

# Institutional Mapping and Analysis of WASH Services and Costs

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December, 2009

**WASHCost India Project**



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Institutional Mapping of WASH Services in Andhra Pradesh is a collective output of WASHCost India Team at CESS; project partners such as WASSAN; Rural Water Supply and Sanitation Department, GoAP; members of learning alliance and members of working groups/ advisory committees. While WASSAN team took the main responsibility of preparing this report, the involvement and contribution of all these members in preparing this paper is invaluable.

The report could not have been prepared without active involvement and contribution from several senior officers working with RWSS Department and other concerned departments. They shared their views formally and informally; shared their databases and insights from their work experiences with the WASHCost team. These inputs were the basis for preparing this paper. WASHCost team sincerely thanks all of them. WASHCost team sincerely believes that RWSS team finds this document useful.

In this process, the inputs and guidance from WASHCost global team is particularly of great significance. Though the process of preparing this report; structure and contents of the report are different from those of other countries, this "deviation" was supported by Global Team with a complete faith in the process and quality of the output. This confidence is highly appreciated.

A rapid assessment of WASH Services was conducted as part of preparing this paper on Institutional Mapping of WASH Services in AP. 21 habitations in the state were profiled to understand the perspectives of the communities on WASH services. This part of the report is published as a separate report. WASHCost team thanks all the villagers (women, men, children and members of various institutions at local level), representatives of RWSS Department and NGOs for their valuable support and contribution for preparing this document.

WASSAN took the responsibility of anchoring the process of preparing the document. WASSAN team produced several drafts and improved them based on the feedback from other members. WASHCost India Team acknowledges this special role of WASSAN in the process of preparing and finalizing the report and appreciates their inputs.

The preparation of this paper is envisaged as a capacity building and reflection process of all the members engaged in the preparation of the same. WASHCost team certainly achieved this objective by following this path. This paper itself is a testimony of this achievement. We once again thank all the contributors and partners who helped, supported and contributed in preparing this document.

WASHCost Country Team - India  
CESS and WASSAN  
Andhra Pradesh, India  
November 2008

## EXECUTIVE SUMMARY

Preparing “Institutional Mapping of WASH services in Andhra Pradesh” was envisaged as a process of capacity building and reflection among the WASHCost team and its partners. The main objective of this paper is to project a picture of policies, programs and practices on WASH services in the state. An attempt was made to understand various dimensions of WASH services in the state. This paper is prepared based on a systematic review of available literature (policy documents; earlier research and reviews; data from web sites); interactions/ meetings/ workshops with several senior government officers; rapid assessment of WASH services in selected villages.

The process of preparing this paper clearly brought out that there are several dimensions to cost of WASH services, such as – financial costs (capital/ operational and maintenance); environmental costs; social costs (burden/ equity/ exclusion related); institutional costs. Common Information Framework (CIF) of WASHCost project is aiming at identifying key parameters of “costing the WASH services” such as capital costs for hardware and software; source creation; operation and maintenance costs; direct and indirect support costs; supplementary house hold level costs. While the CIF is being conceptualized and developed, the paper on institutional mapping of WASH Services is expected to explain the context in which the project is located. The paper is also expected to suggest methodological and operational issues related to action research components of WASH project.

Traditionally, surface water bodies such as streams, tanks, rivers, ponds were used for drinking water purposes in the state. After independence in 1947, the responsibility of providing drinking water became the mandate of the state. Panchayati Raj and Engineering Department (PRED), GoAP has the mandate of providing safe drinking water to rural population of the state. Rural Water Supplies and Sanitation Department (RWSS) is part of PRED. The responsibility of planning, execution and maintenance of various drinking water supply schemes was largely with Rural Water Supply and Sanitation Department, GoAP. Several state governments including Government of Andhra Pradesh largely followed the guidelines/ framework of Central Government in the context of Drinking Water and Sanitation. Accelerated Rural Water Supply Schemes, Swajaldhara, Sector Reforms in Drinking Water Sector; Total Sanitation Campaign are some of these policies and schemes that were adapted by RWSS, GoAP. However, the local experiences in Andhra Pradesh in drinking water and sanitation sector are prominent

in the country. These experiences provided useful lessons for the entire country. While following the norms and policy directions, RWSS Department, GoAP was able to establish its own course of direction in defining its own mandate and vision.

*Objectives of RWSS Department are*

- *Delivery of Safe Potable water to all Rural People* (ensuring access to a reliable (defined as 40 lpcd), financially and environmentally sustainable and affordable RWSS service to the entire rural population)
- *Safe Water Supply to Fluoride, Brackish and other Polluted Habitations.*
- *Up gradation of standards of all “Partially Covered” Habitations to “Fully Covered” status.*

*ULTIMATE GOALS are -*

- ◆ *All houses with piped water supply connections with assured supply of water.*
- ◆ *All habitations with solid and liquid waste disposal facilities.*

*Key elements of GoAP’s “Vision” are:*

- *Devolution of funds, functions and functionaries to the PRIs;*
- *Enforcement of full recovery of O & M costs and sharing of capital costs from user charges (taking into consideration affordability, particularly by disadvantaged groups); and*
- *Improvement of the “accountability framework” by clarifying the roles and responsibilities of the various actors of the RWSS sector at the state, district and village level, including responsibilities for policy formulation, financing, regulation, construction, operations and maintenance*

The above vision statement and goals have strong influence on the policy and programmatic directions of WASH services in the state. This paper argues that “piped” water is largely considered as “safe” water and the shift is slowly towards multi village schemes. These programmatic directions are analyzed in the light of institutional convergence in the context of WASH Services in the state. Several departments such as irrigation department; rural development department; agriculture department; Panchayati Raj department; pollution control board, health and education department were profiled in terms of their roles in WASH services. Similarly, the role of Community Based Organizations; Civil Society Organizations and markets in WASH services were analyzed. It was argued that there is a need for institutional convergence for provision of better WASH services in rural areas. Currently, the absence of effective institutional

convergence platforms/ systems is leading to options that are not necessarily sustainable and equitable. The rapid assessment also brought out this issue very clearly. This is supported evidently by the the growing number of problem villages and villages covered under multi village schemes.

Analysis of on-going programs such as Swajal Dhara, Sector Reforms Project; Sanitation Campaign clearly indicate that several good opportunities are missed in the haste of doing programs on a large scale. Managing quality and quantity is always a major challenge for RWSS and related departments in provision of WASH services. It is hoped that with the new roles and responsibilities of RWSS Department (as per the new goals, objectives and vision), there would be some decisive shifts in the functioning of the RWSS Department. It is envisaged that the department would function as “facilitator” and the local governance institutions such as Grama Panchayati (Village level council)/ Mandal Praja Parishad (Block Level Council)/ Zilla Parishad (District Level Council) are expected to play more of executive roles in provision of WASH services, particularly in Operation and Maintenance of the systems. The hypothetical analysis of life cycle of WASH services (with drinking water as an example) also indicated that role of RWSS Department is high at various stages of the WASH services in rural areas. The RWSS has a major challenge of reinventing itself to suit to the new roles as envisaged in the vision statement. It is also pertinent to ask questions like ‘whether this role shift is actually feasible and necessary?’.

