks and disrupt solid waste collection systems. Floods can contaminate water sources and block distribution and collection networks. Droughts can cause water sources to dry up temporarily or even permanently, and prevent sewerage networks from functioning adequately.

All types of hazards can negatively affect hygiene practices that are dependent on a predictable supply of water and functioning sanitation services. In particular, in disaster situations when people are displaced from their homes and congregate in shelters or informal camps, the health risks are exacerbated if they do not have adequate water and sanitation for domestic and personal hygiene purposes.

Climate change is already causing, and will continue to cause, massive changes to the global water cycle. These include: changing precipitation patterns resulting in longer and more widespread droughts; melting glaciers and increased flooding; sea-level rise and salinity ingress in groundwater; greater intensity and frequency of extreme events; less predictability in water availability, quality and security, etc.

These changes increase the likelihood of damage and disruption to drinking water and sanitation infrastructure and systems. Traditional hygiene practices may lose relevance or not be practical anymore in changing climatic conditions and with unpredictable water availability, for example. Climate-induced water stress is also expected to cause competition and tension between different types of water users (e.g., pastoralists, agriculturalists, industry), potentially leading to migration, conflict and displacement.

Mainstreaming DRR and CCA in WASH means considering disaster and climate change risks and including various measures to address them, in WASH programming.

#### 1.3.4 Education

High levels of disruption to education not just caused by specific disaster events, but by chronic conditions and the cumulative impacts of repeated small-scale disasters. Whilst culturally communities seem to value children's education more than ever before, when people are faced with limited options because of eroding viability of livelihoods and increased disaster impacts, it is often children and their education that suffers the most.

The education sector faces the challenges of how to deliver quality education in a context of increasingly unstable conditions with many disruptions; how to enable children to access education when rural livelihoods are so under threat and with high levels of migration to urban areas ill-equipped to meet their educational needs; and how to educate the children about disaster risk and climate change in a way that equips them to make appropriate choices about their lives and livelihoods in anticipation and in response to the changes they will be exposed to throughout their lives.

Mainstreaming DRR and CCA requires knowledge, requires being able to analyse information, and to be able to make forward-looking decisions. It requires incorporation of DRR, CCA and environmental education into the educational curriculum, having policies and measures to ensure resilience of resources and infrastructure to climate and non-climate disasters, such as floods, cyclones, and earthquakes to ensure minimum disruption to education services, for example, measures to retrofit schools unsafe for predictable flood, cyclone, and earthquake risks in both urban and rural locations.

#### 1.3.5 Livelihoods and food security

Disasters and food insecurity are directly interconnected. Floods, cyclones and other hazards destroy agricultural, livestock and fishing infrastructure, assets, inputs and production capacity. They interrupt market access, trade and food supply, reduce income, deplete savings and erode livelihoods. Economic crises reduce real income, force the poor to sell their assets, decrease food consumption and reduce their dietary diversity. Disasters create poverty traps that increase the prevalence of food insecurity and malnutrition.

Climate change has profound and far-reaching effects on the environment, ecosystems, natural resources, economy and human life. Climate change is magnifying existing patterns of disaster risk and present scenarios that exceed the capacity of the humanitarian and development communities. The most severe consequences of climate change are likely to be on the food security and livelihoods of agriculture-dependent populations in vulnerable communities. Long-term changes in the patterns of temperature and precipitation include shifting production seasons, increasing the supply variability and risks in the fishing sector, and the emergence of new animal and plant diseases.

The multiple threats to food and nutritional security and the clear link between shocks and hunger reveal the fragility of current food production systems and their vulnerability to disruptions. In order to break this cycle, it is necessary to protect livelihoods from shocks, and to make food production systems more resilient and more capable of absorbing the impact of, and recovering from, disruptive events and to secure sustainable development gains.

Sustainable livelihoods programmes typically assess the barriers that people face in improving their livelihoods, and design programme interventions to overcome these. For example, when rising temperatures increase crop water demand and weather is ever more unpredictable, farmers struggle to know when to cultivate the land, sow, and harvest. Likewise, when violent conflict forces people to migrate, they do not have access to the resources they are normally used to.

Migration may also increase competition for natural resources such as water and pasture between migrants and host communities. Urban populations, especially vulnerable households, often face food access problems. While these types of impact are almost universal, strategies for implementing possible solutions need to be rooted in an understanding of how people sustain their livelihoods, and implemented alongside those that aim to overcome the barriers that prevent people from improving their livelihoods.

In relation to livelihoods and food and nutrition security, mainstreaming DRR and CCA means considering disaster and climate change risks and including measures to address these risks, in programming for livelihoods and food and nutrition security.

### 1.3.6 Child Protection

Climate change is increasing children's vulnerability by eroding people's livelihoods and ability to provide for their family's needs, and by increasing the physical, emotional, and psychological risks of disasters. For families who have lost or are losing everything they have few options, and it is the children who suffer worst in such situations. Some families migrate, exposing children to new challenges often in ill-equipped and unsafe urban slums, others send their children out to work, and others marry off their girls. The impacts of climate change through disasters and as well as slower erosion of people's assets and opportunities, has the potential to put back advances in child protection. It also means that who is vulnerable and where they are located may well change.

Climate change initiatives that could be consider include Pilot projects to target prevention of post-disaster/disruption child labour and child marriage, initiatives to take cash transfers /social protection measures to keep climate change vulnerable children in school post climate disruption or disaster, child-centred social protection measures to be implemented as a vital component of the government's climate change adaptation strategy, provision of child and adolescent safe cyclone shelters, education and awareness-raising of the role of climate change in increasing the vulnerability of children, and ways to identify and reduce vulnerability of at-risk children.

### 1.3.7 Natural resource management

Disasters and NRM have a complicated relationship, as disasters can both exacerbate and be intensified by existing environmental degradation. Deforestation, for instance, directly affects the environment by reducing the amount of pure air or oxygen to breathe and destroying the natural habitat for wild animals and birds; it also increases floods, drought and climate change and cause soil erosion because trees help in binding soil with their roots. Not only can NRM support adaptation to climate change and buffer communities from some of the worst impacts of climate-related disasters, it can also offer significant opportunities to reduce carbon emissions.

Mainstreaming DRR and CCA in NRM means considering disaster and climate risks and including risk reduction measures in NRM programming.

## 1.4 Climate Change and Vulnerability

### Who is most vulnerable to climate change, and why?

- Those who depend on climate-sensitive resources and ecosystems for their families' livelihoods, such as agriculture, fisheries, and forests.
- Those who live in marginalised and more hazard prone areas, such as flood plains, urban slums, and deforested hillsides.
- Those with limited assets and political voice to enable them to respond to the impacts of climate change (lower adaptive capacity).

#### 1.4.1 Climate Change and Children

*In every crisis, children are the most vulnerable. Climate change is no exception. As escalating droughts and flooding degrade food production, children will bear the greatest burden of hunger and malnutrition. As temperatures increase, together with water scarcity and air pollution, children will feel the deadliest impact of water-borne diseases and dangerous respiratory conditions. As more extreme weather events expand the number of emergencies and humanitarian crises, children will pay the highest price. As the world experiences a steady rise in climate-driven migration, children's lives and futures will be the most disrupted.*

- Anthony Lake, Executive Director, UNICEF (2015)

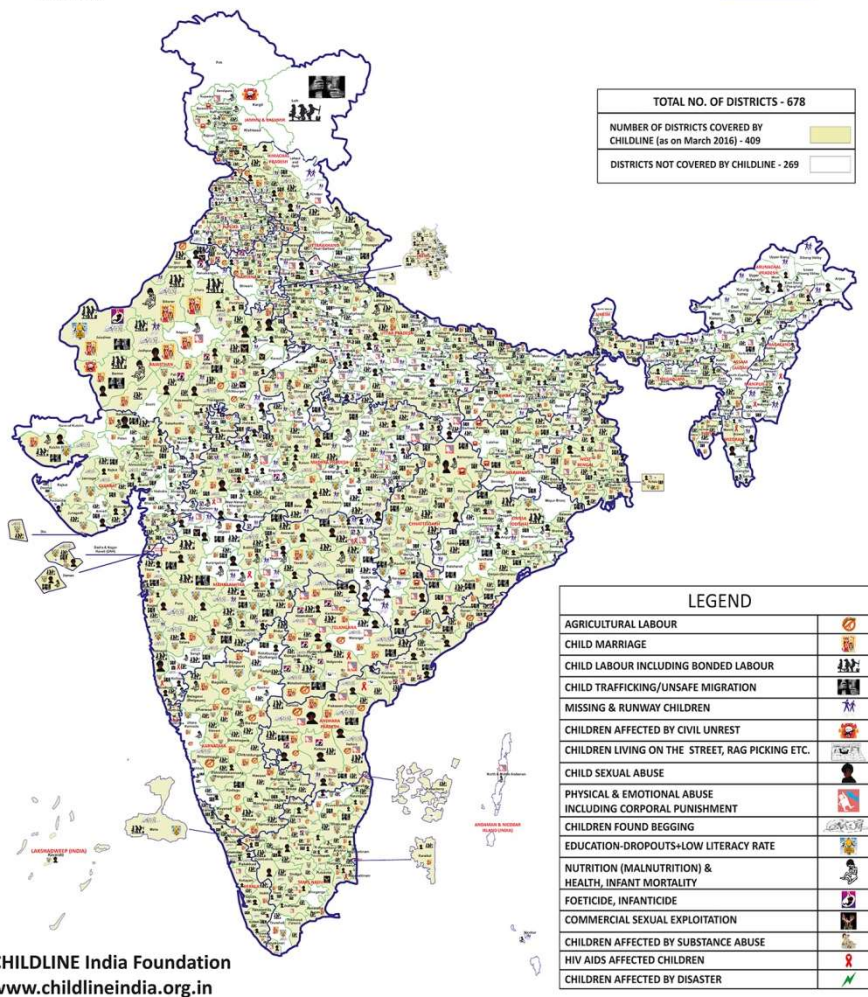
*Climate change and environmental degradation are already harming children, especially those that are most disadvantaged. Unless action is taken, future impacts will be far more dramatic, undermining much of the progress made for children over the last decades. Each of the seven Outcomes Areas of the UNICEF Strategic Plan 2014-2017 – health, nutrition, HIV, water and sanitation, child protection, social inclusion and education – is affected in some way by climate change and/or environmental degradation.*

- UNICEF Strategic Framework on Environmental Sustainability for Children 2016-2017

Frequently forgotten in the global discussions and agreements on climate change are children and young people, who both disproportionately suffer the consequences of a rapidly changing climate, yet also offer innovative solutions to reduce greenhouse gas emissions (climate change mitigation) and adapt to climate change. Children and women are among the most vulnerable, and face the brunt of the growing impact of natural and human induced disasters. Due to their manifold particular vulnerabilities (physical conditions, role and status defined by socio-political processes, limited access to resources, power and education, including access to life-skills training, etc.), they systematically constitute over 70% of disaster victims.



## Mapping of Child Vulnerability



The adverse effect of climate change is already visible among these groups, and risks further jeopardizing their natural development and exacerbating pre-existing vulnerable conditions to become a life-long threat impeding their well-being through recurrent shocks and stresses. It is therefore imperative to focus particular action in reducing vulnerabilities and exposure to disaster and climate risks through the

development of their own capacities and those of government departments, particularly at the State levels, who have a primary responsibility to address disaster risks and provide safe and secure living conditions for all their citizens.

The approach to building (children's and women's) resilience to disasters is referred to as "Child-sensitive disaster risk reduction". This includes adaptation to climate change (referred to as "mitigation" in disaster risk reduction to address the underlying drivers of disaster risk). While addressing disaster risks, an increasing focus on managing climate risks

is critical, as the adverse effect of hydro-meteorological phenomena are linked to almost 70% of all natural disasters, with increasing trends due to global warming and increasingly unpredictable climate conditions, often creating more intense and more frequent drought, storm and high intensity rainfall spells, which adversely impacts crops, access to nutrition, livelihoods, development services and brings about epidemiological changes, etc.

Making sense of the changing and unsafe conditions, and taking planned and organized action for maintaining continuum of care for children is still not an established policy or practice. The duty bearers and institutions responsible for planning and programming for children are yet to be included in the mainstream work on climate change mitigation or adaptation. Climate change is an issue of vital importance for children, not just because they are one of the most affected groups right now, but also because their future – and their children’s future – will be so fundamentally influenced by what actions are taken now to meet this challenge.

Children are affected in many ways by climate change in India, both in a worsening of challenges that were already present, and through new challenges arising from changing average climatic conditions becoming the new ‘normal’.

The types of climate risks confronting children are diverse, ranging from direct physical impacts, such as cyclones, storm surges and extreme temperatures, to impacts on their education, psychological stress and nutritional challenges:

- Cyclones, floods, rising sea levels, tidal surges, and river erosion are damaging and destroying infrastructure critical to children’s well-being, including schools, health facilities, latrines, houses, and roads.
- Floods, increasing salinity, and droughts are destroying crops and trees, disrupting water systems, and contaminate water resources, reducing children’s access to safe water and nutritious food.
- Seasonal shifts, salinity, increasing temperatures, and more erratic rainfall patterns are eroding livelihoods, increasing poverty and leaving families struggling to meet their most basic needs.
- Rising temperatures and changing rainfall patterns are exacerbating the spread of vector-borne diseases such as dengue, which disproportionately affects children.
- Land loss from flooding and river erosion, dwindling water supplies, and failing climate-sensitive livelihoods are increasing migration, disrupting families and increasing vulnerability of displaced children.

These impacts are falling unequally on children compared to adults. Children are more vulnerable to vector-borne diseases than adults; under-nutrition and diarrhoeal diseases can much more easily lead to severe and often dire consequences in children; and the physical dangers of disasters pose unique threats to young bodies and minds. Children will suffer the effects of climate change *and* climate change policies longer than adults, making them vital stakeholders in today’s decisions about climate change responses.

#### 1.4.2 Climate Change and Women

Indian society is segregated in multiple ways, by caste/class, gender, wealth, poverty and religion. The complex caste system in India stratifies the population into so called upper and lower castes. Some groups are ostracized as 'untouchables', while Other Backward Castes (OBC) is a collective term used by the Indian Government to classify socially and educationally disadvantaged castes. An entrenched patriarchy and gender divisions, which value boys over girls and keep men and women and boys and girls apart, coupled with child marriage, contribute to the creation of a society in which sexual abuse and exploitation of women, particularly 'untouchable' women, is an accepted part of everyday life.

India has performed poorly in removing gender-based disparities, ranking 114 out of 142 countries according to the World Economic Forum's 2014 Gender Gap Index. In 2015, only 12.2% of parliamentary seats were held by women and just over one quarter of adult women (27%) received some sort of secondary education, compared with 56.6% of their male counterparts.<sup>27</sup> Female participation in the labour market is 27%, compared with 79.9% for men.

## Gender issues for WASH

### Gender division of labour

Women and girls more often collect water for families and animals, purification, food, family hygiene and sanitation practices, and home-based businesses in their households.

- When women and girls have to travel long distances to collect water or defecate openly, they are more vulnerable to assault and harassment and urinary tract infections. Women and girls have less time for economic activities due to their unpaid duties related to water collection.
- Clean and private sanitation facilities play a significant role in enabling girls to stay in school; clean water supports better family health, including improved maternal and infant mortality.
- Tasks related to sanitation are also assigned by sex (e.g., families expecting women to have greater responsibilities for toilet care, although women are not always involved in household choices about these facilities).

### Women have had a greater role in family hygiene oversight and education.

As with other health services, women more often have greater involvement and programs are directed to them. Hand-washing education and communication campaigns are more often targeted to women and their children.

### Women do not always have the same level of information as men regarding the timing of drought forecasts, water shortages, and supply disruptions.

Access to information varies by sex.

### Women are less involved WASH decision-making and planning at community and higher levels.

There has been more progress in recent years at achieving greater gender balance at the community level, but women's percentage still declines as the scale of management activities increases. WASH issues are often priority ones for women and provide a way to involve women in larger multiple-use water management decisions in their communities.

- For sanitation, women have not always been involved in community decision-making about service level, type of system, design, and construction, and the distribution of all opportunities brought by sanitation.
- For both water and sanitation, women have also not been as involved as men in decisions about what is affordable and in willingness to pay, even though women may be responsible for paying for family water or sanitation services.

## Gender-WASH issues in the context of climate change

While climate change affects everyone, it is not gender neutral. It magnifies existing inequalities, reinforcing the disparity between women and men in their vulnerability to climate change, and their capability to cope with it. Women, who form the majority of the world's poor, tend to be more vulnerable to the effects of climate change and are being affected in their multiple roles as food producers and providers, as guardians of health, care givers, and economic actors. They are more likely to become direct victims (through death and injuries) of climate-related disasters, such as hurricanes and flooding, because they are less likely to be able to swim, and are more likely to be at home when such events occur. Drought, deforestation, and erratic rainfall cause women to work harder to secure resources (such as food, water, and fuel) and mean that women have less time to earn an income, get an education or training, or participate in decision-making processes. Families affected by poverty, many of which are headed by females, often live in more precarious situations: on low, flood-prone lands or on steep slopes.

### Climate change disproportionately increases women's time burdens.

These include:

- After a flooding event, women have to spend additional time collecting water, cleaning their home, and ensuring family well-being.
- Coastal flooding may lead to increased salinization of household and business water sources, which is a particular problem in coastal areas. As a result, water security and conflict will become bigger issues and multiple agencies will become involved.
- With droughts, women need to spend more time and calories on water collection and suffer physical strains from heavy loads.
- As water-borne or sanitation-related illnesses increase, so do demands for women's time for family care-giving.

### Climate change increases conflicts over competing water uses.

Communities are increasingly faced with allocating scarce water across multiple uses and users, including potable water for humans and animals, irrigation, water for hydropower and other energy, and business usage. With less involvement in community water decision-making and planning, women's priorities may get less attention.

## Gender related policy recommendations and responses for climate change adaptation in India

The 2008 National Action Plan on Climate Change (NAPCC) drawn up by the Government of India fails to recognise the gender dimensions of climate change, either explicitly or implicitly. The national plan has been translated into State Action Plans on Climate Change (SAPCC). As a result of the policy research and advocacy on gender and climate change pursued by organisations, the Federal Ministry of Environment and Forests (responsible for climate change in public policy and programming) has advised State Governments to address gender concerns in State Action Plans on Climate Change, ensuring adequate participation of men and women in the implementation process. As a result, State Governments are now beginning to reflect greater gender sensitivity in their SAPCCs. For example, the Uttar Pradesh Climate Change Action Plan discusses links between gender and climate adaptation and mitigation.

A recent study (2016), as part of a global study commissioned by the Climate Development Knowledge Network (CDKN) and carried out by Practical Action Consulting (PAC), together with the Institute of Development Studies (IDS) in Latin America (Peru), Eastern Africa (Kenya) and South Asia (India) titled **“Gender approaches in climate compatible development: Lessons from India”** made the following recommendations to national and state level policy-makers:

1. In societies where patriarchal attitudes are strong, proactive efforts are required to create an enabling environment where women can feel confident and fully participate in decision-making processes. Community-based participatory planning and monitoring can provide this space and is crucial to improving the effectiveness and accountability of climate compatible development actions. In Uttar Pradesh, the 74th Constitutional Amendment should be fully operationalised, so as to facilitate the institutionalisation of gender-based approaches and resilience micro-planning within government schemes.
2. Government policy and programmes relating to climate compatible development – including National and State Action Plans on Climate Change – must integrate women’s perspectives when designing and implementing livelihood support strategies.
3. Areas that are closely associated with women’s roles and responsibilities – such as education and health – require more funding to help urban dwellers achieve better living standards and adapt to changing weather patterns.
4. Another key area for maximising benefits from climate compatible development initiatives is supporting women to achieve greater economic empowerment at an individual level. This would place them in a stronger position to make decisions about investments in key areas exposed to climate change, thereby building family resilience. Such an approach will involve conducting activities aimed at transforming gender relations by building awareness and confidence among women, men, elders and society in general around equality and empowerment.

Hence, to adapt to a better and likely adverse consequences of disasters and climate change, including children and women in building resilience, it demands for a suitable strategy for tackling the risks and uncertainties posed by climate related disasters to development processes, through using climate change adaptation (CCA) strategies.



However, it should very well focus on mainstreaming the development processes and to keep indicating the track of development.

DRAFT



## 2. Session 2: CLIMATE CHANGE AND WASH

*Time: 60 mins*

### **Key Learning Objectives:**

- To understand WASH risks and uncertainties due to climate change in Indian context
- To understand climate change induced disruptions
- To understand potential (direct and indirect) impacts of climate change for water and sanitation service delivery (WASH)
- Understand impact of climate change in terms of:
  - Environmental Impact
  - Social Impact
  - Impact on Health

### **Key Learning Points:**

- Impact of climate change in WASH service delivery due to climate-change induced disruptions are:
  - Infrastructure collapse
  - Contamination by flood water Displacement and scarcity of safe water and sanitation service
  - Diminishing supply of ground water Salinity intrusion and water contamination
  - Saline environment and health hazards
- Responses led by government WASH ministries and departments need to be robust to climate risks alongside other pressures on resources, systems and services (so-called stressors) such as demographic change, economic transitions, increasing competition over limited resources, and conflicts.
- Integrating climate resilience into WASH strategies and plans is an important entry point in working towards and delivering more sustainable WASH services.
- The effects of climate change can be grouped into four categories:
  - Increasing intensity of rainfall
  - Greater rainfall variability
  - Longer term decline in rainfall and run off
  - Sea level rise

### **Session Content:**

#### **2.1 WASH context**

The water, sanitation and hygiene (WASH) sector is already affected in many different ways by weather and climate events such as variability, seasonality, extreme events and climate-related disasters. This translates into negative impacts on drinking water availability and quality and on the performance of sanitation and hygiene services as well as impacts on

investments and infrastructure. Climate change will place additional stresses on delivering and sustaining public health and well-being related outcomes, and today's evidence suggests that people living in developing countries will be worst hit by changes, particularly those living in marginalised and vulnerable environments.

