

# **Strategic Plan – 2011- 2022**

## **Department of Drinking Water and Sanitation – Rural Drinking Water**

### **“Ensuring Drinking Water Security In Rural India”**

Department of Drinking Water and Sanitation  
Ministry of Rural Development  
Government of India

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# A Strategic Plan for Rural Drinking Water in India

## Chapter 1- Introduction

This document sets out a strategic plan for the Department of Drinking Water and Sanitation in the rural drinking water sector for the period 2011 to 2022. The Plan is broadly set out in the following parts

- *Aspirations and Goals* for the Strategic Plan of the Department of Drinking Water and Sanitation and the rural drinking water sector as a whole.
- The current situation, and challenges concerning the rural drinking water sector.
- The *Strategy and Implementation Plans for different objectives*: The Department of Drinking Water and Sanitation has identified five *Strategic Objectives* (Source Sustainability; Water Quality Management; Sustainable Service Delivery (O&M), Strengthen Decentralised Governance, and Build Professional Capacity) to achieve its overall objective of providing improved, sustainable drinking water services in rural communities.
- The Implementation Plan under each Strategy provides options from which each State can formulate its own *Implementation Plan* depending on its needs, capacity and resources, and establish a timeframe for achieving transformation.
- *The Learning Agenda, Resources Required and Key Performance Indicators* to monitor progress against the Strategy and Implementation Plans.

The Government of India, through the Department of Drinking Water and Sanitation, has already taken significant steps to meet this challenge through the National Rural Drinking Water Programme (NRDWP).

This document has been prepared to help operationalise the NRDWP by setting out a Strategic Plan in terms of aspirations, goals, objectives and strategic initiatives for the sector for the period 2011-2022.

## Chapter 2 : Aspirations and Goals

### 2.1 Aspirations

All rural households have access to piped water supply in adequate quantity with a metered tap connection providing safe drinking water, throughout the year, that meets prevalent national drinking water standards, leading to healthy and well nourished children and adults and improved livelihoods and education. Continuous uninterrupted water supply is an aspiration and efforts should be made to cover increasing numbers of habitations with 24x7 water supply.

### 2.2 Goals

To ensure that every rural person has enough safe water for drinking, cooking and other domestic needs as well as livestock throughout the year including during natural disasters.

By 2022, every rural person in the country will have access to 70 lpcd within their household premises or at a horizontal or vertical distance of not more than 50 meters from their household without barriers of social or financial discrimination. Individual States can adopt higher quantity norms, such as 100 lpcd.

It is recognized that States will adopt their own strategies and phased timeframes to achieve this goal. Three standards of service can be identified depending on what communities want:

- Basic piped water supply with a mix of household connections, public taps and handpumps (designed for 55 lpcd) -with appropriate costing as decided by States taking affordability and social equity into consideration
- Piped water supply with all metered, household connections (designed for 70 lpcd or more) - with appropriate cost ceilings as decided by States taking affordability and social equity into consideration.
- In extreme cases, handpumps (designed for 40 lpcd), protected open wells, protected ponds, etc., supplemented by other local sources – preferably free of cost.

Optimum use of rainwater should be an integrated element in all the three cases.

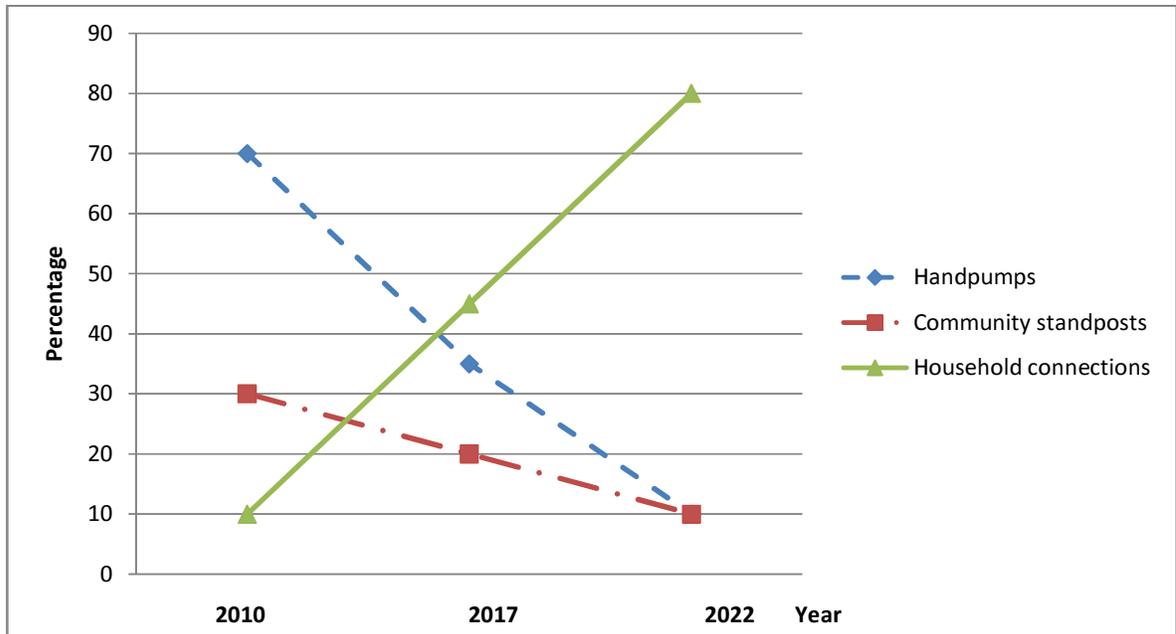
### 2.3 Timelines

**By 2017,**

- Ensure that at least 55% of rural households are provided with piped water supply; at least 35% of rural households have piped water supply with a household connection; less than 20% use public taps and less than 45% use handpumps or other safe and adequate private water sources. All services meet set standards in terms of quality and number of hours of supply every day.
- Ensure that all households, schools and anganwadis in rural India have access to and use adequate quantity of safe drinking water.
- Provide enabling support and environment for Panchayat Raj Institutions and local communities to manage at least 60% of rural drinking water sources and systems.

**By 2022,**

- Ensure that at least 90% of rural households are provided with piped water supply; at least 80% of rural households have piped water supply with a household connection; less than 10% use public taps and less than 10% use handpumps or other safe and adequate private water sources.
- Provide enabling support and environment for all Panchayat Raj Institutions and local communities to manage 100% of rural drinking water sources and systems.



## Chapter 3 : The current situation, and challenges facing the sector

### 3.1 Background

By 2022, India may have moved to upper-middle income country status with the third largest economy in the world behind only the USA and China. Though economic growth is expanding access to resources and opportunities for increasing numbers of educated people coming from rural, small town and urban backgrounds it is evident that many areas of the country and many sections of the population are unable to access the opportunities available. The challenge is to sustain and broaden the scope of the growth process, to overcome the many inequalities that exist in urban slums and lagging rural areas, for SC/ST, poor and marginalized households and habitations, and to ensure that more people have better jobs, and better access to basic infrastructure and improved public services, like health, education, water supply and sanitation.

### 3.2 Government initiatives in Rural Drinking Water

Since the First Five Year Plan (1951-1956), Government of India (GoI) and State governments have spent about Rs. 1,10,000 crore on rural drinking water. Under the current Eleventh Five Year Plan (2007-2012), the total expenditure is likely to exceed Rs. 1,00,000 crore, and it is certain that investment in rural water supply will increase even more. Yet despite these huge investments, the sector is beset with problems. Ground water sources are deteriorating, many areas are classified as water quality affected, and poor operation and maintenance has resulted in dilapidated facilities. The causes behind this situation are to do with competing demands on scarce water resources, weak institutional governance, insufficient support structures and professional capacity at all levels. These need urgent attention. Looking to the future, there will be rising demand for higher quality of services to match those found in urban centres, intense competition for water from agriculture and industry, and increasing scarcity and variability of water resources due to population growth and climate change. Above all, Indian citizens, across a broad base of economic and social circumstances, are demanding transparency in “how decisions are made, how money is spent and to what end, and who the beneficiaries are”<sup>1</sup>.

The Government of India, through the Department of Drinking Water and Sanitation, has already taken significant steps to meet this challenge through the National Rural Drinking Water Programme (NRDWP) launched in April 2009. NRDWP provides grants for construction of rural water supply schemes with special focus on water-stressed and water quality affected areas, rainwater harvesting and groundwater recharge measures, and for operation and maintenance including minor repairs. It promotes conjunctive use of surface, groundwater and roof water rainwater harvesting and actively supports convergence with other development programmes such as the MNREGS and Watershed Development Programmes. Support activities include setting up of State Water and Sanitation Missions and Water and Sanitation Support Organisations at State level, District Water and Sanitation Missions, Block Resource Centres and Village Water and Sanitation Committees, provision of District and Sub-divisional water quality testing laboratories, on-line MIS, and community involvement in water quality monitoring.

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<sup>1</sup> Nandan Nilekani, writing on the advantages of information and communications technology in *Imagining India, Ideas for the New Century*, 2008

### 3.3 The current situation :

*The current situation: There is no question that India has been successful in providing access to basic water supply facilities for nearly everyone; the challenge now is how to provide higher levels of service with sustainable sources and systems that provide good quality water to a growing population.* Under the Accelerated Rural Water Supply Programme (ARWSP) India made good progress in terms of coverage. The Uncovered habitations as of 1<sup>st</sup> April, 2005, were 55,067 (4,588 Not Covered, and 50,479 Partially Covered)<sup>2</sup> the balance as of 1<sup>st</sup> April, 2010 was only 376 uncovered habitations. However, out of the total number of 16,61,058 habitations in India, the States reported that 4,94,610 habitations (30%) had slipped back to partial coverage and 1,44,064 (9%) habitations were water quality affected as on 1<sup>st</sup> April, 2010 . The reasons for this include:

- a) In line with NRDWP guidelines as of 1<sup>st</sup> April, 2009, the inclusion of newly formed peri-urban habitations and new habitations even those with less than 100 persons.<sup>3</sup>
- b) Slippage of covered habitations due to poor O&M and drying up of sources.
- c) Increase in population and growth of settlements.
- d) Increased testing of sources and improved knowledge of quality affected areas.
- e) Increasing contamination of sources due to deeper drilling of borewells into quality affected aquifers, contamination with untreated sewage, industrial effluent, and agricultural fertilizers and pesticides.

*The number of piped water supplies in rural areas is rapidly increasing, driven in part by water resource constraints, but increasingly because people want a higher level of service.* In 2010, about one third of rural households already use piped water, and about one third of those have a house connection. The achievements of the last two decades in the RWS sector in India are shown in the figure below from the JMP Report 2008. However it should be noted that there are significant inequalities between the rich and the poor and this needs to be addressed in moving forwards. For example, while about 32% of the rich people have piped connections on their premises, only about 1% of the poorest have this facility.<sup>4</sup> This corroborates well with some field surveys which indicate that expenditure on the SC/ST population is proportionately less than on the rural population as a whole.<sup>5</sup>

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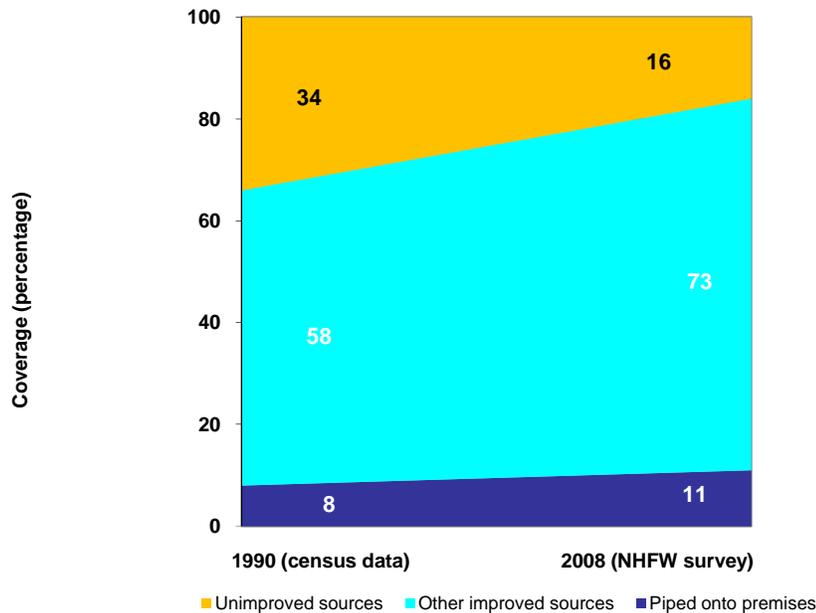
<sup>2</sup> 'Covered' means that at least one public investment has been made to create drinking water sources and / or systems. In addition, under ARWSP, Government of India norms were 'fully covered' meaning 40 liters per capita per day (lpcd), 'partially covered' meaning more than 10 lpcd but less than 40 lpcd, and 'not covered' meaning less than 10 lpcd. In addition, a potable water source should be within 1600m in the plains and 100 meters elevation in hilly areas of any household. This is the basis on which slippage was identified.

<sup>3</sup> This replaces the previous definition of coverage which was based on 40 lpcd, with a safe source for all permanently settled populations of 20 households or 100 persons.

<sup>4</sup> Analyzed by UNICEF in 2010 based on data from National Family Welfare and Health Surveys in 1993, 1999 and 2006.

<sup>5</sup> All India Impact Assessment Study of ARWSP during 2004-2007.

Rural drinking water trends



### 3.4 The Challenges:

The Eleventh Plan document identifies the key issues facing the sector. The main ones are deteriorating **source sustainability** resulting from over-extraction of groundwater in large part due to irrigation demand for agriculture, **water quality** problems including arsenic and fluoride contamination and bacteriological contamination due to lack of sanitation which kills hundreds of children every day from diarrhea, and poor **operation and maintenance** including neglect of replacement and expansion resulting in rapid deterioration in the quality of water services. The other major challenges are related to **inter-sector coordination**, continuous **professional support** to GPs/ communities and emerging **climate change** challenge.

### 3.5 Source sustainability:

*One of the most critical challenges that face rural villages is to secure an adequate source of water in terms of quantity and quality.* Since 1947, with increasing growth of the population the per capita water availability has fallen from over 5,000 m<sup>3</sup>/year to about 1,700 m<sup>3</sup>/year. This is due to massive over-exploitation of groundwater mostly to meet irrigation demand and increasing scarcity in drinking water during summer months. The status of groundwater development is more than 100% in the States of Delhi, Haryana, Punjab and Rajasthan. More than 15% of the total blocks in the States of Andhra Pradesh, Delhi, Gujarat, Haryana, Karnataka, Punjab, Rajasthan and Tamil Nadu are over-exploited or critical in terms of ground water development. Due to deeper drilling of aquifers, drinking water sources are increasingly becoming contaminated with natural contaminants like fluoride, arsenic and salinity.