The paper also analyses the decision support systems such as WaterSoft which are important for planning and learning. The issues related to WASHCost services and WaterSoft were also analyzed as part of the institutional mapping. It is observed that WASHCost project is likely to create new databases and information systems that are not necessarily part of current package. There is a considerable scope for joint action research on the databases related to various dimensions of WASH services in the state.

Institutional Mapping of WASH Services also analyses the factors influencing the provision of WASH services in the rural areas. The issue of “coverage” of habitations under WASH services is “deciphered” with databases and insights from fieldwork (rapid assessment). Quality and quantity aspects of WASH services; availability of sustainable water resources; O & M related issues, health related implications of poor quality WASH services; gap between physical facilities and internalization of sanitation and hygiene practices are systematically discussed in Section 3 of the paper. It is argued that the understanding of WASH services should go beyond “physical facilities”. The need for going beyond rhetoric of coverage and actually look at critical dimensions of WASH services coverage is vividly brought out by the above analysis in a systematic manner.

The relevance of WASHCost project in the above context seems to be immense. It is important for the WASHCost project to crystallize appropriate methodological tools and systems to understand, analyze and improve the provision of WASH services in various socio-economic situations of the state. Obviously the entire exercise has to be a collaborative process in which various willing partners contribute and learn together. This paper on “Institutional Mapping of WASH Services in Rural Areas in Andhra Pradesh” is a first step in this direction.

## Current WASHCost Working papers

Working Paper	No.
<p><b>Costs of Providing Sustainable Water, Sanitation and Hygiene Services in Rural and Peri-Urban India: WASHCost (India) Inception Report</b>  <i>V. Ratna Reddy, Charles Bachelor, M. Snehalatha, M.S. Rama Mohan Rao, M. Venkataswamy, M.V. Ramachandrudu, December, 2009</i></p>	1
<p><b>Status of Rural Water Supply and Sanitation in Andhra Pradesh, India</b>  <i>B. Rajeswara Rao, V. Vidyanath Sastry, M.Rama Mohan Rao, H. Umakantha Rao, M. Venkataswamy, M.S. Rama Mohan Rao, December, 2009</i></p>	2
<p><b>Groundwater Scenario in Andhra Pradesh</b>  <i>A.K.Jain I.F.S, B. M. Muralikrishna Rao, M.S. Rama Mohan Rao, M. Venkata Swamy, December, 2009</i></p>	3
<p><b>Institutional Mapping and Analysis of WASH Services and Costs</b>  <i>M.V. Ramachandrudu, Safa Fanaian, M. Snehalatha, Charles Bachelor, V. Ratna Reddy, December, 2009</i></p>	4
<p><b>Patterns of WASH Services in Rural Andhra Pradesh</b>  <i>Community's Perspectives and Insights from Rapid Assessment</i>  <i>M.V. Ramachandrudu, S. Narasimha Rao, R. Subramanyam Naidu, M. Snehalatha, V. Ratna Reddy, December, 2009</i></p>	5

# SECTION -1

## ABOUT THE INSTITUTIONAL MAPPING ON WASH SERVICES

### BACKGROUND

Supplying of domestic water has always been the mandate of the state and local government in India. Pre-Independence era also had several experiences where local government (village/rulers) made necessary arrangements for providing drinking water to the population. The role of communities in establishing and managing drinking water related infrastructure was also very significant during this era. After independence, state took the responsibility of supplying drinking water to its citizens as it was considered to be the mandate of a welfare state. Elaborate arrangements were made to establish drinking water related infrastructure facilities in the country in the form of establishing departments; funding support for capital and maintenance and so on. The drinking water supply systems eventually became sources of water for all domestic purposes. So the drinking water systems are in a way synonymous with domestic water supply schemes. However, the standard term for these systems is still “drinking” water systems and “domestic” water system has gained little popularity, as a nomenclature.

Over a period of time, there is a realization that **“well being of citizens is dependent not only on the availability of safe drinking water, but also on good sanitation and hygiene facilities at household level”**. (Safe) Water, Sanitation and Hygiene - WASH services are considered to be a comprehensive package of services that are necessary for improving the overall living conditions of poor in rural and urban settlements. This realization expanded the mandate and scope of providers, donors, administrators, policy makers and local government units.

However, in the light of globalization, changing situation of natural resources (particularly water resources), newer experiences and changing technologies, the roles and functions of state, citizens and other systems have been changing. The changing times have their own influence on issues like provision of basic needs such as drinking water also. The role of state is changing from that of a provider to a facilitator. Some responsibilities are being shared with several others and some of them are shunned. Markets, private

institutions (service providers/others), citizens are expected to supplement/ complement the state and take up responsibilities along with the State. In this dynamic situation, the issues related to WASH services need to be understood. The quantity, quality, cost of facilities/ services, sustainability, equity, outreach of services are some of the concerns against which the roles and responsibilities of various partners (state/ citizens/ local governments/ donors/ private institutions/ markets/ others) need to be understood. This paper “Institutional Mapping of WASHCost Services in Andhra Pradesh” is an attempt to look into some of these aspects in details.

## OBJECTIVES

**Objectives of the paper are the following:**

- To provide a reasonable picture of
  - ◆ Evolution of policies, projects/ schemes related to WASH services in the rural context of Andhra Pradesh
  - ◆ Institutional mapping of the WASH services in rural Andhra Pradesh
  - ◆ Life Cycle Analysis of WASH services in rural areas of Andhra Pradesh
- To broadly indicate future directions for WASHCost project, in the light of overall objectives of the project.

## METHODOLOGY

Given the short period of time and vastness of the subject, the following methodology was adopted for preparing the paper.