Although the precise nature and extent of change are not yet certain, planners and policy-makers responsible for the WASH sector should start acting now to build climate resilience and support adaptation within the WASH sector. Waiting for certainty is not an option.<sup>2</sup>

At a global level, significant progress has been made in extending access to improved water services. The international target for halving the number of people without access to safe water – Millennium Development Goal (MDG) 7 – has already been met, three years before the 2015 deadline (WHO/UNICEF, 2012). Progress on sanitation lags further. Over 2.5 billion people globally still lack access – over one third of the world's population – and more people live without access to sanitation today than in 1990. Globally, the costs of inadequate water supply and sanitation amount to US\$260 billion annually (Hutton, 2012).

As the quarter-century for completion of the MDGs approaches in 2015, there is now growing debate over appropriate goals for the next quarter-century. While a final set of Sustainable Development Goals (SDGs) has yet to be agreed, it is clear that an aspiration of universal coverage will not be realised unless investments are resilient to both current levels of climate variability and future change. Failure to ensure that services are resilient will have major public health consequences if water quality deteriorates, water availability becomes less certain and sanitation systems cause environmental contamination (Hunter, Zmirou-Navier, & Hartemann, 2009; Howard & Bartram, 2010; Calow et al, 2011). Indeed not taking climate change into account, alongside other pressures on services, could result in a reversal of progress against future targets and the loss of hard-won public health and poverty alleviation gains (ibid).

While much has been written about resilience and adaptation in general terms, relatively little has been written about its practical substance (Fankhauser & Burton, 2011). In short, what 'adaptation' and 'resilience building' actually mean in the context of delivering sustainable water and sanitation services in the face of multiple pressures. In part, this is because of the 'deep uncertainty' regarding the translation of large-scale climate scenarios into local adaptation solutions on the ground (Ranger, 2013), and the difficulties associated with untangling the climate signal from the many other factors affecting the sustainability of services – see Box below (Conway, 2011; OECD, 2013). This has not stopped a simplistic crisis narrative emerging around climate change and WASH, in which climate change is held

#### Climate variability and change

- Projections indicate warming by the end of the 21st century of between 0.3 and 5°C (centigrade).
- With a 2°C global temperature rise, up to 10 million more people could be affected by coastal flooding each year. With a 4°C temperature rise, a 50% decrease in water availability could occur in East Africa and the Middle East.
- In developing countries, the incidence of diarrhoea is expected to increase by around 5% for every 1°C increase in temperature.
- US\$2.5 trillion economic losses from disasters so far this century – 70% relate to floods and droughts.
- Since the original Rio Earth Summit in 1992, floods, droughts and storms have affected 4.2 billion people (95% of all people affected by disasters).

Source: IPCC

<sup>2</sup> WHO/DFID, 2009

principally responsible for perceived increases in water scarcity and system failure (Calow et al, 2011; Conway, 2011). The evidence, such as it is, does not support such claims. Rather, an understanding of the known risks posed by existing climate variability reinforces the need for responses that are robust to both existing variability and future uncertainty, alongside other pressures on resources, systems and services.

Resilience can be defined as the ability of people and systems to anticipate, adapt to, and recover from the negative effects of shocks and stresses (including natural disasters and climate change) in a manner that reduces vulnerability, protects livelihoods, accelerates and sustains recovery, and supports economic and social development, while preserving cultural integrity.<sup>3</sup> Climate resilient development promotes measures and approaches that will deliver benefits now as well as under potential future climate changes, and enhancing disaster risk prevention and preparedness is often a first line of defence in adapting to future climate change.

Responses led by government WASH ministries and departments need to be robust to climate risks alongside other pressures on resources, systems and services (so-called stressors) such as demographic change, economic transitions, increasing competition over limited resources, and conflicts. Integrating climate resilience into WASH strategies and plans is therefore an important entry point in working towards and delivering more sustainable WASH services. To manage these risks, specific actions may be based on impacts that have already been observed.

Making WASH services more resilient and adaptable to climate change brings potential to improve overall WASH service provision and to enhance poverty reduction and sustainable development. Extending and securing access to water and sanitation services also plays a key role in poverty reduction. Households benefit through a range of health, educational, nutritional and broader livelihood impacts; local, regional and national economies benefit from greater economic activity, spending and investment; and over the longer term, households and economies benefit through greater resilience to climate change. In monetary terms, the numbers are compelling: combined water supply and sanitation interventions have a combined return of at least US\$4.3 for every dollar invested (Hutton, 2012), if services can be sustained in the face of multiple risks, including that posed by climate change.

## 2.2 Climate change and WASH: risks and uncertainties in Indian context

Climate change in India is very often described through water issues and its associated health, safety, and hygiene challenges. Whilst it is wrong to characterise climate change in India only as a water issue, this is an area that will be heavily impacted and will be

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<sup>3</sup> Interpretations and definitions will vary across organisations, for example “The ability of children, households, communities and systems to anticipate, manage, and overcome shocks and cumulative stresses” (UNICEF) and “The ability of a social or ecological system to resist, absorb, accommodate and recover from the effects of a (climate) hazard in a timely and efficient manner while retaining the same basic structure and ways of functioning” (GWP)

enormously challenging to manage. With climate change the threat multiplier, the water impacts will be most pronounced where there are already significant challenges relating to water: where there is limited water there will likely become even less, where there is flooding it will likely become more severe, and where there is salinity this will become harder to combat and more widespread.

The complex interaction of changes to amounts of rainfall, distribution of rainfall, evaporation rates, and storm events, further interact with non-climatic influences such as population size, water management measures, and changing resource use, to make the design and delivery of effective climate change adaptation measures extremely challenging. Whilst the development challenge has previously been to ensure access to safe drinking water for all – and India has made significant advances in this – the challenge now presented by climate change is to shore-up that coverage against climate change impacts, which may well prove to be an even more difficult outcome to achieve.

Globally diarrhoea is the second biggest killer of children, after pneumonia. Vector-borne diseases such as dengue, malaria, and diseases are associated with poor water quality, inadequate sanitation, and poor hygiene practices are on the rise as a result of climate change, and children are far more vulnerable to these diseases than adults.

As with the other sectors, infrastructural damages will increase with climate change, and latrines, hand washing equipment, and irrigation infrastructure are all vulnerable to disasters.

Globally, water is predicted to be the main channel through which climate change impacts will be felt by people, ecosystems and economies (Bates et al, 2008). Both observation records and climate projections provide strong evidence that freshwater resources are vulnerable, with the potential to be strongly impacted. However, predicting impacts on the availability and quality of freshwater resources, and more so on water-dependent services, remains extremely difficult. Changes could be gradual or dramatic, but with the potential to jeopardise water security over the long term, making it more costly over time for governments to adjust to changing circumstances (Elliot et al, 2011; OECD, 2013).

While there is a high level of confidence in the scientific community about the geophysical processes that link emissions to warming, much less is known about how warming will manifest itself at the *local level* through changes in rainfall, runoff, groundwater recharge and climate extremes (Conway, 2011; Taylor et al, 2013). Some of this information can be obtained by downscaling GCMs, but resolution remains coarse and levels of uncertainty are high, particularly for rainfall. As a result, the usefulness of climate models for adaptation decisions has been questioned (Stainforth et al, 2007).

Climate effect	Hazard	Impact on WASH sector
Decrease in precipitation	Drought	Reduction in raw water supplies, reduced flow in rivers, less dilution/increased concentration of pollutants in water, challenge to hygiene practices.
Increase in precipitation and severe weather	Flooding	Pollution of wells, inundation of wells, inaccessibility of water sources, flooding of latrines, damage to infrastructure, landslides around water sources, sedimentation and turbidity, challenges to sustainability of sanitation and hygiene behaviours, and waterborne diseases.
Increase in temperatures	Heatwaves	Damage to infrastructure, increase in pathogens in water leading to increased risk of disease.
	Melting and thawing of glaciers, snow, sea ice and frozen ground	Seasonality of river flows affected leading to a reduction in water availability in summer.
Sea-level rise	Flooding and saline intrusion into freshwater aquifers	Reduction in availability of drinking water, with high impacts on quality.

Drawing on the above, what can say about the range of possible rainfall scenarios and associated risks? Despite the uncertainty and knowledge gaps, there is a growing body of evidence documenting the *range* of possible changes in water systems that *could* be expected in a changing climate. Drawing principally on Howard et al. (2010), Calow et al. (2011), Elliot et al. (2011) and OECD (2013), the effects of climate change can be grouped into four categories:

**Increasing intensity of rainfall**, such that even in those areas where average rainfall is expected to fall, a greater proportion of rainfall is likely to fall in heavy rainfall events.

- Increased risk of flooding, leading to both infrastructure damage and contamination of surface and groundwater supplies. In rural areas for example, floods can damage or inundate springs, wells, rainwater harvesting systems, and boreholes, though boreholes are typically less vulnerable. This can hamper both access to water and cause contamination and health risks. Piped systems are also vulnerable because of their size and complexity, and their exposure to multiple threats from source, through treatment to delivery. The pit latrines widely used in rural areas are also vulnerable to flooding and can cause serious environmental contamination, although adapted designs are available and latrines can be upgraded.
- Depending on timing and intensity, and whether critical recharge thresholds are breached, an increase or decrease in groundwater recharge and groundwater levels. Longer term increases in groundwater levels could reduce the potential for pathogen and chemical attenuation or removal, and cause flooding of sub-surface infrastructure

such as pit latrines or septic tanks. Longer term declines in groundwater levels could affect the viability of springs and wells drawing on shallow groundwater systems with limited storage.

- Increased flushing of fertilisers, animal wastes and particulates into water supplies, potentially affecting both quality and flow.

**Greater rainfall variability**, including changes in the timing, duration and distribution of rainfall.

- Longer and/or more frequent droughts, with implications for all water supply systems relying on limited storage to buffer seasonal and inter-annual variability. These include urban systems relying on limited and variable surface water flows and storage, and also groundwater-based supplies – particularly springs and shallow wells - drawing on aquifers with limited storage. Water-borne sanitation may also be compromised.
- For many areas, a proportional increase in winter flows may result in further reductions in water availability during low-flow periods, reducing the capacity of rivers to dilute, attenuate and remove pollution and sediment loads.

#### **Longer term decline in rainfall and run off**

- While impacts on groundwater resources remain uncertain even with decreasing rainfall, declining annual rainfall will lead to reductions in river flows, especially in conjunction with population growth and the need to grow more food. This, in turn, could increase the demand for groundwater, potentially threatening sustainability.
- As above, long term declines in water availability could also threaten the viability of water-borne sanitation systems, and the capacity of surface water to dilute, attenuate and remove pollution.

To this list, we could also add **sea level rise** and the threat this poses to coastal zones in terms of saline intrusion, and damage to/contamination of water systems and treatment works from inundation during coastal storms.

#### **2.2.1 Climate change induced disruptions**

Climate change (and disasters) damage asset and environment and disrupt services including water supply and sanitation facilities.

- **Infrastructure collapse** – cyclone, tidal surge or riverbank erosion may damage tube-wells and latrines; infrastructure for water supply and sanitation service may collapse. Also, tube-wells and latrines could be inundated. It seriously reduces people's access to safe water and sanitation.
- **Contamination by flood water** – Faeces from inundated latrines spread in the surrounding and contaminate environment and water sources. Open defecation also

spreads contamination. Similarly, hanging unhygienic latrines contaminate water and environment. In such situation, safe water becomes very scarce.

- **Displacement and scarcity of safe water and sanitation service** – Cyclone and flood force people to leave their houses. Also, people living in low lying area have to leave their houses during water logging. Temporary shelters rarely have arrangements for adequate supply of safe water or sanitation facilities. Moreover, displacement affects life and livelihood so severely that the people often do not have enough resources to set facilities for safe water supply and sanitation.
- **Diminishing supply of ground water** – Climate change may cause ground water table to drop; also, the volume of accumulated water could diminish. Generally, it occurs in drought prone areas. However, more often, it is induced by human actions such as over extraction of ground water for agriculture. It results in serious reduction in the availability of safe water for household consumption. People could not get enough water for drinking or cooking; also, they become unable to use hygienic latrine that depends on water availability.
- **Salinity intrusion and water contamination** – Saline contamination could make the natural sources of water totally unusable for human consumption. It happens during cyclones. However, to some extent, human actions are also responsible for that. Shrimp cultivators bring in saline water in their farms. Tidal surges during cyclones breach the embankments and inundated the fields with sea water and cause water logging. Then fresh water becomes unavailable in the area.
- **Saline environment and health hazards** – Saline environment and saline water adversely affect health. It causes various skin diseases. It also has harmful consequences on reproductive health. In particular, adolescent girls and pregnant women suffer the most. Moreover, warm and humid weather help breeding of insect vectors. So, prevalence of water borne and insect transmitted diseases such as diarrhoea – including cholera, dysentery and malaria increases in the areas.

To sustain safe water supply, sanitation service and hygiene practice in climate change disaster affected areas, it is crucial to find new sources of water, e.g. rain water instead of ground water, and new technologies – e.g. reverse osmosis instead of tube-wells.

## 2.3 Impacts of Disaster and Climate Change on WASH Practices

Climate change and recurring disasters region wise contaminate natural water sources; make infrastructures of water, sanitation and hygiene practice fragile and causes shortage in supply. The adverse impacts affect environment, society and health simultaneously. As a result severe shortage of accessibility to services occurs and accessing safe water and sanitation services as well as health protection become very difficult for the communities.

### 2.3.1 Environmental Impact

Losses due to disasters and climate change increasingly affecting the environment. For example water logging, salinity and desertification are increasing; ground water level is dropping. The adverse environmental impacts of Climate change are different in different regions of India. In some regions severe drought and extreme cold; in some regions excessive rainfall and flash floods; in river basin and flood plain areas flood, river bank erosion, water logging and in coastal region tidal surge, cyclone, salinity and river bank erosion are occurring with increased frequencies and higher magnitude. It is seriously affecting the environments of the respective areas and contaminating natural water sources as well as making sanitation systems ineffective.

### **Salinity**

The frequencies and magnitudes of the current hazards of coastal regions, such as cyclone and tidal surge have increased due to climate change. Apparently, the trend continues. Consequently, excessive saline water intrusion continues to contaminate the natural sources of water and create scarcity of potable water. Because of high levels of salinity sources of potable water, such as river, water bodies, and ponds are becoming unusable. Salinity intrusion is also causing severe damage to the sanitation systems and infrastructures. As a result some of the existing technologies are becoming ineffective and communities are being forced to use contaminated water for household chores and drinking purposes as well as apply unhygienic sanitation systems.

### **Desertification**

Lack of rainfall has been considered as one of the climate change impacts in some regions in India. Due to the lack of rainfall frequently severe seasonal drought occurs in these regions. During this period most of the water sources, such a river, wet lands, ponds dry up at the same time the ground water level drops so low that most of the tube-well as well as deep tube-wells dry up, which cause severe potable water crisis. Apart of that as because the surface water dries up, communities are forced to uses unsafe water and consequently suffer various health problems.

### **Increasing Hazard Proneness**

Although types of natural hazards are different in different regions of India, due to climate change impacts the hazard proneness is increasing everywhere. The frequencies and magnitude have increased noticeably in comparison to the past. Because of these natural hazards, especially, cyclone, river bank erosion and flood, water supply and sanitation system get severely affected; sometimes collapse completely. In this situation existing technologies, such as tube-well, PSF or ring slab latrines become ineffective.

### **Water Logging**

In case of excessive rainfall or flooding when the water does not have sufficient channels to flow away then water logging occurs. Because of climate change impacts and recurring disasters as well as anthropogenic interventions for disaster risk reduction (building embankments) and development (building roads and high ways) several parts of the country have become prone to water logging.

Water logging causes severe distress to communities. Emergency services, especially safe water, sanitation and hygiene practices get seriously disrupted. Because of water logging

severe fresh water crisis occurs and the affected communities have no other options but to use unsafe or contaminated water for household chores and drinking. As a result they suffer from various water born diseases. Apart from this, in water logged areas latrines are inundated and become ineffective. People are forced to defecate in open places, which cause environmental pollution and water born diseases to spread. Due to water logging women and adolescent females suffer the most. They cannot perform regular hygiene practices as well as reproductive health related practices properly. In addition, as they have to go in open places for defecation, risk for sexual harassment increases significantly.

### 2.3.2 Social Impact

Disaster and climate change impacts, not only affect lives and livelihood but also gradually making the entire social and socio-economic system of the country vulnerable. Consequently social discrimination, deprivation, unacceptability and migration are increasing significantly and its adverse impact is reflecting on safe water accessibility, sanitation services and hygiene practices.

#### **Deprivation**

Ensuring safe water supply and sanitation services has become increasingly difficult because of climate change and disasters. Every community members are not being able to access safe water and proper sanitation services as per requirement. As a result deprivation occurring.

First of all, due to disasters water supply and sanitation system frequently collapse. Restoration of the collapsed system takes time. During the restoration period affected people get deprived from the services. Because of the recurring disaster these state of deprivation repeatedly comes back.

Secondly, as the sources are contaminated, people can no longer fetch safe water from farther distances. It is very difficult, especially for the women, to fetch safe water from such distance.

Thirdly, due to disaster and climate change the managing safe water supply has become reasonably expensive. For example in severely saline polluted areas instead of existing technologies, such as tube-well and PSFs, Reverse Osmosis Machine (desalination technology) is needed, which is very expensive compare to the existing technologies. Because of asset losses government or humanitarian agencies are not being able to establish sufficient number of Reverse Osmosis Plants. As a result many people in the affected areas are being forced to use unsafe water.

#### **Discrimination**

Due to climate change and disaster when scarcity of safe water occurs then the excess demand and water scarcity create a highly competitive situation. Because of that people have to spend relatively more money that normal conditions, which may not be possible for some people under the circumstances. Only those have the ability can ensure access to safe water. The same scenario can be seen in restoring damaged latrines and sanitation systems.

Only the wealthy families can ensure safe water supply and sanitation systems during disaster. This creates social discrimination and inequity.

### **Distress**

To cope with the crisis of safe water and sanitation system due to climate change and disaster, affected communities have to make new arrangements instantaneously. For example, in case of saline contaminated areas or during flood if a family's tube-well or latrine becomes dysfunctional, family members, especially the women of the family have to fetch water from distant places instantly. In case of using the latrine they have to ask help from others or defecate in open places. These instant decisions are often socially unacceptable. As a result lack of safe water supply and sanitation cause severe distress to the affected community.

### **Migration**

Because of climate change and disaster a lot of affected families migrate to other places. These migrations can be short run or permanent. Either short run or permanent whatever the case may be, the displaced families tend to take refuge in slums in urban areas. It is very difficult to construct separate latrines for each family in those urban slums. As a result the migrated families cannot access basic sanitation or perform regular hygiene practices.

### **2.3.3 Impact on Health**

Due to climate change and disaster health related issues have been severely disrupted in the affected communities. During disaster water logging, inundation and crisis of safe water and sanitation system due to salinity occur. Because of these various diseases spread in the community. As a result personal health, public health and reproductive health gets affected in the community.

#### **Personal health**

Usually in the sources of safe waters in the affected areas get contaminated and safe water scarcity occurs. As a result usage of unsafe water increases in regular household chores. Under this condition people cannot perform personal hygiene practices. And because of this they suffer from various water born diseases, such as- Diarrhoea, Cholera and Hepatitis.

#### **Public health**

During disaster sanitary latrines in the affected areas get inundated; due to salinity the sanitation infrastructures get damaged and rapidly break down. As a result the sanitation system suffers great damage and sometime become completely dysfunctional. Insufficient sanitation system and latrines communities cannot perform minimum hygiene practices and also defecates in open places that pollute water sources and environment. As a result various water borne diseases spread widely and affects overall public health.

#### **Reproductive health**

During disaster due to water scarcity performing periodical health related practices becomes very difficult for the women and adolescent females. Because of this they suffer various health related complications. Pregnant women cannot perform personal hygiene practices. Apart from this women suffer from skin diseases due to saline water. Besides,

during disaster, due to insufficient latrines adolescent females, women, and pregnant mother have to use other's latrines or defecate in relatively unsafe and open place, which is great threat to their reproductive health and safety.

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### 3. Session 3: CONSIDERATIONS FOR WASH CLIMATE RESILIENCE

**Time: 60 mins**

**Key Learning Objectives:**

- Understand the institutional arrangements for WASH, especially the set up in India for WASH service delivery.
- Understand key strategies and principles for managing WASH in climate change induced uncertainty.
- Learn about key considerations in WASH Practice i.e. mobilising resources and accountability

**Key Learning Points:**

- Details of institutional setup for WASH service delivery at national, state, district, sub-district and village/gram panchayat levels
- Key strategies for managing WASH in climate change induced uncertainty are:
  - Use appropriate and effective technology
  - Cost sharing through economic pricing for services
  - Create demand through awareness-raising
  - Subsidy for the poor and disadvantaged
  - Accountability and communities' participation
  - Partnership among public, private and voluntary agencies
- Principles in managing uncertainty are:
  - Long term perspective
  - Multiple sources and technologies
  - Introduce new technology
  - Region specific system
  - Accessible to all
  - Affordable pricing
  - Social acceptance
  - Accountability
- Principles of Accountability and accountability structure

**Session Content:**

Constitutionally, safe water and sanitation are perceived as rights and acknowledges it as basic needs. At practice level, public health concerns determine the needs and services provisions. The Millennium Development Goals and the Five Year Plans are the main drivers for formulating the related policies and strategies, besides the national flagship programmes and state annual plans. However, safe water and sanitation are also economic goods. Therefore, the policies and strategies aim at bringing the provisions within the reach of the people at affordable cost. The Department of Public Health Engineering (or equivalent counterparts in other states) and the Local Government are the key agencies for providing

the services although the private sector agencies and non-governmental organisation should be significantly involved in that.

With respect to the WASH sector, climate resilience requires a focus on:

- A reduction in the likelihood that individuals feel the effects of climate change and related shocks. This can be achieved through programming that seeks to both understand the determinants of climate risk exposure to WASH services and act on them to minimise the exposure of individuals.
- Strengthening the reliability of WASH services. A starting point for the integration of climate resilience into WASH service delivery is the prioritisation and implementation of no/low regrets measures. These measures have a high chance of success against the full range of uncertainty in climate change and other future drivers. A number of no/low regrets measures will be those dealing with the existing level of climatic fluctuations, which many WASH systems are still not well protected against.
- Strengthening capacities of governments and communities to increase climate resilience over time. This can be achieved by helping governments design, deliver and sustain investments in WASH services that consider the additional risks posed by climate change. Also by strengthening multi-level WASH governance, strategies/plans and systems as well as building the adaptive capacity of communities to deal with climate-related shocks and stress.