### 3.6 Water Resource regulation

*In terms of water resources regulation, critical issues facing the sector concern inter-sectoral distribution, bulk water tariffs and water resource management.* In particular, ensuring that drinking water receives priority especially during scarcity and drought is a challenge because irrigation demand dominates water demand. The current distribution of water resources in the country is about 86% percent for agriculture, 6 percent for industries and 8 percent for domestic uses. With increasing industrialization the share of industry is set to rise. The comparable share of industry in rich industrialized countries is more than 50%. The share of domestic water use will also rise with increasing urbanization and demands of rural households for urban levels of amenities and services. *There is lack of a holistic approach to water resources management with communities taking the lead in preparing their own water balance* to ensure that they manage their available surface water, groundwater and rainwater resources and competing demands for drinking water, irrigation and industry. The Planning Commission in its Mid-Term Appraisal of the 11<sup>th</sup> Plan progress and the 13<sup>th</sup> Finance Commission Report recommend establishment of independent water resources regulatory bodies at state level. The 13<sup>th</sup> Finance Commission has earmarked a conditional grant of Rs. 5,000 Crores for this purpose.

### 3.7 Water Quality:

As indicated earlier, as of 1/4/2010 about 9% of habitations remain that face water quality issues due to chemical contamination. Out of the 1,44,064 remaining quality-affected habitations, arsenic contamination is reported in 6,548 habitations of 8 States, fluoride contamination in 26,131 habitations of 19 States, salinity, both in inland and coastal areas, in 28,398 habitations of 15 States, iron contamination in 79,955 habitations of 21 States and nitrate contamination is reported in 3,032 habitations of 12 States. These contaminations are either natural or associated with over-exploitation of groundwater.

Many more sources report bacteriological contamination, especially during rainy season due to poor sanitation, poor O&M and hygiene leading to water borne diseases impacting on maternal and child morbidity and mortality.

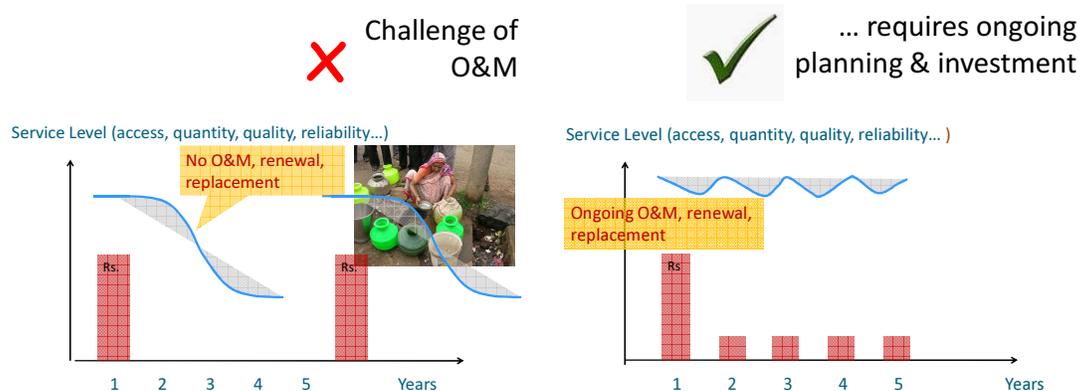
The main issues in dealing with water quality are related to: weak legislation and enforcement of water quality standards and testing protocols, exploitation of sources contaminated due to deteriorating groundwater levels, poor Operation & Maintenance, weak provider accountability with respect to quality of water provided and lack of awareness amongst rural citizens about the importance of safe water and poor environmental and domestic hygiene.

### 3.8 Operation and Maintenance:

*Another major challenge is to move from a project mode which focuses on creating infrastructure, to a programme mode which focuses on providing, improving and sustaining high standards of drinking water supply services.* Decentralization puts planning, implementation, operation and maintenance in the hands of beneficiaries. This creates ownership and commitment to action. It has been the goal of successive rural water reform programmes in India since 1999. The Sector Reform Programme (1999-2002) and

Swajaldhara (2002-2008) have promoted a bottom up, “demand responsive” community based approach that has now been mainstreamed in the National Rural Drinking Water Programme (2009).

The PHEDs have been concerned with physical progress and financial disbursement, not longer term sustainability. There has been poor interaction with communities to involve them in planning, implementation and managing their own schemes. As a result, the dominant approach to service delivery has remained supply driven and characterized by large investments in schemes and works, followed by deterioration of the infrastructure and long periods with *low levels of service* while communities wait for the government to rebuild the schemes.



### Institutional roles and responsibilities

It is clear that local governments and communities cannot succeed on their own. They need to be given clear-cut roles and responsibilities. These include Panchayat Raj institutions, line departments, training institutions, and the local private sector and NGOs. Before the NRDWP Support fund was created there was no provision for regular funding of Support activities under the main programme. It is now possible to take up capacity building programmes on redefining roles and responsibilities using these funds.

### 3.9 Inter-sector coordination:

Government of India has established many flagship development programmes to improve rural health and livelihoods and provide sustainable infrastructure. These include MNREGS, Watershed Development Programmes, BRGF, NRHM, ICDS, TSC, SSA and NRLM. However, there are multiple institutions involved, varying ‘rules of the game’ and replication of projects which overwhelm village communities. There is an urgent need for convergence towards common objectives.

### 3.10 Continuous Professional Support:

*The rural water sector has suffered so far from a lack of continuous institutionalized support and a programme for strengthening professional capacity.* By focusing on a project mode of delivery, capacity building in rural water has been directed at infrastructure planning and implementation. State governments have generally adopted a top down approach to identify ‘shelves’ of schemes and works for financing, based loosely on priorities for

uncovered habitations and quality affected areas. But while many GPs and VWSCs have had facilities handed over to them, they have mostly lacked the financial and technical skills to independently manage and operate their new sources and systems. In addition, they have lacked the knowledge and experience to contract these skills. More recently, progress is being made through the establishment of Water and Sanitation Support Organisations, District Water and Sanitation Missions and Block Resource Centres.

Perhaps the most important lesson over the past twenty years of rural water supply is that local government and communities should not be abandoned once project infrastructure has been built. They need continuous support including training, technical support, access to professional services and financing to supplement their own resources.

### **3.11 Climate change – identifying key risk areas and potential opportunities.**

The 2009 Conference of the Parties to the United Nations Framework Convention on Climate Change meeting in Copenhagen, and the latest Intergovernmental Panel on Climate Change (IPCC) Report (2007), has confirmed the consensus amongst scientists and policy makers that human-induced global climate change is now occurring. The Copenhagen meeting also confirmed the need for action to mitigate and adapt to climate change. India has recently signed the Copenhagen accord, agreeing to work with other nations to address the issues and threats posed by *climate change*. The major threats from climate change are rising temperatures, increased droughts, increased flooding, long-term wastage of the region's snow and ice stores, saline intrusion from rising sea levels, and a more variable monsoon with unpredictable intermittent breaks in the monsoon.

## Chapter 4 - Strategy

Based on the above analysis and extensive national consultations<sup>6</sup>, the Department of Drinking Water and Sanitation has identified five *Strategic Objectives* to address the challenges in the sector and achieve its goals, namely:

### 4.1 Enable Participatory Planning and Implementation of Schemes and Source Sustainability

- a. *Participatory Integrated Water Resource Management* at village, district and State levels including *Conjunctive Use* of rainwater, groundwater and surface water and provision of *Bulk Water Supply* as needed
- b. *Water security planning and implementation by ensuring cost-effective, optimal scheme design to reduce O&M requirements*
- c. *Water Source Sustainability measures including Sustainability Plans implemented* at block, watershed and village level including *Water Harvesting* and *Groundwater Recharge* measures

### 4.2 Water quality Management

- a. Source Protection with *Water Safety Plan implemented* at village level to prevent contamination before it happens
- b. Monitoring, Surveillance and Testing through *Water Quality Testing* including field test kits and district and sub-divisional water quality testing laboratories
- c. Treatment of water from contaminated sources with cost-effective, appropriate technologies, safe distribution and household hygiene
- d. Legal, Institutional and Regulatory measures to make water quality standards mandatory and enforceable in a phased manner

### 4.3 Sustainable Service Delivery (Operation and maintenance)

- a. *Operation and Maintenance measures implemented* at village level to ensure skills and finance for operation and maintenance, replacement, expansion and modernisation.
- b. *Incentivise States to take measures for decentralising functions, funds, functionaries using a Management Devolution Index*
- c. *Focus on metering, bulk and individual, to reduce Unaccounted for Water*
- d. Service agreements for handpump mechanics and piped water supply operators

### 4.4 Strengthen Decentralised Governance

- a. *Institutional Roles and Responsibilities* to support water security planning and implementation (source sustainability, water quality and O&M)

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<sup>6</sup> The DDWS organized four rounds of Regional Consultation Workshops at Chandigarh (18<sup>th</sup> June 2010), Guwahati (on 18<sup>th</sup> August 2010) Bangalore (9<sup>th</sup> July 2010), Gandhinagar (on 26<sup>th</sup> August, 2010) and a National Consultative Workshop in New Delhi (14<sup>th</sup> Jan 2011) to discuss the challenges and way forward with various sector experts from government, NGOs, academics and media.

- b. *Convergence of different development programmes*
- c. *Results Based Financing* of drinking water security plans
- d. *Oversight and Regulation* including value for money and monitoring of progress and performance

#### **4.5 Build Professional Capacity**

- a. Training to capacitate new roles and responsibilities
- b. Technical support
- c. Outsourcing including handpump mechanics and piped water supply operators

#### **4.6 Implementation Plan**

The Strategic Objectives can be achieved through an appropriate mix of implementation initiatives. Most of these are set out in the National Rural Drinking Water Programme guidelines (DDWS, 2010) and other publications of the DDWS. Other key options are set out below, as identified in regional and national consultation workshops held with all States, inputs from water community groups and other stakeholders. **Each State can formulate its own Implementation Plan depending on its needs, capacity and resources, and establish a timeframe for achieving the Strategic Objectives.** Part Five provides some Key Performance Indicators which can be used to monitor progress.

## Chapter 5 - Enable Participatory Planning and Implementation of Schemes

### 5.1 Primacy for Drinking Water in Water Resource Allocation

As per the provisions of the National Water Policy, drinking water has the first priority in allocation, of all available water. However, it is often seen that in surface water harvesting or water impounding projects, requirements of drinking water are not given appropriate priority. **States should review existing water resource allocations for irrigation, drinking water etc. in cases of new demands for improved or augmented drinking water supply in rural and urban areas. Water policy should also provide for review and reallocation of water resources among competing user groups giving primacy to drinking water supply.**

### 5.2 Protection of Water sources

Moving it to a higher level of sanctity of sources, rather than mere protection should be a guiding principle both to keep the sources sustainable in quantity as well as save the water from being contaminated beyond usability. This would involve **participatory integrated water resource management, conjunctive use of water and source sustainability measures.** It may also involve suitable legislative or regulatory measures including defining water source protection zones or water sanctuaries.

### 5.3 Participatory Integrated water resource management.

*A Holistic approach with active community and PRI participation in villages at a watershed or aquifer or a hydrological unit level , especially in areas facing water stress in the whole or part of the year should be followed to ensure drinking water supply as in the Andhra Pradesh Farmer Managed Groundwater Systems project. This should take into account availability of water through groundwater, surface water, rainwater and seawater (where applicable) sources; allocation of water to irrigation, and for domestic purposes; and reuse and recycling of wastewater. Strategies should include a water budget with community monitoring of water tables to balance demand (especially irrigation and industrial demand) with available water as well as local measures for rainwater harvesting and groundwater recharge. States may also consider giving GPs more power over local water sources, so that agricultural and industrial use could be regulated so as not to jeopardize domestic water requirement. Waste water should be managed to prevent contamination and for reuse and recycling.*

Andhra Pradesh Farmer Managed Groundwater Systems (APFAMGS) project's key premise is behavioral change leading to voluntary self regulation. In seven drought prone districts of Andhra Pradesh, thousands of farmers residing in 638 habitations have voluntarily taken a number of steps to reduce groundwater pumping, for tiding over the problem of groundwater depletion. The main intervention of the project is the capacity building of the farmers in the catchment Hydrological Units (HUs) on water budgeting and collective decision making.

The project introduced two key measurement devices. The first is the rainwater gauge to measure the rainfall in their areas. The second is the long rope scale to measure the depth of groundwater in observation wells. The farmers groups were trained to collect and use data from these two sources to calculate the potential ground water availability in each season. This knowledge has empowered the farmers to collectively make their own decisions on water entitlements, crop water budget (CWB), changing crops to suit the water availability and planning recharge measures to enhance groundwater recharge potential.

The efforts have led to significant changes in the overall situation in a short 3 year period from 2005 to 2008. Out of 53 Hydrological Units (HUs) the groundwater balance has increased in 57% HUs, remained constant in 34% HUs and decreased only in 9% HUs. Similarly out of 58HUs the groundwater pumping has reduced in 55% HUs, remained constant in 31% HUs and increased only in 14% HUs. About 4800 farmers in the 638 habitations have voluntarily adopted water saving methods in one form or the other without losing the incomes from agriculture. This project demonstrates the power of building capacity of local organizations to collect real time data, process it and make local decisions and regulate water use.

## Implementation Plan

These implementation measures encompassing *Integrated Water Resource Management* are set out below:

### 5.4 Integrated Water Resources Management

#### 5.4.1 National level:

1. The DDWS, through the National Water Mission and the National Drinking Water and Sanitation Council, would prepare a convergent approach with the Ministries of Water Resources, Agriculture, Environment and Forests, Power, Industry and others. The Central Ground Water Authority will be requested to regulate drilling of non-drinking water supply wells in over-exploited blocks. The Water Quality Assessment Authority, Central Pollution Control Board and the National River Conservation Directorate will be requested to identify and take steps for suitable prevention and regulation of pollution of drinking water sources.

## 2. Regulation of Groundwater Development

85% of the supply of drinking water is based on ground water sources. Availability of drinking water during lean periods becomes a major issue. One of the major causes is that groundwater is over-extracted for industry and agriculture leading to depletion of drinking water sources. Farmers literally engage in a race to the bottom in drilling deeper and deeper borewells and falling into debt traps. Public need should triumph over private interest. For this regulation of ground and surface water extraction is necessary. It should also be effectively implemented. The Department would work with the **Ministry of Water Resources on suitably incentivising States for enacting a comprehensive Ground and Surface Water Development legislation and its effective enforcement especially in over exploited blocks.**

## 3. Need to notify all Over- Exploited Blocks

The Central Ground Water Authority would be requested to take the initiative to notify all over exploited Blocks, so as to regulate ground water abstraction in such blocks, other than for public water supply. The overuse of ground water resources is critically affecting the availability of drinking water in such blocks. Even in those blocks which have been declared as over-exploited blocks, the regulation of ground water exploitation requires tremendous improvement. **The District officers need to be pro-active in this and action should be initiated to establish farmer managed Ground Water associations in these block compulsorily.**

## 4. Upscaling of Farmer managed Ground and Surface water resources model

However, legislation alone is not sufficient. There is need to create awareness about the finite nature of ground and surface water resources. As has been shown in the Andhra Pradesh Farmer Managed Ground Water Systems programme if farmers are given the necessary awareness and skills to measure and monitor their water resources, community monitoring and self-regulation of water resources, both ground and surface water, becomes a reality. This is needed to ensure sustainability of drinking water supply. This has to be done by investing in awareness generation and capacity building of the Panchayats and communities. **The lessons of the APFMGS should be upscaled in all over-exploited through the schemes of Ministry of Water Resources and Ministry of Agriculture.**

## 5. Promotion of drip and sprinkler irrigation systems in water stressed areas

Programmes for promotion of micro-irrigation by the Ministry of Agriculture and by State Departments may not have sufficient funds to saturate all eligible land holdings in all blocks in the country. **It may therefore be considered for targeting these programmes on water stressed States, districts and blocks based on groundwater development in those areas.** For instance they could be targeted at the 839 over-exploited, 226 critical and 550 semi-critical blocks in the country.