- Literature Review (Secondary Sources)
- Interactions with senior government officers
- Case studies of limited number of villages (Field Work for Rapid Assessment<sup>1</sup>)
  - ◆ Purposive sample method is adapted to select villages that broadly represent a specific category of experiences/ trends/ regions. The villages were selected in consultation with concerned district officers/ local NGOs.
  - ◆ Field Teams (About three to four persons – male/ female) conducted field work for about two to three days in each village. They used a variety of tools such as Social Mapping/ Transect Walks/ Time Line Analysis)/ Focused Group Discussions/ Collection of Data from Grama Panchayat and Department (if available)/ Others

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<sup>1</sup> Please refer to Patterns of Part 2 of Institutional Mapping for a detailed analysis of Case Studies and Rapid Assessment–“Insights from Field- Understanding WASH Services from Community’s Perspective”

- ◆ The main focus was to understand the experiences of the villages (men/ women/ young girls) in the context of drinking water, sanitation facilities and hygiene practices. The following tools were used to understand the above issues.
  - Life Cycle Analysis of each type of intervention
  - Costs of various WASH services were obtained from the above interactions. These costs are mainly related to Capital Costs and Operation & Maintenance.
  - Perceptions of community members were obtained through focused group discussions and interactions during PRA exercises. These were recorded in the form of statements
  - Village Profiles (Case Studies) were prepared to highlight some of the key concerns, lessons and strategic directions.
- The report is presented in various sections to consolidate the understanding from the above process of exploration.
- The report is presented in 4 Sections.

### Framework for Estimating WASH Costs:

With changing technologies, availability of sustainable sources and complex nature of individual behavior, the provision of WASH services is becoming increasingly challenging, not only to the state, but also to others. The early assessment related to costing of WASH services (during field work) broadly indicates that there are several dimensions to Cost of WASH services, such as – financial costs (capital/ operational and maintenance); environmental costs; social costs (burden/ equity/ exclusion related); institutional costs. There is a need to organize information related to these costs in a systematic manner. **WASHCost Project** basically aims at generating new and relevant knowledge on these dimensions of WASH Cost services in different socio economic situations, across the globe, using a Common Information Framework (CIF<sup>2</sup>). To begin with, WASHCost project aims at generating cost related information using the following framework.

- ◆ **CapEx Hardware:** (Capital Investment in fixed assets)
- ◆ **CapEx Software** (One-off work with communities to prepare construction and management (pre-construction community work)

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<sup>2</sup> The Common Information Framework is being evolved at this stage. In due source of time, this CIF would be stabilized and formally used for future action research and advocacy efforts.

- ◆ **Cost of Capital**
- ◆ **OpEx:** Operation and minor maintenance expenditure
- ◆ **CapManEx:** (Capital Maintenance Expenditure (Asset renewal and replacement costs))
- ◆ **Direct Support Costs:** (e.g. Post construction support activities that reach the community or operator)
- ◆ **Indirect Support Costs** (e.g. Macro level support, planning and policy making)
- ◆ **Supplementary HH Costs** (e.g. direct and indirect costs at the household level to supplement the unmet demand -quantity or quality).

It is expected that these components of service costs would be assessed against cost of resources and cost of service delivered and cost of service upgraded. However, the fieldwork did not strictly follow the above framework, as the CIF was in an evolutionary stage at the time of field work. The fieldwork was mainly aimed at understanding the community level databases and perceptions on various issues related to WASH service delivery. This paper is also expected to contribute to the evolution and finalization of CIF and subsequent fieldwork of the project. Given this background, the fieldwork largely focused on the understanding the level of WASH services and infrastructure in the selected villages using various participatory exercises. Case studies brought various dimensions of WASH service delivery in the selected villages.

## SECTION - 2

# INSTITUTIONAL FORMS AND PLATFORMS AND ISSUES RELATED TO INSTITUTIONAL CONVERGENCE IN WASH SERVICES

### RE-ENGINEERING FOR PROVISION OF DRINKING WATER, SANITATION AND HYGIENE SERVICES IN RURAL ANDHRA PRADESH - RURAL WATER SUPPLY AND SANITATION (RWSS) DEPARTMENT

Traditionally surface water bodies such as streams, tanks, rivers, ponds were used for drinking water purposes in the state. The flow of water in these water bodies (mainly streams, rivers and springs) is expected to ensure good quality for drinking purposes. Apart from streams, open wells of various sizes were also dug to provide drinking water to rural communities in various parts of the state, where surface water is not dependable. These wells were largely constructed by local communities with voluntary labor or by headman of the village or by local rulers. After independence, the responsibility of providing drinking water became the mandate of the state. Panchayati Raj and Engineering Department (PRED) has the mandate of providing safe drinking water to rural population of the state. Rural Water Supplies and Sanitation Department (RWSS) was part of PRED. The responsibility of planning, execution and maintenance of various drinking water supply schemes was largely with Rural Water Supply and Sanitation Department, GoAP. The role and functions of the RWSS Department are also changing with time under the influence of prevailing policy environment in the country.

State government largely followed the guidelines/ framework of Central Government in the context of Drinking Water and Sanitation. The influence of Five Year Plans of GoI and targets for state governments for coverage under various schemes (Accelerated Rural Water Supply Schemes, Swajaldhara, Sector Reforms in Drinking Water Sector; etc) are part of this process. In the light of 73rd Amendment to Constitution of India that devolves powers to local governance bodies (Panchayati Raj Institutions at village/ mandal/ district levels), RWSS Department, GoAP has evolved its own vision. In Oct

2006, GoAP issued RWSS Sector Vision and Policy Note<sup>3</sup>. This note broadly describes the framework in which rural water supplies and sanitation related services are to be delivered.

The objectives<sup>4</sup> of RWSS Department are:

- Delivery of Safe Potable water to all Rural People (ensuring access to a reliable (defined as 40 lpcd), financially and environmentally sustainable and affordable RWSS service to the entire rural population)
- Safe Water Supply to Fluoride, Brackish and other Polluted Habitations.
- Up gradation of standards of all "Partially Covered" Habitations to "Fully Covered" status.
- ULTIMATE GOALS ----
  - All houses with piped water supply connections with assured supply of water.
  - All habitations with solid and liquid waste disposal facilities.

Key elements of GoAP's "Vision" are:

- Devolution of funds, functions and functionaries to the PRIs;
- Enforcement of full recovery of O&M costs and sharing of capital costs from user charges (taking into consideration affordability, particularly by disadvantaged groups); and
- Improvement of the "accountability framework" by clarifying the roles and responsibilities of the various actors of the RWSS sector at the state, district and village level, including responsibilities for policy formulation, financing, regulation, construction, operations and maintenance.

One could understand that the above vision statement is based on the experiences of Andhra Pradesh, overall policy directions in the country and concerns related to various costs of WASH services. The focus of GoAP is to provide "piped" water to all households. Perhaps this technical option is guided by the notion that the "piped" water is "safe" water. There is also a notion that the "decentralization" of power and finances helps in better management of WASH service delivery, particularly from finances point of view.