The need for responses that are robust to climate uncertainties alongside other pressures on resources, systems and services (e.g. demographic change, economic transition or increasing competition over limited resources) is undeniable. Acting now to identify, manage and minimise climate risks will offer benefits to long-term WASH programme performance by decreasing the sensitivity of the WASH sector to uncertain climate futures.

### 3.1 Institutional arrangements for WASH

Water supply and sanitation is a State responsibility under the Indian Constitution. States may give the responsibility to the Panchayati Raj Institutions (PRI) in rural areas or municipalities in urban areas, called Urban Local Bodies (ULB). At present, states generally plan, design and execute water supply schemes (and often operate them) through their State Departments (of Public Health Engineering or Rural Development Engineering) or State Water Boards.

Highly centralised decision-making and approvals at the state level, which are characteristic of the Indian civil service, affect the management of water supply and sanitation services. In 1993 the Indian constitution and relevant state legislations were amended in order to decentralise certain responsibilities, including water supply and sanitation, to municipalities. Since the assignment of responsibilities to municipalities is a state responsibility, different states have followed different approaches. According to a Planning Commission report of

2003 there is a trend to decentralise capital investment to engineering departments at the district level and operation and maintenance to district and gram panchayat levels.<sup>4</sup>

## Policy and regulation

The responsibility for water supply and sanitation at the central and state level is shared by various Ministries. At the central level three Ministries have responsibilities in the sector: The Ministry of Drinking Water and Sanitation (until 2011 the Department of Drinking Water Supply in the Ministry of Rural Development) is responsible for rural water supply and sanitation; the Ministry of Housing and Urban Poverty Alleviation and the Ministry of Urban Development share the responsibility for urban water supply and sanitation. Except for the National Capital Territory of Delhi and other Union Territories, the central Ministries only have an advisory capacity and a limited role in funding. Sector policy thus is a prerogative of state governments.

### **National Urban Sanitation Policy**

In November 2008 the government of India launched a national urban sanitation policy with the goal of creating what it calls "totally sanitized cities" that are open-defecation free, safely collect and treat all their wastewater, eliminate manual scavenging and collect and dispose solid waste safely. As of 2010, 12 states were in the process of elaborating or had completed state sanitation strategies on the basis of the policy. 120 cities are in the process of preparing city sanitation plans. Furthermore, 436 cities rated themselves in terms of their achievements and processes concerning sanitation in an effort supported by the Ministry of Urban Development with the assistance of several donors. About 40% of the cities were in the "red category" (in need of immediate remedial action), more than 50% were in the "black category" (needing considerable improvement) and only a handful of cities were in the "blue category" (recovering). Not a single city was included in the "green category" (healthy and clean city). The rating serves as a baseline to measure improvements in the future and to prioritize actions. The government intends to award a prize called Nirmal Shahar Puraskar to the best sanitation performers.<sup>5</sup>

## Service provision

**Urban areas.** Institutional arrangements for water supply and sanitation in Indian cities vary greatly. Typically, a state-level agency is in charge of planning and investment, while the local government (Urban Local Bodies) is in charge of operation and maintenance.<sup>6</sup> Some of the largest cities have created municipal water and sanitation utilities that are legally and financially separated from the local government. However, these utilities remain weak in terms of financial capacity. In spite of decentralisation, ULBs remain dependent on capital

<sup>4</sup> Planning Commission: [India Water Supply and Sanitation Assessment 2002](#), a WHO-UNICEF sponsored study, 2003, p. 23-26

<sup>5</sup> Water and Sanitation Program (2010). ["New Sanitation Award Creates Healthy Competition Among Indian Cities"](#). Retrieved 21 August 2012.

<sup>6</sup> National Institute of Urban Affairs: [Status of Water Supply, Sanitation and Solid Waste Management](#), 2005, p. xix–xxvi. The evaluation is based on a survey of all 23 metropolitan cities in India (cities with more than 1 million inhabitants) and a representative sample of 277 smaller cities with an aggregate population of 140 million. The survey was carried out in 1999.

subsidies from state governments. Tariffs are also set by state governments, which often even subsidise operating costs.<sup>7</sup> Furthermore, when no separate utility exists, there is no separation of accounts for different activities within a municipality. Some states and cities have non-typical institutional arrangements. For example, in Rajasthan the sector is more centralised and the state government is also in charge of operation and maintenance, while in Mumbai the sector is more decentralised and local government is also in charge of planning and investment. In 2012 the Delhi Jal Board contracted out operations and management in three zones of the city to private companies under performance-based contracts to reduce non-revenue water.

**Private sector participation.** The private sector plays a limited, albeit recently increasing role in operating and maintaining urban water systems on behalf of ULBs. For example, the Jamshedpur Utilities & Services Company (Jusco), a subsidiary of Tata Steel, has a lease contract for Jamshedpur (Jharkhand), a management contract in Haldia (West Bengal), another contract in Mysore (Karnataka) and since 2007 a contract for the reduction of non-revenue water in parts of Bhopal (Madhya Pradesh).<sup>8</sup>

**Rural areas.** There are about a 100,000 rural water supply systems in India. At least in some states, responsibility for service provision is in the process of being partially transferred from State Water Boards and district governments to Panchayati Raj Institutions (PRI) at the block or village level (there were about 604 districts and 256,000 villages in India in 2002, according to Subdivisions of India. Blocks are an intermediate level between districts and villages). Where this transfer has been initiated, it seems to be more advanced for single-village water schemes than for more complex multi-village water schemes. Despite their professed role Panchayati Raj Institutions, play only a limited role in provision of rural water supply and sanitation as of 2006. There has been limited success in implementing decentralisation, partly due to low priority by some state governments.<sup>9</sup> Rural sanitation is typically provided by households themselves in the form of latrines.

## 3.2 Institutional Set Up

### 3.2.1 National Level

The Ministry of Drinking Water and Sanitation to,

- Provide policy guidance and financial and technical support to the States.
- Conduct regular Monitoring and Evaluation of the implementation and impact of the rural water supply programme in the States.
- Support the States in setting up WSSO as per the NRDWP guidelines.
- Assist the States in case of natural disaster for restoration of damaged water supply systems.

<sup>7</sup> 10th Plan, p. 613

<sup>8</sup> [The Financial Express: Jusco reaches Bhopal, aims for other cities under JNURM](#), 25 August 2007

<sup>9</sup> World Bank: [Punjab Rural Water Supply and Sanitation Project, Project Appraisal Document](#), 2006, Annex 1

### 3.2.2 State Level

Public Health Engineering Departments/Rural Water Supply and Sanitation Departments/Boards are the primary executing agencies for commissioning rural water supply schemes at the state level. The changed water resource situation and need to adopt decentralized strategy emphasizing a user-driven demand-oriented approach necessitates these Engineering Departments to have a greater understanding about communication methodologies, PRA techniques and shifting their role to one of facilitator rather than just a service provider. For this, it will be necessary to strengthen and restructure the existing PHEDs/ Boards by making them responsive to the needs of the community and the evolving scenario by studying their strengths and weaknesses.

Each State is to have the following Institutions:

- State Water and Sanitation Mission (SWSM).
- State Level Scheme Sanctioning Committee (SLSSC).
- State Technical Agency (STA).
- Water and Sanitation Support Organization (WSSO).

### 3.2.3 District Level

A District Water and Sanitation Mission (DWSM) shall be constituted at the district level and should function under the supervision, control and guidance of Zilla Panchayat/Parishad. States which do not have a proper PRI set up in place, as in case of 6th Schedule Area and desire to supervise the working of the DWSM through alternative mechanism, may put in place a suitable body through which the District Water Security Plan will be prepared and implemented. The Village Water Security Plans should be analyzed and consolidated at the district level by DWSM. It should prepare a district based water security plan for implementation. At the district level, convergence of all the other related programmes and funding should be ensured.

Some of the major related programmes are MGNREGS, Integrated Watershed Management projects of Department of Land Resources, Ministry of Rural Development, Central and State Finance Commission funds, NRHM, various Watershed and Irrigation schemes of the Ministry of Agriculture, various schemes of the Ministry of Water Resources etc. The DWSM would be supported by Consultants and office staff.

### 3.2.4 Sub District Level

A Block Resource Centre shall be set up at the block/taluka/mandal level to provide continuous support to GPs/GPWSC/VWSCs on both water and sanitation issues and to act as a link between them and the DWSM. The Centre will be entrusted with the task of continuous awareness generation, motivation and training of GPs, GPWSC/VWSCs and local community members to enable them to ensure safe drinking water and improved sanitation in their villages/habitations. The expenditure on the BRC staff and on its activities may be met out of the NRDWP Support fund.

### 3.2.5 Village/Gram Panchayat Level

A Gram Panchayat/Village Water and Sanitation Committee (GPWSC/VWSC) is to be set up as a Standing Committee/ Sub- Committee in each Gram Panchayat for planning, monitoring, implementation and operation and maintenance of their Water Supply Scheme to ensure active participation of the villagers. This Committee may be merged with the Village Health Committee set up under NRHM, so that water, sanitation and health issues are tackled together at the village level. The membership of a GPWSC/VWSC may consist of about 6 to 12 persons, comprising elected members of the Panchayat, women with due representation to SCs, STs and poorer sections of the village. This Committee shall function as a Standing Committee/ Sub-Committee on Water and Sanitation of the Gram Panchayat and should be an integral part of the Village Panchayat. The composition and functions of the GPWSC/VWSCs can be regulated by a set of by-laws under the State Panchayati Raj Act.

### 3.3 Strategies for managing WASH in climate change induced uncertainty

Climate change has caused uncertainty in water, sanitation hygiene sector; and induced by climate change, disasters have become increasingly severe and recurring. Ground water became unreliable. Tube wells and the traditional ring-slab latrines are becoming less useful. Costs of water and sanitation are rising. Ensuring safe water and sanitation for all has become difficult.

Strategies to cope with climate change induced uncertainties in safe water supply, sanitation service and hygiene practice include-

**Use appropriate and effective technology-** it is crucial to find appropriate and effective technology that ensures water supply, sanitation services and hygiene practices in the changing circumstances. The current sources of water and the traditional technologies should be assessed to understand whether or to what extent they could serve their purposes. If they become unreliable, alternative sources of water and new technologies should be found. Information, knowledge and research help finding new technologies. However, promotion and supply of new technologies to large extent depends on functional and economic capacities. Also, the communities should learn how to use them.

#### Strategies to manage uncertainty

- Appropriate and effective technology; - Cost sharing through economic pricing;
- Create demand through awareness raising; - Subsidy for the poor and disadvantaged;
- Accountability and communities' participation; -Partnership among public, private and voluntary agencies.

**Cost sharing through economic pricing for services-** disaster risk and climate will inevitably increase the costs of safe water supply and sanitation services. It is unlikely to provide the services without cost sharing. Therefore, economic pricing for the services should be introduced.

**Create demand through awareness-raising-** rising costs for the services may influence the demand at household and personal levels, negatively. In particular, for less affluent households, demand for such services may diminish. Therefore, it is vital to encourage them use safe water and proper sanitation facilities through public education and awareness-raising.

**Subsidy for the poor and disadvantaged-** understandably, poor and disadvantaged households may find it difficult to bear the increasing costs of the services. Therefore, accessibility issues should be carefully assessed in promoting new technologies. It is important to ensure that the economic pricing does not deprive the poor and disadvantaged households. If necessary, the system should allow these households access the services at subsidized price or free of charge. Also, disparity in men's and women's demand and accessibility should be considered. It should ensure that technological complexity or weaknesses in distribution do not create any gap in men's and women's accessibility.

**Accountability and communities' participation-** the key issues in safe water supply, sanitation service and hygiene practice are:

- a) Effective technology, if required, introduce new technology;
- b) Uninterrupted supply and distribution, and
- c) Public education to raise awareness.

The Local Government bodies have a vital role in these. However, communities should be involved in both planning and implementation processes. It should be built-in at national level planning process; DPHE is primarily responsible for this. Also, the Disaster Management Committee at the local level should be aware of the weaknesses of the existing technologies and the criteria for new technologies; and to do that the Local Government bodies should consult with the communities.

The Local Government bodies have important role promoting public education and awareness rising. The key issues in this regard are-

- When if a new technology becomes necessary, it is important to educate communities about the proper way of using that and its management system; for example, educate people how should they store and use rain water or the management system piped water.
- Educate people about adaptive hygiene practices in changed circumstances; for example, ensuring personal cleanliness using less water.
- Aware communities about the need for adaptation in social norms; for example, hygienic latrine system for heavily crowded location.

**Partnership among public, private and voluntary agencies-** the Local Government bodies take part in supply and distribution to implement water supply and sanitation programme of DPHE. However, because of climate change and disaster risk the system became increasingly complex and expensive. Presently, it is no longer possible for a single agency to mobilize resources necessary to deliver services, undertake maintenance and manage all links of the supply chain. Therefore, it is important to arrange for partnership to share the responsibilities among public, private and voluntary agencies.

### 3.4 Principles in managing uncertainty

Principles for developing strategies to manage climate change and disaster risk induced uncertainties in water, sanitation and hygiene practices include-

**Long term perspective** – it is not certain whether or to what extent the current projects and systems will continue to be reliable in the context of disaster risk and climate change. Therefore, water supply and sanitation service related activities should not be permanent or unchangeable. Plans to meet the urgent immediate needs must apply a long term perspective; and they should include element to help modification to cope with the changing circumstances.

**Multiple sources and technologies**– due to climate change the existing sources of water and the current technologies are becoming less useful. For example, ground water table is gradually dropping. It is not certain how long it will be reliable. Also, it is difficult and time consuming switch from one system to another. Therefore, it is reasonable to use more than one source and depend on one source solely. For example, use rain water instead of relying solely on ground water. Similarly, use reverse osmosis machine along with tube-well; or introduce other types of hygienic latrine along with the ring-slab system.

**Introduce new technology** – due to climate change some of the current technologies became ineffective; for example, the traditional tube-well and PSF in salinity prone areas. To meet the needs in such changing circumstance, it is better to introduce new technologies instead of investing more on the traditional technologies; for example, introduce reverse osmosis or rain water harvesting system to replace tube-well and PSF in saline contaminated localities.

**Region specific system** – disaster risk and climate change related challenges manifest regional variations; for example, salinity in the coastal areas and ‘too much and too little water’ cycle in the char land. It is unlikely that a single technology (e.g. tube-well) or natural water source will be effective for the whole country. Therefore, options for water supply and sanitation should be region specific.

**Accessible to all** – climate change and recurring disasters have been causing deficits in water supply and sanitation services; and results in increasing deprivation and discrimination. In meeting the basic needs, deprivation and discrimination are unacceptable. Therefore, technologies and distribution systems should be such that safe water and sanitation service should be accessible to all; and persons with disability, pregnant women, children or old-aged people have access to water and sanitation. Also, communities living remote and marginalized areas should have access to that.

**Affordable pricing** – producing water and sanitation services incur costs although they come under the basic needs. The national policies have proposed to recover the production and delivery costs. Making the services climate change and disaster resilient will inevitably increase the costs; and the end user will have to bear the burden. Therefore, the

distribution system should be set up in a way that the hardcore poor and disadvantage have access to water and sanitation service. To achieve that, if necessary, rates of service charge may vary for different economic and social groups.

**Social acceptance** – some tradition or well practiced systems have become ineffective; for example, ring-slab latrine in densely populated area. It is vital to ensure social acceptance in introducing new technologies. For example, water distribution points should be set up in way that women could access them without compromising their dignity; structure and procedure for use should be such that it is acceptable to all. However, if local practices or prejudices impede d promotion of appropriate technology, effort should be made to remedy that.

**Accountability** – because uncertainties caused by disaster risk and climate change it is extremely difficult to precisely predict the future benefits or losses of current investment or the existing projects. Also, needs may arise to modify the currently running projects. Therefore, it is vital to have structure and processes to determine how and to what extent individuals are responsible for adapting the operation and how they will be hold to account for the success and failure of the project.

### 3.5 Key Considerations in WASH Practice

In addition to the principles for managing uncertainties in water supply, sanitation service and hygiene practice, there are few other considerations. They are-

#### Safe water

- Determining the quality standard and volume of water per person and ensuring that is prime consideration. Water must be safe – it should be free from harmful substance, mineral, chemical and microorganism; and the distribution should such that every gets enough water.
- It should be ensured that women do not have to travel long distance to collect water and fetching water does not increase women’s work burden. Also, women should be able to collect water without exposing themselves to harassment or compromising their dignity.

#### Sanitation

- Technologies and structure and their application should be such that it does not contaminate the environment; and the use of sanitation service prevents disease transmission.
- Sanitation services should be affordable for all, socially acceptable and do not compromise the dignity of the users, women, in particular.

- Technologies and structure are durable and their repair and maintenance are within the reach of the households.
- Target should be one latrine for each household; to achieve this target appropriate technology should be developed.

## Hygiene

- The main concern in hygiene practice is to protect oneself against illness and prevent disease transmission through good practices. It is about learning and disseminating the institutional knowledge and change behaviour of individuals and communities to reduce disease prevalence. It may be done achieved public education and awareness raising.

### 3.5.1 Mobilizing Resources

- Commonly resource refers to money. Essentially, resources include materials, technologies and human resource. Generally, these are obtained in exchange of money. However, sometimes, money cannot get them timely. Therefore, it is important to understand precisely what resources are required and how they could be obtained.
- Main role of the local government bodies about water and sanitation is to raise awareness of the communities. It requires resources to that; and a very large part of that resource is human resource. The local government can get enough numbers of people from the communities; but these people may not have the required skills. Skills can be developed through training; and for that, it may require material resources and technologies. The local government agencies can request the DPHE and local NGOs involved in water and sanitation for assistance. To get financial assistance, it requires specific work plan. This work plan clearly defines the activities and indicates the types and quantities of resources required for each of the activities.
- Governmental and non-governmental agencies involved in water and sanitation sector may provide financial assistance. Therefore, it is important to build and maintain good relation with them. To such assistance from these agencies, local government bodies have to demonstrate-
  - Specific activities relating water supply, sanitation service and hygiene practice and how the money will be spent for each of activity.
  - The concerned local government body has both jurisdiction and capacity to undertake and complete the proposed activities.
  - Work procedure of the local government body is adequately transparent and accountable.

### 3.5.2 Accountability

Accountability refers to using authority and power in responsible manner. Key issues of humanitarian accountability include informing people about intervention and progress, get suggestion and feedback from community and receive complaint and respond to that.

## Accountability Target<sup>10</sup>

### Information sharing

- All information, including financial information, relating the intervention disseminated in a way that all members of the community, despite their gender and educational achievement, understand.
- All information, including direct and indirect cost, disseminate at regularly, publish progress report regularly and discuss and agree with community about the methods of information

### Participatory decision making

- Local community have key role in decision making and they feel ownership
- Recognize specific needs of the poor and marginalized groups, including women
- Resolve conflicts among different groups impartially

### Feedback mechanism

- Establish feedback mechanism through discussing with the community, and in way that local people, including women, can give feedback with any fear
- Local government bodies monitor communities' satisfaction level at regular basis

### Behaviour

- Workers of the local organization show trust and respect in their behaviour with the community members
- Regular contact and discussions with the community to find new options and opportunities

### Accountability structure

- Ensuring accountability requires and structure and process. The local government body should do the followings to ensure accountability.
- Inform community about the current and future interventions. Community should know about the details of the interventions as well about their roles in

<sup>10</sup> Source: The Listen First Framework: <http://www.Leadership in Action>

Accountability	
Inform the community	<ul style="list-style-type: none"> <li>▪ What are the information to be disseminated</li> <li>▪ When are the information to be disseminated</li> <li>▪ What are the process that apply for disseminating information</li> <li>▪ Who in the community should get information</li> </ul>
Know from the community	<ul style="list-style-type: none"> <li>▪ When should the agency seek information</li> <li>▪ What are the issues that the agency should explore</li> <li>▪ Whom should the agency contact to get information</li> <li>▪ What are the processes that the agency apply to get information</li> <li>▪ How should the agency use information received from community</li> </ul>
Receive suggestions and complaints	<ul style="list-style-type: none"> <li>▪ When may the community lodge complaints</li> <li>▪ What are issues open for lodging complaints</li> <li>▪ What are process that apply to lodge complaints;</li> <li>▪ How should the agency respond to the complaints</li> <li>▪ What feedback should the community get</li> </ul>

that. Also, they should get reports on implementation and progress of the project; for example, what are the activities; what are processes and how long it would continue; what resources are required and how are the resources mobilised; what are the progresses and what are the constraints and challenges faced.

- Get disaster water, sanitation and hygiene related information from the community. Consult community at all stages of the programme intervention – e.g. situation analysis, problem identification, preparing plans, implementation and monitoring. To consult with the community the local government body should apply participatory tools and methodology; and should processes that ensure participation of women, disable and disadvantaged groups.
- Establish mechanism to receive complaints and respond to that timely. Inform community how they could send their complaints and suggestions about the intervention and its progress, and how the agency responds to the complaints received.

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#### 4. Session 4: SCENARIO-BASED PLANNING

*Time: 90 mins*

##### **Key Learning Objectives:**

- Understand how to apply a 'climate lens' to WASH strategies and plans to learn about the limitations of existing planning approaches
- Know about the key elements of a climate lens approach
- Learn the benefits of a climate lens approach
- Understand how can scenario-based planning (in entirety or influenced by key ideas) be used as a practical framework/tool to improve WASH planning processes at different levels (from high level strategic to operational) and one in which it is easy to understand climate change.

##### **Key Learning Points:**

- A step by step approach to application of a climate lens approach to existing WASH strategies, programmes, and plans.

##### **Session Content:**

#### 4.1 Applying a 'Climate Lens' to WASH Strategies and Plans

Most countries manage their WASH sector development process through cyclical multi-annual national and sector strategic plans, developed through participatory processes with lead WASH sector ministries and departments, central planners and others. The setting of objectives and priorities is informed by both top-down and bottom-up processes and benefit from lessons learned during previous implementation cycles.

Within national WASH strategies and plans, the management of water resources and increasing access to drinking water supply and quality are important considerations alongside other public health aspects such as sanitation, hygiene and behaviour change.

Specific mention is often given to community WASH services in schools and health facilities. Strategies and plans consider the demographics of the country and advocate targeted interventions to areas of greatest need – like needs of women and children, and /or vulnerable groups.