### 5.4.2 State level:

The SWSM with the Irrigation, Agriculture, Environment and Forests, Power, Industry and Aquaculture Departments, would promote a common State Water Policy addressing the availability of overall water resources and water requirements of irrigation, rural and urban drinking water, and industry. In this context, the steps to

be taken to meet the needs of domestic water, as the priority, would be agreed by the different sectors. This would include monitoring of ground water levels and rainfall at sub-block levels, monitoring and regulating over-abstraction of ground water in over-exploited blocks, water efficient agricultural practices, recycling and reuse of wastewater, water treatment by industry, and environmental water protection from industrial effluents, fertilizers, pesticides and untreated sewage. Stress will be laid on the roles of Irrigation and Agriculture Departments in increasing efficiency of water use in agriculture.

#### 5.4.3 District level:

The DWSM would prepare a District Water Vision based on the availability of overall water resources and water requirements for irrigation, rural and urban drinking water, and industry. It should systematise the monitoring and recording of groundwater levels and rainfall at sub-block or GP level. Based on this plan it should take steps in coordination with Agriculture and Irrigation Departments for diversification of cropping patterns, appropriate sowing calendars to reduce abstraction of groundwater, improve water-use efficiency in irrigation, ensure reduction, reuse and recycling of water by industry, environmental protection of drinking water sources, ensure open-defecation free villages, and cost-effective management of solid and liquid wastes. It should draw up plans for water harvesting and groundwater recharge structures to benefit drinking water sources on a watershed basis using Ground Water Prospects maps, GIS and Watershed Development Department technical inputs. These would be done on a priority basis for over-exploited, critical and semi-critical blocks. The works planned on this basis would be taken up under MNREGS, NRDWP (Sustainability) and IWMP.

#### 5.4.4 Village level:

At the village level water security planning should start with knowledge of water resources management in the village, aquifer or watershed. A **water budgeting exercise** should consist of understanding water resources available, and methods of increasing the utilisation of available water resources, water requirements of different sectors like drinking water, livestock, agriculture, industry and commerce. **Monitoring** of ground water levels and rainfall with rain gauges will lead to knowledge of availability of water resources. Understanding of **water conservation and recharge** should lead to planning of water harvesting and groundwater recharge structures which maximise recharge and minimise evaporation losses. **Demand management** of water by the irrigation sector would focus on use of less water intensive crops, efficient irrigation methods like drip and sprinkler, reuse and recycling of water, and regulation of groundwater over-abstraction. The **water budgeting exercise** should culminate in arriving at a shared **Village Water Vision** on managing this resource and equitable allocation for landless villagers and land holding agriculturists while protecting the domestic requirements. This collective approach requires considerable work with by trained persons with the villagers. The Village Water Vision should deal with the impacts of declining ground water tables, increasing competing demands and vagaries caused by climate change.

### **Aquifer Management**

**Pune, Buldhana and Aurangabad Districts, Maharashtra.** The hydro-geological features of Maharashtra (93 percent hard rock, variability in rainfall) impose limitations on ground water availability. Competing demands on ground water, particularly for agricultural purposes through indiscriminate pumping, have led to an unsustainable situation, warranting innovative solutions through community partnership. The aquifer pilots implemented in Pune, Buldhana and Aurangabad Districts through the Jalswarajya World Bank-assisted project are a step forward in achieving sustainable aquifers through community participation. The pilot experiment has proved that the community at aquifer level can be brought together for participatory ground water management, and therefore it has emerged as a rational tool in ensuring the sustainability of ground water to meet the needs of the village community. The additional quantity of ground water retained in the aquifer translates to an availability of about 1,690 kilolitre of water per household per year; or it can irrigate an additional area of 3,900 hectare per year, in addition to providing round-the-year drinking water security to the villagers. The pilot has also resulted in cost savings of Rs. 88 lakh per year for the Government of Maharashtra by avoiding tanker supplies to villages.

## **5.5 Water security planning and implementation at village, district and State levels.**

Participation of local government and communities is the cornerstone for sustainable development. States, districts and villages should adopt a mix of top-down and bottom up planning approaches to service delivery based on Water Security Planning and implementation with training institutions, NGOs and the local private sector providing a supporting role. At the village level, GPs and VWSCs should be guided to make informed choices regarding appropriate technologies so that they get the services they want. The NRDWP prioritises coverage of remaining uncovered habitations, slipped back habitations and water quality affected habitations. Water supply schemes should have cost-effective and optimal design and timely implementation to reduce capital and O&M costs. Planning and implementation of schemes should prioritise SC/ST, poor and minority households/habitations and the role of women, make provisions for schools, anganwadis and livestock, and adopt strategies to cope with natural disasters. Cases of isolated rural houses where households have their own private safe and adequate drinking water sources would be considered as covered.

## **Implementation Plan**

### **5.6 Universal access and participation**

1. From 2013, planning, investment and implementation of all new single-village piped water supply schemes or in-village distribution systems of multi-village schemes should be preceded by constitution of Village Water and Sanitation Committees,

- their training, and their preparing their Village Water Security Plan with approval by the Gram Sabha/GP and implementation by the GP/VWSC.
2. All new drinking water supply schemes should be designed, estimated and implemented to take account of the water supply cycle, with (i) recharge and water conservation structures wherever necessary and feasible, for the sources, (ii) constitution, training and support to VWSCs to plan, implement, operate, maintain and manage the schemes (in-village), and (iii) waste water management through stabilisation ponds and other options by convergence with MNREGS, TSC, etc.
  3. Communities should be enabled to plan and implement schemes to have piped water supply with metered household connections and volumetric tariffs with appropriate cross subsidy for SC/ST and BPL households.
  4. Where households within a habitation are self providing (for example, they have installed their own shallow hand pump or open well), the GP/VWSC still has a responsibility to ensure that they have an adequate supply of safe drinking water. The GP/VWSC can (i) provide public taps/ handpumps, (ii) provide water quality tests, and (iii) provide the services of a qualified mechanic for preventative maintenance.
  5. GPs/VWSCs should ensure a minimum level of safe drinking water and sanitation for transient communities. For example, enterprises and contractors should be held accountable for providing the minimum level of safe drinking water and sanitation facilities for migrant labourers and in their labour colonies.
  6. All government schools and anganwadis will be provided with water supply for drinking and for toilets in adequate quantity by convergence of NRDWP for existing schools and SSA for new schools set up under SSA. For private schools, supply of water will be ensured by enforcement of the provisions of the Right to Education Act by the Education Department.
  7. All community toilets built with public funds and maintained for public use will be provided with running water supply under NRDWP.
  8. It will be ensured that the allocations for SC and ST concentrated habitations under NRDWP are utilized for the planned purpose. Proportionate allocation and expenditure will be made under NRDWP in minority concentrated districts.
  9. Women should be included in all aspects of decision making with respect to drinking water security planning, implementation, operation, maintenance and management.
  10. Waste water treatment and recycling should be an integral part of every water supply plan or project. Management of liquid and solid waste should be promoted together with recycling and reuse of grey water for agriculture and groundwater recharge and pollution control.
  11. Design of schemes for peri-urban areas should factor in the requirements of increasing population and increasing per capita demand in the planning stage itself so as to avoid wasteful expenditure. SWSMs can make special provisions to ensure peri-urban areas get the level of services demanded by the inhabitants.

### **Case Study: Beneficiary Groups executing and maintaining schemes**

Under the **Jalanidhi Rural Water Supply Project in Kerala**, instead of engaging contractors to build the water supply systems, Beneficiary Groups (BGs) directly procure materials and construct the schemes on their own, employing local workers – both skilled and unskilled. The community contracting system adopted in the implementation of the Jalanidhi Rural Water Supply Project in Kerala has successfully demonstrated the value of empowering communities to be responsible for the implementation and management of the water supply systems. Community contracting resulted in substantial reduction in the construction costs (about 15 percent less than the approved estimates), ensuring good quality construction and transparency. This approach also helped in mobilizing local resources, especially manpower for construction, and making the beneficiaries actively involved in the entire process whereby their ownership and sustainability of the schemes are enhanced. Equally important, the water supply schemes completed and commissioned are now being operated and maintained (many of these now for more than five years) by the BGs. Water tariffs have been fixed appropriately, corresponding to O&M expenditures, and are being levied and collected in all the schemes.

### **Village Drinking Water Security Plans and Implementation**

Efficient and effective operation depends upon sound village water supply strategies made up of (a) Water Source Sustainability Plan and implementation that provides sufficient quantity of good quality drinking water to meet demand throughout the year, including water harvesting and groundwater recharge measures for the drinking water sources, (b) Water Safety Plan that describes how water quality will be managed from source to mouth (point of consumption), (c) Operating and Maintenance Plan of the water supply scheme which describes standard operating procedures and balances expenditure and income, and (d) Service Improvement Plan summarizing provisions for new infrastructure, replacement, expansion and optimization of production cost.

In addition, there should be promotion of awareness directed at water conservation and household water storage and handling. (Issues such as hand washing, excreta disposal and solid waste management being covered under other government programmes).

*Source: Department of Drinking Water and Sanitation, A Handbook for Gram Panchayats to Help Them Plan, Implement, Operate, Maintain and Manage Drinking Water Security*

## Chapter 6 – Sustainability of Sources and conjunctive use of water

### 6.1 Source Sustainability Plans

All rural habitations irrespective of the number of households should have access to a safe, adequate and sustainable source or sources.<sup>7</sup> Taking up recharge and water harvesting structures in an unscientific manner may result in infructuous expenditure. Therefore Sustainability Plans should be prepared and implemented prioritising for over-exploited, critical and semi-critical blocks using Ground Water Prospects(HGM) maps, GIS mapping and appropriate geophysical investigation with assistance from CGWB.. These should be prepared on watershed/aquifer/hydrological unit basis and implemented by converging resources of NRDWP(Sustainability) for material component and MNREGS for labour component and other Watershed Development programmes.

### 6.2 Implementation Plan- Source sustainability

1. Sustainability Plans should be prepared especially for over-exploited, critical and semi-critical blocks for taking up scientifically located recharge measures and water harvesting structures on a watershed or aquifer basis. These would be prepared using GroundWater Prospects (HGM) maps, GIS and GPS techniques to ensure maximum water conservation to benefit drinking water sources in a cost effective manner. These plans should be financed by convergence of NRDWP Sustainability MNREGS as well as Watershed Development Programmes.
2. The GP/VWSC should plan, prepare and implement Source sustainability water harvesting and groundwater recharge measures for all existing sources of drinking water schemes, wherever feasible and required using Groundwater Prospects Maps.
3. All plans and estimates of new schemes for drinking water supply should include provision of source sustainability measures, wherever feasible and required using groundwater prospects maps and GIS tools.
4. Community management includes measuring water tables using simple or automated rain gauges and rope measures and preparing a water budget to match demand (especially for irrigation) and available water.<sup>8</sup>
5. Water harvesting and groundwater recharge structures should be planned on watershed basis and adopted to augment available water. However, hydro-geologists should assess overall impacts of reduced runoff including reduced inflows to tanks.
6. The GP/VWSC should also rehabilitate and develop traditional village tanks, ponds and wells.

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<sup>7</sup> This replaces the previous definition of coverage which was based on a safe source for permanently settled habitations with populations of 20 households or 100 persons or more.

<sup>8</sup> Examples include APFAMGS with measuring groundwater, and Dakshin Kannada District in Karnataka with metered household connections and volumetric tariffs.

### **Ensuring sustainability in water stressed areas**

#### **Alwar District, Rajasthan.**

Solutions to ensure drinking water security in highly water stressed areas as in Rajasthan exist. This has been amply demonstrated by the successful experience of local communities in Alwar District in Rajasthan, supported by the NGO Tarun Bharat Sangh (TBS) and its founder Mr. Rajendra Singh. It is possible to harvest and augment water resources through the construction of small water harvesting structures called “*Johads*” and the implementation of local water governance. Since 1985, 8,600 *Johads* have been built in 1,086 villages. This has resulted in the rise in water levels in the shallow aquifer, increase in the area under single and double crops, increase in forest cover and drinking water supply security.

### **Protection of spring sources**

Under the **North-Eastern Region Community Resource Management Project for Upland Areas**, Spring Trap Chambers (STCs) have been promoted with the objective of protecting natural sources of drinking water. Two STC designs have been developed by the project in consultation with PHED staff : i) design for the plains; and ii) design for hill locations.

Protection of drinking water sources that serve a population of approximately 7,12,500 has been enhanced as a result of the IFAD project. Existing rules relating to catchment protection (such as timber felling, ban on hunting and fire control) have been enforced more effectively. Multiple use of water from STCs has been emphasized (drinking water, clothes washing, livestock rearing and kitchen gardens). The average annual household economic benefits derived from the use of STCs are in range of Rs. 84,550,000 in Meghalaya alone. In addition to economic benefits derived from livestock rearing, households also derive non-economic benefits through enhanced food security provided by kitchen gardens (mustard leaves, beans and cabbage).

### Sustainability Plan

Sustainability of drinking water sources is probably the most important factor determining whether a rural drinking water supply system will function satisfactorily for an appreciable length of time. Interventions to ensure source sustainability include **Software** inputs (raising awareness on need for recharge, avoiding water wastage and the need to plan for balancing availability and consumption) and **Hardware** inputs (Building physical structures which can capture rainwater and surface water runoff, and/or help recharge ground water like ooranis, check dams, subsurface dykes etc.).

The following steps are suggested for the preparation of a *Sustainability Plan* with a view to appropriately locating sustainability structures to sustain drinking water sources.

- i. Prioritising Difficult Areas - Identification of overexploited, critical and semi-critical blocks, areas with water stress in the whole or part of the year and quality affected areas, identification and testing of all sources there.
- ii. Identifying the respective micro watershed/aquifer/hydrological unit - hydro geo morphological study of the area
- iii. Preparation of a plan for recharge, water impounding (optimizing evaporation losses) and roof top harvesting with peoples participation.
- iv. Preparing Estimates, Building Capacities and Institutionalising the System
- v. Financing the Plan by converging NRDWP-Sustainability, MNREGS and Watershed Development Programmes.