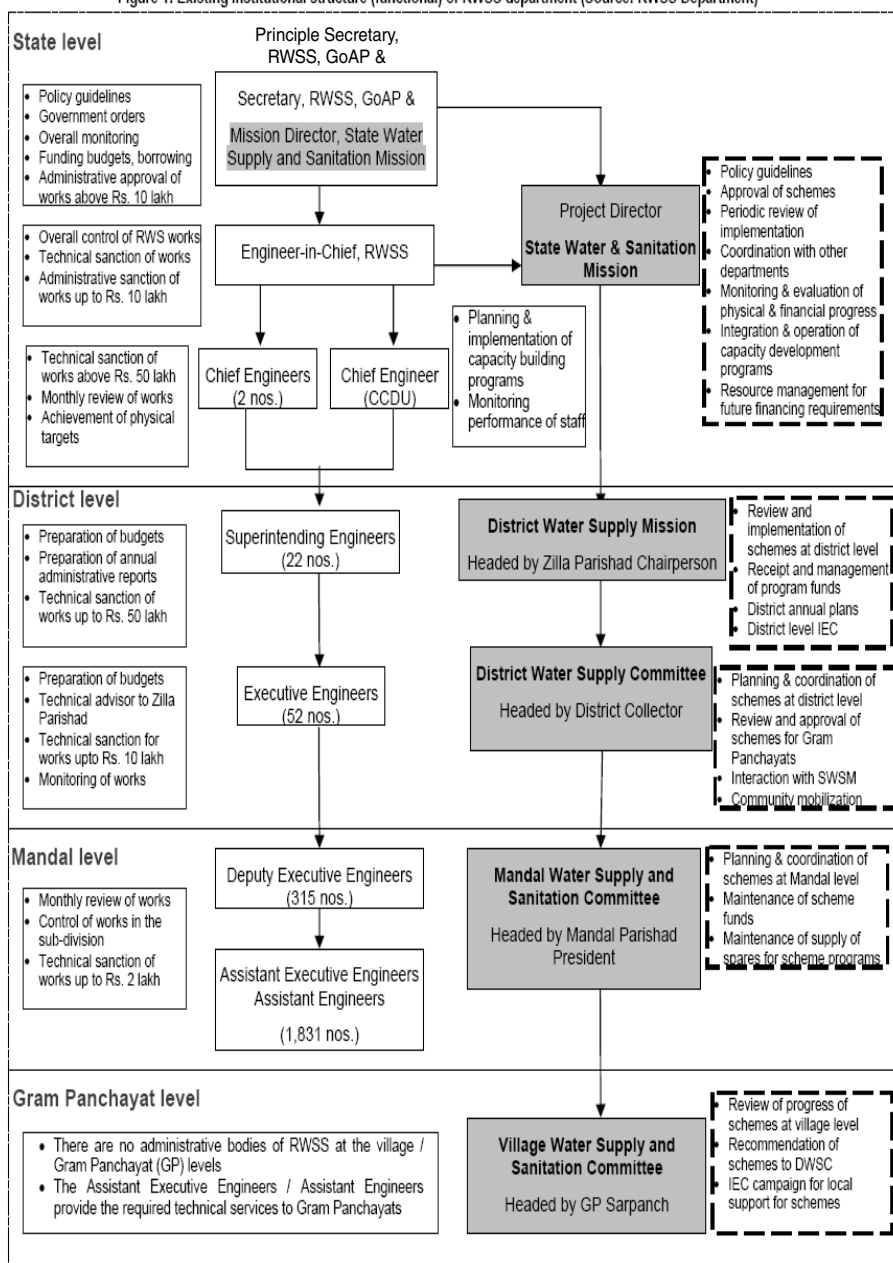
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<sup>3</sup> Source: Project Implementation Document (PID), World Bank, 15th Jan 2007 and Presentation by V. Vidyanath Sastry, Project Director, CCDU & Project Support Unit, APRWSSP, Rural Water Supply & Sanitation Dept, Government of Andhra Pradesh (June 2008)

<sup>4</sup> Source: Presentation by Mr Ajay Mishra, Principal Secretary, RWSS, GoAP

The key elements of the vision give emphasis on involvement of local level institutions (particularly governance institutions at village level such as Grama Panchayati) in operation maintenance and financial aspects of WASH services. This policy framework

**Box No – 1 : Institutional Arrangements for Rural Water Supply and Sanitation in Andhra Pradesh**  
Figure 1: Existing institutional structure (functional) of RWSS department (Source: RWSS Department)



Sources: RWSS Dept. GoAP

also indicates that RWSS Department plays a supportive or facilitator role to the governance institutions at district/ mandal/ village level. This is a clear shift in the role of RWSS Department from implementation to support functions. This shift is fairly new and the operational processes are in the nascent stage. Based on this policy framework, the structure and institutional arrangements of the RWSS Department and rural water supply and sanitation sector are re-designed. The Key Elements of this Institutional Arrangement are presented in the Box No 1 and Table No 1.

In this new arrangement, Water and Sanitation Mission is established at state/ district/ mandal/ village level. These missions are headed by people's representatives such as - Zilla Parishad<sup>5</sup> Chairperson; Mandal Parishad President and Village President. At state level, the rural water supply and sanitation has a dedicated minister. The state level

**Table No - 1: Main features of this institutional arrangements – RWSS Dept**

Sl.No.	Institution	Roles and Responsibilities
1.	State Water & Sanitation Mission	Policy Formulation; Approval of Schemes; Periodic Review of implementation; Coordination with other departments; monitoring and evaluation of physical and financial progress; integration and operation of capacity development programs; Resource Mobilization and Management.
2.	District Water Supply Mission and District Water Supply Committee	Planning, Implementation and Review of schemes at district level; Receiving and managing funds; IEC related activities, Coordination with other departments.
3.	Mandal Water Supply and Sanitation Committee	Planning and Coordination of schemes at mandal level; maintenance of scheme funds; maintenance of supply of spares for various schemes/ programs.
4.	Village Water Supply and Sanitation Committees Headed by Sarpanch, Grama Panchayat	Review of progress of schemes at village level; Recommendation of schemes to DWSC; IEC campaign for local support for schemes

Source : Presentation by V. Vidyath Sastry, Project Director, CCDU & Project Support Unit, APRWSSP, Rural Water Supply & Sanitation Dept., Government of Andhra Pradesh

<sup>5</sup> India has three tier system of governance, which are represented by people's representatives. These representatives are elected through elections. At village level, the governance institution is Grama Panchayat, headed by Sarpanch (President). At block level, the governance institution is Mandal Parishad and this is headed by President Mandal Parishad. At district level, the governance institution is Zilla Parishad. This is headed by President, Zilla Parishad.

mission is headed by a Principal Secretary. Professional staff of RWSS Department is staffed up to mandal/ block level. The responsibilities such as policy formulation; planning; approval of plans; execution of works; operation & maintenance; coordination; monitoring & review; capacity development are shared between RWSS Department and Water & Sanitation Mission at various level. The responsibility of executing works is largely with local level governance institutions such as Zilla Parishad and Mandal Parishad. Similarly, the maintenance related responsibilities are also with these institutions mainly with Mandal Parishad and Grama Panchayati. The responsibility of maintenance is largely with local Grama Panchayat and Mandal Parishad. Receiving funds for projects and maintenance is also at Zilla Parishad; Mandal Parishad and Grama Panchayati levels. RWSS is expected to plan, design various schemes and advice local governance bodies on execution related issues. The staff of RWSS Department works in coordination with these institutions and provides technical assistance to PRI bodies at district/ mandal/ village level. Thus the role of RWSS Department is largely as a facilitator and supporter, while the project execution and maintenance responsibilities are with governance institutions at district/ mandal/ village level. The main emphasis is on making the WASH Services affordable. The local institutions are expected to mobilize adequate financial resources (in the form of user charges) for operation and maintenance. One should wait and watch whether the local institutions are able to meet this expectation of this new policy framework.