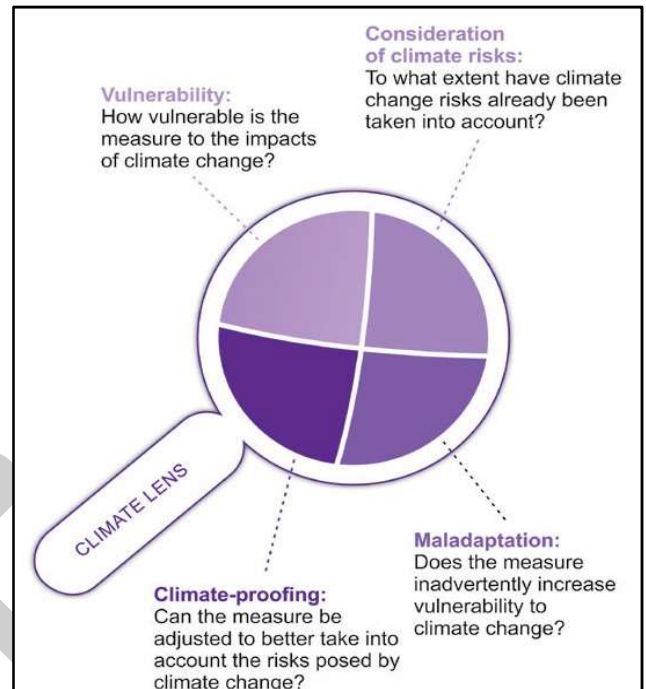
Attention is also usually given to the critical issue of strengthening the institutional structure in the WASH sector, which will help to improve coordination, coherence and monitoring. Investment costs and financing mechanisms are generally provided at a high level. Strategy implementation plans include timelines and responsibilities of the WASH ministries and departments for individual intervention areas.

## 4.2 Elements of a 'climate lens' approach

A 'climate lens' approach is essentially an analytical method that stimulates a questioning mode of analysis, as illustrated in the figure. Ideally, a 'climate lens' should be applied during the formulation of national WASH sector strategies and plans. However, there are also many benefits in applying this retrospectively (at state level for example) to identify areas where existing strategies and plans, and the implementation priorities and approaches recommended within these, could be strengthened with respect to climate resilience during review and reformulation processes.

With respect to national/state WASH strategies and plans it can serve to examine the following:

- To what extent have climate risks already been taken into account? Examine the extent to which national/state WASH strategies and plans draw on already identified climate change and climate-related DRR priorities and analyses, and how these have been taken into consideration in the course of the formulation of national/state WASH strategies or plans.
- How vulnerable are strategies and plans to the impacts of climate change? Examine the extent to which climate change risks and impacts are understood, and the extent to which identified approaches are resilient to climate change.
- Does the strategy or plan inadvertently increase vulnerability to climate change? Examine the extent to which there is a good understanding of how to manage climate risks, and whether good practice and innovation can help to reduce vulnerability and enhance climate resilience.
- Can strategies and plans be adjusted to better take into account the risks posed by climate change? Examine the extent to which knowledge, information and good practice for climate resilience are integrated into national/state WASH strategies, programmes, and plans.



## 4.3 Benefits of a 'climate lens' approach

The application of a 'climate lens' to national/state WASH strategies, programmes and plans will help to improve their overall formulation, with positive impacts subsequently materialising during the implementation of on-the-ground activities and investments. Anticipated benefits would be to:

- Ensure national/state WASH strategies, programmes and plans are aligned with existing national climate change adaptation and climate-related priorities and actions
- Ensure vulnerabilities and risks arising from climate variability and change are considered in national/state WASH strategies, programmes and plans, and subsequent implementation
- Strengthen and supplement country/state analyses by incorporating climate change considerations and ensuring measures are responsive to the impacts of climate variability and change
- Assist with the prioritisation of measures by identifying children and their communities living in high-risk locations, and targeting investments to areas where the needs are most pressing
- Provide a foundation to ensure that subsequent programming and implementation incorporates considerations of climate risks
- Identify elements of good practice for managing current climate variability and risks that may also contribute to managing future risks
- Identify opportunities for innovative approaches to manage climate risks and to strengthen climate resilience
- Identify cross-sectoral influences on WASH services and provide the impetus for engagement, collaboration and shared learning with stakeholders from outside the WASH sector
- Provide evidence on what amendments might be warranted in order to address climate risks and to strengthen climate resilience.

#### 4.4 Other considerations

The integration of climate resilience into national/state WASH strategies, programmes and plans is not an end point in itself. The challenge is to also integrate climate resilience into subsequent programmes and implementation actions, including those of the government's WASH partners and support agencies. Implementation approaches across water supply, sanitation, and hygiene services should be selected or adapted to reinforce climate resilience. Benefitting from existing good practice and the identification of innovative measures and approaches that help manage current climate risks is likely to be a good start point. This is particularly true where these innovative measures and approaches also provide a foundation for managing future climate risks. Strengthening awareness and sharing knowledge will help to ensure that considerations of climate risks are incorporated in subsequent programming, project planning and implementation cycles.

Although the concept of climate resilience in the WASH sector is relatively new, it is growing in importance. Cross-fertilization and the sharing of ideas and approaches are to be encouraged, and can help to speed up the identification of reliable and affordable responses and solutions. Making use of evidence and good practice that has been compiled at the national level can help to supplement state-level knowledge. Out-of-the-box thinking is also necessary, particularly where climate-related hazards affecting WASH services are addressed more efficiently and effectively by taking preventive measures outside the realm of the WASH sector itself (e.g. better land use management). An integrated approach to identifying climate resilient solutions will ultimately be one that considers all sectors and stakeholders that impact on the effective functioning of WASH services.

Strengthened capacity to supplement existing WASH planning, decision-making and implementation processes will be necessary. Capacity development should be firmly grounded in existing institutional roles and responsibilities and be targeted towards strengthening existing skills and practices in risk-based approaches, rather than as a separate stream of activity.

The process of integrating climate resilience into WASH sector strategies and plans should result in greater awareness among WASH sector planners and decision-makers of the implications of climate change risks on the sector and the appropriate responses to manage these.

#### 4.5 A stepwise approach to applying a 'climate lens'

A step-wise approach to applying a 'climate lens' to national/state WASH sector strategies, programmes and plans is recommended. Quick wins can be achieved by considering the following initial questions:

- Does your state already have a state WASH sector strategy and plan, and is it aligned with overarching national climate change and climate-related priorities and actions?
- Is there a good understanding of climate change impacts on the WASH sector, and has this knowledge and information been used to inform strategies and plans?
- Is there a good understanding of how to manage climate risks, and has good practice and innovation been built into strategies, programmes and plans?

A flow chart centred on these questions, and their responses, is presented further ahead in this chapter. The pathway through the flow chart will vary from state to state as some states may be further advanced in terms of integration than others.

Suggested actions for different steps in the process are further elaborated in the following section.

## 4.6 Questions, responses and actions

### DOES YOUR STATE ALREADY HAVE A STATE WASH STRATEGY AND PLAN?

State WASH strategies and plans can be adapted from the wider National WASH sector strategies and plans, as the national strategies and plans aim to anchor WASH objectives within wider development strategies and goals (e.g. Poverty Reduction Strategies, the Sustainable Development Goals or similar). They highlight the critical importance WASH contributions make to national development objectives with respect to health, education, gender equity, productivity, long-term poverty reduction and growth. In the context of state development, WASH strategies, programmes and plans should also be aligned with existing national climate change adaptation and climate-related DRR priorities and actions.

Climate change adaptation is increasingly referenced in overarching national economic, social and environmental development policies, and in many cases national priorities and actions have already been identified. The WASH sector is identified as a priority sector in many of these overarching national documents. However, many of the responses and actions have yet to be integrated into state WASH sector strategies and plans.

### IS THERE A GOOD UNDERSTANDING OF CLIMATE RISKS IN YOUR STATE?

State WASH strategies and plans should be informed by analyses of the impacts of climate variability and change. Climate change intensifies risks to WASH systems and risk-based planning is essential.

WASH strategies and plans that are informed by climate risk assessments will help to deliver WASH approaches and solutions that are more likely to withstand climate-related shocks and stresses. Climate-informed decisions help to identify and prioritise high-risk locations and to target investments in areas where the risks are highest.

Strengthening and supplementing situational analyses by incorporating climate change considerations will help to ensure that strategies and plans become more responsive to the impacts of climate variability and change. Upfront climate risk assessments will also facilitate appropriate contextual customisation of adaptation approaches and solutions to climate resilience.

Cross-sectoral influences will need to be taken into consideration when improving the climate resilience of WASH services. Engagement and collaboration with stakeholders from outside the WASH sector, as well as between the various levels of governance within the WASH sector itself, will be an important factor.

A key element for the integration of climate resilience into WASH strategies and plans is the prioritization of no/low regrets measures and approaches (low-hanging fruits). These measures have a high chance of success against the full range of uncertainty in climate change projections and other future drivers. In addition, they often allow climate change adaptation agendas to be brought together more explicitly to tackle underlying climate-related issues.

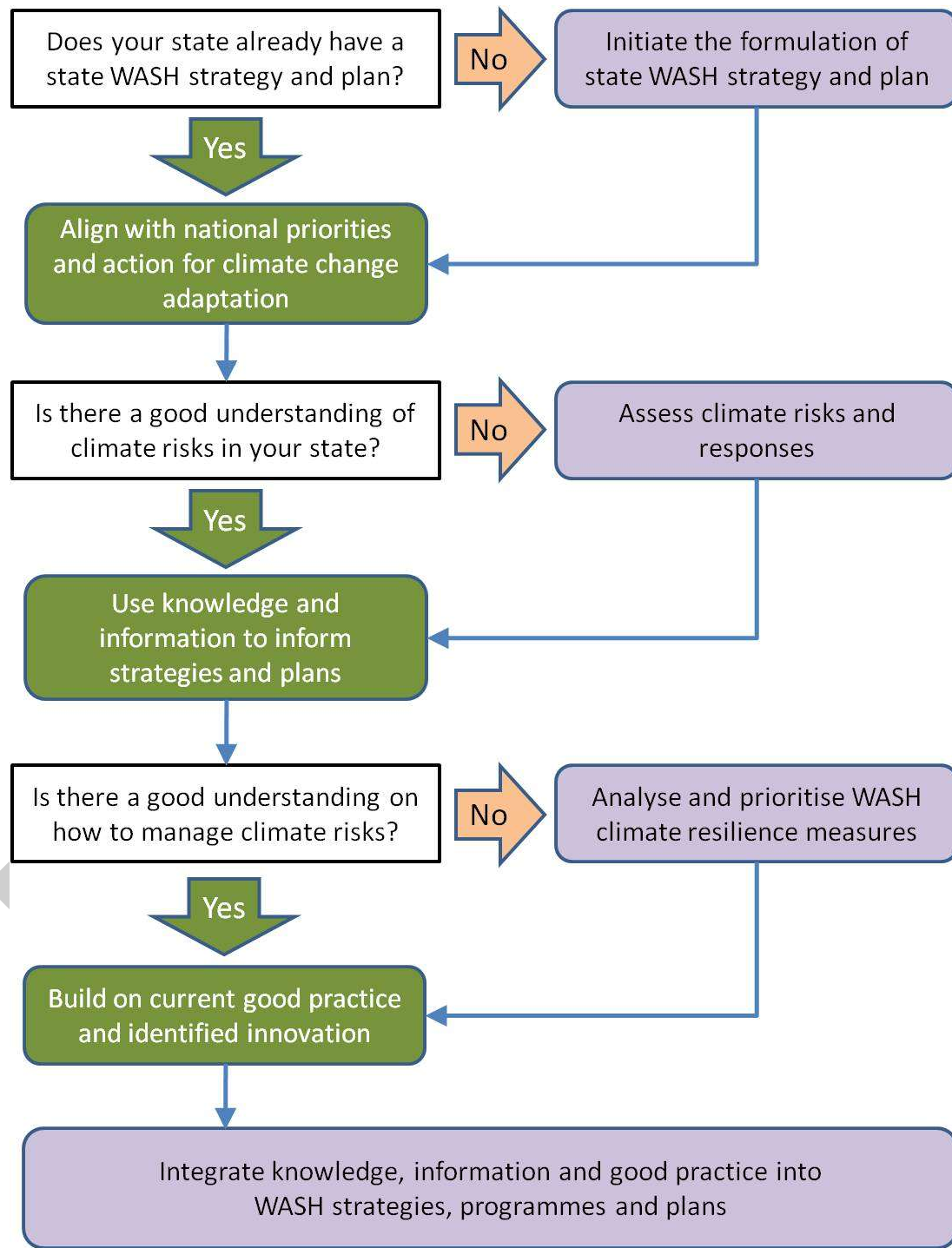
## IS THERE A GOOD UNDERSTANDING OF HOW TO MANAGE CLIMATE RISKS?

Many elements of good practice for managing current climate variability will also provide opportunities to enhance resilience to future climate variability and change. For example, careful siting and design of water and sanitation infrastructure can help to ensure that it retains its ability to operate under climate-related hazards such as floods and droughts. In areas where there will be increased stress on water availability (surface water and groundwater), augmenting supplies through increased storage or rainwater harvesting may be a solution to managing periods of low flow. Protection of water sources and improved management of source catchments are also likely to bring benefits both now and in the future to water availability and water quality.

However, building climate resilience is not just about infrastructure and management practices. Raising awareness and stimulating behavioural change can also bring benefits by encouraging the use of water-saving technologies and promoting water use efficiency and conservation. Climate hazards such as floods affect not only water supply infrastructure, but also sanitation facilities. Flood affected latrines can lead to negative changes to sanitation hygiene behaviour with negative impacts on public health.

By adopting approaches that make WASH services more resilient and adaptable to climate change there is the potential to improve the overall performance of the sector. Integrating these at a state WASH strategy and planning level is beneficial and helps to ensure that existing good practice and innovation provide a foundation for subsequent refinement during more detailed programming and project implementation levels.

## A STEPWISE APPROACH TO INTEGRATING CLIMATE RESILIENCE



## DOES YOUR STATE ALREADY HAVE A STATE WASH STRATEGY AND PLAN?

### If YES – Align with national priorities and actions for climate change adaptation

The alignment of state WASH strategies and plans with national adaptation priorities is an important first step and ensures coherence between WASH sector development and national agendas for action on climate change.

Specific actions would be to:

- Review existing national climate change policies, strategies, plans and associated documentation to identify national adaptation and climate-related DRR priorities, noting in particular those that relate to, or have an influence on, the WASH sector
- Establish to what extent existing state WASH strategies and plans encompass and align with national climate change adaptation priorities, and in particular note any gaps or omissions
- Communicate and disseminate state climate change priorities relevant to the WASH sector among WASH ministries, departments and partner agencies at all levels of governance
- Work with WASH ministries and departments to align WASH strategies and plans with national climate change priorities
- Ensure realigned priorities are captured in outline plans for strategy implementation, including those for financing, budgeting, monitoring and evaluation.

### If NO – Initiate the formulation of state WASH strategy and plan

Where state WASH strategies and plans do not exist, a process to develop these is recommended. This will bring opportunities to integrate climate resilience from the outset. Processes will vary from state to state, but many of the other considerations and actions will also remain valid. The reformulation or revision of state WASH strategies and plans also provides an excellent opportunity to strengthen the integration of climate resilience.

Specific actions would be to:

- Engage in WASH sector strategy and planning processes and ensure climate resilience becomes an integral component from the outset
- Make the case for climate resilience as an integral component of state WASH strategies and plans, drawing on evidence of existing climate impacts on WASH outcomes, and highlighting how climate change can further exacerbate these
- Engage in cross-sectoral dialogues, not simply within the WASH sector itself, to ensure factors outside of the WASH sector's realm of influence are taken into account within climate resilience strategies and plans.

## IS THERE A GOOD UNDERSTANDING OF CLIMATE RISKS IN YOUR STATE?

### If YES – Use knowledge and information to inform strategies and plans

Climate-informed decisions help to identify and prioritise high-risk locations and target investments to areas where the risks are highest. Findings from climate risk assessments will also help to deliver WASH approaches and solutions that are more likely to withstand climate-related shocks and stresses.

Specific actions would be to:

- Strengthen and supplement WASH situational analyses by incorporating climate resilience considerations
- Ensure the formulation of strategies and plans has been responsive to the impacts of climate variability and change, and do not inadvertently increase vulnerability
- Review priorities and ensure these consider communities and locations most vulnerable to climate risks
- Prioritise no/low regrets measures and approaches as these will help to manage current climate variability as well as future change
- Ensure cross-sectoral influences and actions are identified and taken into consideration as a mechanism to improve climate resilience.

### If NO – Assess climate risks and responses

Risk assessment is already a central component of many WASH situational analyses, but in many cases this has not yet been extended to encapsulate climate risks. Strengthening and supplementing situational analyses by incorporating climate change considerations will ensure strategies and plans become more responsive to the impacts of climate variability and change.

Specific actions would be to:

- Gather evidence on the impacts of climate variability and change at the state level, including an analysis of climate hazards, vulnerabilities, exposure and adaptive capacity
- Draw on past experiences and benefit from previous studies and information on the impacts of climate variability and change
- Identify the most serious and plausible climate-related threats, and how these impact specifically on the WASH sector
- Reach agreement among WASH ministries, departments and their implementation partners on the most important climate risks, and how best to respond to these risks
- Increase understanding among state WASH ministries and departments, and their implementation partners, of the ways climate change influences WASH service delivery outcomes and response measures.

## IS THERE A GOOD UNDERSTANDING OF HOW TO MANAGE CLIMATE RISKS?

### **If YES – Build on current good practice and identified innovation**

Many elements of good practice to manage current climate variability will also provide opportunities to enhance resilience to future climate variability and change. Building on existing good practice and proven methods is a good place to start.

Specific actions would be to:

- Collate evidence on existing good practice and integrate recommended approaches into strategies and plans
- Maximise the use of approaches to influence and change behaviour to ensure this also supports the climate resilience agenda
- Ensure innovation benefits from lessons learned nationally and internationally, and from institutions specialising in the piloting and testing of innovative techniques and approaches
- Where appropriate, incorporate the piloting of approaches to test their effectiveness in managing climate variability and change
- Raise awareness among key WASH stakeholders on current good practice and innovative approaches for enhancing climate resilience.

### **If NO – Analyse and prioritise WASH climate resilience measures**

Prioritisation should aim to ensure WASH resilience measures target areas of highest risk and meet the needs of those most susceptible to these risks, often the poorest and most vulnerable groups, including women and children.

Specific actions would be to:

- Evaluate the performance of WASH facilities and services under existing climate hazards such as floods, droughts and storms
- Gather evidence from local stakeholders on what worked well and what did not during extreme events, and from community experiences of coping with historic climate variability
- Identify aspects or components of WASH facilities and services that contributed to robust performance and those that led to failure or under-performance under different climatic hazards
- Draw on identified national and international best practice and innovation, and contextualise and customise recommended approaches and solutions for your own state context
- Agree recommended approaches (e.g. for different hazard types) and incorporate recommendations into strategies and plans.

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## 5. Session 5: GOOD PRACTICES, WASH INNOVATIONS AND CASE STUDIES

*Time: 60 mins*

### **Key Learning Objectives:**

- Learn about practical interventions and WASH technologies
- Review case studies on good practices and innovations for climate change adaptation in WASH

### **Key Learning Points:**

- Practical interventions and WASH technologies
- Case studies on good practices and innovations for climate change adaptation in WASH

### **Session Content:**

#### **5.1 Practical Interventions and WASH Technologies**

There are numerous practical interventions and WASH technologies which help strengthen community resilience to the impacts of climate change.

##### **5.1.1 Groundwater development (using springs)**

- In its most basic form, spring development involves protecting the immediate area around a spring and constructing a facility where water can be collected safely. The flow from upland springs (which are often some distance away from water users) can be partially diverted into pipes and tanks that supply tap stands in communities. Such schemes can serve large numbers of users.
- Springs can provide a reliable year-round supply of clean water, if their catchment areas are protected from environmental degradation, and leakage in distribution systems is well-controlled.

##### **5.1.2 Groundwater development (using dug wells)**

- Hand-dug wells are manually constructed using hand tools. They vary in diameter from 1.5m to several metres. They are typically no deeper than 30m because digging becomes increasingly difficult (and unsafe) at greater depths, but some wells do exceed 30m. If wells are dug using de-watering techniques, they are more likely to be able to accommodate seasonal fluctuations in water availability. Wells dug without de-watering are prone to drying, which could mistakenly be attributed to climate change.

- Dug wells can provide year-round access to water and are a suitable climate change adaptation option in areas where groundwater is relatively close to the surface. In areas where groundwater moves at very slow rates, wide diameter dug wells are appropriate solutions because they provide greater storage capacity than boreholes do. This storage is less likely to be exhausted by manual pumping.

#### 5.1.3 Groundwater development (using boreholes or tubewells)

- Groundwater acts as a giant natural storage reservoir that can provide water when surface sources have dried up or are contaminated. The natural filtering property of aquifers ensures that groundwater is generally (although not always) of good quality. If groundwater is well managed and protected from pollution, it can provide reliable year-round supplies. Groundwater can be accessed and developed by drilling boreholes into underground water-bearing fractures, soil or rock formations. Boreholes may be fitted with a manually operated pump that can lift water from 45 to 60m, or a motorised pump that can lift water from deeper depths. Motorised pumping can supply large piped schemes.
- Research by the British Geological Survey, investigating the likely impact of climate change on groundwater, indicates that groundwater is more resilient to changes in climate than rivers, lakes and ponds. Well-sited, well-designed, well-constructed and supervised boreholes tapping into groundwater are a credible climate change adaptation strategy. Because groundwater can usually be developed close to the home, the hardship of water collection is reduced, meaning people can collect more water in less time to meet their daily needs. Well-sealed and well-protected boreholes provide water for hygiene and help to reduce the incidence of water-transmitted diseases, meaning people are better able to cope with the impacts of climate change.

#### 5.1.4 Storage

- This involves construction of tanks, cisterns, dams and reservoirs to capture and store water when it is available.
- Storage is an essential component of any water supply system. Without storage, there is no way to make water available in times of scarcity or to accommodate changing demands. Storage capacity in many countries is extremely low, meaning water is not always available in times of need. Tanks and reservoirs provide much-needed storage to cover water shortages, helping people to adapt to climate variability.