### 6.3 Conjunctive use of surface water, groundwater and rainwater harvesting:

Conjunctive use of surface water, groundwater and rainwater sources offers the best chance of ensuring adequate supply all year round at the least cost. Where villages, such as those in semi arid areas, are not able to find local solutions the State, District or Block will need to take responsibility. For example, States may consider regional grids or multi village schemes to provide water to districts, blocks and groups of villages. Unbundling bulk supply and retail distribution can ensure that local governments and communities manage distribution, while PHEDs manage bulk supplies.

### Implementation Plan

#### 6.4 Conjunctive use

1. All habitations should move from dependence on a single source to conjunctive use of rainwater, groundwater and surface water sources.

2. States or districts can consider regional grids or multi-village schemes based on surface sources wherever feasible to supplement in-village sources, especially in drought prone areas.
3. Services of qualified hydrogeologists should be made available to support the PHED, DWSMs, BRCs and VWSCs in all districts.
4. GIS mapping of sources, water bodies and inter-village pipelines should be done to help prepare district and regional drinking water security plans, identify uncovered habitations, design schemes and reduce duplication in planning and investment.
5. Roof water harvesting and storage or recharge should be done on all village Institutional and community buildings and promoted in private buildings. States need to be incentivised to make recharge or storage of roofwater compulsory for private buildings of appropriate size and design.
6. In extremely remote habitations in hilly areas, where sources are very distant and laying of pipelines would entail a very high per capita cost, roof water harvesting can be considered as a cost-effective alternative to provide drinking water to households in such habitations.

**Case Study : Conjunctive Use of water**

**Jepar of Chuda Taluka in Surendranagar District, Gujarat**, is a village that embraced the decentralized community managed water supply system in 2006. It has developed a water distribution system, which allows all 160 households to have tap connections and enjoy 24x7 water supply. The village's two sources of water – a well and Narmada pipe water supply system – supplement each other to ensure regular safe water supply to the village. The total storage capacity is an Elevated Storage Reservoir (ESR) of 50,000 litres and one sump of 20,000 litres.

Before the village adopted 24x7 water supply system in 2006, the supply was available for about two hours a day and the average consumption of water was around 400 litres per day per household. When each household was assured of 24x7 supply, the consumption per household reduced to 250 litres per household, thus saving 25,000 litres per day which represents 38 percent of the water previously distributed. Power consumption reduced too by 4.39 units per day or a decrease in one-third of the previous electricity bill; an annual saving of about Rs. 7,900. The reduction in consumption of water occurred primarily because people abandoned the practice of storing water to cover several days' needs. Now, 125 villages in Gujarat are successfully operating the 24x7 water supply system.

## Chapter 7 - Drinking Water Quality Management:

The focus of this strategy is to ensure that the water supplied to rural citizens meets the national water quality standards. In investments under NRDWP priority should be given for coverage of quality affected habitations. The strategies to ensure drinking water quality will broadly be protection, monitoring and surveillance and treatment. Improvement programmes should be based on village water safety planning and implementation with verification by water quality testing.

### 7.1 Legal, Institutional and Regulatory issues:

The DDWS, in coordination with state governments and appropriate national agencies, will strive to make the national water quality standards mandatory in a phased manner. This involves strengthening existing legislations and also issuing necessary guidelines to the service providers. Water quality monitoring and enforcement will be part of the regulatory mechanisms existing/ designed by various agencies- described in section 3.3. Water Quality Cells need to be set up in each State manned by technically qualified staff with expertise in testing and treatment of major chemical and biological contaminants found in the State.

### 7.2 Drinking Water Quality Standards and Assessment:

The IS 10500 drinking water quality standards are voluntary in nature. So far there is no notification to make drinking water quality parameters and standards legally enforceable both for urban and rural areas are still to be declared. The Water Quality Assessment Authority constituted under the EPA 1986 has been mandated to declare the quality parameters for drinking water as also for all water. **The Authority should initiate action to declare the minimum quality requirements for drinking water in a phased manner after consultation with the concerned Dept of Drinking Water and Sanitation and the Ministry of Urban Development.** Requirement of a separate Drinking Water Quality Assessment Authority for better focus on drinking water quality would be considered.

### 7.3 Drinking Water Safety Planning and Implementation:

#### 7.3.1 Source Protection.

Existing drinking water sources and freshwater resources in general should be protected by implementation of the Total Sanitation Campaign to make villages open-defecation free and maintain a clean environment; by safely disposing of solid and liquid wastes; by ensuring the control and treatment of industrial effluents; and by raising awareness about impacts of use of high concentration of fertilisers and pesticides on water. The regulatory authority of the CPCB, SPCBs and the Water Quality Assessment Authority will be applied to protect the quality of drinking water sources polluted by industrial effluents and untreated sewage.

## Implementation Plan

Modern methods of water quality management are required based on ensuring water safety and verification through water quality testing.

### 7.4 Ensuring Water Safety

1. States should adopt the drinking water safety planning and implementation approach for rural supplies to prevent contamination. In order to address water quality problems, the VWSC must prepare and implement a Water Safety Plan.
2. Where possible, SLSSC and DWSMs should move away from high cost treatment technologies for tackling arsenic and fluoride contamination to rainwater harvesting and development of alternative sources for arsenic and alternative sources/dilution of aquifers through rainwater harvesting for fluoride.
3. For chemically contaminated sources, the first step should be testing, marking, including colour coding, and switching of sources, before exploring other options on the mitigation ladder with higher costs and benefits.
4. Dual water supply may be adopted, as a short term measure, if treating all supplied water or providing minimum quantity of safe water is not feasible in rural habitations facing acute water quality problems. In these habitations 10 lpcd of safe water may be provided which would be sufficient for drinking and cooking purposes and the remaining 60 lpcd may be provided from untreated/unsafe sources for other domestic activities.
5. As an interim step before provision of safe tap water, point of use treatment such as boiling and filtration of water will be promoted through intensive awareness generation campaigns.
6. Setting up of Reverse Osmosis or any other water treatment plants which results in wastage of water or other adverse environmental impacts should be avoided except where there is no other option available.
7. The Jalmani Scheme for implementation of standalone drinking water purification systems in rural schools should be promoted in areas with iron, turbidity and bacteriological contamination.

#### **Why is Water Safety Planning and implementation needed?**

There are many advantages: i) Better management of water quality by preventing contamination before it happens, ii) It is a 'learning by doing' mechanism to achieve improved operational management, iii) It provides an approach to prioritising improvement programmes (physical and operational) based on health outcomes which emphasise customer services, and iv) It provides a concrete means of linking sanitation and hygiene to water supply.

In implementation there are other advantages. By identifying the functions required to support water safety it is possible to articulate activity mapping (roles and responsibilities), and improve needs based training programmes.

## 7.5 Monitoring and surveillance.

Modern methods of *water quality monitoring and surveillance* should be provided in all districts and sub-district level laboratories and adopted for all drinking water sources and systems (water safety to prevent contamination with verification by water quality testing) along with standard operation and maintenance procedures. VWSCs will be trained in preparation and implementation of water safety plans, and protocols introduced for water quality testing based on Field Test Kits and District and Sub-divisional water quality testing laboratories.

## Implementation Plan

### 7.6 Water quality testing

1. The VWSC and DWSM must ensure that regular sampling and analysis takes place using field test kits and district and sub-district testing laboratories. The national protocols for water quality testing should be followed.
2. The five grass roots level workers trained for testing water quality through the use of field test kits should act as ambassadors for achieving household level drinking water security. They may be paid suitable charges for the number of samples collected and sent for lab testing and disseminating test results to the VWSC and the community.
3. The VWSC's responsibilities, with support from the DWSM, include maintenance of the field test kits (replacement of used materials) and meeting the sampling expenses.
4. The VWSC should liaise with PHCs and NRHM workers (ASHA) to monitor incidence of diseases relating to water quality and the results must be shared with the community (Gram Sabha).
5. All districts should have well equipped labs with qualified technicians. Sub-district labs may be set up by the PHED or outsourced to NGOs, educational institutions, etc. The district and sub-district water testing laboratories should have facilities to test for all notified quality parameters.
6. All water quality testing labs at State and district levels, should obtain accreditation from the National Accreditation Board for Laboratories.
7. Modalities for convergence of Food Safety, Health, Pollution Control, Groundwater Labs and water quality testing labs should be worked out and implemented.

### 7.7 National Laboratories:

National laboratories for water quality testing will be identified in NEERI, its regional offices and in other National scientific and research institutions to support and build capacities of the State and district labs.

### 7.8 Treatment, Distribution and Household hygiene.

Highest priority should be given to provision of safe water in arsenic and fluoride affected habitations. Cost effective solutions are needed. Dilution of chemically contaminated sources in case of fluoride and salinity is a cost effective option that should be promoted. Roofwater harvesting, development of traditional village tanks/ponds/wells to make them safe can provide safe water for cooking and drinking. Alternate safe sources are generally preferred in case of arsenic affected areas.

Chemical treatment of water may be taken up in cases of bacteriological and chemical contamination where the other options are not available. In addition to chemical contamination, there should be focus on measuring, reporting and tackling bacteriological contamination in sources, storage, transmission, delivery points and within households during storage and use. Distribution systems should be protected from contamination with untreated sewage in leaking pipes, by regular checks. Contamination in storage and handling at household level should be tackled through awareness campaigns under NRDWP and TSC on simple remedial actions such as boiling, filtering etc

### **Case Studies: Water Quality Management**

#### **Tackling Arsenic contamination**

**In West Bengal**, arsenic contamination of ground water was first detected during the early 1980s in different districts adjoining Bhagirathi/Hooghly rivers. Investigation showed that arsenic beyond permissible limit of 0.05 mg/l existed in the ground water. The arsenic problem was found to be geogenic, i.e., due to the presence of excessive arsenic in the geological formation. Ground water was the main and staple source of drinking water in such areas due to its easy, inexpensive and location specific abstraction. Therefore, the drinking water supply systems in the affected areas received a serious setback owing to arsenic contamination of ground water.

Ground water in 79 Blocks (out of 341 blocks in the state) in the Districts of Malda, Murshidabad, Nadia, North 24 Parganas, South 24 Parganas, Howrah, Hooghly and Bardhaman is at risk of arsenic contamination. In order to tackle the arsenic menace in West Bengal, three types of mitigation measures have been taken up so far:

- **Short-term Measures:** Hand pump fitted tube wells at deeper aquifers; Ring wells
- **Medium-term Measures:** Arsenic treatment unit with existing hand pump fitted tube wells; Arsenic removal plants for existing ground water based piped water supply schemes; Large diameter deeper aquifer tube wells for existing/new piped water supply schemes; New ground water based piped water supply schemes
- **Long-term Measures:** Surface water based water supply schemes

#### **Tackling Fluoride contamination**

**Andhra Pradesh** is among the worst fluoride affected states in the country, with an estimated

1,881 habitations reporting fluoride incidence in addition to other types of contaminations (physical and bacteriological). The incidence and intensity of water pollution is higher among poor households. Provision of safe drinking water in a sustainable manner, therefore, is crucial for improved quality of life in the rural areas, in general, and that of poor households, in particular. During the mid 2000, some NGOs such as Byrraju Foundation, Water Health International, Naandi Foundation, Center for Water and Sanitation (CWS), Smaat Aqua, etc., established water treatment plants in different parts of the state. These NGOs worked in collaboration with technology providers like Water Health International and TATA Projects for developing technologies at one end and with the communities and PRIs for establishing and the running the plants on the other end. Some of the technologies adopted in the state are:

- Roof water harvesting methods promoted by both Government of Andhra Pradesh and some NGOs

- Household deflouridation methods promoted by some NGOs as well as Government of Andhra Pradesh
- Private enterprisers selling water in rural areas particularly in coastal districts and Nalgonda
- Water treatment plants with ultra violet (UV) and reverse osmosis (RO) technology with public private participation
- Micro filter technologies promoted by some of the organizations to the government and other agencies

## Chapter 8 - Sustainable Service Delivery (Operation and Maintenance)

### 8.1 Operation and Maintenance Policy:

States should draw up O&M policy for rural drinking water supply focusing on ensuring sustainable service delivery at the village level and laying out the roles of VWSCs, GPs, PHEDs, operators, outsourcing agencies. The policy should also lay down standard operating procedures for O&M of handpumps and piped water supplies. It should build capacities of GPs and water operators and incentivise GPs/VWSCs to maintain accounts of their income and expenditure on O&M, improve collection of water charges and generate surplus for replacements. States should consider imposing conditions of continued maintenance of a scheme for 3/5 years and building local capacity for taking over the scheme, on the contractor who is entrusted with execution of the scheme.

### 8.2 Implementation Plan - Operation and Maintenance

1. States should introduce standard operating procedures for O&M of handpumps and piped water supplies and GPs/VWSCs should identify and assign key functions to the appropriate person such as the handpump caretaker or operator.
2. Timely transfer of O&M, State plan and Finance Commission funds is necessary to enable GPs to operate and maintain schemes without service breaks. Wherever it is not yet adopted NRDWP(O&M) and other funds necessary for drinking water supply to GPs should be transferred electronically to GP accounts.
3. For handpumps, the GP or VWSC needs to be provided access to spare parts and trained mechanics by the DWSMs for regular preventative maintenance of all handpumps in the GP.
4. For piped water supply systems with community standposts and/or household connections, the DWSM/BRC and VWSC needs to make sure that community based operators receive training to gain the technical and financial skills to do the job.
5. Block or District Panchayats and Joint Scheme Level Committees consisting of heads of VWSCs/GPs benefited by the scheme are responsible for overseeing multi-village schemes.
7. In multi-village schemes or large water grids, bulk supply should be managed/operated by PHEDs or private operators with tariffs set by the State government/PRIs/water resources regulator.
8. Customer consultation and grievance redressal mechanisms should be established such as provision of a toll free number, call centres, mobile SMSs, linking GPs and engineers electronically with Block and District IMIS systems, citizen report cards and community score cards.
9. Initially all bulk water supply and retail water supply to commercial, industrial establishments and private institutions should be installed with volumetric metering. Gradually all household connections should be metered.
10. Water audits, energy audits and measurement of Unaccounted for Water (UfW) and Non Revenue Water (NRW) should be introduced for bulk and distribution piped water supplies.

11. In time, optimisation of large water supply systems through technologies like SCADA should be promoted in all States.
12. Automated pumps should be installed, wherever feasible, in piped water supply schemes to ensure reliable water supply and reduce operator workload.
13. Standard operating procedures for coping with natural disasters, including for drought and floods, will be laid down and disseminated through training and awareness generation programmes.
14. GPs/VWSCs must also prepare and implement service improvement plans for prioritising repairs, replacement and expansion of source and system parts.
15. Zilla Panchayats should have a Water Supply O & M Wing to provide continuous technical support to GPs in managing their water supply schemes.
16. Federation of VWSCs can also take up major maintenance, renovation and modernization of rural water supply schemes with technical and staff support from PHEDs/Corporations/Boards. They can reduce costs by engaging local technicians trained in vocational institutes or industrial training institutes(ITIs) to provide services round the year. This would significantly mitigate deficiencies of technical capacity and manpower availability at block and lower levels.
17. **Water Metering and Unaccounted for Water:** Water metering, both bulk and individual household, will be promoted in all piped water supply schemes to reduce unaccounted for water.
18. **Use of improved technology:** Use of improved technology to increase the efficiency of motor pumps by using star ratings of motor pumps should be strictly enforced in all Government supported programmes of Agriculture, Rural development and Water Resources Ministries. Use of techniques like bulk water metering, SCADA and telemetry should be promoted.