### *Water Related Departments and Institutions:*

During 1997-2004, there were considerable efforts to evolve water related institutional arrangements in the state. During this period, AP Water Vision (2003) was also conceptualized. As per this, the water related departments and institutions were organized into four categories (Refer Box 2). A task force was also established to develop effective institutional arrangements and coordination systems across these various departments. With the changing in the ruling party, these initiatives could not travel longer distances. In this institutional mapping, details of certain key departments and other actors are presented. These institutions have a clear bearing on the WASH services in the state.

### *Other departments:*

Situation of water resources in rural areas is governed by several departments of state government. Influence of these department's work on rural water supply and sanitation is almost direct. These departments and their nature of involvement/ influence on rural water supply and sanitation is briefly mentioned here.

Box No- 2

Institutional Mapping of Water Related Department in AP

Water Use Departments	Water Resources Department
Panchayati Raj Department	Irrigation and Command Area Development
Public Health and Municipal Engineering	Major/Medium/Minor
Agriculture	Command Area Development
Horticulture	AP State Irrigation Development Corporation
Animal Husbandary and Fisheries	Ground Water Department
Energy (Thermal and Hydro)	Panchayati Raj Department
Industries AP Industrial Infrastructure	Rural Development Department
Corporation AP Industrial Development	Watershed Department
Corporation	Water Conservation Mission

Task Force for  
Convergence and  
Coordination

Water Monitoring Departments	Capacity Building Organizations
Irrigation (Surface Water)	Administrative Staff College of India
Ground Water Department	Environment Protection Training and
Environment, Forests, Science and	Research Institute
Technology	Andhra Pradesh Academy of Rural
AP Pollution Control Board	Development
Meteorology	Engineering Staff College of India
Central Water Commission	Acharya NG Ranga Agricultural University
Central Ground Water Board	Water and Land Management Training and
	Research Institute

**Irrigation Department:** Irrigation Department of GoAP is responsible for managing the irrigation infrastructure of the state. Major, Medium and Minor Irrigation schemes are being constructed/ maintained by this department. About 9000 Water User Associations were created with the famers in the canal command areas of these projects, for management transfer of these command areas. It is observed that the nature and priority of several irrigation schemes (major and medium irrigation schemes) are changing with time. Provision of safe drinking water is dominating the priority of several irrigation schemes in the state. New pipelines are being established to several old projects to bring

drinking water from these reservoirs to urban/ rural settlements (Multi Village Schemes). Several new Multi Village Schemes are likely to be established in future, as the local sources are increasingly becoming unsafe and unsustainable. Given this trend, the Irrigation Department has to play an important role in rural water supplies in the state. The national water policy gives top priority to drinking water. Given this broad policy direction, there is a possibility of shift in the priority of several irrigation schemes in the state (shifting priority towards drinking water). The allocation of water for drinking purpose from various irrigation schemes needs a clear policy, institutional arrangements, as the investments are already being made in the form of Multi Village Schemes (MVS).

**Rural Development Department:** Though the establishment of rural water supply schemes is with the RWSS Department, the sustainability of local sources largely depends on the effective functioning and contribution of Rural Development Department. Rural Development Department has the mandate of establishing various types of water resources/ bodies in rural areas through various schemes such as watershed development projects; National Rural Employment Guarantee Scheme; other schemes with the support of RIDF/NABARD. The regulation of groundwater use through AP Water, Land and Trees Act (APWALTA) is also the mandate of Rural Development Department.

**Panchayati Raj Department:** As part of the new vision of RWSS Department, the local governance bodies (PRI) have a major role in maintenance of the infrastructure created by RWSS Department. The district/ mandal/ village level Panchayatis are expected to perform different roles related to maintenance of rural water facilities. RWSS Department already developed norms for allocating funds for this purpose. The staff of RWSS Department works in close coordination with these institutions at district/ mandal/ local levels. The effectiveness of the drinking water facilities depends on the proper functioning of these departments/ institutions at various levels. The Drinking Water and Sanitation Committees at mandal/ village level under the leadership of Mandal Parishad President and Sarpanch are expected to provide leadership to water and sanitation agenda at mandal/ village levels. Provision of drainage facilities (clean neighborhood) is one of the mandates of the local bodies.

**Groundwater Department:** The role of Groundwater Department is largely to monitor the quality and quantity of groundwater resources and classify the state into various categories, depending on the potential of groundwater availability. The Department conducts ground surveys from time to time and classifies each mandal into safe; semi-critical; critical and over-exploited mandals. These reports also indicate the level of groundwater exploitation in the state in different mandals. The physical parameters of water quality are also regularly assessed by the department. Since a large number of

rural water supply systems (Single Village Schemes) is dependent on local groundwater resources, the support from Groundwater Department in terms of locating the sustainable source is an important requirement.

**Education and Health Departments:** The hygiene education in rural areas is largely from education system in the rural areas. School Sanitation Program (related facilities); Anganwadi Centers (Day care centers of pre-school children) are part of the support systems under these departments, which focus on hygiene education at local levels. While the provision of sanitation is the responsibility of RWSS Department, the right use of these facilities is the result of the education efforts by these departments.

**Pollution Control Board:** Pollution Control Board (PCB) also has the mandate of monitoring the quality of water resources in the state (rivers, water bodies, groundwater, etc) and taking punitive action against offenders. The quality of ground and surface water resources is increasingly becoming precarious with urbanization and industrialization. These processes have significant negative impact on the drinking water facilities and their use in the state. PCB has a role in regulating the water resource use and control pollution. This function of pollution control department is most essential to safeguard the quality of ground/ surface water and ensure sustainable use of drinking water.