#### 5.1.5 Elevated water points

- These are hand pumps installed on elevated platforms in flood-prone areas. They tap into groundwater.

- They provide access to groundwater during floods. If the borehole the pump draws from is well-sealed, it is possible that water supplies will be protected from inflow of contaminated water.

#### 5.1.6 Elevated latrines

- These are latrines built on stilts or a concrete or brick plinth. Waste may drain into a sealed chamber to be emptied, or into a septic tank buried beneath the ground.
- Elevated latrines provide access to sanitation facilities during floods.

#### 5.1.7 Dams

- **Sand dams** involve constructing a barrier across a river channel that contains high volumes of coarse grained sediments. The barrier allows water to flow but traps coarse grained sediment behind it. This sediment acts as an artificial aquifer, storing water below the surface and protecting it from contamination. Sand dams are only appropriate in very specific hydro-geological conditions.
- Sand dams can store and provide large volumes of water in times of scarcity. They may contribute to increased soil water availability in the immediate vicinity of dams, improving prospects for crop growth. Water can be used for irrigation and livestock watering, strengthening livelihood and food security.
- **Sub-surface dams** involve digging into a river bed and building a dam under the surface, which slows the underground flow of water.
- Like sand dams, sub-surface dams constructed in river channels can retain water behind them, making supplies available in times of scarcity.
- **Small dams** involve constructing a barrage across a river channel, storing surface water in a pond or reservoir behind it.
- Small dams constructed in river channels store water, making it available for crop watering and other uses in times of scarcity.

#### 5.1.8 Rainwater harvesting (rooftop catchment with tank)

- Rainwater falls onto a clean roof surface and is channelled by guttering and pipes into a storage tank. Storage tanks can vary in capacity, and can provide for households, schools or health centres. People draw water from a tap connected to the storage tank.
- They provide a means of capturing and storing a relatively clean supply of water that can be used in times of scarcity. If used sparingly, for drinking, washing and cooking only, rainwater can provide essential supplies during dry periods. Supplies may not last for a

full dry season, but can act as a buffer, supplementing water available from other sources.

#### 5.1.9 Rainwater harvesting (ground catchment with water flowing into protected tanks)

- In certain areas, where there are outcrops of impermeable rock, it is possible to capture rainwater runoff and direct it into storage tanks. Relatively large catchments can be enclosed within small walls, resulting in collection and storage of large amounts of water. In some desert areas in South Asia this ancient practice is employed to capture precious rainwater in protected tanks.
- It provides a means of capturing and storing a relatively clean supply of water that can be used in times of scarcity. Supplies can be used for kitchen garden and small livestock watering, strengthening household food security and resulting in people being better able to adapt to impacts of climate change.

#### 5.1.10 Rainwater harvesting (ponds)

- This involves the construction of ponds that collect rainwater or runoff diverted into them from the surrounding area.
- In areas where the groundwater is saline or contaminated, rainwater collection in sealed ponds can make critically needed supplies of fresh water available in times of scarcity. However, pond water must be filtered before it can be used for human consumption. These supplies can provide much-needed water in areas with intermittent rainfall.

#### 5.1.11 Managed groundwater recharge

- This involves capturing and channelling water into recharge wells that replenish groundwater during the rainy season.
- In areas with high groundwater salinity, fluoride, arsenic or obstruction of recharge (for example in urban areas), managed groundwater recharge can help to dilute salinity, arsenic and fluoride concentrations in the area around a well, provided that groundwater flows do not take diluted water away from the well area. Increased availability of cleaner water helps people adapt to water shortages that may emerge due to climate variability.

#### 5.1.12 Improved sanitation

- This involves promoting solutions that remove faecal waste from the environment. Sanitation solutions typically capture, store, transport, treat and safely dispose of faecal waste.

- Safe capture, storage, transportation, treatment and disposal of faecal waste are critical if exposure to disease is to be minimised. With reduced exposure to disease, people are better able to cope with the impacts of climate change.

#### 5.1.13 Water treatment

- This involves the removal of harmful constituents from water so that it is safe to drink. This can be done using a variety of techniques, which include sedimentation, filtration, addition of chemicals, adsorption, boiling, distillation, ion exchange, reverse osmosis and solar disinfection.
- Water treatment, coupled with improved hygiene and sanitation, can help to reduce the incidence of debilitating diseases that weaken people's ability to sustain livelihoods. With reduced exposure to disease, people are better able to cope with the impacts of climate change.

#### 5.1.14 Hygiene promotion

- This involves promoting improved hygiene behaviours, such as handwashing with soap at critical times of the day, for example after using the toilet, and before food preparation and meals.
- Improved hygiene behaviours help reduce exposure to waterborne and water-washed diseases that occur now and may be accentuated by climate change. With reduced exposure to disease, people are better able to cope with the impacts of climate change.

## 5.2 **Case Studies/Best Practices/Innovations in WASH**

### 5.2.1 Pond sand filter

*A sustainable solution for disaster-prone coastal areas*

#### **Introduction**

Filtration is an ancient and widely used technology that removes particles and at least some microbes from water. The practicality, ease of use, availability, accessibility and affordability of the medium and methods of filtration vary widely and often depend on local factors. The effectiveness also varies depending on the type of microbe.

#### **The Challenge**

It is found that saline water transgresses into ground and surface water sources in the disaster-prone locations, especially adjacent to the coastline. Besides, ponds and rivers are also found to contain biological contaminants. Majority of the communities use pond water for drinking and domestic purposes in spite of it being unsafe.

## The Intervention

The main objective of construction of a pond sand filter was to have an alternate filtering unit through which people in the coastal community can access safe drinking water during and post-disaster situations. A slow sand filter is sometimes referred to as a "Biosand" filter, or a biological sand filter. All three refer to a water filter that works using biological action in sand without adding any chemicals to the water and are classical examples of sustainable technology. A slow sand filter consists of a container with a system of pipes with holes drilled in them covered by about 6 inches of gravel, in turn covered by three feet sand. Water is allowed to flow over the top of the sand and flow slowly down (because of the pull of gravity) through the sand and gravel to the pipes at the bottom. The water then flows back up (due to hydraulic pressure) through an output pipe to the level of input water. After about 3-4 weeks, a biological layer forms on the sand that traps and destroys harmful bacteria and viruses.

## How does it work?

When a slow sand filter is first put into operation or after it is "cleaned," a living "community" of aquatic aerobic, predatory microscopic organisms grow on the top 5-10 cm of wet sand and forms a bio layer or "Schmutzdecke" made of exo-cellular polymers (complex proteins and carbohydrates) and living organisms consisting of diatoms, algae, bacteria, and zooplankton. This sand and bio layer must always be submerged under oxygen rich water (the filter must always have water in it up to and cover all the sand) and it is effective in mechanically filtering small particles out of the water flowing through it. Also, the living organisms in the bio layer literally "eat" the pathogens in the water that get caught in the bio layer from a process known as "biological flocculation" (they stick to the biofilm). Some filtering also occurs because of the physical action of sand below the bio layer. Moreover, organisms in the bio layer produce substances that are toxic to viruses and bacteria in the water. Water must not flow through the filter faster than the biological action occurring in the "Schmutzdecke." In small versions of slow sand filters, the drainpipes at the bottom connect to a (usually PVC) pipe that runs out and up to an outlet several inches above the top of the sand. This way, water drains slowly and never leaves the surface of the sand exposed to open air.

Tests have shown that slow sand filters remove viruses, bacteria, and chemicals. They are an alternate option for safe drinking water in coastal belt and arsenic and fluoride affected areas. The surface water source may be a nearby river or a pond and the water can be lifted by hand or motorised pump to the treatment unit. The untreated water passes through gravel, pebbles, sand and then passes through carbon medium. The safe drinking water can then be stored in another chamber supplied through taps.

## Are slow sand filters safe?

They can be quite safe but should be used with caution and sufficient knowledge of their operation. The effectiveness of slow sand filters depends on the conditions in which they operate; and on the degree of pollution in the water to be filtered. Water must be allowed to run through them for at least three weeks before consumption. All parts of the filter must be kept clean to prevent contamination. Water must be always kept over the sand and the filter must be allowed to run again for three weeks after cleaning before consuming water

from them unless "wet harrowing" is used. Slow sand filters are thus able to provide safe water free from biological pathogens.

However, though biological sand filters can remove some harmful substances from water and most certainly improves the quality of water in all respects, the exact nature of its ability to remove industrial pollution has not been well-established. Nevertheless, the ability of carbon filters to remove chemicals from water is proven and the addition of a high quality carbon filter to the output of a biological sand filter could be a good idea. Water should not be consumed from a slow sand filter unless it has been tested and shown to be of acceptable biological and chemical quality; monitored and tested regularly by someone who understands its operation. Also, an UV filter on the output after the carbon filter is advisable. The output treated water chamber may be provided with the transparent sheet cover so that sun rays can enter into the chamber helping in further treatment through sunlight.

#### **Disadvantages of small slow sand filters**

- They do not remove 100 % colour or odour from water
- They require relatively non-turbid water to function properly
- They cannot function if water is frozen
- Water must be added regularly and the sand must stay covered by water continuously
- Care must be taken to prevent air pockets from forming in the sand during construction as it will foul the filter and require removing sand and all anaerobic bacteria and odours.
- Industrial pollution is only partially removed from water by these filters
- Water must flow for at least 3 weeks before it can be used
- They are very heavy and the location for its set-up must be well-thought of

#### **Advantages of small slow sand filters**

- They can remove over 99 % of harmful bacteria and 91-99 % of viruses from water
- They improve water clarity and do not require addition of chemicals to function
- They can be designed to function using only the power of gravity. They last many years by occasionally adding more sand to the top layer
- They are inexpensive and do not pollute
- They are based on sustainable technology and do not produce harmful by-products as chlorine and ozone purification processes.
- Its construction and maintenance is simple and easy to understand.
- They can be built from locally available materials and can operate in remote areas where no electrical power or petroleum energy is available.

### 5.2.2 Bio- Digesters

*A potential solution for faecal sludge management in flood prone areas*

#### **Introduction**

Human waste disposal is an ever-growing problem resulting in environment pollution, ground water contamination and health problems leading to epidemic proportions at times.

Besides, untreated waste is responsible for several diseases like, dysentery, diarrhoea, amoebiasis, viral hepatitis, cholera, typhoid etc. causing deaths of lakhs of children annually.

### **The challenge**

Under the Govt. of India's flagship programme Swachh Bharat Mission (SBM), the super structure in toilet construction allows access to a room (or covered space) having water closet taking into factors like dignity, safety and security. The faecal sludge management is generally done by construction of leach pit, septic tank or any other suitable options. However, this important aspect of collection of faecal sludge and its proper management is usually left inadequately unaddressed.

Unless special care is taken, the leach pit and the septic tank prove to be unsuitable options in high water table areas. In disaster-prone areas, due to water logging and frequent submergence due to flood, there is greater chance of surface and ground water contaminations through such types of faecal sludge management system.

Thus bio-digester technology was conceptualized and developed for resolving problems of un-decomposed human waste. The inoculum degrades and converts the human waste into usable water and gases in an eco-friendly manner. The generated gas can be utilized for energy/ cooking and water for irrigation purposes. The process involves bacteria in the form of inoculum, which feed upon faecal matter inside the tank through anaerobic process. This finally degrades the matter and releases methane gas that can be used for cooking, along with the treated water. The bio-digester tank can be manufactured and customized as per the requirement.

### **Advantages of using a bio-digester**

- No bad smell in toilets from tanks and faecal matter in the tank not visible
- No infestation of cockroaches and flies
- No clogging of digester
- Effluent is free from odour and solid waste
- Reduction in pathogens by 99% and in organic matter by 90%
- No maintenance required and no requirement of adding bacteria/enzyme
- No need of removal of solid waste
- Use of phenyl is permitted upto 84 ppm

### **5.2.3 Iron Removal Plant (IRP)**

*Makes water potable for communities in disaster-prone area*

### **Introduction**

The coastal district of Puri with a 150-km of coastline is prone to cyclone and floods. Epidemics are a regular phenomenon in these parts. Most of the areas in the District are waterlogged and high salinity in the groundwater makes the water unsafe for drinking. This is further aggravated during floods. Moreover, the water sources in the coastal district - both surface water and groundwater- have high contamination levels. The groundwater in Puri has high salinity and iron content. Data shows that almost 63 % of its population consumes iron contaminated water. Though iron is not as toxic as other heavy metals like

lead or arsenic, but a higher concentration of iron (WHO approves 0.3 mg/l to 1 mg/l as the agreeable levels of iron contamination) is undesirable in potable water. It has an unpleasant taste and odour and turns red on settling down. The alternative water source is untreated surface water (with biological contamination). This leads to spread of water borne diseases like cholera, typhoid, diarrhoea, and dysentery. The community also suffers from skin ailments and allergies.

Oxfam India has been working with NGO, SOLAR, in Puri district since 2008. It has reached 44 villages in Kanas block with its work on Disaster Risk Reduction (DRR). Providing safe drinking water solution is one of the focus areas of Oxfam's work in Puri. Currently, Oxfam is working in 15 villages in three Gram Panchayats in Kanas block. These villages, close to the coast, are located in the Daya and Makhara river basins and are frequently affected by floods and water logging. They suffer mostly due to lack of safe drinking water- both during and after disaster. For the communities in Ogalpur and Jaguleipadar - two villages where Oxfam India worked - the options drinking water sources were limited to the tube well that generated water with high iron content and surface water (village ponds, and Daya and Makhra rivers) with biological contamination.

Ogalpur village has about 128 households, with an approximate population of 780. Due to high iron contamination from the two tube wells, the villagers draw water from the Makhara river. The community here is primarily agrarian. On the other hand, Jaguleipadar village is larger with 450 household, with approximately 2400 members. This village has 10 tube wells. The village is on the banks of the Daya River. This village mostly comprise of fisher folk community.

The communities collect water for cooking and drinking purposes from the river to avoid the foul smelling water from the hand pump. Further, they used to collect it from the same point where they would bathe and clean. Water borne diseases were common in these parts. Oxfam supported SOLAR to install Iron Removal Plants (IRPs) to address the drinking water problem, especially the groundwater problem in these villages. These IRPs are attached to the existing hand pumps.

### Implementation

The first hand pump was reinstalled on a raised platform in 2013 in Ogalpur. The shallow sub-surface tube wells, the main source of drinking water in these parts, get easily contaminated during floods. The height of the hand pumps were raised above the highest flood levels in the area to overcome this problem. This prevented the hand pump from submerging during floods and kept the water source functional. The hand pump wasn't reinstalled on a raised platform in Jaguleipadar village.

### Middle Plate with filtration system

The IRP, a cylindrical structure retrofitted with terra filters were set up in 2015 in both the villages. The terra filters separate the IRP internally into two chambers. The IRP has a capacity of 2000 litres and is filled four times during the day. A motor pump lifts the water into the top chamber of the IRP and the filtered water is collected in lower chambers. Two taps are fitted at the bottom as outlets. The terra filters filter the iron out. The tube well water is filtered and the community now has access to drinking water that is free of pungent

smell or taste. The WASH (Water, Sanitation and Hygiene) Committees formed in these villages were trained by Oxfam India and SOLAR to run, clean and maintain the IRP and its adjoining areas. The seven-member WASH Committee in Ogalpur for example, which also functions as the maintenance committee, has been trained to clean tanks.

The tank and the filters are cleaned every Sunday; the insides of the tank and filters are scraped cleaned to ensure that no residues remain in the inner sides of the tank. Bleaching powder is applied, twice daily, in the areas adjoining the IRP and the hand pump to keep it dry and disinfected. While the village funds are used for the upkeep of the tank, a nominal fee of INR 5 is also collected from each household towards these costs. The cost of setting up an IRP is between INR 35, 000-45, 000. Some cost is incurred towards electricity consumption as well.

### Results & Lessons Learnt

Earlier, when the water collected from the hand pumps was stored, its colour would turn red. Now with the IRP filtering out the iron, the water tastes better and doesn't have a foul smell. The households collect water twice daily and use only for drinking purposes. They still rely on the hand pump or the river for cooking largely because the water is boiled during cooking.

However, on probing it was understood that there wasn't enough filtered water. At its full capacity, at least 7 litres of water per capita is what would be available to the community at Ogalpur village, which complies with the WHO standards. But because the water has to be lifted into the IRP through an electric motor and electricity is not very regular, the tank doesn't reach its full capacity. This leaves the families with only enough water for drinking and sometimes not even that. Moreover, the long queues make women opt for the hand pump. Thus, the IRPs have been able to address only part of the problem at the moment but it is a promising start. The communities want more such IRPs built in the village. The second hand pump in Ogalpur was in a school and if another IRP is set-up, it could meet the cooking requirements as well. The one IRP in Jaguleipadar caters to only 150 households from four wards. But the families are unable to stop villagers from other wards and that means less water for the community. They have nine other hand pumps; the Sarpanch or the village head has agreed to build one more IRP. This proposal has been passed in the Palli Sabha and the work will be taken up at the block level. Communities from neighbouring villages flock to see this model work and have approached SOLAR to set at least one such plant in their villages as well. The Block Officer in Ogalpur has sent a Junior Engineer to assess the IRP and the water quality. The WASH Committee is following up with the district administration for an additional IRP and in case the administration doesn't assist in building it they will do it on their own. They plan to pass it through the Palli Sabha by next summer.

### Conclusion

The community recalled that in the last few months, cases of diarrhoea have fallen down drastically. The high demand for IRPs is a clear indication that the model is a success and should be replicated in the coastal villages prone to flooding. Renewable Energy could be explored as a source to run the motor. This will ensure that there is water all the time in the tank. Secondly, another tank should be attached to the main IRP for storing water as and when it gets filtered. This will help ease the load and ensure that families have enough

water for drinking and cooking. The IRPs are extremely relevant in the coastal districts and villages as they provide a clean source of drinking water without bad odour or taste. Though partially, the IRPs have been both effective and efficient. There are some teething problems like electricity shortage which can be addressed through alternate sources of energy like solar to make the initiative sustainable. Though the pilot IRPs were set up by Oxfam India and SOLAR, the community has played a big role in its maintenance and upkeep. The success of the IRPs in these villages has encouraged other villages to consider sourcing village funds for setting up these plants.

#### 5.2.4 Raised Handpump Platform

##### **Introduction**

Access to safe drinking water for the community becomes very difficult during emergencies like flood or cyclone. In spite of numerous water sources available within the community, they become contaminated due to open defecation and animal excreta. Water sources such as well, pond and hand pump are affected. The hand pumps get submerged with contaminated water making it unfit for human consumption. Thus, people suffer from water borne diseases like diarrhoea and gastroenteritis. Therefore, to provide safe drinking water during such natural calamities, raised platform are being designed by considering the high flood level in the community so that they can easily access safe drinking water.

##### **The implementation**

Nankar is a revenue village under Jalapok Gram Panchayat in the Luna-Karandia river island. The village suffers from annual flood as the two rivers on south and north of the village merge during flood and remain so for days and at times in multiple phases. The deep tube well situated in the lowland gets completely submerged preventing access to 24 households. The tube well is the only source of safe water and the villagers had no other option but to use contaminated river water.

After the initial assessment, discussion with village community and PRI members, it was decided to set-up a tube well with raised platform and inclusion features. The tube well will be centrally located and accessible to the dependent households. Moreover the tube well was newly sunk and hence preferred by the community assuming it to serve for a longer time. The present design raised the hand pump considerably above the high flood level, where the community can easily access safe drinking water. The raised platform with DRR features operates throughout the year providing safe drinking water to the community. The waste and excess water could also be utilized for kitchen garden.

##### **Design Components**

- Raised platform to protect the water source from the incoming flood
- Ramp is provided with stairs and also surface mounted tiles with hand railings on both sides.
- Fencing around the raised platform is provided to make it child-friendly.
- Platform, columns and hand pump seating casting is through RCC ensuring good quality for longer period of use.
- RCC ratio M 20 (1:1/2:3)

- Ramp is placed and maintained at the angle of 65 degree from the raised platform to the ground.
- During flood and normal operation, the contaminated water does not leak to the ground below due to proper sanitation seal.
- The excess water drained from the hand pumps are channelized to nearby water sources or the kitchen gardens.
- Railing on the ramp is provided for support while fetching and carrying.

### **Innovation**

It was observed that the raised platform hand pump generally used during the flood or cyclone remained idle in the normal days. So, to use it on a day-to-day basis new innovative features were added. A Bath Room (6'x6'x5'6") underneath the platform was designed. The structure was brick masonry adjoining the 4 columns. Ventilators were provided in either side with a door. The bath room was supplied with water from the water tank placed parallel to the platform height.

Plumbing was done in such a manner that the water could be pumped to the tank and it could be accessed for bathing through pipe. Floor and wall tiles were fixed on the floor and walls. Both adolescent girls and women now had a bathing space in the locality for which they were happy.

- A synthetic tank of 1000 litres placed at par to the hand pump seating platform
- The water tank connected through pipe to the out flow of the hand pump
- The water tank connected to the bath room with PVC pipes for 24x7 water supply with continuous hand pump operation.
- An additional tap can be fitted at the bottom of pipe connection so that others can also access the water as and when required.
- The outlet hand pump fitted with T-valve for fetching water during the bath room is not in operation.

The excess water coming out from the hand pump operation is collected through PVC pipe to a sediment tank and from the sediment tank it is directed to nearby water source or for the kitchen garden by the community users group.

### **Water Quality Testing**

All sources of water in the affected villages underwent a biological test three times along with a chemical test. The H<sub>2</sub>S kit and field testing kit were used for ascertaining contamination and 10% of the positive screening was tested with the Rural Water Supply Scheme (RWSS) laboratory for confirmation. The water testing report was shared with the RWSS.

### **Linkage with Government line departments**

Before starting the construction, the concerned line department from Health, ICDS, RWSS and Education were consulted. The RWSS especially was linked for water quality and raising the platform in the community.

### **Community engagement**

The community was made aware about the operation and minor maintenance of the raised platform to sustain it. The group formed within the community known as Water User Group (WUG) was responsible for O&M. The WUG have 15-20 members comprising women, adolescent girls and religious leaders. The members are familiar with WASH practices and maintenance of the raised platform. The WUG entered with a MoU with the partner organization for its O&M. The capacity of the group was built by the organisation. The WUG convened meetings in the community and strengthened the activities of the Village Water, Health and Sanitation Committee. The WUG was also involved in monitoring the work in progress including the quality and quantity of building materials. Save the Children provided hand-holding support at the time of need and assisted in establishing linkage with government departments for any major repair work. After initial testing, the WUG was trained in water quality testing methods.