#### **Case Study: Impact of adopting metering**

**Dakshina Kannada, a coastal district in Karnataka bordering Kerala**, is situated on the western coast of India, which spreads from the Western Ghats to the Arabian Sea. The major part of its length lies along the seaboard. The population is about 1.3 million people (2001 census). The district is characterized by scattered habitation, isolated households, hilly terrain and saline water in the coastal belt in the summer months. The district is made of five blocks and 203 Gram Panchayats (GPs) including 368 villages and 2,683 habitations. In 2010, 128 of 203 GPs adopted meters for household connections coupled with volumetric-based tariff and computerized billing and collection in Dakshina Kannada District. This is unique in rural India. In 2010, there were about 43,000 metered connections against less than 4,500 prior to adoption of this practice. This has led to reduction of water losses, improvement of service delivery hours with GPs able to provide 24x7 water in some cases, improved collection of charges and financial sustainability of schemes.

### 8.3 Coping with Climate Change

Various adaptation measures need to be considered to address the risks of climate change. The Box below identifies the kinds of adaptation measures that can be considered.

#### **Adaptation measures and opportunities for rural water supplies**

- Redesigning the engineering codes for pipelines, water treatment, water supply systems, local dams, and irrigations systems.
- Increasing use of rain fed systems to enhance the sustainability of local water supplies.
- Introducing measures to enhance groundwater recharge following all rainfall events.
- Addressing waste water treatment and recycling waste water.
- Providing improved flood forecasting measures based on measure precipitation gauges or weather radar systems, linked to catchment models.
- Helping refine policy at national, state, and local levels to incorporate the above four tasks.
- Supporting educational systems to inform local people and also encourage research to support the above five tasks as well as development of a regional climate model which can be linked to local water use patterns to better estimate impacts of climate change.

*Source: Water and Sanitation Program – South Asia, Climate Risk Screening*

### 8.4 Service Agreements

GPs/VWSCs should explore options to access professional experience and skills for operation and maintenance, including qualified mechanics for handpump preventative maintenance and operators for piped water supplies. (See Section 5.3 on Outsourcing).

#### **Service Agreements**

Whether the water supply system is being operated by community based technical and operational staff, a public utility / department, or a local private entrepreneur, a service agreement is a very useful tool. Service agreements set out the operators' tasks and what they will be paid, and as such can be used to provide guidance and incentives to gather information, plan and implement as effectively and efficiently as possible. If local entrepreneurs are involved then other advantages include management expertise, tariff / financial discipline and access to private capital. In addition, performance indicators provide the basis for monitoring implementation and performance, including demand side outcomes.

*Source: Ministry of Rural Development, Provision of Urban Amenities in Rural Areas*

### 8.5 Incentive Fund

The Incentive fund of 10% of NRDWP allocation at the National level will be used to incentivise specific steps taken by States to devolve functions, funds and functionaries and improve finances of GPs in managing their water supply systems. For this purpose a Management Devolution Index will be prepared and given weightage in allocation of the Incentive fund.

### Management Devolution Index

In the inter-State allocation criteria for allocating National Rural Drinking Water Program (NRDWP) funds the Govt. of India has given a weightage of 10% for “Rural population managing rural drinking water supply schemes” to encourage State governments to devolve management of rural water supply schemes to PRIs.

At present, some states have transferred the full range of functions to GPs, others have transferred only a few functions. Moreover some States have transferred only handpumps management to GPs, whereas some have transferred single village piped water supply schemes (pwss) and some have even transferred multi-village pwss. Fund flows to the Panchayats remains a problem in many States. Functionaries support to the Panchayats is also a weak area. The net result is that due to lack of substantive devolution the Panchayats are handicapped in managing the schemes leading to poor O&M of the schemes, non-functionality and poor service delivery.

In order to incentivize States to devolve greater functions, funds and functionaries in respect of rural water supply schemes it is proposed to define a Management Devolution Index based on selected indicators that measure the depth of management devolution for use in allocation of incentive grants. Some of the major indicators proposed for measuring the Management Devolution Index are:

- Whether the state Acts and/ or executive orders clearly define the transfer of responsibility for infrastructure creation and/or for operation and maintenance to PRIs for hand pumps, single village and/or multi-village piped water schemes
- Whether the VWSC is a Standing/Sub-Committees of GPs under the State Act/Rules
- Proportion of NRDWP (Coverage, Quality and/or O&M) funds (Central + State share), transferred to PRI/DWSM subordinate to ZP accounts
- Whether unit charges of electricity for pumping in pwss by PRIs are **equal to or lesser than the** lowest slab of unit charge for domestic consumers
- Percentage of water charges demand collected by PRIs
- Proportion of filled up positions of RWS engineers at block and sub-block level
- Proportion of VWSC members trained in RWS functions for atleast two days
- Proportion of filled up positions of DWSM Consultants and BRC Coordinators

## Chapter 9 - Decentralised Governance

The RWS sector should promote the overall programme for decentralization set forth in the Constitution and the NRDWP Guidelines and strengthen the implementation approaches adopted by the government.<sup>9</sup> Diversity of conditions in the States will be recognized. The major issues related to strengthening sector decentralized governance are: clear policies, appropriate institutional arrangements, financing mechanisms and appropriate oversight mechanisms, including regulation.

### 9.1 Policy environment:

Drinking water is a state subject and most policies have to be defined by the states in line with the Constitution and sector policies. Policies set out the broad objectives for the sector to ensure drinking water security. The key issues include institutional roles and responsibilities (activity mapping), service standards, cost recovery/subsidies and access for SC/ST and poor habitations and households. As of 2010, very few states have a comprehensive Water policy and O&M policy. All states will be encouraged to develop appropriate policies by 2012.

### 9.2 Incentive Fund

The Department will incentivize States to devolve functions, funds and functionaries to gram, block and district panchayats to plan, implement and manage their drinking water schemes with NRDWP Incentive funds using a Management Devolution Index.

### 9.3 Appropriate Institutional Arrangements:

This again varies from state to state based on the prevailing institutional arrangements and strengths. As of date in most States the Public Health Engineering Departments are providing the leadership to the sector management, perform functions related to policy, investment planning, execution, measuring outcomes and in some cases O&M of schemes. This may result in conflict of interest. In some States Corporations/Boards/Authorities have been set up to address this issue and to bring in greater accountability.

### 9.4 Reforms in Institutional set up of Public Health Engineering Departments

States could consider restructuring Departments into Boards/Authorities or Corporations in order to bring in greater transparency, accountability and improved management practices at the State level. This would also enable them to raise finances from different sources. However, after the 73<sup>rd</sup> amendment to the Constitution there has been a growing trend to devolve the drinking water responsibilities to PRI institutions. This devolution is at various stages in different States. The experience from

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<sup>9</sup> For example, the Planning Commission 'Manual for Integrated District Planning' (2008), and the Ministry of Panchayati Raj guidelines for, 'Planning at the Grassroots Level, An Action Programme for the Eleventh Five Year Plan' (2006).

some of the States has led to an understanding of the issues involved in unbundling the sector, in order to arrive at appropriate institutional arrangements.

## Implementation Plan

### 9.5 Institutional roles and responsibilities

Institutional roles and responsibilities laid down in the NRDWP Guidelines should be followed:

1. **Gram Sabha:** The community talks about what it wants in the Gram Sabha and approves decisions about water services based on techno-economic criteria.
2. **The GP** is responsible for ensuring that every person has access to an adequate supply of safe water.
3. **Water Operators:** Contracts set out caretakers/operators tasks and what they will be paid.
4. The **VWSC** should be a standing committee of the **GP** as per the Panchayat Raj Act/Rules and responsible for planning, implementation, operation, maintenance and management of the water supply system.
5. GPs/VWSCs implement plans to agreed budgets and timeframes, and provide annual reports on progress and performance to the Gram Sabha and the Block Panchayat.
6. The **Block Resource Centre** provides motivation, training, support etc. to the GP/VWSC.
7. **District support:** ZPs and DWSMs help organize financing, training and technical support, review plans and monitor implementation and performance.
8. In Union Territories and smaller States the full complement of BRCs and DWSMs and their staffing would not be required nor could it be funded from the Support funds. The UTs and smaller States can appropriately plan the staffing, remuneration and setting up of BRCs and DWSMs depending on the availability of funds and requirements.
9. All States should have a dedicated line Department/ Board/ Corporation for rural water supply with dedicated Rural Water Supply engineers and other staff at district, block and section levels located within the PRIs or to support them.
10. **State support:** SWSMs provide policy guidance; SLSSCs approve schemes and Support activities to be taken up and review implementation progress and operational performance; WSSOs deal with software aspects of RWS; State Technical Agencies (STAs) support PHEDs through technical expertise.
11. The SWSM and DWSM are responsible for getting the GPs and VWSCs to participate in planning for improved drinking water security.
12. **Awareness creation and IEC:** Awareness of all stakeholders on various aspects of ensuring drinking water security is very vital to achieving the overall sector objective. This involves not just communication of messages but also adequate behavior change. States should design and implement appropriate behavior change communications and monitor the progress on the change achieved periodically.

13. Linkages with R&D institutions, national and State level scientific institutions and educational institutions at all levels will be strengthened through R&D projects, tie-ups for water quality monitoring, training, technical support, monitoring, evaluation, impact assessment studies etc.
14. **Role of NGOs and CSOs** will continue in community mobilization, information dissemination, institution building, planning and technical support and monitoring. In addition they may also be involved in planning, designing and piloting of model innovative schemes by the States.
15. **Department of Drinking Water and Sanitation , Ministry of Rural Development** would be in charge of policy making at the national level, revising policy and guidelines from time to time, financial and technical support to the States, facilitating States to avail external assistance, macro-monitoring of sector performance, programme monitoring, advising and coordinating with other Ministries/Departments and their subordinate offices, institutions, autonomous bodies on matters relating to drinking water supply in rural areas and for coordination with urban water supply where required and other functions as laid down in the rules and by the competent authorities.

**Case Study: Role of NGO in Decentralised Water Supply on 24x7 basis with Equity Gram Vikas, Orissa.**

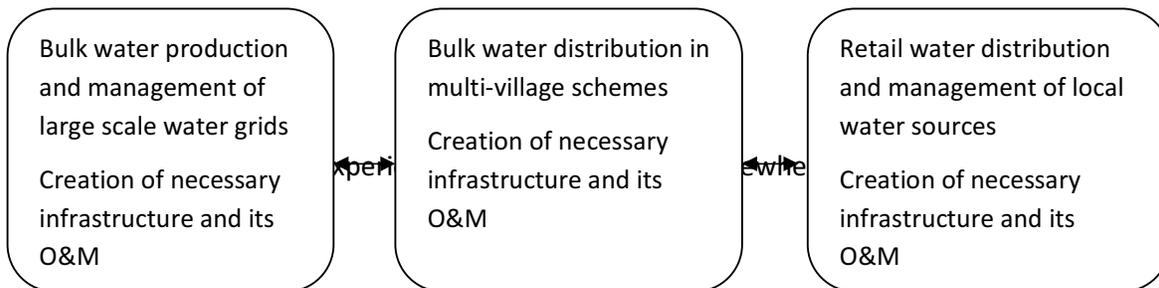
Unique to Gram Vikas is the adoption of the social inclusion approach wherein all families of a habitation, irrespective of their economic, social and caste considerations, are provided the same infrastructure and service. Under the Gram Vikas scheme, every family gets access to good quality toilets and bathrooms, coupled with three taps per household and 24x7 piped water supply. Gram Vikas' scheme integrates the concepts of demand-led supply through decision making processes and cost sharing. In addition, this scheme differs from other approaches by breaking with the formula that equates poor people with low quality services and products. The quality, convenience and privacy of the design have really changed the daily lives of these poor rural communities and led to widespread behaviour change, inducing communities with no history of fixed point defecation to adopt new habits. Gram Vikas' Movement and Action Network for the Transformation of Rural Areas (MANTRA), as on March 31, 2010, has served about 2,50,000 people in 787 villages in 22 districts of Orissa.

#### **9.6 Unbundling bulk water production, bulk water supply and village distribution:**

The Strategic Plan emphasises conjunctive use of water and rejuvenation of traditional sources of water. In water stressed areas where water has to be transported from long distances service provision can be unbundled in terms of bulk water production, bulk water distribution, and retail water distribution including management of local water sources. Unbundling and corporatization of sector functions of production, bulk transfer and distribution

have been done in some States. Other States should study and appropriately develop their own institutions.