### *Community based organizations and institutions:*

There are several community based organizations/ institutions in Andhra Pradesh, which have the mandate of looking after water resources/ other natural resources in the rural areas. These institutions are created under the framework of various projects/ Acts. Water Users Associations; Watershed Committees; Committees for Water and Sanitation; Self Help Groups; Village Organizations; Forest Committees, mothers committees are some of these institutions in rural areas. Depending on various factors, the effectiveness and capacities of these institutions differ from village to village.

## **CIVIL SOCIETY ENGAGEMENT IN RURAL WASH SERVICES:**

The involvement of Civil Society Organizations/ Non Government Organization/ Private Institutions in WASH service sector is also increasing in the state. These agencies are performing several roles and largely filling the “gaps” in the system. While the systems of government are largely limited to provision and maintenance of infrastructure facilities, these agencies are engaged in the following areas of action.

- Research, Advocacy and Lobbying
- Community Mobilization
- Creating Infrastructure and Innovations
- Information, Education and Communication Campaigns
- Drinking Water Markets

While some of the above functions are performed in collaboration with concerned government departments including RWSS Department; some other functions are performed by them to “put pressure” on the state to improve its performance.

International NGOs and donors such as UNICEF; Water Aid, OXFAM; Independent Agencies such as Satyam Foundation, Byraju Foundation, Sri Satya Sai Charitable Trust, Sri Ram Trust are some of the active members of the civil society organizations engaged with drinking water issues in the state. These agencies established several innovative models for rural water supply systems in various parts of the state in collaboration with other NGOs/ Department/ Communities. Some of their interventions include establishing infrastructure facilities that cover single/ multi villages; quality enhancement; local level monitoring systems; improving sustainability of local water sources and so on.

Local NGOs take the support of international agencies and line departments to improve the provision of WASH services in the rural areas. Bala Vikas, Sri Ram Trust; Rural Development Trust, Naandi Foundation; Byraju Foundation, Satyam Foundation, Medvan Network, Partners of Water Aid are some of the NGOs, who worked at community level to establish several innovative models in the rural drinking water/ sanitation sector. These experiences include establishing model villages and institutional base at community level for better drinking water provision; preparation of district/ mandal level action plans under Total Sanitation Campaigns; monitoring of government interventions on WASH services; enhancing sustainability of drinking water sources and so on. Some of the experiences from NGO sector focus on “better pricing” for drinking water in rural areas. These experiences are keenly observed by academic institutions and policy makers, to understand the wider implications. There is also a concern about the approach proposed by these models (particularly in the context of roles and obligations of the State).

Functions related to Research, Advocacy and Lobbying are also performed by limited number of agencies. Center for Economic and Social Sciences (CESS); Fluorosis Vimukti Porata Samithi; Forum for Better Hyderabad; Watershed Support Services and Activities

Network (WASSAN); Social Watch AP Chapter are some of these institutions/ networks that are engaged with water sector (including drinking water) related research, advocacy and lobbying processes. These efforts have various levels of successes and achievements. Examples like evolving better systems for fluorosis effected villages in Nalgonda district are far and few, that indicate the hidden potential of this engagement of Civil Society Organizations (CSO/ NGOs) in the rural WASH sectors. The research, advocacy, lobbying and networking in WASH context has a weak base in the state. Both government and CSO/NGO groups need to focus on this agenda and evolve mutually agreeable partnerships on this agenda.

## **DRINKING WATER MARKETS:**

As several sources for drinking water are getting scarce or polluted or depleted, a local market for drinking water is emerging in several parts of the state (in urban, semi urban, small towns and rural areas). Sale of bottled water by several entrepreneurs/ small companies is a common sight in several parts of the state now. The packaged water bottles are accepted norms and the market is growing at a very fast rate. There are few studies that are conducted on this growing presence of water markets in rural areas also. Villages affected by flourosis, industrial/ domestic pollution had limited options except to buy “so called” safe water from private markets. Limited number of no source villages also depends on these markets. These markets are silently establishing the “willingness to pay” concept in the minds of consumers and policy makers. The “cost” implications of these private markets are a cause of concern for consumers; policy makers and the state. However, the reality is that “no option” for consumers is pushing them to buy waters from the markets. In the growing market size of drinking water, it is likely that these players gain more strength and other players are not strong enough to counter these forces at present.

## **ISSUES, CONCERNS AND PROBLEMS RELATED TO INSTITUTIONAL CONVERGENCE AND ITS IMPLICATIONS ON WASH SERVICES:**

While the expectations from departments, civil society organizations and markets are well articulated, the reality is different. There are several gaps between the cup and the lip. Some of the issues, concerns and problems related to institutional convergence and coordination in the context of WASH Services in Andhra Pradesh are briefly mentioned here.

**Issues related to Irrigation Department:** Coordination between irrigation department (including Water Users Associations - WUA) and RWSS Department is fairly low. The

water allocation between drinking water and irrigation purposes is not yet formalized with a policy framework. Several of these sharing arrangements are made at project level or at the District Collector level. Obviously several of the major and medium irrigation schemes are largely perceived as “irrigation only” schemes and allocating water for drinking purposes is a latest trend. Since both drinking water and irrigation are sensitive issues, considerable importance is given to these two issues by current political leadership.

It is important to note that water user associations largely consist of agriculturists and not drinking water users. The institutions related to irrigation/agriculture are well organized and fairly strong, when compared to those institutions around drinking water. This imbalance in institutional space could tilt the priority towards irrigation, when there is a scarcity for water. On the other hand, the urban centers, which are mainly dependent on irrigation reservoirs/projects, are able to influence the operational policies and get water transported to their settlements. In this process, they are also able to deprive the local farmers in the designed command areas. In this process, the rural settlements are yet to gain space and strength.

**Issues Related to Rural Development Department:** Several schemes of rural development department are focused on improving ground / surface water facilities for agriculture. The explicit or implicit priority for drinking water is almost negligible. It is observed that several of the rural development schemes have mixed results on drinking water situation in the rural areas. On one hand, in the short run, the drinking water potential increases as a result of watershed development projects. But, on the other hand, in long run, these schemes also induce an artificial scarcity of drinking water. In fact several of these schemes increase the “demand” for ground/ surface water as they tend to improve the infrastructure facilities for harvesting rain water. This “unregulated” demand for water, which is a result of large scale private investments that exploit the ground / surface water potential, puts drinking water in a precarious situation. Though the effectiveness of AP Water, Land and Trees, Act (2004) is not yet formally established, there is a general sense that this Act is not very effective in real terms in regulating the groundwater use.

Similarly, at present there is considerable priority to rural housing schemes in the state. These schemes also did not effectively integrate WASH services. The drinking water, sanitation and waste disposal arrangements received cursory attention in these housing schemes.