### Exit strategy

After completion of the work the same structure was handed over to the WUG for O&M. The WUG is now conducts monthly meetings regularly and maintains the hand pump for minor repairs. It is also responsible for cleaning the surroundings of raised platform and the sediment tank regularly. It promotes hand washing in the locality and remains in touch with the Gram Panchayat for any major repair of the hand pump.

## 5.2.5 Roof Top Rain Water Harvesting

*An alternate sustainable water source*

### Introduction

Natural disasters like drought often compound the ever increasing problem of water scarcity. Also, other disasters often leave water sources contaminated causing a multiplicity of water borne diseases and infections. Besides, in many areas ground water contamination occurs due to fluoride and arsenic resulting in serious problems among communities residing in the area. Roof top rain water harvesting is an alternative technique through which rain water is captured from the roof catchments of community buildings and collected after which it passes through the pipe network and stored in the storage tank. This technique can be adopted in disaster-prone and water scarce areas facing water shortage or contamination to store water. In saline or coastal areas, rain water provides good quality water and when recharged to ground water, it reduces salinity and also helps in maintaining balance between the fresh-saline water interfaces.

### The intervention

The ground water in Nuapada district of Odisha was found to be contaminated with much more than the permissible limit fluoride content. The sub-surface lithology imparted high fluoride to the aquifers. Thus, the tube wells in Nuapada generated fluoride contaminating drinking water resulting in dental and skeletal fluorosis among the population. Assessment of the quality of water by the volunteers of NGO RCDC with support from WaterAid in the intervention villages revealed high amounts of fluoride in the groundwater, much beyond the permissible limits as laid down by the Bureau of India Standards. It was thought to use surface water resources for drinking purposes to address the problem. However, this was a

comparatively costlier intervention with maximum engineering and skilled work to be installed through its transportation, treatment, storage etc. in a complete network. So, it was thought to collect rain water for drinking and domestic use. The water collection can be made in the roof top of existing community buildings like schools; Panchayat buildings etc. The safe storage conditions can be made by constructing a structure. The stored safe water can be beneficial to school students and the community. Roof top rain water harvesting is an alternative technique through which rain water is captured from roof catchments of community buildings. The collected water passes through the piped network and is stored in the storage tank generally constructed by excavating the earth from the ground level. The water of first rain is released as it might be contaminated. The water collected in the tank passes through a filter medium and is also disinfected. The prime objective of rooftop rain water harvesting is to make water available for future use. Capturing and storing rain water for use is particularly important in water scarce areas, more so where there are further issues of fluoride contamination due to the typical lithology of the area.

Rooftop rain water harvesting could be used for a number of purposes such as to meet the ever-increasing demand for water, reduce the runoff which clogs storm drains, avoid flooding of roads augment ground water storage and control decline of water levels. It is also adopted to reduce ground water pollution improve its quality and helps in reducing soil erosion. Importantly, it supplements domestic water requirement during summer, drought etc.

### **Rooftop rain water harvesting through storage in tanks**

The storage tank should not be located close to a source of contamination, such as a septic tank etc. It must be located on a lower level than the roof to ensure that it fills completely. A rainwater system must include installation of an overflow pipe which empties into a non-flooding area. Excess water may also be used for recharging the aquifer through dug well or abandoned hand pump or tube well which has been demonstrated in Nuapada. The capacity of the storage tank should be based on the average annual rainfall of the area and also to meet the users' water requirements. Storage tanks should be accessible for cleaning and the inlet into the storage tank should be screened in such way that these can be cleaned regularly. In addition, water may be disinfected regularly before using for drinking purpose by chlorination or boiling etc.

#### 5.2.6 WASH Watch Group

##### *A Community Advocacy Network*

### **Introduction**

Too often existing budgets for water and sanitation remain unspent. Civil society groups can play a crucial role in facilitating service delivery for policy implementation. Besides, by giving evidence of what works on the ground with respect to varying geospatial circumstances, the community network can effectively bring the needs of poor and marginalized to the fore. Working closely with the Government, yet retaining the watchdog role has led to a sustainable solution in WASH in Puri, Odisha.

### **The Process**

The WASH Watch Group (WWG) - a community advocacy network facilitated by the CYSD with support from WaterAid India is playing a crucial role in enabling the community and civil society organizations to demand and facilitate services from the Government. The members of the WWG normally comprise of: ASHA, Anganwadi Worker, school or retired teachers, SHG and PRI members and other influential people of the village/Gram Panchayat. It is also organically linked to the Village Water & Sanitation Committee (VWSC) and the Gaon Kalyan Samiti (GKS) and works together as a powerful pressure group to influence policy actions at the ground level.

### Major outcomes of the advocacy efforts

The restoration of drinking water lifting points through a campaign called Nirmal Daya Abhiyan is a striking example of restoration of the water resources working in collaboration with the Govt. of Odisha.

There were four water lifting points along the Daya river in Kanas Block and about 22 Gram Panchayats (GPs) were connected with water supply system through these units. This was a multi-GP water supply system. It soon became defunct due to poor O&M.

The WWG intervened and influenced the local administration and was able to clean river Daya through the campaign. The villagers got together at the call of the groups. Over 20 boats were utilized to clean the weeds from the river on 21st September 2015 and encroachment by some vested interest group which was contaminating the source and blocking its free flow. The water supply system was restored by ensuring chlorination and minor repair work by the Rural Water Supply & Sanitation (RWSS) Department. Thus, the water supply was restored in all the 22 GPs. As a follow-up action to maintain the water flow in the river, The Groups again cleaned the river after three months. Thus the water lifting points were restored at Benagaon, Chupuringi, Gadabalabhadrapur and Baidyanath Patna in Puri district of Odisha. "Although it was a ceremonial call for action, it had lasting impact retaining the free flow of the river," says Adikandha Srichandan, the Chairman of Nirmal Daya Abhiyan.

In addition, letters were dispatched by the Campaign to the Central Pollution Control Board, State Pollution Control Board, Commissioner of Environment & Forests, State Govt., Ministry of Environment and Forests (MoEF), local MLAs to stop discharge of untreated waste of Bhubaneswar city into Gangua river. The waste ultimately gets offloaded in Daya river, killing the aquatic life forms and making the water highly toxic. Besides, a post card campaign was also undertaken to raise incentive for individual household latrine (IHHL) under Swachh Bharat

Abhiyan as the area is low-lying and needs additional cost to build toilets with raised platforms unlike the conventional leach pit latrines. The water flow was also restored in Dimirisena GP in Puri where the Khajuria pipe water supply unit was supplying the drinking water earlier. It was defunct owing again to poor O& M. The pipe water supply system is now being restored with major repair work including activation of its filtration system of

water lifted from Bhargavi river, thanks to the initiative of the WWG. The fund (over INR 4 lakh) for the activity was allocated by the Sarpanch of Dimirisena Panchayat.

## Conclusion

Thus, the effective and proactive community WASH Watch Group is the true devolution of power to the people, which has immense potential to bring about lasting changes in the lives of people.

## 5.2.7 Community-managed Flood-Proof Pond Sand Filtration Unit

### *A Community-based initiative*

#### Introduction

Puri, a coastal district of Odisha, is prone to cyclone, floods and water logging. Epidemics are thus, common. Communities are often unable to get safe drinking water because the two sources of drinking water i.e. groundwater and surface water are often contaminated. While groundwater in Puri has high levels of iron and salinity, the surface water has biological contamination. Lack of access to safe drinking water during and after the disasters leaves the population vulnerable to water-borne diseases like cholera, dysentery and diarrhoea.

Lack of sanitation in the rural areas, especially open defecation, is one of the key factors contributing to surface water contamination. Draining of human and animal waste in the surface water bodies is another source of biological contamination. Further, the waste from the cities is dumped into rivers, which form the lifeline for these villages. About 70-80 % of water used for daily domestic purposes drains out to nearby ponds, tanks or rivers through the drains or nalas carrying loads of harmful bacteria and viruses. For instance, a tier-II city like Bhubaneswar generates approximately 10 lakh litres of sewage every day and discharges it into the Kuakhai and Daya river. The latter is one of the rivers flowing through Puri and serves as one of the source for water for the villages along its bank.

Oxfam India has been working with NGO, SOLAR, in Puri district since 2008. It has reached 44 villages in Kanas block with its work on Disaster Risk Reduction (DRR). Providing drinking water solution is one of the focus areas of Oxfam's work in Puri where it is currently working in 15 villages in three Gram Panchayats of Kanas block.

The village pond was the main source of water for drinking and cooking - for the community in Harasapada village in Kanas block. Since the tube well water had high iron contamination with bad taste and smell, the villagers used the pond water. The pond was also used for washing utensils and clothes along with bathing and cleaning. Open defecation along the pond, especially during the rains, added to the biological contamination. The pond catered to the needs of 250 households with 2000 members.

The community spent INR 100,000 to clean the pond in 2014. In the next year too, the pond was cleaned during the summer (when the water body dried up) but before it could be cleared, the rains refilled the pond with water and waste. Oxfam India supported SOLAR to set-up a flood-proof Pond Sand Filtration (PSF) unit in Harasapada. The overhead tank built approximately 10 feet above the ground filters water to make it potable which has helped reduced the dependency of community on the pond. Apart from the village households, nearly 30 families from neighbouring villages also collect water from the unit.

### Implementation

The overhead tank is built close to the pond. The structure on top of stilts is 10 feet above the ground. This ensures that the water filtration unit is not contaminated during floods. Water from the pond is drawn into the overhead tank that holds about 10000 litres of water through an electric motor. The motor is run early morning for a couple of hours.

The tank is divided into six chambers, containing 20-mm stone chips, 10-mm stone chips, sand and charcoal. The water passes through the inlets and moves from one compartment to another before the filtered water is stored in the last compartment. This is then attached to outlets/taps through which the community draws water. The raised structure was built in 2014.

Though the water is drawn to the tank through an electric motor, there is an alternative hand pump installed to draw water. The hand pump can be used when there is no electricity and this is especially useful when there are floods.

The members of the WASH (Water, Sanitation and Hygiene) Committee run the tank and take care of its maintenance and cleaning. The tank is cleaned every Sunday. The village youth have been trained by Oxfam India and SOLAR to clean the tanks through the backwash technique. All outlets are opened and the water is let out clearing the sediment. The filters - pebbles, gravels etc. - are cleaned with fresh water. Once clean, the outlets are shut tightly and the tank is ready to be used. If the pond water has been extremely dirty then the tank filters need to be changed annually. The tank is cleaned voluntarily. A nominal amount is collected from the community for the upkeep of the tank and the electricity bill. The monthly electricity bill to run the pond filtration unit is approximately INR 250. The capital cost incurred in building the flood-proof PSF unit was INR 4.5 lakh. A low-cost design with a smaller tank sans flood proof features will cost around INR 50,000-75000. Around INR 2000-5000 would be incurred if the tank had to be overhauled and renovated.

### Results & Lessons Learnt

The community vouches for the quality of the PSF unit as it is the most viable option. Women prefer to collect water from the tank. The water is currently being used for drinking purposes only as there isn't sufficient water to meet cooking requirements. For cooking, the community still continues to rely on the pond.

Lack of sufficient water is attributed to two factors: A single tank cannot meet the requirement of the village and so more tanks need to be built. Besides, the erratic electricity supply meant that the pump could be run only for a minimum number of hours. Though there is a hand pump connected to the tank, it is rarely used (except during floods) because it is time consuming and requires hard work.

Though the PFU is the best option during floods and for most of the year, during the two months of extreme summer when the pond dries up, the women have to walk for nearly two km to fetch water. The community wants more such units that can provide clean and safe drinking water. There is a demand from neighbouring villages also. A quick check with the villagers confirmed that the number of cases of water-borne diseases has fallen substantially.

### Conclusion

A reduced disease incidence and a high demand for more PSF units is a clear indication of its success and the need to replicate it. Though partially, the units are efficient and effective. To make it a sustainable and permanent solution, renewable energy should be explored. The electricity needed to run the motors can be replaced by a renewable energy alternative which would ensure water in the tank at all times. More units should be installed along other ponds to ensure that water is made available for cooking as well. The youth is eager to be trained and train others on the upkeep of the unit. The success of these units has encouraged other villages to consider building similar structures and approach SOLAR and Oxfam India for the same.

### 5.2.8 Making toilets accessible and inclusive for PwDs

#### Introduction

People with Disability (PwD) represent the largest socially excluded group. Most of them live without access to basic sanitary services, which can exacerbate impairments and poverty. The situation is worsened by exposure to poor sanitation, unsafe water and inadequate hygienic behaviour practice. It is important to provide minimum accessibility features in WASH infrastructures for PwDs who are considered as most vulnerable among the marginalized and excluded groups.

The most common WASH constructions that we find in India are individual and community toilets, drinking water sources like open wells, sanitary wells and hand pumps etc. Disability inclusive infrastructures reinforce the WASH programmes to make more accessible, inclusive and user friendly, not only for the PwDs but also other vulnerable members in the family and community like old men, pregnant, women, children, and sick persons. It is much cheaper to ensure designs are disability inclusive at the planning stage than to make adaptations later.

#### The intervention

WaterAid decided to include disability inclusive designs in construction of individual household toilets through its sanitation programme in Odisha and Jharkhand states. WaterAid experimented using the local materials to modify the existing design of individual toilet and helped the community in constructing disability inclusive toilets. The particular disability of the individual in the family was thoroughly studied and the appropriate design was made to make it accessible.

The following are the adaptable design consideration for accessible toilet construction.

- Toilet with inner space of 1.2mt X 1.5mt (must for wheel chair user). Otherwise existing dimensions of IHHL (1.2mt X 1.2mt) is manageable.
- It is better to have two offset (leach pit) pits and connected through Y-connection and chamber in which one pit will be functional and second will be blocked. Once the first pit is filled up it will be blocked and the second pit will be made functional. After a few months, the excreta will turn to compost in the first pit, cleaned up and kept ready to be use in future when the second pit is filled up.
- No wash basin and possibly other fixtures should be there in the toilet that will shrink the inner space.
- Water has to be carried for flushing or a storage tank constructed outside adjacent to the structure having the tap at inner side and pipe connection arrangement from the water storage tank for easy handling of water. The water storage tank and wash basin may be constructed as suitable to use by the PwD.

### PwD Friendly Toilets

- The Water Closet (WC) should be a commode or modified commode (a raised structure of masonry work on which Indian pan is fixed). The commode should preferably be placed at one side of the room, neither at the entrance nor in front of gate to provide a space for movement. The following are different type of commode arrangements.
- There must be grab bars to support the person with disability to transfer himself/herself into the commode base. These should be 25mm to 35mm dia G.I. pipe or stainless steel bars fixed at both sides of the commode at appropriate height (may be at 700mm from ground).
- The toilet should be supported with superstructure and roof. The walls of the superstructure should be plastered.
- The door of the toilet may be of at least 900mm wide and should open outward. There should not be any threshold fixed at the bottom floor.
- If the toilet is at a distance from the house, then possibly bamboo made railings at height of 0.9mt from ground could be fixed at both sides of the approach (pathway) from the house to toilet.
- The entrance/pathway of the toilet should have a ramp (moderately with a slope of 1:12), if there is a level difference between toilet base and the ground.
- There should be a landing of at least 900mm wide at the end of ramp before entrance door of the toilet extended to the floor, so that the person can open the door outside and enter into the toilet.

Locally available materials like bricks, clay earth, bamboo, wooden poles, could be used to make such toilets along with the features so that it is cost effective. Technology for using such materials is available.

The cost of interventions carried out during 2013-2015 varied from INR 1,500-12000. Some of the cases have also been cited in the Disability Manual published by MoDWS, Govt of India in its guideline.

### Adapting locally available materials

General considerations	Consideration using local materials
<p><b>Ramp</b> The ramp may be prepared with cement concrete (1:2:4) with brick masonry at the side wall. The gradient of the ramp may be kept between 1:12 to 1:20. The surface should be rough.</p>	<p><b>Ramp</b> If the soil is clay soil. There may be side walls in brick masonry constructed. The inside material may be clay earth, rammed to powder and compacted to provide a walking surface. It may require maintaining the gradient (between 1:12 to 1:20) in proper slope and accordingly the surface. Otherwise a cement mortar may be provided to the earth fill gradient surface to access.</p>
<p><b>Hand Rails</b> The hand rails may be of Steel pipes or G.I. pipes of 40 to 45 mm dia and fixed with support bars of same size. The surface of the bar may be painted with contrast colour painting.</p>	<p><b>Hand Rails</b> The hand rail may be provided with good quality bamboo or wooden poles fixed with support poles of 40 to 50mm dia size. The surface should be painted with contrast colour paint.</p>
<p><b>Commode</b> It is the western type pan available in the market. Its height may be up to 480mm with S or P trap in built and facility to attach the cistern to it.</p>	<p><b>Commode</b> It is a raised base and Indian squatting pan fixed by masonry work and P trap is connected and extended till leach pit or septic tank.</p>
<p><b>Grab Bars</b> These are specially designed steel bars of 40 to 45 mm dia fixed to the walls (may be L and U shaped)</p>	<p><b>Grab Bars</b> These may be the G.I. bars of 35mm to 45mm size shaped to L type or U type using the fittings like elbow, socket, sort piece etc. and fixed to the masonry wall or floor as appropriate.</p>
<p><b>Approach Pavement:</b> There should be a complete approach pavement of 1200mm clear wide, concrete or masonry pavement without any obstructions in between and hand rails fixed in both sides at the height between 750mm &amp; 900mm.</p>	<p><b>Approach Pavement:</b> The pavement surface should be clean dressed, rammed earth and earthen policed to mark as pavement with hand rails fixed in both sides as appropriate (between 750mm &amp; 900mm). Sometimes the pavement floor is lined with brick or rammed with morrum.</p>

## Conclusion

Small and suitable changes in design make a great change in converting the existing toilet designs into inclusive toilets using locally available materials.

### 5.2.9 Sanitary Wells

*A viable alternative to safe drinking water*

## Introduction

Water is needed by all for drinking, preparing food, washing, cleaning, etc. Access to adequate and safe water greatly contributes to improved health. Surface water of suitable quality is not always enough in the places where it is required.

Access to safe water for drinking and other domestic needs was a problem in almost all the intervention villages of WaterAid and RCDC in the 10 Gram Panchayats of Nuapada district in Odisha. Excessive fluoride concentration much beyond the permissible limit was found in ground water in large areas of the district. The underground strata contained lithological formations with presence of fluoride in the rock types. When the sub-surface aquifer comes in contact with these fluoride rich rocks, the fluoride leaches into water concentrating its composition. The rate of concentration of fluoride compound varies from place to place. While in some areas it is within permissible limit, in other areas it is beyond permissible limit. Over extraction of ground water or depletion of ground water table reduces the quantity of water available in an aquifer whereas leaching of fluoride increases its content. Excessive fluoride content causes serious health hazard in the form of dental and skeletal fluorosis and gastrological disorders.

The Govt. of Odisha predominantly dug tube wells in the villages after 1975 and during the 1980s and 1990s, to meet the requirement of safe drinking of water. It was observed in Nuapada that the tube wells dug post 1997-98 in the district generated fluoride contaminated drinking water which soon resulted in visible manifestation of the contamination through dental and skeletal fluorosis. The assessment of the water quality by RCDC volunteers with support from WaterAid in the intervention villages revealed high amounts of fluoride much beyond the permissible limits as laid down by the Bureau of India Standards (BIS) in the groundwater.

## The intervention

It was then decided that creating sanitary well in the area will to a large extent will meet the needs of safe drinking water for the communities. The main purpose of creating a sanitary well- either new or through renovation of an existing well into sanitary well - is to tap sub-surface water in the region where ground water is contaminated with chemical contaminants, store it safely in a well form and sanitize it for drinking and domestic requirements.

The traditional wells of shallow depth (varying from 1-6.5 m) were almost defunct in the area due to non-use or other reasons. However, it showed relatively low amount of fluoride and were within the permissible limits as per BIS. Thus as an alternative, shallow sub-surface water was thought to be tapped to ensure access to safe drinking water in these villages.

Sanitary well is a dug well excavated with the diameter varying from 1 to 6.5 m which and lined with brick or stone masonry to create a storage at the sub- surface level. The well protection measures are taken up to safeguard it from external contaminants converting it to sanitary well. Disinfections are undertaken at critical time intervals to enable safe water supply to the targeted community.

Necessary recharge structure could be designed in the upper terrain to store rain water and recharge to these wells through sub-surface recharging methodologies.

Sanitary well is also of particular relevance to microbiological quality of water. It is essential to prevent direct contamination of groundwater at the point of extraction or resulting from rapid recharge pathways close to the source. The sub-surface leaching and transport of mobile and persistent biological and chemical contaminants is prevented by plastering of inner surface of the staining wall of the sanitary well till the water level. This allows natural recharge while limiting the leaching of fluoride and other contaminants into the well. The sanitary well remains completely covered with an appropriate lid (for periodic disinfection). Water extraction is done through a hand pump while taking care to prevent sanitary activity (waste disposals, water logging, waste water drains etc.) within an approximate distance of 10 metre radius. Proper drainage arrangement of the waste water is done near the sanitary well.

Besides the underground and over ground construction of the extraction facility (sanitary well), the designing of the surrounding area was designed by the technical team of WaterAid. Thus, the fluoride ingress and biological contamination (particularly E.coli) into the water regime was prevented whilst ensuring safe drinking water in the intervention villages of Nuapada.

## 6. Session 6: MAINSTREAMING CLIMATE CHANGE ADAPTATION IN WASH

*With focus on women and children*

**Time: 60 mins**

### **Key Learning Objectives:**

- Understand the relevance of the concept of mainstreaming climate change adaptation for WASH and different mainstreaming principles and approaches/steps.
- Discuss existing responses and issues in climate change in WASH planning in India on an adaptation/mainstreaming continuum.
- Learn about good practices and innovations in climate change adaptation in WASH through case studies

### **Key Learning Points:**

- Development, disasters and climate change are very closely related.
- DRR and CCA share extensive similarities and common actions.
- Sustainable development will depend upon integration of DRR, CCA and development.
- Mainstreaming should be planned and implemented at all levels and across all sectors of development.
- Mainstreaming is a dynamic process with twin objectives of protecting development as well as ensuring development is not contributing to increase further vulnerability to disasters and climate change.
- Suggestions on Way Forward

### **Session Content:**

#### **What is climate change adaptation?**

Climate change adaptation refers to the actions that people and institutions make in anticipation of, or in response to, a changing climate. This includes changes to the things they do and/or the way they do them.