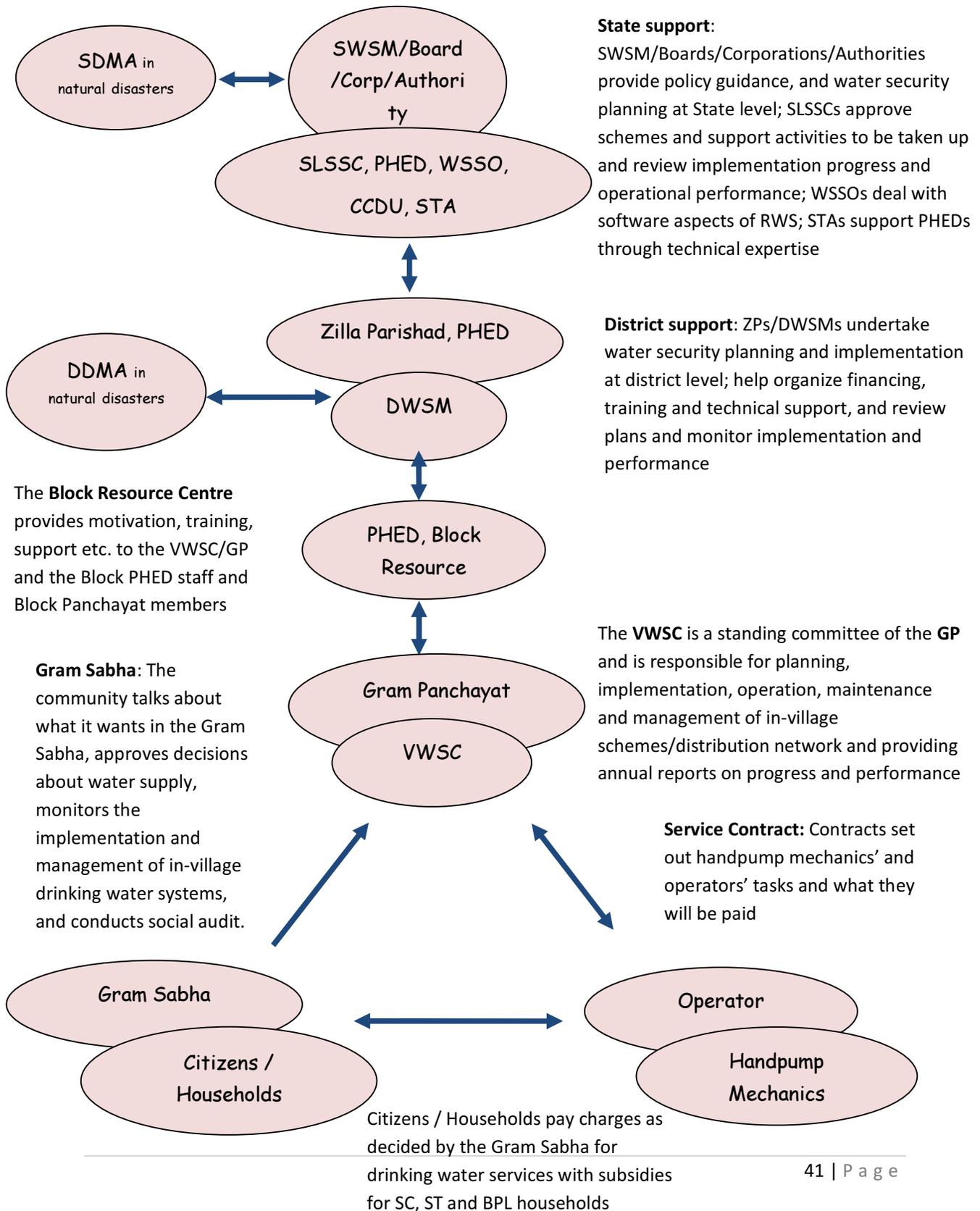
It should be recognized that the three functions need different levels of capability in management and operations and can be assigned to the appropriate institution or level of government.



1. **Bulk water production.** Priority must be given to local sources. However where local sources may not be sufficient, bulk water may need to be transported. Highly specialized agencies are required for design and maintenance of bulk water production. This involves skills related to engineering, construction management, hydro-geology, financing, etc. There would be a need to serve different stakeholders such as drinking water, irrigation and industry, and deal with different ministries / departments.
2. **Bulk water distribution.** Many states have taken up multi-village schemes with piped bulk water supply to a group of villages and in some cases towns or local industries. The end customers are the GPs and/ or ULBs who are responsible for distribution. However GPs would require technical support on a continuous basis for taking up major repairs, replacement, modernization, renovation etc. A model of VWSCs or GPs setting up a federation or a O&M society run by representatives of VWSCs, GPs, PHED etc. at block or district level would enable such a body to provide reliable, continuous and sustainable O&M services and capacity building of societies at lower cost.
3. **In-village water management.** This is the responsibility of GPs/VWSCs with appropriate institutional and technical support.

Such an approach will provide needed clarity on roles and responsibilities for various institutions within the state. The NRDWP guidelines articulated well the roles and responsibilities of various actors which are summarized in the chart below.

## Institutional Structure in States suggested under NRDWP



## Chapter 10- Convergence of different development programmes.

### 10.1 District or Block Water Security Planning

Water security planning is required to optimise the use of water resources within the constraints of financial and human resources to meet the basic needs, manage convergence of different development programmes, and take decisions about broader water resources management and investments. Convergence takes place at all levels but it is the DWSMs responsibility to coordinate matters relating to water and sanitation among district representatives of Health, Education, Forests, Watershed Development, Agriculture, Rural Development, Urban Development, Women and Child Development etc., and National programmes/grants such as SSA, NRHM, ICDS, IWMP, BRGF, MNREGS, AIBP, JNNURM, 13<sup>th</sup> FC etc. They should follow the Guidelines for Effective functioning of SWSMs and DWSMs issued by DDWS.

### Implementation Plan

#### 10.2 Convergence of different development programmes

1. Regular meetings of the National Drinking Water and Sanitation Council should be held for better coordination and convergence at the national level.
2. SWSMs are responsible for convergence of policy and programmes for water supply and sanitation with other related Departments and programmes at the State level.
3. DWSMs are responsible for coordination of activities relating to water and sanitation among district officers of Health, Education, Forests, Agriculture, Rural Development, etc., and National programmes/grants such as TSC, SSA, NRHM, ICDS, BRGF, MNREGS, FC .
4. The SWSMs and DWSMs should meet regularly. The issues for discussion listed in the SWSM and DWSM Guidelines for effective functioning of SWSMs and DWSMs indicate many activities and areas of convergent action. These should be discussed, followed and built upon.
5. Convergence with Health and Women and Child Development Departments to spread the message of safe water use, safe sanitation and hygiene has to be ensured by SWSMs and DWSMs.
6. A concurrent monitoring system for water borne diseases and health should be set up for clinical assessment for arsenical dermatitis and fluorosis and regular monitoring done for other water borne diseases especially diarrhea through the community health monitoring approach.
7. Capacity building should be provided to Medical Officers on detection of arsenic and fluoride poisoning cases and other water borne diseases and their management in the affected GPs/blocks.

## Chapter 11 - Oversight mechanism (including Regulation):

### 11.1 Integrated Management Information System

The success of achieving the targets listed under this Plan can be measured only against the correct baseline. The IMIS will be strengthened and regularly updated to make it more reliable as an essential input to policy and planning.

### 11.2 Oversight

With respect to the rural drinking water sector, there is a need for States to establish processes for setting service standards and tariffs, customer grievance redressal, water quality monitoring, ground water abstraction and environmental pollution. There is also a need to put in place the necessary procedures for effective monitoring, audit and reporting on preparation, implementation and performance of village water supplies which can support M&E systems which focus on demand side outcomes. It might not be possible for one organization to play this role and hence can be played a set of organizations based on their expertise and location advantage.

The tiered approach to oversight can be summarized as:

- *Gram sabha*: At the village level, monitoring and approving the activities carried out by the GP/ VWSCs. This can also include local regulation on water resources use and conservation. Water budgeting, Social audits etc can be appropriate tools at this level.
- *Zilla Parishad/ DWSM*: At district level monitoring the activities and services provided by various sector agencies (GPs, PHED etc) and ensuring that they are adhering to the sector policies and rules. The ZPs should also establish appropriate grievance redressal systems to capture citizen's voices. The role of the district can be seen as planning coordination.
- *Various State agencies*: This can be the existing state level agencies like the : SWSM for over all sector coordination, State Pollution Control Boards for water quality issues, especially industrial and urban effluents, sector regulators like: Water Resources Regulatory Authority (WRRRA) for ensuring water resources allocations and its use<sup>10</sup>.

### 11.3 Regulation of water resource allocation, abstraction and quality

The Central Ground Water Authority should notify over-exploited blocks to regulate further abstraction. The Water Quality Assessment Authority should regulate quality standards and testing. States need to introduce legislation for water resources regulation as a priority to address concerns regarding distribution of resources for

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<sup>10</sup> Various states governments are in different stages of setting up state level water resources regulatory authorities. The Maharashtra Water Resources Authority (MWRRRA) was the first state level regulator to be established and various states governments are in different stages of setting up such state level water resources regulatory authorities. One of the roles of the regulator is to ensure allocation of water resources as per state decided entitlements and monitor its use.

different categories of users, improving water use efficiency, tackling impacts of climate change, priorities during scarcity and bulk water tariffs.<sup>11</sup> .

#### 11.4 Foundation for regulation

It may not be possible for a single State level *regulator* to be able to reach out to many numbers of localised water supply services. The NRDWP advocates a number of steps to build the foundation for regulation: District Water and Sanitation Missions have the responsibility of ‘coordination’ to check that village plans meet policy objectives and are what communities want; assess technical, financial and operational viability; facilitate financing, and monitor progress and performance. At the local level, village social audits involving the Gram Sabha and mechanisms of customer grievance redressal need to be established.

##### **District planning coordination**

The importance of district planning coordination for rural water supply is that it provides an institutionalized means of scaling up and capacitating village planning, as well as coordinating planning within the district vertically (from villages to blocks to the district), horizontally (at least between water, environmental sanitation and health, and source conservation and protection) and spatially (between villages and towns, where common water resources are to be utilised). A planning coordinator’s job includes reviewing plans in terms of service levels vis a vis costs, providing advice on tariffs and subsidies, and monitoring implementation and performance.

*Source: Planning Commission, Guidelines for Integrated District Planning*

#### 11.5 Regulation

Transparency of information is a critical first step towards effective regulation. States should provide access to information through online reporting mechanisms with information placed in the public domain to bring in transparency and informed decision making<sup>12</sup>.

States are required to establish a regulatory body as a condition of the 13<sup>th</sup> Finance Commission. However, many interim steps can be taken to establish sound regulatory functions.

#### **11.6 Water resources regulation<sup>13</sup>**

States should ensure mainstreaming of drinking water sector concerns like primacy to drinking water in overall water resource allocations, service delivery and maintenance of water quality in water regulatory bodies set up by them.

##### **Water resources regulation should:**

1. Put in place systems for measuring availability of water through monitoring groundwater levels and rainfall in every village and GPs.

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<sup>12</sup> A good example is the Madhya Pradesh State Planning Commission web portal for integrated district planning carried out in five pilot districts under the Planning Commission - UNDP Joint Programme on Convergence.

<sup>13</sup> Adopted from Key Provisions of the Maharashtra Water Resources Act of 2005, based on MWRRA (2005).

2. Calculate existing usage of water by various categories of users.
3. Determine the equitable allocation and distribution of water within each category of use (irrigation water supply, rural water supply, municipal water supply or industrial water supply).
4. Determine the priority of equitable distribution of water available, and adjustment of allocations during droughts.
5. Establish a water tariff system for bulk supply, and fix the criteria for water charges.
6. Keep in mind inter-state water resources apportionment on river systems.
7. Improve water use efficiency over existing levels.

**11.7 Economic regulation** (setting, monitoring and enforcing tariffs and service standards for water service providers)

1. States must establish O&M policy on service standards and user charges with appropriate subsidies and protecting the supply of basic needs without any financial constraints.
2. The GP and VWSC should support a process of social audit by placing key issues for discussion and decisions in the Gram Sabha, including selection of sources and systems, community contributions, user fee charges and connection fees, and subsidies/concessions provided to ST, SC and BPL households.
3. DDWS, SWSM, DWSMs, VWSCs and operators should have mechanisms in place for client/consumer grievance redressal.

**11.8 Value for money**

1. E-procurement should be introduced for rural water supply schemes in all States.
2. States and districts should adopt computerised inventory management in all offices.
3. Third party or Departmental Quality Control Laboratories for testing materials used in RWSS should be set up at State and/or regional levels by all States and strengthened.
4. Engineers will be trained in efficient design of new schemes and in rehabilitation and restoration of old schemes to ensure value for investments.

**11.9 Environmental regulation** (regulating water abstractions and discharges back to the environment so as to manage resources in a sustainable manner)

1. States should enact and effectively enforce water resource legislation to regulate abstraction of ground and surface water.
2. GPs should be empowered to address the issue of controlling irrigation and industrial demand within their boundaries to secure their own drinking water supply.
3. Larger schemes and works such as storage tanks require attention to environmental and social impacts.

**11.10 Public health (water quality) regulation** (setting standards and monitoring drinking water quality)

1. The DDWS and States should notify and enforce drinking water quality standards in a phased manner in line with IS 10500 and NRDWP guidelines.

2. A Uniform Protocol for Drinking Water Quality Monitoring should be developed and disseminated for guidance to all States for following in all labs.
3. States should obtain assistance of agencies like CPCB, SPCBs, CGWB, State Ground Water Boards/Departments, NIH, scientific and educational institutions with established water quality testing facilities for training and technical assistance.
4. Impact assessment studies of water quality on health and environment should be done regularly.

#### 11.11 Monitoring, audit and reporting

1. In monitoring coverage, focus should move from achieving habitation level coverage towards household level drinking water coverage. Habitations with uncovered households cannot be considered fully covered.
2. IMIS with GIS mapping will be improved for transparency, effective monitoring, and reporting on preparation, implementation and performance of drinking water schemes.
3. Cross checking and independent verification of IMIS data including through reputed NGOs, academic institutions etc. would be done to improve reliability of the database.
4. Work wise monitoring from estimate to payment will be integrated in the IMIS to link the physical and financial reporting systems.
5. All drinking water sources, storage structures and delivery systems, will be mapped using GPS on GIS and their date of installation should be added to the GIS database.
6. **Social audits** should be mandated by States. The existing Mahatma Gandhi National Rural Employment Scheme (MNREGS) model can be replicated for rural water. Detailed guidance will be provided by DDWS on conducting social audits. Training programmes will be conducted for this purpose.
7. Exclusion of habitations with concentrations of Scheduled Caste, Scheduled Tribe, minorities, and , remote habitations should be prevented by use of IMIS and GIS maps.,
8. Overtime State WSSOs and DWSMs should establish process and metric benchmarking (see Box below).
9. Conduct annual / biennial independent verification and monitoring survey and beneficiary assessments to verify coverage, service levels, satisfaction etc.

There are two forms of “benchmarking” performance, metric and process, which WSSOs/DWSMs should take up and establish over time.

- Process benchmarking involves identifying and learning from ‘best in class’, i.e., GPs/VWSCs can learn from other GPs/VWSCs that are doing well. The approach is to find out which GP/VWSC is currently the best at some aspect of planning or operations. For that particular aspect, the other GPs/VWSCs can then learn how to perform at a level comparable with the best. If this learning process can be established not as a competition, but as experience sharing, there can be great enthusiasm to take part in the workshops and to work together to the benefit of all. This can be a part of existing training/refresher training programmes.
- Metric benchmarking aims to establish league tables of performance to stimulate GPs/VWSCs to improve performance. It is important to start in a simple way with a few key performance measures, obtain sound baseline data, and initially concentrate on looking at performance trends for each GP/VWSC. Each GP/VWSC should be aiming to improve on its own performance year by year. This can be a part of the existing annual reporting process, where year by year operational performance can be compared.

States can begin by identifying the critical aspects for process benchmarking. Workshops can be held to develop the approach for learning from best in class in a State. At the same time a few critical parameters could be chosen for making a start on metric benchmarking, for which simple league tables can be established and linked to national or state incentive reward schemes. Training of the benchmarking facilitators (DWSMs and others) is critical for success.

## Chapter 12- Building Professional Capacity

### 12.1 Training

DDWS and States should develop appropriate job specifications and training programmes based on Training Needs Assessment, new roles and responsibilities to capacitate the new approach to rural drinking water. Key Resource Centres, NIRD, SIRDs and other training institutions have a key role in developing appropriate modules and materials and delivering a combination of class room and field based training programmes. Village Water Security planning and implementation lends itself to a process of learning by doing, which should be the basic principle for such training.