Given these observations, there is a need for bringing the focus of WASH services (drinking water, sanitation and hygiene practices) in all rural development schemes (with natural resource management projects and rural housing schemes). This focus could save considerable investments and influence the composition of drinking water schemes in the state (Eg: Share of budgets for Single Village Schemes and Multi Village Schemes)

**Issues Related to Panchayati Raj Department:** In the light of 73rd Amendment, local governance institutions (Zilla Parishad, Mandal Parishad and Grama Panchayati) are expected to perform various functions. The amendment also talks about devolution of funds, functionaries and functions. In case of rural drinking water supply and sanitation, the principles of devolution are followed. The local institutions are expected to take major responsibility in operation and maintenance of drinking water infrastructure and sanitation. They are expected to levy user charges for this purpose. Certain funds are allocated for maintenance purpose and spare parts are made available at mandal level for maintenance of hand pumps. However, the capacities of Grama Panchayat in management and maintenance of drinking water facilities seem to be a major challenge. There is a need to develop capacities of Grama Panchayati members and systems of coordination between Grama Panchayati and RWSS Department. It is important to realize that the RWSS Department also had tough time in operation and maintenance of drinking water facilities and it is always a low priority, when compared to creating new infrastructure. The Grama Panchayati also might take considerable time to evolve their systems and capacities to perform these functions.

**Issues Related to Groundwater Department:** The groundwater surveys and monitoring is an important input in locating drinking water sources. However, the number of persons engaged with groundwater surveys and monitoring (within the department) is fairly low. The professional inputs on groundwater related data is expected to be derived from the available data sources of groundwater department. The staff of groundwater department also spends very little or no time for exactly identifying the sources of groundwater in rural areas. One could broadly conclude that the inputs on groundwater related issues have been fairly reducing over a period of time.

**Issues Related to Pollution Control Board:** The regulatory function of pollution control board is found to be fairly weak in several parts of the state. Locations nearby major urban settlements and industrial units are already polluted. The action on these polluting industries and municipalities is either absent or long pending. The implications and consequences of pollution of ground/surface water are the following.

- Quality of drinking water of several sources is deteriorating in several parts of the state, due to uncontrolled pollution. As a result, several villages are slipping back to the No Safe Source (NSS) category.
- A cluster of such villages warrant the intervention of RWSS Department and the obvious solution seems to be Multi Village Scheme, where drinking water is being “imported” from faraway places / reservoirs.
- This perpetuates the negligence of existing drinking water facilities in the village. Eventually, such villages under MVS face several management problems.

As the regulation of groundwater use and control of pollution is not effective, several villages are becoming part of multi village schemes. It is important to realize that this trend is not a desirable one.

**Issues Related to Education and Health Department:** Hygiene practices and related education is being imparted to young children by schools and anganwadis, as part of their mandate. The effectiveness of these inputs varies from place to place and largely dependent on the interest of individual members of these departments (teachers/anganwadi members). It is important to strengthen the linkage between the education and health department and RWSS Department for improving the Information, Education and Communication services by the existing staff of the education and health departments.

**Issues Related to Civil Society Organizations:** Many civil society organizations are able to contribute to WASH services effectively. However, their number is very limited and their presence is concentrated. They do not have necessary capacities to influence the policy and programmatic directions. They are largely limited to “service delivery and stereo typed roles” (Community mobilization, awareness generation and capacity development). These roles are also performed as per the project requirement (Eg: Total Sanitation Campaign). Their partnerships and engagement with RWSS Department and rural communities is informal and inconsistent over a period of time.

**Issues Related to CBOs:** It is fair that each CBO has a specific focus in which the members are interested. Drinking water, sanitation and hygiene services are not formal mandate of several CBOs, except for Water and Sanitation Committees. In several places, the WASH based institutions are either weak or absent. As a result, the attention given by these CBOs (including water sanitation committees) is fairly low. Due to this several hygiene related practices are not internalized in the daily life of the rural

communities. This has considerable impact on the use of individual sanitary latrines and other hygiene related practices. Absence of leadership on WASH practices within CBOs is a major concern.

**Issues Related to Markets:** Profit is the bottom line for markets. The drinking water markets are biased against the poorer sections of the rural society, as they cannot afford the higher price of the drinking water. They tend to pay higher share of their incomes for getting safe drinking water, when compared to relatively better off communities in the rural areas. The basic input for these water markets (source of water) is largely from public sources (such as groundwater, tank, canal, any other surface water). Even then, this market is not regulated till now. In a way, the public is subsidizing the water markets by allowing them to use water (as a basic input) freely.

## **A TYPICAL LIFE CYCLE OF DRINKING WATER FACILITIES IN RURAL AREAS IN ANDHRA PRADESH**

In this section of the report, an attempt is made to project a typical picture of a life cycle of drinking water facilities in rural areas. At various stages of these drinking water facilities (conceptualization to operation & maintenance), different institutions and actors take responsibilities (Table No 2). These inputs and interfaces enhance the quality and life of each intervention.

In this depiction, an ideal picture is presented. It is obvious that there would be several deviations from this ideal process path. It may be also noted that the revised institutional roles and functions as per the Box No - 1 might call for a different arrangement in terms of responsibility sharing. The role of communities (particularly disadvantaged); sustainability of source and infrastructure; financial viability with equity concern are some of the issues that need to find a stronger role in the life cycle of drinking water facilities in the rural areas. There are considerable gaps in understanding the total picture of water resources and planning for drinking water resources/ systems. The usual missing links are - incomplete resource investigations; low level of support for resource conservation/ sustainability; low investments for capacity building of institutions; appropriate designing of tariff and maintenance systems.

**Table No -2 : A Typical Life Cycle of Drinking Water Facilities in Rural Areas of AP**

Process Step	● Key Process	Process Description
	● Key Actors	
1.	● Process of selection of Scheme	● Based on demand or need, a scheme is conceptualized. This need or demand might emerge from local leaders, people's representatives or a specific local situation.
	● Political leader; People's Representatives; Local strong person; Department based on the problem; Any other	
2.	● Preliminary investigation for feasibility	<ul style="list-style-type: none"> <li>● Based on the above demand, a preliminary investigation would be conducted to assess the availability of water (source, quality and quantity). Based on the source, a tentative estimation is prepared.</li> <li>● An assessment of local water resources and their potential for supplying drinking water is assessed. Convergence of any on-going water resource development projects is to be explored.</li> <li>● Similarly, the quality of water resources is to be assessed to ensure the suitability of drinking water.</li> <li>● In this process, local leaders (mainly Grama Panchayati President or locally active leaders) might participate.</li> </ul>
	● RWSS/PRED; Geological investigators (From Department of Groundwater or from within the RWSS Dept); Irrigation Department; Local Leaders	
3.	● Field investigation for water resources assessment and Design of Infrastructure	<ul style="list-style-type: none"> <li>● Based on the feasibility study, a detailed engineering survey would be conducted. Based on this, technical options are decided.</li> <li>● Based on engineering survey; designs, plans and estimates are prepared for approval and sanction.</li> </ul>
	● RWSS	
4.	● Funding source/Funding	● Based on the estimate and other considerations, these approved plans are converted into project proposals for fund raising. These project proposals are presented to various central/ state government schemes for consideration and approval.
	● RWSS	

Contd...