The purpose of climate change adaptation is to create the conditions where people become increasingly able to make informed and appropriate decisions about their lives and livelihoods in a changing climate. The goal is the ability for everyone to thrive in spite of a changing climate.

#### **What is adaptive capacity?**

Adaptive capacity refers to the *potential* of individuals, communities, and societies to be actively involved in the processes of change, in order to minimise negative impacts and maximise any benefits from changes in the climate. This potential is undermined in situations of poverty and inequality, and points to the wider socio-economic factors that

influence how households and communities manage risk on a daily basis, and relates to the successes and failures of development and poverty reduction.

### **What is resilience?**

Resilience means many things to many people, and there is no universally applied definition within the international development and humanitarian sector. Notions of resilience tend to be similar to adaptive capacity, but often focusing more on shocks and hazards (such as disaster events) than on longer term changes (such as changes to average seasonal conditions over decades).

Mainstreaming something into development means doing development better, by integrating additional qualitative considerations into the way we define, implement and evaluate development projects and programs. In a way it emphasizes upon shaping the development pathway in a holistic manner that considers the sustainability concerns. The mainstreaming should ensure that the development is protected and is not bringing negative consequences for the vulnerable and poor. Different elements of mainstreaming take into consideration the various left out or unaddressed issues that have both scope and potential to be addressed under the developmental domain.

Development is very closely related to disasters and climate change. Climate change and disaster risk are fundamental threats to sustainable development and the eradication of poverty. The negative impacts threaten to roll back decades of development gains. Building resilient and sustainable societies means addressing both climate and disaster risks, and integrating these risks, as well as potential opportunities, into development planning and budgeting.

DRR and CCA are those components which have both scope and potential to be integrated and mainstreamed in development. Mainstreaming DRR and CCA is a process of integrating DRR and CCA at all levels of decision-making including national, State and local government & community levels, empowering for evidence based decision-making for hazard assessment and vulnerability assessment at all levels, creating appropriate incentives, including regulatory and incentive based instruments for disaster management, for risk reduction, creating appropriate public-private partnerships at different levels and creating direct linkages with international and regional commitments like SFDRR.

The mainstreaming of DRR and CCA can be taken as a dynamic process which is primarily designed for twin purposes. First, it strives to ensure that development is protected and sustainable with DRR and CCA elements and second, development is not increasing people's vulnerability to disasters and climatic extremes. Thus mainstreaming strives to address the concerns of present impact as well as commits for reducing future impacts. For mainstreaming to be successful, a number of issues are to be addressed. It requires assessment of the implications of disasters & climate change on any planned development action covering all thematic practice areas and sectors at all levels and as an integral dimension of the design, implementation, and monitoring and evaluation of policies and programs.

## 6.1 India: Current Climate Change Adaptation status

India's development agenda is implemented through various State administered policies and schemes with guidance from the Central Government. CCA approaches are integrated at national level through India's commitment to HFA 2005-15, SFDRR 2015-2030, NAPCC and other programmes of the government. The recent ratification of the Paris agreement by India will test the existing institutional capacity at state level to plan, implement and monitor targets for climate action within their regular development work and responsibilities. Thus the states will urgently need access to a sound knowledge base and gain experience on climate change adaptation, to adapt their regular development work to enhance climate resilience and monitor to report on climate benefits. Unless additional efforts are made, inter-departmental coordination, which is already known to be weak with many limitations, will become a major impediment in enabling climate change adaptation which requires multi-sectoral planning and action to ensure that the local priorities of diverse populations with diverse needs on differing scales are met in most efficient manner.

There will be urgent need for new frameworks, mechanisms and tools by relevant departments and institutions to integrate climate needs and growing vulnerabilities that need to be addressed by climate resilient development plans. The onus is now on the 29 states of India to implement the above mentioned international agreements and revise and amend their current state policies and programs in order to mitigate, adapt, reduce disaster risk and achieve the SDGs in the next 14 years.

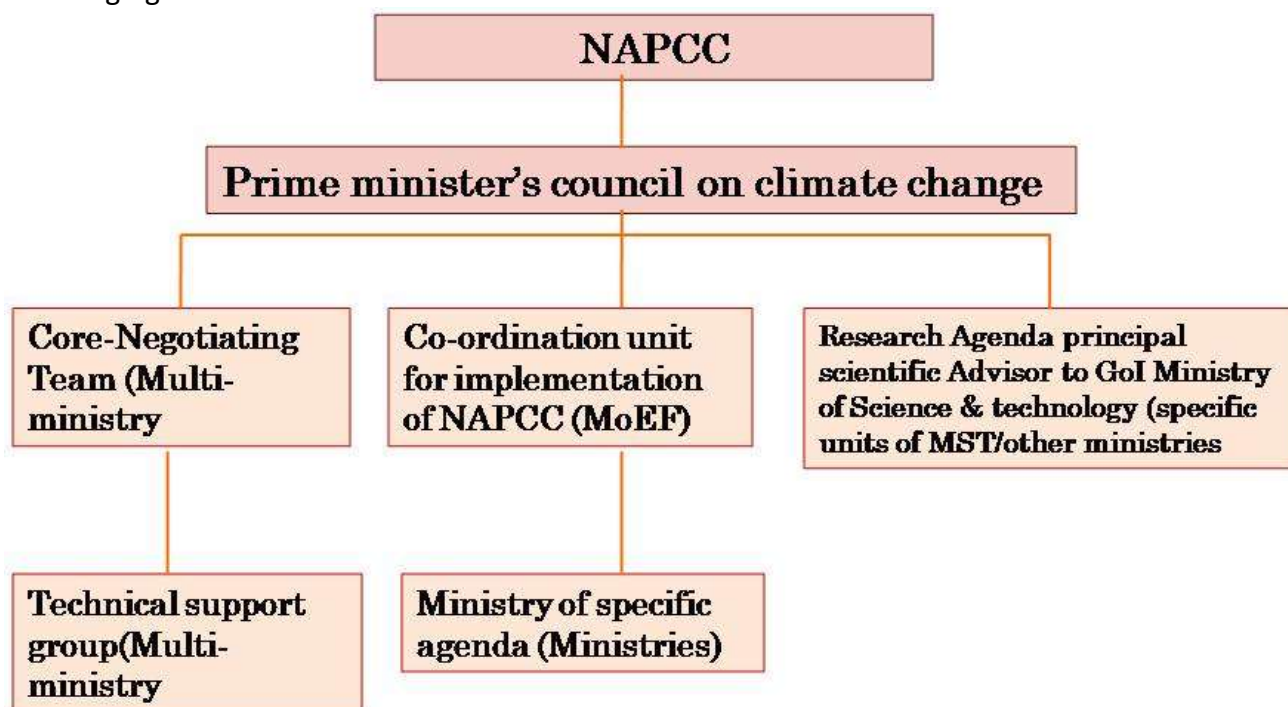
Agencies such as the State Disaster Management Authorities, District Disaster Management Authorities, Department of Forest and Environment, Agriculture and Urban Local Bodies are required to have a forward looking approach in their planning and implementation activities that account for range and trends in climate projections. Promoting climate sensitive decentralised disaster management planning in DDMA's and at ward levels represents a potential point of entry for addressing the above gap.

## 6.2 The Institutional Mechanism on Climate Change

Constituted on 6th June 2008, a committee chaired by the Prime Minister, known as the Prime Minister's Council on Climate Change (PMCCC), coordinates national action for assessment, adaptation and mitigation of climate change. The committee is serviced by the Prime Minister's Office (PMO), which may obtain assistance as required from any Ministry/Department/Agency of Government. Specifically, the Ministry of Environment and Forests (MoEF) assists PMO in facilitating the work of this Committee. 25 committee members include, External Affairs Minister, Finance Minister, Minister of Environment and Forests, Minister of Agriculture, Minister of Water Resources, Minister of Science and Technology, Minister of New and Renewable Energy, Deputy Chairman of Planning Commission, National Security Advisor, Chairman of Economic Advisory Council, Chairman of Investment Commission, Chairman of National Manufacturing Competitive Council, Principal Scientific Advisor and Principal Secretary to Prime Minister, Chairperson of The

Energy Research Institute, Chairman of Bureau of Energy Efficiency, Foreign Secretary, etc. Besides, the Chairman may invite any other ministers/ officers/experts to any meeting of the Committee depending upon the context of the meeting.

The institutional arrangement on climate change in India can be understood from the following figure.



(Source: National Action Plan on Climate Change, 2008)

### 6.3 National Action Plan on Climate Change

The 11th Five Year Plan for 2007-2012 recognized that a substantial adverse change in climate appears unavoidable, and stated that achieving rapid economic growth as targeted in the Plan is a key element in adaptation. In June 2008, India's National Action Plan on Climate Change (NAPCC) was released, outlining existing and future policies and programs addressing climate mitigation and adaptation (GoI, 2008). The Plan identifies eight core national missions running through to 2017 and directs ministries to submit detailed implementation plans to the Prime Minister's Council on Climate Change by December 2008:

**National Solar Mission:** The NAPCC aims to promote the development and use of solar energy for power generation and other uses with the ultimate objective of making solar competitive with fossil-based energy options.

**National Mission for Enhanced Energy Efficiency:** To achieve growth with ecological sustainability by devising cost effective and energy efficient strategies for end-use demand side management.

**National Mission on Sustainable Habitat:** To promote energy efficiency as a core component of urban planning.

**National Water Mission:** With water scarcity projected to worsen as a result of climate change, the plan sets a goal of a 20% improvement in water use efficiency through pricing and other measures.

**National Mission for Sustaining the Himalayan Ecosystem:** The plan aims to conserve biodiversity, forest cover, and other ecological values in the Himalayan region, where glaciers that are a major source of India's water supply are projected to recede as a result of global warming.

**National Mission for a "Green India":** Goals include the afforestation of 6 million hectares of degraded forest lands and expanding forest cover from 23% to 33% of India's territory.

**National Mission for Sustainable Agriculture:** The plan aims to support climate adaptation in agriculture through the development of climate-resilient crops, expansion of weather insurance mechanisms, and agricultural practices.

**National Mission on Strategic Knowledge for Climate Change:** To gain a better understanding of climate science, impacts and challenges, the plan envisions a new Climate Science Research Fund, improved climate modelling, and increased international collaboration.

Since the National action plan is a vision oriented plan with specific missions, each mission occupies a huge arena of goal, objectives and activities and considerable amount of resource allocation, strategic implementation, monitoring and evaluation mechanisms are addressed through a coordinated approach involving different ministries and departments.

The NAPCC has already set a landmark for initiating climate change mitigation and adaptation actions in the country. The eight national level missions emerging from NAPCC cater to address socio-economic and environmental concerns arising from climate change. India also recognises that strategy for addressing climate change has to be based on a sustainable development strategy, which is particularly addressed in the 12th Five Year Plan of the country. Current government expenditure in India on adaptation to climate variability exceeds 2.6 percent of the GDP with agriculture, water resources, health and sanitation, forests, coastal zone infrastructure and extreme events being specific areas of concern.

Government of India has shown strong commitment in realizing the vision of the NAPCC and slowly but gradually resources have been identified, channelized, allocated and utilized marking the implementation of the plan as per its eight missions.

## 6.4 Other National and State level Initiatives for incorporating DRR and CCA

### **State Action Plans on Climate Change (SAPCCs)**

A key instrument to address climate change has been the existing “*State Action Plans on Climate Change (SAPCCs)*”. Twenty nine states in India have completed the process of drafting SAPCCs, however, the SAPCCs submitted so far remain vision documents at state level waiting to be integrated into the existing policy practice framework. Further support is needed to prepare the ground and move towards systematic and large scale adoption of climate sensitive action as part of the States’ redefined development agenda. This would be a dynamic process involving close partnerships with multiple stakeholders, formation of new committees, cross sectoral deliberations, capacity development, and significantly, the marriage of new research and plans with existing policy programmes. The SAPCCs, if implemented effectively, can build a resilient society and address climate change drivers in India.

### **Five Year Plans**

11th five-year plan (FYP) of India (2007-2012) recognized the urgent need to balance the trade-off between economic growth and environmental stability. With regard to adaptation to climate change, the strategy stated that, since a substantial adverse change in climate appears unavoidable even with the optimal mitigation response, the process of adaptation to climate change must have priority. The plan also recognized the need to incorporate adaptation responses in the relevant programs, including those relating to watershed management, coastal zone planning and regulation, forestry management, agricultural technologies and practices, and health. However, in this plan there was no systematic or scientific effort to incorporate climate change in planning developmental projects, probably due to lack of scientific knowledge on climate change impacts and economic vulnerabilities.<sup>11</sup> This also states that programs and projects that will lead to sustainable development, with assurance of disaster risk reduction built in. It speaks about mainstreaming disaster management in development planning. It states that every development plan of a ministry/department should incorporate elements of impact assessment, risk reduction and the ‘do no harm’ approach.<sup>12</sup> The 12th plan also echoed for more sustainable and inclusive growth and focused on both climate change adaptation and disaster risk reduction. Somehow the integrated vision for DRR and CCA is missing even in the 12th five year plan as well.

### **Convergence of Green India Mission and MGNREGS**

On 3rd March 2015, Ministry of Environment and Forest, Government of India sent letters to Chief Secretaries of all states issuing guidelines for convergence of Green India Mission (One of the eighth missions under the NAPCC) and the MGNREGS. The guideline provides a comprehensive framework with background, shared visions, supported interventions, planning and implementation framework, targets, funding mechanism, monitoring and evaluation with list of works that can be carried out under different sub-missions in

<sup>11</sup> Ravindranth D, Chaturvedi R.K and Dr. Kattumuri R- Mainstreaming Adaptation to Climate Change in Indian, Policy Planning available at <http://www.lse.ac.uk/asiaResearchCentre/files/ChaturvediKattumuriRavindranath.pdf>

<sup>12</sup> Eleventh Five Year plan of India (2007-12), Inclusive Growth, Volume I, Planning Commission, Government of India available at [http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11\\_v1/11th\\_vol1.pdf](http://planningcommission.nic.in/plans/planrel/fiveyr/11th/11_v1/11th_vol1.pdf)

convergence with MGREGS. This is a welcome step where climate change and development are viewed with one perspective and links both mitigation and adaptation activities.<sup>13</sup>

## 6.5 Call for action

CCA needs to be prominently integrated in all national planning processes. While the strategic thinking in the region, regarding disaster risk reduction, has been initiated and institutional arrangements are being implemented, the ground reality is far from satisfactory. Risk levels and exposure are increasing due to ill-managed development and growth of populous centres in vulnerable locations. Considering the above, the major areas like health, nutrition, child protection, education and WASH would be given priority in addressing effective disaster preparedness for achieving sustainable development goals. Therefore, the region's policy makers, planners and climate negotiators need to endorse long-term approaches to building resilience, building on effective regional cooperation, while planning for uncertainty in the long-run. There needs to be a shift away from relief to risk reduction and climate change adaptation to build people's resilience to disasters, climate variability and change, reducing the underlying risk factors that make them vulnerable to hazards.

From preliminary reviews of the State Action Plans for Climate Change (SAPCCs), the following observations, discussion points and recommendations have emerged.

## 6.6 Background understanding on CCA

CCA is an important element of disaster risk preparedness and reduction. Amongst others, the impacts of climate change include an increase in the frequency and severity of the hydro-meteorological events. Some types of extreme weather and climate events have already increased in frequency or magnitude, and this trend is expected to continue over coming decades. Climate change is altering the face of disaster risk, not only through increased weather-related risks and sea-level and temperature rises, but also through increases in societal vulnerabilities - for example, from stresses on water availability, agriculture and ecosystems.

Climate change is a new factor that will act as an additional stress to increase the existing vulnerabilities of many people. As a result of global warming, climate-related hazards like floods, droughts, heat waves, and storms are expected to become more frequent and/or possibly also more intense (e.g. cyclones may have more rainfall and stronger winds, cover more territory). This will result in increasing vulnerability as climate trends will damage livelihoods, increase poverty and damage food security. In addition, some climate-related hazards such as tropical cyclones, storms, floods, droughts, heat and cold waves will affect places that have not experienced them before.

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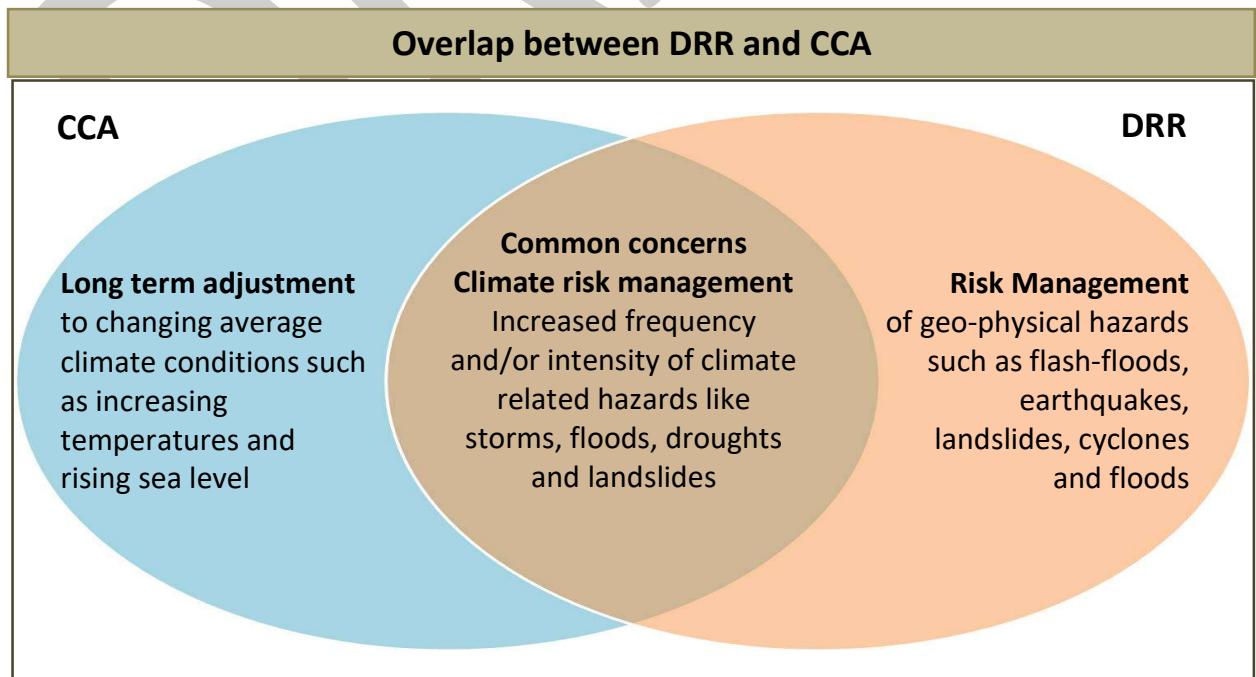
<sup>13</sup> MoEF's letter to Chief Secretaries of all states on convergence of MGNREGS and GIM available at [http://envfor.nic.in/sites/default/files/MGNREGS-GIM\\_0.pdf](http://envfor.nic.in/sites/default/files/MGNREGS-GIM_0.pdf)

Climate change confronts India with a whole series of challenges. It makes existing problems worse, and brings new risks to people. Nothing will be the same, and “business as usual” is no longer an option. The myriad and uncertain effects of changing climate oblige the government to possess an increased ability to analyze, assess and understand the future consequences in order to support better planning and preparedness.

### 6.7 Convergence of DRR and CCA

In recent years there has been a growing convergence between DRR and CCA. However they do not overlap completely. Broadly speaking, DRR deals with all hazards, including hydro-meteorological and geophysical hazards, while CCA deals exclusively with climate-related hazards associated with changes in the average climate conditions. CCA also considers the long-term adjustment to changes in gradual changing climatic condition, including the opportunities that this can provide, whereas DRR is predominantly interested in extremes leading to disasters.

However, DRR and CCA have common concerns in managing climate-related risks; this is the area where they converge. DRR and CCA share a common goal of reducing vulnerability and achieving sustainable development. They also share a common conceptual understanding of the components of risk and the processes of building resilience; they regard risk as the product of exposure and vulnerability to hazards or effects of climate change, or both. Both exposure and vulnerability are compounded by other societal and environmental trends, for example, urbanization, environmental degradation, and the globalization of markets. Thus, to reduce these risks, exposure needs to be minimized, vulnerability reduced, and capacities for resilience strengthened. This is a dynamic process requiring continual effort across economic, social, cultural, environmental, institutional and political spheres to move from vulnerability to resilience.



## 6.8 Mainstreaming DRR and CCA

Owing to its linkages with humanitarian emergency response, DRR is often the first line of protection against weather-related disasters, and because this risk increases it is an essential part of CCA. For DRR to be efficient, it has to take into account climate-related risks or be climate-smart. Increasingly, humanitarian and development practices will have to gain the benefits of bringing together DRR and CCA in a more holistic approach to development programming, in order to maximize the effectiveness and sustainability of efforts and investments made by all stakeholders.

For DRR and CCA measures to be effective and efficient and to produce desired outcomes, they need to be mainstreamed into the states' development planning to ensure that their strategies, policies, programmes or projects are designed with due consideration for potential disaster and climate change risks and thus prevent them from inadvertently increasing vulnerability to disaster or climate change.

## 6.9 Barriers to mainstreaming DRR and CCA

DRR and CCA mainstreaming, like other mainstreaming processes, encounter both foreseeable and unforeseeable barriers. They include, among others:

1. bureaucratic organizational processes
2. lack of capacity and knowledge
3. restricted financial frameworks
4. short term thinking
5. lack of access to relevant information
6. ineffective procedures for retaining organizational memory
7. a culture of working in 'silos' (departments)

At a practical level, there are also disparate issues such as lack of clarity of roles and responsibilities and time constraint when it comes to DRR and CCA mainstreaming. The lack of funding for cross-cutting initiatives is another hurdle.