#### **Key Resource Centres:**

People and organizations working in the drinking water and sanitation sector need to be sensitized to the change in their role and responsibilities to cope with various critical issues facing the sector. Knowledge, skills and attitudes need to be enhanced through continuous professional development and capacity building by sector specialists through appropriate organizations.

Towards this end, the Department of Drinking Water & Sanitation has identified about 2

5 National Key Resource Centres, institutions of repute having experience in imparting training and capacity building of different stakeholders in the water and sanitation sector. The National KRCs will be engaged in more than one State in capacity building, reorientation of different stakeholders through IEC, disseminating knowledge and information, documenting best practices, etc. targeting various stakeholders like PHED engineers , SWSM, DWSM members and staff, Master Trainers of VWSCs, PRIs, NGOs and SHGs et al.

### **12.2 Technical support.**

SWSMs, DWSMs, GPs and VWSCs need technical support to help them plan and implement and maintain village water security systems. This can be facilitated by Block Resource Centres, PHED engineers, DWSM, Key Resource Centres, educational institutions, scientific and research institutions and NGOs.

### **12.3 Outsourcing.**

GPs should be guided to explore options to access professional experience and skills for operation and maintenance. States should support the GPs with appropriate knowledge and tools to prepare, tender and manage service agreements with community based, public or private handpump mechanics, contractors, piped water supply operators and other service providers. Care should be taken while drawing up such service agreements that the basic requirements of poor households to minimum service levels are not violated under any circumstances.

## **Service Agreements**

Whether the water supply system is being operated by community based technical and operational staff, a public utility / department, or a local private entrepreneur, a service agreement is a very useful tool. Service agreements set out the operators' tasks and what they will be paid, and as such can be used to provide guidance and incentives to gather information, plan and implement as effectively and efficiently as possible. If local entrepreneurs are involved then other advantages include management expertise, tariff / financial discipline and access to private capital. In addition, performance indicators provide the basis for monitoring implementation and performance, including demand side outcomes.

*Source: Ministry of Rural Development, Provision of Urban Amenities in Rural Areas*

## **Implementation Plan –**

### **Build Professional Capacity**

#### **12.4 Training**

1. Training should be based on Training Needs Assessment on all identified issues and specifically targeted to new institutional roles and responsibilities to support village, district and State water security planning and implementation
2. States should identify State Key Resource Centres at State and regional/district levels to provide continuous training and resource support to districts, blocks and GPs/VWSCs in drinking water supply service delivery.
3. National Key Resource Centres, State KRCs, SIRDs and other training institutions should establish training modules and programmes on all issues related to drinking water supply including for village and district water security planning and implementation, sustainability, promoting community involvement for operators, pump men, lab technicians, engineers, VWSC and PRI representatives, WSSO, BRC and DWSM staff.
4. Polytechnics and industrial training institutes and vocational education institutions should offer courses to develop practical skills for rural water supply.
5. WSSOs (CCDUs) should operate a Help Desk and Outreach Training Programme.
6. Pilot demonstrations at GP or Block level to provide an opportunity for 'learning by doing' should complement class room sessions.
7. Technology parks can be established to showcase cost effective technologies.<sup>14</sup>
8. State workshops should be held with participation of practitioners to share case studies of good practice.
9. Exposure visits for key stakeholders are the best way to facilitate peer to peer learning from cases of good practice.
10. Written documentation and short films on success stories should be used to help disseminate lessons learned.

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<sup>14</sup> Such as the rural technology park and mela at NIRD, Hyderabad.

11. PHED engineers should have the opportunity to learn new skills so that they are better able to offer technical support to local governments and communities. Staff (institutions) should be results orientated, people focused, effective and efficient in resource utilisation, and able to deal with unknowns.
12. **Change management** training programmes will be imparted in all States to re-orient roles of engineers towards greater participatory planning and implementation and provide better value for money.

### **Case Study : Communications at the Core of Reform**

People working in rural development agencies realize the importance and value of communications. Yet very often, their definition of communication is out of date; they think in terms of extension-type activities, such as advice disseminated with no feedback mechanism, or the production of mass media, such as leaflets, posters or radio programs commonly called IEC which does not measure the impact of the products and what messages they convey.

Strategic communication must ensure that development policies and goals are understood and shared by all stakeholders so that there is ownership and commitment to action. With new age media – TV, mobile phones, satellite, internet – reaching the deepest corners of our country, there is an opportunity to disseminate messages more effectively. In addition, evidence shows that face to face contact through grass roots functionaries and performance arts can be most effective in reinforcing these messages and give participants a chance to seek clarifications. Simple, consistent messages are needed that clearly articulate major issues, explain individual, community and institutional responsibilities, provide information for decision makers to take action, and emphasize the role of women and other marginalized groups, as well as providing feedback mechanisms.

In terms of the critical issues for drinking water such as source sustainability, water quality management and better operation and maintenance, it is critical that strong grass roots demand is generated. While individuals and communities may see Panchayat Raj Institutions and PHEDs as responsible for providing water services, it is critical that more participatory processes are adopted to involve all sections of the community in making decisions.

### **12.5 Technical support**

1. The Public Health Engineering/Rural Water Supply Departments/Boards/Corporations are the key to successful implementation of the Strategy. The expertise and experience available with them should not be lost or duplicated while outsourcing any activity.
2. PHED engineers are a key resource for engineering designs, cost estimates and troubleshooting technical problems. Therefore, professional capacity building of water supply engineers in knowledge, skills and attitudes should be taken up through STAs, National and State KRCs, regular training programmes in reputed institutions both within the country and abroad, and through online and distance education courses.

3. Posts of field level engineers have to be filled regularly. States should plan recruitments by manpower planning and ensure that not more than 5% vacancies exist in the district, block and sub-block level cutting-edge technical posts.
4. WSSOs, DWSSMs and BRCs should be set up and staffed depending on the availability of funds and requirement in each State/UT.
5. Key Resource Centres at State and district level can be identified and tasked with providing technical and managerial support.
6. Services of qualified hydrogeologists should be made available to support PHED, DWSSM, VWSSCs in all districts.
7. Groundwater survey and development, hydrology, geology, geomorphology should be integrated in the RWSS Departments of States on the **GSDA model** of Maharashtra.
8. Water Operators Partnership among water operators working in irrigation, industry and drinking water sectors, will be promoted with the objective of recognising, sharing and learning from good practices and providing mutual support.

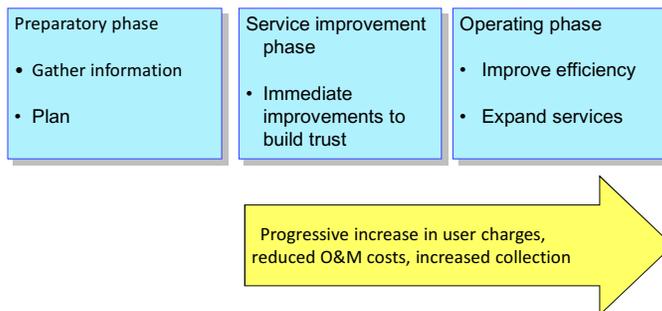
#### 12.6 Outsourcing and Public Private Partnerships

1. "The Rural Drinking Water Supply sector requires enormous investments to provide assured and safe piped water supply at household level in all rural households of the country, to meet the rising expectations of rural population and to improve their standard of living. The sector also requires to resolve tariff and collection issues, improve operational and cost efficiency and instill financial discipline and managerial efficiency for satisfactory operation and maintenance of existing systems as well as new systems. In this context Public Private Partnerships allow States to retain regulatory and supervisory responsibilities while accessing skilled operators and service providers. Some of the models of PPP that may be considered by States are **Service contracts, Management contracts, Lease contracts**-mainly for existing systems, **BOT (build, operate and transfer) contracts**- mainly for new systems. PPP Agreements (whether with community based or private operators) in all PPP models, should be drawn up with transparent, objective, non-discretionary provisions to bring transparency to service deliverables and to clearly lay out the roles, responsibilities, performance indicators, customer accountability with incentives and disincentives for the operator.
2. Aspects like equity in access of SC, ST and poor households to drinking water supply, medium-term and long term recurring liabilities likely to devolve on the Government or the community due to PPP agreement, sensitive nature of water being a finite basic necessity with many competing demands, management of rejects of water treatment plants etc should be kept in mind while deciding on the need for and nature of PPP agreements.
3. States should develop and disseminate appropriate knowledge and tools to prepare, tender and manage service/PPP agreements with community based or private handpump mechanics, contractors, piped water supply implementing agencies/operators and other service providers. While formulating State specific PPP

policy the PURA scheme Guidelines and documents prepared under it may be considered for guidance”.

4. Service Agreements (whether with community based, public or private operators) should be in place since they bring transparency to service deliverables and how the operator will be paid.
5. Service agreements also help to orientate inexperienced operators in gathering information, planning, routine operations, efficiency improvements and expansion.

## Operator contracts



## **Chapter 13 : Learning Agenda, Resources Required and Key Performance Indicators**

### **13.1 Learning agenda for the Department of Drinking Water and Sanitation**

Training and technical support has been presented in Part Four. The implementation of a learning agenda is built upon the following strategies, which are led by DDWS:

1. Laying down national policy framework in the NRDWP Guidelines
2. Issuing detailed guidance on individual strategies and implementation plan options where necessary e.g. on regulatory model, convergence of schemes etc. to help States.
3. Guiding States to prepare State specific Strategic Plans within one year to achieve the goals set out.
4. Bringing out Handbooks/ Manuals for guidance of PHEDs and PRIs.
5. A national pilot in selected blocks in different States to demonstrate participatory integrated water resource management, drinking water security and source sustainability planning and implementation.
6. Development and provision of training modules and materials by National Key Resource Centres and NIRD.
7. Sharing field experiences from good practices/ case studies in India and internationally in surface water management, ground water management, water safety planning, etc.
8. Setting up and strengthening the National Resource Centre to provide technical and knowledge support to DDWS.
9. Arranging trainings and exposure visits within and outside the country for senior officers of RWSS in States and staff of DDWS.
10. Promoting strengthening of curriculum on rural drinking water supply, water quality and sanitation in curricula of school, engineering, technical and vocational educational institutions.

### **13.2 Resources required by DDWS**

Manpower resources – The National Resource Centre consultants will be utilised to strengthen the Departments policy making and guidance roles. The NRC will be strengthened to become an autonomous institution on the lines of National Rural Roads Development Authority.

All Technical Advisors posts in the DDWS will be filled up and suitable cadre management adopted to attract good talent.

## Chapter 14 – Financing

### 14.1 Need for clear financing policy

It is desirable to align financing of service augmentation and operation and maintenance of schemes with reforms like recovery of user charges, maintenance of accounts at GP level, reduction of water wastage, protection of drinking water sources etc. so that investments are linked to service outcomes, i.e., they are performance based. Financing should not be a one-time grant. Water security planning requires annual investments in new schemes and works, operation and maintenance, replacement and expansion as well as support activities like water quality testing and IEC. States should establish clear policies for Operation and Maintenance including service standards and cost recovery, and may like to ensure that their policy on cost recovery provides SC, ST and BPL households with appropriate subsidies in user fees. In addition, it is critical for VWSCs to establish a corpus fund from discretionary grants and user fees to meet future costs of replacement. The table below summarises the key needs and available funds under NRDWP and other Government schemes as of 2010.

### 14.2 Sources of funds

Rural water supply schemes are predominantly financed from public funds. State Governments can tap private sources of financing through PPP models like in the PURA scheme to supplement public funding with suitable safeguards to ensure universal supply of a minimum quantity of drinking water to all families without social or financial discrimination.

Key needs	Available funds (as of 2010)
New schemes, augmentation, expansion of existing schemes.	NRDWP – coverage State Plan, BRGF, DoNER funds and Externally Aided projects, MoMA, Others
Source sustainability (rainwater harvesting, groundwater recharge, development of traditional structures)	NRDWP - sustainability MNREGS, Watershed Development Programmes, Others
Operation and Maintenance (including minor repairs)	NRDWP – O&M Central and State Finance Commission grants User charges, Gram Panchayat revenues, State Plan and non-Plan grants/subsidies, Others
Replacements	NRDWP – Coverage (and later under a Renovation and Modernisation component to be introduced)

	VWSCs corpus fund which can include funds from BRGF, Central and State Finance Commission grants, and user charges, Others
Potable water in water quality affected areas (treatment technologies, new sources - to address arsenic, fluorides, iron, nitrates, salinity, etc.)	NRDWP - water quality State Plan, BRGF, DoNER funds and Externally Aided Projects, MoMA, Others
Water quality monitoring and surveillance	NRDWP – support Others
Training and IEC	NRDWP – support BRGF, TSC, Others
Water Supply in Natural Disasters	NRDWP – natural calamities NDRF, SDRF

### 14.3 Renovation and Modernization

The allocation for O&M under NRDWP should be reduced from 10% in 2010 to 5% in 2017 and phased out in 2022 and the reduction should be diverted for Renovation and Modernization(R&M) costs increasing from 5% in 2017 to 10% in 2022.

## Implementation Plans

### 14.4 Financing of Drinking Water Security

1. Funds would be allocated according to NRDWP Guidelines, including allocations for Sustainability, Water Quality and O&M.
2. GPs/VWSCs should have an annual workplan with activities, budget and timeframe/milestones.
3. Funds should be devolved to GPs from DWSMs to implement their village water security plans/annual workplan, with DWSMs reviewing operational and financial viability of plans and monitoring whether planned activities are on schedule and to budget.
4. States should ensure clarity on O&M policy, including subsidies and tariffs, so that VWSCs and operators can estimate their revenues and plan accordingly.
5. Incentive schemes should be introduced to reward good performance by GPs/VWSCs and BRCs.
6. An incentive award 'Sajal Gram Puraskar' will be instituted to encourage Panchayats that provide safe and adequate drinking water supply to all households on a convenient and sustainable basis.

7. Various indicators will be used for measuring devolution of functions, funds and functionaries (3Fs) by States to PRIs. A Management Devolution Index based on these indicators will be used to allocate the 10% incentive under NRDWP for States where PRIs manage RWSS. This will encourage States to devolve the 3Fs to the PRIs.

## 14.5 Financial Resources

### 14.5 .1 Assumptions for financial resource estimation

The Financial resources required to achieve the goals set out in this Plan according to NRDWP funding components for the period 2011-2022 have been worked out on the following basis:

- 2009-10 per capita cost of PWSS of each State is calculated from IMIS with minimum cap of Rs. 2500 per capita plus Rs. 250 for household metering
- Cost escalation and population increase were not considered in this calculation.
- The amount required to raise the coverage level from 40lpcd to 70lpcd is assumed as 40% of present per capita cost.
- Community contribution of 6% of total cost; present NRDWP sharing pattern between Centre and States
- Apart from 10% for O&M(R&M), 10% Sustainability and 10% for Support and Administrative including Calamities has been provided for

### 14.5.2 Financial resources requirement

Based on the above the amount required to increase service level of population covered with PWS at present from 40lpcd to 70lpcd for the present population is estimated at Rs.37,471 cr. The amount required to covered remaining population with PWS @70lpcd to reach 90% coverage is estimated at Rs. 3,03,457 cr.

### 14.5.3 State-wise requirement of funds

The table below shows the State-wise requirement of funds. The total funds required at present per capita cost and population to cover 90% of the rural population with piped water supply schemes @70lpcd is estimated at Rs. 3,40,928 cr. Assuming the NRDWP sharing pattern the Central Share would be Rs.2,01,898 cr., the State Share Rs 1,18,575 cr. and community contribution the balance of Rs. 20,456 cr. At the macro level this level of funding appears to be within the feasible range. The total planned investments by Centre and States under the XI Five Plan is about Rs. 1,00,000 cr. including NRDWP, State Plan funds, Finance Commission grants and external assistance. It is therefore feasible to invest the required higher amounts in the

next two Five Year Plan periods given the necessary demand. However the crucial detail is that the major funding requirements are for States where the proportion of rural population covered with piped water supply schemes is less than the national average like the States of UP, Bihar, Rajasthan, West Bengal, MP, Jharkhand , Orissa, Assam, Chhattisgarh, Uttarakhand etc. Therefore there is a need to explore the pattern and possibilities of funding this requirement in these States if the goals set out in this Plan are to be achieved.

#### 14.6 Separate Piped Water Supply programme for lagging States

NSSO 65<sup>th</sup> round survey shows that 8 States of Bihar, Uttar Pradesh, Jharkhand, Orissa, Assam, Chhattisgarh, West Bengal and Madhya Pradesh have less than 10% of piped water coverage at present. A separate piped water supply programme for assisting these States would be launched to meet their enhanced funding requirements to achieve the goals set out in the Strategic Plan. The needs of these States should be taken into consideration in the financing of rural water supply schemes by DDWS and external funding agencies.

<b>Rural population covered with Piped Water Supply as per IMIS data as on date And NSSO 65<sup>th</sup> Round Survey</b>			
<b>Name of the State/ UT</b>	<b>Total Population</b>	<b>Population covered with PWS as per IMIS on date</b>	<b>Percentage of population covered with PWS</b>
ANDAMAN and NICOBAR	241964	16539	6.84
ANDHRA PRADESH	61357604	44768341	72.96
ARUNACHAL PRADESH	975110	803540	82.41
ASSAM	26351703	5437393	<b>20.63</b>
BIHAR	90415338	2368635	<b>2.62</b>
CHANDIGARH	81397	0	0.00
CHHATTISGARH	18378854	3297274	<b>17.94</b>
DADRA & NAGAR HAVELI	168664	0	0.00
DAMAN & DIU	78219	0	0.00
DELHI	0	0	0.00

GOA	754931	262360	34.75
GUJARAT	36071891	27660053	76.68
HARYANA	17503346	13742768	78.52
HIMACHAL PRADESH	6247229	4024513	64.42
JAMMU AND KASHMIR	9592413	3744578	39.04
JHARKHAND	24661289	1062439	<b>4.31</b>
KARNATAKA	38168224	28507562	74.69
KERALA	25471476	19315986	75.83
LAKSHADWEEP	50947	0	0.00
MADHYA PRADESH	52691600	3892409	<b>7.39</b>
MAHARASHTRA	64770901	32827697	50.68
MANIPUR	2478842	1736283	70.04
MEGHALAYA	2318489	1543038	66.55
MIZORAM	522543	297233	56.88
NAGALAND	1721522	1004812	58.37
ORISSA	34741802	8842583	<b>25.45</b>
PUDUCHERRY	356996	304725	85.36
PUNJAB	17670495	15651330	88.57
RAJASTHAN	51995399	12264025	<b>23.59</b>
SIKKIM	540848	114553	<b>21.18</b>
TAMIL NADU	35111001	21084840	60.05
TRIPURA	2813306	1053749	37.46
UTTAR PRADESH	157042060	4975321	<b>3.17</b>
UTTARAKHAND	7060130	1359224	<b>19.25</b>
WEST BENGAL	75088208	10441568	<b>13.91</b>
<b>INDIA</b>	<b>86,34,94,741</b>	<b>27,24,05,371</b>	<b>31.55</b>

**Financial requirements for covering 90% of rural population with Piped Water Supply**

Sl. No	Name of the State/ UT	Total Population	Population covered with PWS as on date	Population yet to be covered with PWS	90% of Total Population to be covered with PWS	Population yet to be covered with PWS to reach 90% population coverage	Total funds requirement in Rs. Crore to provide PWS to uncovered population to reach 90% coverage @ 40lpcd	Total funds requirement in Rs. Crore to provide PWS to uncovered population @ 70lpcd	Total funds requirement in Rs. Crore to provide PWS to uncovered population @ 70lpcd and Sustainability, Support & Admin @ 30%	Funds required to provide 70lpcd to population already covered with PWS	Total funds required to provide PWS to existing population and 90% of	Total Central Share	Total State Share	Community Contribution @ 6%
1	ANDAMAN and NICOBAR	241964	16539	225425	2,17,768	2,01,229	55	77	101	2	103	61	36	6
2	ANDHRA PRADESH	61357604	44768341	16589263	5,52,21,844	1,04,53,503	2875	4025	5,232	4925	10,156	6,015	3,532	609
3	ARUNACHAL PRADESH	975110	803540	171570	8,77,599	74,059	91	127	165	393	558	331	194	34
4	ASSAM	26351703	5437393	20914310	2,37,16,533	1,82,79,140	7542	10559	13,727	897	14,624	8,660	5,086	877
5	BIHAR	90415338	2368635	88046703	8,13,73,804	7,90,05,169	22277	31188	40,545	267	40,812	24,169	14,194	2,449
6	CHANDIGARH	81397	0	81397	73,257	73,257	0	0	0	0	0	0	0	0
7	CHATTISGARH	18378854	3297274	15081580	1,65,40,969	1,32,43,695	3642	5099	6,628	363	6,991	4,140	2,432	419
8	DADRA & NAGAR HAVELI	168664	0	168664	1,51,798	1,51,798	72	101	131	0	131	78	46	8
9	DAMAN & DIU	78219	0	78219	70,397	70,397	33	47	61	0	61	36	21	4
10	DELHI	0	0	0	0	0	0	0	0	0	0	0	0	0
11	GOA	754931	262360	492571	6,79,438	4,17,078	270	378	492	68	560	331	195	34
12	GUJARAT	36071891	27660053	8411838	3,24,64,702	48,04,649	1474	2064	2,683	3394	6,077	3,599	2,114	365
13	HARYANA	17503346	13742768	3760578	1,57,53,011	20,10,243	886	1241	1,613	2423	4,036	2,390	1,404	242
14	HIMACHAL PRADESH	6247229	4024513	2222716	56,22,506	15,97,993	1775	2485	3,230	1788	5,018	2,972	1,745	301
15	JAMMU AND KASHMIR	9592413	3744578	5847835	86,33,172	48,88,594	3265	4570	5,942	1000	6,942	4,111	2,414	417
16	JHARKHAND	24661289	1062439	23598850	2,21,95,160	2,11,32,721	10135	14189	18,446	204	18,650	11,045	6,486	1,119
17	KARNATAKA	38168224	28507562	9660662	3,43,51,402	58,43,840	1607	2250	2,925	3136	6,061	3,589	2,108	364
18	KERALA	25471476	19315986	6155490	2,29,24,328	36,08,342	1035	1449	1,884	2217	4,101	2,429	1,426	246
19	LAKSHADWEEP	50947	0	50947	45,852	45,852	38	53	69	0	69	41	24	4
20	MADHYA PRADESH	52691600	3892409	48799191	4,74,22,440	4,35,30,031	11971	16759	21,787	428	22,215	13,156	7,726	1,333
21	MAHARASHTRA	64770901	32827697	31943204	5,82,93,811	2,54,66,114	9461	13245	17,218	4878	22,097	13,086	7,685	1,326
22	MANIPUR	2478842	1736283	742559	22,30,958	4,94,675	136	190	248	191	439	260	153	26
23	MEGHALAYA	2318489	1543038	775451	20,86,640	5,43,602	721	1009	1,312	819	2,131	1,262	741	128
24	MIZORAM	522543	297233	225310	4,70,289	1,73,056	193	271	352	133	485	287	169	29
25	NAGALAND	1721522	1004812	716710	15,49,370	5,44,558	150	210	273	111	383	227	133	23
26	ORISSA	34741802	8842583	25899219	3,12,67,622	2,24,25,039	6674	9343	12,146	1053	13,199	7,816	4,591	792
27	PUDUCHERRY	356996	304725	52271	3,21,296	16,571	6	8	10	41	51	30	18	3
28	PUNJAB	17670495	15651330	2019165	1,59,03,446	2,52,116	69	97	126	1722	1,848	1,094	643	111
29	RAJASTHAN	51995399	12264025	39731374	4,67,95,859	3,45,31,834	13305	18627	24,215	1890	26,105	15,460	9,079	1,566
30	SIKKIM	540848	114553	426295	4,86,763	3,72,210	386	540	702	47	750	444	261	45
31	TAMIL NADU	35111001	21084840	14026161	3,15,99,901	1,05,15,061	2892	4048	5,263	2319	7,582	4,490	2,637	455
32	TRIPURA	2813306	1053749	1759557	25,31,975	14,78,226	430	603	783	123	906	537	315	54
33	UTTAR PRADESH	157042060	4975321	152066739	14,13,37,854	13,63,62,533	37500	52500	68,249	547	68,797	40,741	23,928	4,128
34	UTTARAKHAND	7060130	1359224	5700906	63,54,117	49,94,893	5834	8167	10,617	635	11,252	6,663	3,913	675
35	WEST BENGAL	75088208	10441568	64646640	6,75,79,387	5,71,37,819	19935	27910	36,282	1457	37,740	22,349	13,126	2,264
	<b>Total fund requirement for 40 lpcd service level</b>	<b>863494741</b>	<b>272405371</b>	<b>591089370</b>	<b>77,71,45,267</b>	<b>50,47,39,896</b>	<b>166735</b>	<b>233429</b>	<b>3,03,457</b>	<b>37471</b>	<b>3,40,928</b>	<b>2,01,898</b>	<b>1,18,575</b>	<b>20,456</b>

## Key Performance Indicators

Level	Description	Key Indicators	Means of Verification
Impact	Household health and livelihoods improved	- % Reduction in prevalence of diarrhea in children under 5 from base year - % Reduction in IMR from base year	Data from MoHFW

Outcomes (Results)	Every rural person has enough safe water for drinking, cooking and other domestic needs as well as livestock at all times in all situations.	<ul style="list-style-type: none"> <li>-% of households accessing drinking water through piped water supply with household connections (i)metered and (ii) unmetered.</li> <li>-% of households accessing drinking water through public taps</li> <li>-% of households access drinking water supply through handpumps throughout the year.</li> <li>-% of households accessing drinking water through other means throughout the year</li> <li>-% of habitations with service level of 70 lpcd or more</li> <li>-% drinking water sources with safe drinking water as per IS 10500 norms throughout the year.</li> <li>-No of labs set up/upgraded</li> <li>No. of water samples tested for quality with field test kits</li> <li>No. of water samples tested for quality in labs</li> <li>-% age of public drinking water sources with chemical contamination</li> <li>-%age of private drinking water sources with chemical contamination</li> <li>-%age of public drinking water sources with bacteriological contamination</li> <li>-% households accessing safe drinking water as per IS 10500 norms throughout the year.</li> <li>-% of villages with 24x7 safe water supply throughout the year</li> <li>No. of schools covered with water supply</li> <li>No. of anganwadis covered with water supply</li> <li>No of schools covered with Jalmani units</li> <li>-% of village schools with water supply</li> <li>-% of anganwadis with water supply</li> </ul>	IMIS – Monthly report  IMIS-Annual Report  -do- -do-  -do-  Based on sources tested in IMIS  -do-  IMIS-Annual Report -do- -do-
Outputs	Physical infrastructure created to support drinking water security for rural households.	<ul style="list-style-type: none"> <li>-No of habitations covered by single village piped RWS schemes</li> <li>-No of habitations covered by multi-village piped RWS schemes</li> <li>-No of quality affected habitations covered</li> <li>-No of partially covered habitations taken up for augmentation</li>  <li>-No of rainwater harvesting structures created</li> <li>-No of groundwater recharge measures implemented</li> <li>- No. of quality affected habitations covered</li> <li>% of districts with district level labs</li> <li>-% of sub-districts with sub-district level labs</li> </ul>	All through IMIS-Annual and Monthly reports

		-% of all drinking water sources tested during the year	
Strategic objectives			
1	Drinking water security plans developed and implemented	-Release of BE plan allocation under NRDWP - -% age of GPs/VWSCs managing in-village water supply -% age of single-village/in-village water supply schemes implemented by GPs/VWSCs -No. of village drinking water security plans developed -No of village drinking water security plans implemented -No. of district drinking water security plans developed -No of district drinking water security plans implemented	All through IMIS – Annual Report
2	Conjunctive use of water sources adopted	-% of villages served only from groundwater sources -% of villages served only from surface water sources -% of villages served only from rooftop water harvesting -% of villages using recycled water -% of villages served from surface and ground water sources, -% of villages served from surface, ground water and rooftop water.	All through IMIS - Reports
3	Convergence of various programmes	- Number of drinking water supply schemes using funds from programs other than NRDWP -No. of districts reporting on funds used through convergence	Through IMIS Reports
4	Institutional arrangements strengthened	-No of states that have carried out an activity mapping exercise for PRIs -No. of states transferring capital and O&M finances to PRIs. - Management Devolution Index of States to measure nature and extent of management of RWSS by PRIs.	Through reports from State Governments
5	Financing of plans adopted	- % of GPs with a corpus fund for replacement and expansion. - % of GPs with more than 75% of demand of user charges collected	IMIS - Reports
6	Regulatory processes adopted	-No. of states adopting regulatory legislation to prioritise allocations for drinking water. -No of states institutionalizing regulatory bodies. -No. states with an O&M policy on service standards and cost recovery. -No. of states adopting Uniform Protocol for Drinking Water quality testing. -No. of DWSMs meeting twice in previous year -% of GPs reporting monitoring of drinking water quality -% of groundwater sources for which groundwater levels are reported. -% of Unaccounted for Water in rural multi-village piped water supply schemes	As per State Govt. reports  -IMIS Reports
7	Training of all key stakeholders undertaken	-No. of training workshops completed at different levels -No of village level persons trained for water quality testing -No. of trained people at different levels	

		-No of exposure trips and no of participants	
8	Technical support strengthened	-% of BRCs set up % of BRC Coordinator positions filled -% of DWSM and SWSM support staff positions filled % of district, block and sub-block level engineer posts filled up -No. of State and district Key Resource Centres established -No. of activities undertaken by STA -No. of activities undertaken by State Referral Institute R&D projects approved Monitoring and Evaluation studies initiated Manuals/Handbooks released	
9	Outsourcing	-No. of PPP contracts in rural water supply	