## 6.10 Suggestions for Way Forward

Some ideas that can be considered for the way forward are:

1. **Developing a Programmatic approach.** We need a programmatic risk management approach, to coordinate initiatives, actions, existing expertise and financial resources of disaster risks, climate change and other environmental hazards within the development context.

2. **Improving communication.** It is of paramount importance to improve existing channels of communication between all experts dealing with DRR, CCA and development and finding ways to communicate more effectively.
3. **Improving the institutional framework.** It is time for a radical assessment and improvement of institutional arrangements which today deal with disaster risk management and climate change.
4. **Optimising existing financial arrangements and providing additional resources where needed.** Financial resources should become available for preventive efforts to reduce vulnerability.
5. **Creating an enabling environment for mainstreaming DRR and CCA**
  - 5.1 **Institutional arrangement and capacity.** As the mainstreaming process goes far beyond the adoption of official documents for development planning, it is important to make appropriate institutional arrangements and build the necessary capacity to make mainstreaming happen. As DRR and CCA are crosscutting issues, the mainstreaming process needs to be owned by all departments, rather than by a single department or an individual. It is important to anticipate potential barriers to ownership and consider how to address them to ensure that mainstreaming can be considered as an institutional asset rather than a liability. It will be necessary to develop strategies or initiatives, define responsibilities at different levels of the various sectoral departments, coordinate this multi-sector, multi-tiered engagement, and monitor and evaluate progress. DRR and CCA focal points should be appointed in technical departments to direct and coordinate sectoral DRR and CCA initiatives, including the mainstreaming of DRR and CCA into broader programmes, to identify and draw on existing DRR and CCA expertise within the department and to provide sector-specific technical support.
  - 5.2 **Appropriate institutional capacity** should be put in place to support the mainstreaming process. Building the necessary skills and knowledge is crucial to increasing departmental staff's understanding and ultimately, ownership of the mainstreaming process. Policies and best practices must be understood, implemented and maintained by all staff. Skills, knowledge and understanding can be developed through senior management briefings, reference materials, training for staff, and regular communication between themselves.
  - 5.3 **Departmental Programme/Project Cycle Management.** For DRR and CCA to be mainstreamed, it is necessary for project/programme managers to make it a rule to consider and address disaster and climate change risks in their departmental planning phases, including analysis, design, implementation, monitoring, and evaluation. Using a DRR and CCA lens in the project cycle is an effective way of designing risk-informed and climate-smart projects and programmes.

- 5.4 **Advocacy** can create the conditions in which the awareness-raising and education can empower government departments to change the way they think, behave or strategize in terms of DRR and CCA.

DRAFT

## 7. Session 7: WAY FORWARD: STRATEGIC FRAMEWORK FOR MAINSTREAMING CCA IN WASH

*Integrating knowledge, information and good practice into strategies and plans*

**Time: 120 mins**

### **Key Learning Objectives:**

- Understand learn how screening can be used to reduce the risks associated with WASH technologies, projects and programmes
- Learn how to develop a climate resilient WASH action plan through reflection on the course learning and identifying priorities for an action plan that could be taken forward after the training course

### **Key Learning Points:**

- Developing a climate resilient WASH action plan for National Flagship Programmes and State Plans.

### **Session Content:**

The final step is to integrate the knowledge, information and good practice identified in the earlier steps into the national and state WASH strategies, programmes, and plans. Integration should be consolidated across a number of different facets of strategies, programmes, and plans and be able to demonstrate that:

- Strategies, programmes, and plans incorporate and are responsive to analyses of the impacts of climate change and/or climate-related disasters
- Room has been made within budget estimates for options to build climate resilience through cross-sectoral activities where these have been identified
- Indicators to monitor the implementation and effectiveness of climate resilience measures are defined and included as part of ongoing monitoring and reporting systems.

This integration will provide a high-level foundation for climate resilience and is a starting point for further action, rather than an end point in itself. Encapsulating climate resilience at the state level will help to ensure that concepts, practices, funding and priorities for climate resilience continue to be reflected in all subsequent WASH programming and implementation processes. It provides an overarching framework for the elaboration of a hierarchy of subsequent programming and implementation action plans at a range of governance levels and scales.

A clear next step is to ensure the knowledge, information and good practice identified at the national strategy and planning level also provide a basis for more climate resilient WASH sector programming at the state level. In most cases, programming will be disaggregated across constituent parts of WASH, for example water supply and safety, sanitation and hygiene, WASH in schools and community facilities, emergency preparedness and response, and wider water security and environmental measures. Further detailed analyses and refinement of climate resilient measures and approaches that respond to these sub-sector contexts and concerns can therefore be considered at this stage.

Additionally, sustained advocacy for addressing women and children issues while mainstreaming climate change in the existing WASH sector policies, programmes, plans, guidelines and standards will include:

- Climate change risk screening of government investments and in particular those related to the welfare of women and children.
- Adequate budgeting for climate change and environmental sustainability by all relevant government Ministries, Departments and Agencies.
- Promotion of women and children's voices and perspectives in policy making around climate change adaptation and mitigation, and environmental sustainability, both in terms of how girls and boys, from childhood to adolescence are affected now, and in terms of how the decisions being taken affects their future.

From WASH sectoral perspective, areas to be targeted for advocacy include the following;

- Development of climate resilient plans at the state and sub-state levels which are incorporated into the existing WASH response systems.
- Incorporation of climate change adaptation into the existing WASH policies and standards.
- Incorporation of climate change in school curriculum and teaching learning packages.
- Development of child-centred social protection measures as a component of the climate change adaptation strategy.
- Inclusion of community perspectives/needs assessment, engagement and community capacity development within climate change policies, programming and DRR efforts for resilient buildings.
- Incorporation of the protection risks related to climate change into Child Protection awareness modules targeting parents, children, adolescents and social workers.
- Inclusion of child protection measures into DRR / Emergency / Contingency planning at State, District, Block, and village levels.

## 7.1 Risk screening approaches

Climate risk management describes the process of identifying climate-related risks and implementing measures to reduce such risks to acceptable levels (Olhoff & Schaer, 2010). Risk assessment has been defined as ‘...a methodology to determine the nature and extent of risk by analysing potential hazards and evaluating existing conditions of vulnerability that could pose a potential threat or harm to people, property, livelihoods and the environment on which they depend’ (UN, 2004). Therefore, both the physical climate hazard, and the vulnerability of the system, is considered under ‘risk’.

Climate risk screening typically avoids statistical probabilistic calculations associated with traditional (more technical) conceptions of risk assessment. Rather, it involves systematically examining activities (or projects, programmes, policies, technologies) with the aim of:

- Identifying hazards which could potentially cause harm.
- Identifying inherent vulnerabilities in the system.
- Assessing whether these risks – the product of hazard and vulnerability - are being taken into account.
- Considering the extent to which risks can be reduced or mitigated.

Since the probability of the hazard occurring cannot be reduced, this implies exploring opportunities for reducing the vulnerability associated with physical hazards. The utility of a risk management approach lies in its emphasis on preventative rather than reactive measures. Whilst the complete elimination of risk is seldom possible<sup>14</sup>, what is important is identifying the most significant risks and prioritising their mitigation. This is the broad approach adopted here.

The Central and the State Government are implementing wide range of programs and schemes which offer ample scope for mainstreaming DRR and CCA. Though it may appear difficult but, it requires attention, sensitization and action at different levels from bottom to top to ensure mainstreaming of DRR and CCA in the respective schemes.

### **General Steps**

Mainstreaming requires some steps to be followed. Described below are the general steps to be undertaken to mainstream DRR and CCA into strategies, policies, programmes and projects:

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<sup>14</sup> The term ‘climate-proofing’ has been used to describe this desire to eliminate the vulnerability of physical infrastructure to climate variability and change. Good engineering practice (though not all aspects of WASH system design) has always taken account of climate variability, by designing to estimated return periods (statistical frequency) of extreme events. Even under relatively well-known variability, engineers have never designed structures to withstand every single extreme event. Under greater future variability it is economically unrealistic to design engineering structures to withstand all extremes.

### 7.1.1 DRR and CCA Screening

The first step is to screen a strategy, policy, program or project in question with a DRR and CCA lens. The screening should be done by way of answering the key questions for DRR and CCA screening (see table below). It is recommended to go for a detailed assessment if the screening results show the high risks and the limited capacities to cope with them.

Key Questions for DRR and CCA Screening	Answer Yes/No	Explanation
Are there any estimated risks associated with the planned activity?		
Are these risks high or low?		
Has the planned activity considered these risks?		
Has the activity included actions to address these risks?		
Do these actions reduce vulnerability to disaster and climate change risks?		
Are there any additional actions or opportunities to reduce risks and vulnerability?		
Do you have sufficient capacity to deal with the estimated risks?		
Is there a need for a detailed assessment?		

### 7.1.2 Detailed assessment and adjustment

The detailed assessment should be done when the initial screening indicates the need for it. Adjustment should be made to the planned activity if the results of the detailed assessment show that disaster and climate change risks have not been duly considered or addressed. For the sake of ownership and sustainability of the planned activity, it is crucial to involve all stakeholders concerned in this process. This includes the following actions:

- a) Assess the disaster and climate change risks associated with the planned activity.
- b) Identify possible risk reduction and adaptation options through participatory approaches.
- c) Select the most appropriate among the identified risk reduction and adaptation options. Selection criteria may include effectiveness, cost, feasibility and sustainability, with each having related questions.

### 7.1.3 Developing a monitoring and evaluation (M&E) framework

Mainstreaming DRR and CCA can be ensured only when the process is regularly monitored and evaluated. To this end, it is necessary to set up an appropriate M&E framework.

Although the evaluation of DRR and CCA options is a highly challenging task, an appropriate M&E framework will help evaluate whether an action is justified and whether it is bringing

about the intended benefits and ultimately contributing to building resilience. However, this can be done achieved through the following actions:

- Define realistic and measurable output and outcome indicators;
- Develop a logical framework by using a log-frame table and/or M&E plan table;
- Describe how to monitor and evaluate the mainstreaming of risk reduction and adaptation measures.

These steps can be followed in mainstreaming CCA and DRR in any of the sectors. However, to have more specific understanding, these steps can be applied in mainstreaming DRR and CCA as per capacity at local level in Centrally Sponsored Schemes and state level schemes. The following two tables provide details of select Centrally Sponsored Schemes and State Level Schemes with scope for mainstreaming of DRR and CCA:

<b>Centrally Sponsored Schemes and Mainstreaming of DRR and CCA</b>			
<b>Sr. No.</b>	<b>Name of the Scheme</b>	<b>Benefits</b>	<b>Possible DRR and CCA measures</b>
1	Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS)	Legal guarantee for one hundred days of employment in every financial year to adult members of any rural household willing to do public work-related unskilled manual work	<ul style="list-style-type: none"> <li>• To minimize the economic vulnerability of the people Pre-disaster situation</li> <li>• Creation sustainable assets and capitals</li> <li>• Community based adaptation in agriculture, infrastructure, etc.</li> <li>• Useful for livelihood generation in Post-disaster situation</li> </ul>
2	National Health Mission (NHM) (NRHM and NUHM)	To provide accessible, affordable and quality health care for the urban and rural population, especially the vulnerable groups.	One of the most important components in Pre as well as post disaster situation to provide universal access to health care facilities

<b>State Level Schemes and Mainstreaming of DRR and CCA</b>			
<b>Sr. No.</b>	<b>Name of the Scheme</b>	<b>Benefits</b>	<b>Possible DRR and CCA measures</b>
1	Jeebika - Odisha Rural Livelihood Programme: Watershed Development – A Means to a Better	Its activity regime broadly addresses the following- <ul style="list-style-type: none"> <li>• Interventions to address quality of life such as preventive health measures,</li> </ul>	<ul style="list-style-type: none"> <li>• Livelihood promotion activities should be selected based on local level climate and disaster risk assessment</li> <li>• The component of climate change and disaster resilient capital creation can be taken up. e.g., practices that can withstand future climatic extreme events such as high speed cyclones, extreme floods</li> </ul>

	Livelihood	<p>sanitation, drinking water, and food security</p> <ul style="list-style-type: none"> <li>Promotion of capacity building, community mobilisation, community development and livelihood promotion through deployment of revolving funds and grants.</li> </ul>	<ul style="list-style-type: none"> <li>Improvement of WASH through awareness, resilient infrastructure like raised toilets, hand pumps can be focussed during design and implementation of project activities</li> <li>Integrating livelihood and weather index based insurance with livelihood options for greater adaptation. e.g. if tailoring is promoted as nonfarm based livelihood, the tool such as the sewing machine, the tailoring centre (Infrastructure) must be insured against climatic extreme events.</li> </ul>
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These examples from Centrally Sponsored Schemes and State Level Schemes are only indicative ones. These schemes and programs possess far broader scope if proper assessment is done. Thus, the general steps will throw light on the location specific scope. The planner/practitioner needs to have broad vision and mandate to mainstream DRR and CCA in specific program as it will be local. The above table is designed to facilitate thinking so that local and contextual measures are taken to mainstream DRR and CCA in specific program.

## 7.2 Rationale for the Strategic Framework

In response to growing demands from governments and their development partners, this Strategic Framework advances sector thinking around WASH and climate change. The Framework is grounded in a core objective: to provide sustainable WASH service delivery, both now and into the future. The emphasis is on climate resilient development, including strengthening the resilience of WASH systems and on investments to manage current climate variability, as well as long-term changes in climate. This encompasses both development and emergency preparedness programmatic spheres with climate resilience addressed as a cross-cutting issue encompassing elements of both disaster risk reduction (DRR) and climate change adaptation.

The principles and practices outlined in the Strategic Framework aim to complement and strengthen ongoing national and sectoral adaptation planning processes, for example those under the National Action Plan for Climate Change (NAP-CC) process where WASH sector needs will be a key component.

## 7.3 Strategic Framework for mainstreaming DRR and CCA in development planning

**Strategic objective:** *To ensure that ongoing and proposed government development plans, programmes, schemes and initiatives mainstream DRR and CCA and are sustained and*

*strengthened, leading to long-term institutional development policy and practice changes, and contributing to sustainable socio-economic development.*

This Strategic Framework is a resource for the WASH sector as a whole. The target audience includes government planners, decision makers and practitioners at national, sub-national and local levels responsible for WASH services provision, and their associated WASH development partners. The focus is primarily on rural WASH services encompassing small-scale and community systems.

The Strategic Framework is particularly relevant to those working in areas vulnerable to climate hazards and variability. It is also useful for others who are not directly involved in the WASH sector but are linked to it, for example in the health, development, water resources and education sectors.

Since considerable energy will be expended on mainstreaming DRR and CCA into development policies and practices in the states with a number of initiatives underway to get mainstreaming off the ground, the most critical challenge ahead is to ensure that these various initiatives result in concrete, sustained changes in development practice, particularly at the level of local government. In order to achieve this, a number of fundamental steps need to be taken to complete the establishment of an appropriate enabling environment.

A 3-stage Strategic Framework for DRR and CCA mainstreaming is recommended below and summarized for practical field level purposes in a table at the end of this chapter.

#### Key points

- This Framework advances sector thinking around WASH and climate change. It focuses on investments to increase the resilience of the WASH sector to current climate variability as well as to long-term changes in climate.
- The Framework is a resource for the WASH sector as a whole and it aims to inform and reinforce existing planning processes, and is NOT a new process in itself.
- The Framework highlights 'Why' climate resilient development is important and catalyses selected elements of 'What to do' in terms of action that can be taken now to strengthen resilience.

## 1. Enabling Environment

## 2. Change in operational practice

## 3. Measuring Progress

### 7.4 Key strategic considerations

#### 7.4.1 Creating an enabling environment

##### a) Integration of DRR and CCA into government development planning

- Establishment of strong institutional leadership and oversight mechanisms, and related technical capabilities, for DRR and CCA within the government.
- Creation of DRR and CCA focal points in individual line departments.
- Development of a comprehensive, long-term DRR and CCA mainstreaming strategy, incorporating individual sectoral (departmental) strategies, embracing principles of mainstreaming and replete with meaningful monitoring and evaluation indicators.
- Integration of DRR and CCA responsibilities into the duties of pre-existing department officers and provision of related technical support to strengthen capabilities.
- Integration of DRR and CCA concerns into the state and local development plans, including specification of overarching objectives and strategies, mainstreaming principles and linkages into key socio-economic goals and more specific sectoral goals, measures and activities.

- Establishment of dedicated funding lines for DRR and CCA at each level of government.
- Strengthened vertical and horizontal integration of DRR and CCA plans between different levels of Government and between various line departments.
- Documentation, evaluation and replication of successful local mainstreaming initiatives.
- Strengthened collaboration between the DRR and CCA communities via institutional, policy and research coordination and the development of joint strategies.

#### 7.4.2 Change in operational practice

##### **a) Governance measures**

###### – Intra-government horizontal and vertical integration – collaboration and coordination

- Horizontal and vertical integration of government at different levels ensuring that principles of DRR and CCA mainstreaming are reflected at all levels of government regardless of point of entry.
- Vertical integration is particularly critical because considerable responsibilities have been devolved to local government. While the state governments have a clear role in setting overall policies and priorities, establishing the regulatory framework, designing state programs, providing technical support and monitoring and evaluating overall progress on DRR and CCA, the local government at the lowest level have first-hand knowledge of the nature, frequency and severity of the natural hazards faced and their specific DRR and CCA needs – critical knowledge that needs to be incorporated into local development plans and reflected in higher-level planning documents. However, a challenge remains in ensuring that DRR and CCA priorities and needs identified at each end of the chain are transmitted up and down the system.
- Horizontal integration between state line departments is also important given the crosscutting nature of disaster and climate risks and potential implications of decisions in one area of government for vulnerability in another. Horizontal integration would be further strengthened by the development of a comprehensive state DRR and CCA strategy.
- Setting up of focal points to ensure optimal coordination and coordination across different government departments involved in joint programme design, implementation and monitoring.

##### **b) Non structural measures**

— Change in ways of working

- Environmental impact assessment procedures should be amended to ensure comprehensive analysis of both the impact of natural hazard events on a project and the potential disaster and climate risk-related consequences of the project via its impact on the environment in hazard-prone areas. Some initial work in this area under a sub-state mainstreaming project should be peer-reviewed and built upon, leading to the integration of DRR and CCA guidance into existing project evaluation guidelines and reporting formats rather than the development of separate, stand-alone guidance.
- Adequate funding is required to ensure that disaster and climate risk concerns are adequately considered during project appraisal, particularly at the initial feasibility stage when there is the most flexibility to deal with disaster and climate risk concerns adequately and cost-effectively.

**c) Budgetary considerations – adjustments and additions**

- Clarity around the current level of expenditure on DRR and CCA mainstreaming and the establishment of some dedicated funding to support sustained DRR and CCA initiatives are urgently required.
- Budget lines should be created at the level of local government to support the basic functioning of permanent DRR and CCA management responsibilities of pre-existing offices.

7.4.3 Measuring Progress

**a) Setting mainstreaming goals and related indicators**

- Indicators for monitoring and evaluating DRR and CCA initiatives at both the state and the community levels need to be developed, including indicators for monitoring DRR and CCA aspects of broader development initiatives.

**7.5 Guiding Questions for the Strategic Framework**

In the early phase of the planning process, accept that questions can be more transformative than answers. Powerful questions don't dig for information, but instead cause respondents to think and may be evoke a choice for commitment and accountability. Some of the questioning to uncover challenges and opportunities amongst various sectors/systems/line-departments to craft a DRR and CCA agenda can be:

7.5.1 Understanding Risk

- Is the WASH sector in any way accumulating disaster risk? E.g. the education sector may be concerned about poorly built schools with no regular maintenance in seismically active zones
- Which elements of WASH sector are contributing to build-up of disaster risk? Look beyond physical infrastructure – attitudes/mindsets are the biggest carriers of risk.

#### 7.5.2 Solutions framework

- What climate change adaptation and preparedness work (action/activities) is needed within WASH sector to recover quickly and establish regular and resilient services in the face of any disaster? Also referred as resilient system for continuity of service.
- What can WASH sector/department do in the short, medium and long term to reduce disaster risk? Start with some low hanging fruits, yet link it with a wider, long term strategy. Like ensure all the development programmes, services and infrastructure are as per norms and standards prescribed by Gol.
- What are the challenges/barriers/obstacles/bottlenecks and opportunities to mainstreaming DRR and CCA?

#### 7.5.3 Coordination and Collaboration (Vertical and Horizontal)

- Which other sector/line-departments do we need to work with to reduce risk? Achieving results in any sector/domain is invariably linked to results in other sectors. At management level, due importance can be accorded to interdepartmental coordination and its measurement (set indicators of convergence/integration, cross sectoral analysis/surveillance...).
- How can commitment and leadership be built for DRR and CCA in WASH sector/department? Leadership is vital at all levels to inspire action from at-risk communities and duty bearers. E.g. A teacher inspiring school safety action in a school can mean a lot to the safety and security of children, their families and the community at large.

#### 7.5.4 Resource mobilisation in development planning

- How can we use our existing resources optimally to ensure integration of DRR and CCA in our developmental planning?

#### 7.5.5 Enabling mechanisms for advancing DRR and CCA

- What should we do to regularly track climate change risk in our sector? Small changes in the reporting and monitoring format can herald big changes in due course.

- What kind of tools or changes in existing tools (reporting, monitoring, planning...) can be enabled by the district administration or chief secretary to prompt the line-departments to be responsive to the climate risk profile of the district?

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## 7.6 Strategic Framework Format

Mainstreaming DRR and CCA into Development Policies and Practices											
Sector: WASH											
Narrative: (explain what strategic action will your line-department take to reducing disaster and climate risks by overcoming challenges/ bottlenecks and building upon the opportunities)											
#	Ongoing/proposed Development Plan/Program/scheme	Potential for DRR and CCA mainstreaming		With whom should we coordinate or collaborate with to achieve these DRR and CCA results?	Action to be taken to mainstream DRR and CCA			Additional Resources required	Responsible department /agency	Monitoring	
		Programme activities	Policies, Plans etc.		Structural measures	Non-structural measures	Governance measures			means of verification	Indicators
1		Priority/Immediate									
		DRR	DRR								
		CCA	CCA								
		Longer Term									
		DRR	DRR								
		CCA	CCA								
2		Priority/Immediate									
		DRR	DRR								
		CCA	CCA								
		Longer Term									
		DRR	DRR								
		CCA	CCA								

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