Table No - 2 : Contd...

Process Step	● Key Process	Process Description
	● Key Actors	
5.	● Exact Source Identification	<ul style="list-style-type: none"> <li>● Once a scheme is approved (tentative sources and budgets), detailed investigations are conducted to identify exact source of drinking water. This process differs in Single and Multi Village Schemes and source to source (groundwater and surface water).</li> <li>● In this process, the quality and quantity (availability of drinking water) are estimated through pumping tests and quality tests.</li> </ul>
	● Experts on Quality and Quantity Assessment (water quality tests and geological surveyors from within/ outside RWSS Department)	
6.	● Execution of Works	<ul style="list-style-type: none"> <li>● Tenders are invited by RWSS for executing the works. The contractors who have successfully bid for the tenders execute the works, following the designs and estimates prepared by RWSS Department.</li> </ul>
	● RWSS; Contractors	
7.	● Establishment of System of storage, treatment and distribution	<ul style="list-style-type: none"> <li>● As per the design, the drinking water supply system would be established with necessary components such as storage tanks (overhead; summer storage; cistern; balancing reservoir, local storage - overhead storage tanks or ground level storage tanks , sumps and so on). Similarly, facilities for water treatment and supply are also made. The water would reach either villages or stand posts or individual households.</li> </ul>
	● RWSS; Contractors	
8.	● Operation and Maintenance	<ul style="list-style-type: none"> <li>● Grama Panchayati is expected to have a person to run the system on day-to-day basis. It includes water quality testing, operating motors/ pumps/ treatment plants/ power supply/ repairs and servicing/ any other.</li> </ul>
	● RWSS/ Mandal/ Grama Panchayati/ Operators/ Water Quality Analysts/ Families consuming water	

Contd...

Table No - 2 : Contd...

Process Step	● Key Process	Process Description
	● Key Actors	
		<ul style="list-style-type: none"> <li>● Families, which consume water are expected to make payments for water as per the financial norms. The Grama Panchayati has to take the responsibility of keeping records and ensuring that the drinking water infrastructure is functional.</li> <li>● Depending on the time period for which the system functions (depending on the availability of water from the given source and quality of physical infrastructure), there is a need to rehabilitate the system. This process might include complete removal of existing machinery or repairing the existing ones. Depending on the scale of operation, local governance institutions (Village/ Mandal/ District Panchayatis) or Department of Rural Water Supply and Sanitation takes up this responsibility.</li> </ul>
9.	● Use of water and Waste Disposal	<ul style="list-style-type: none"> <li>● Individual families and persons consume water for various purposes. This process not only meets the basic needs of persons, but also generates waste water, at the end of water consumption.</li> <li>● Community level/ individual family level facilities are to be established for safe disposal of waste water.</li> </ul>
	● Community	

Contd...

Table No - 2 : Contd...

Process Step	<ul style="list-style-type: none"> <li>● Key Process</li> </ul>	Process Description
	<ul style="list-style-type: none"> <li>● Key Actors</li> </ul>	
10.	<ul style="list-style-type: none"> <li>● Water Tariffs and collection</li> </ul>	<ul style="list-style-type: none"> <li>● The PRI and community should be involved in fixing of cess/water tariff</li> <li>● One of the role's of the Gram Panchayats/ Village Water and Sanitation Committee is collection of funds through a tariff system for O&amp;M of water supply and sanitation works;</li> <li>● Villagers (selected / interested villagers) can also be involved in collection of funds - capital cost share, O&amp;M cost, etc. This entire process depends on the local leadership and involvement of local communities in such matters.</li> <li>● The tariff in case of a Multi Village Scheme that is within a district is approved by District Panchayat / DWSM. The tariff for MVS covering 2 or more districts is approved by State Water and Sanitation Mission (SWSM)</li> </ul>
	<ul style="list-style-type: none"> <li>● PRI, Village Water and Sanitation Committee (VWSC)</li> </ul>	
11.	<ul style="list-style-type: none"> <li>● Provision of technology options at national/ state level</li> </ul>	<ul style="list-style-type: none"> <li>● They are responsible for identifying, evaluating and prioritizing research areas and projects. This will help the Mission to identify, adopt, generate, modify technological as well as research and developmental activities with specific reference to Rural Water Supply and Sanitation sectors.</li> </ul>
	<ul style="list-style-type: none"> <li>● Research advisory committee at national level.</li> </ul>	
	<ul style="list-style-type: none"> <li>● State Water and Sanitation Mission (SWSM)/District Water and Sanitation Committee (DWSC), the Core Group<sup>6</sup>.</li> </ul>	

Contd...

<sup>6</sup> The core team includes: professionals in the field of community development, drinking water supply, engineering, rural management, sociology/social sciences, communication, human resource development, etc

Table No - 2 : Contd...

Process Step	● Key Process	Process Description
	● Key Actors	
		<ul style="list-style-type: none"> <li>● Several factors influence the selection process: (technical feasibility; users' preferences and requirements;) Willingness to contribute towards capital cost and O&amp;M; Site specific conditions such as; Availability and reliability of electricity supply; Quality of ground water etc. must also be factored in by the community while making choice of technology.</li> <li>● The service level shall be as per the users' preference.</li> <li>● Priority should be given to rehabilitation and / extension of existing schemes.</li> <li>● Adequate room for local level innovations and greater community participation should also be provided for<sup>7</sup></li> <li>● In case of sanitation program the vertical upgradation is encouraged in view of the affordability of the economically weaker sections of the society.</li> </ul>
12.	<ul style="list-style-type: none"> <li>● Efforts to conserve water resources and sustain the water resources</li> </ul> <hr/> <ul style="list-style-type: none"> <li>● Local Institutions such as Grama Panchayati; CBOs such as watershed committees; Line Departments/ Project Staff and regulatory agencies such as pollution control boards, etc.</li> </ul>	<ul style="list-style-type: none"> <li>● Planning special interventions for conserving rain water/ streams near the source of drinking water in such a way that water source is sustained.</li> <li>● Apart from that, take precautions for not spoiling the quality of water by pollution or any other type of human action.</li> <li>● Ensuring regulated use of ground water (for irrigation/ industrial/ recreational purposes) in water scarce regions so that the drinking water sources is protected.</li> </ul>

Contd...

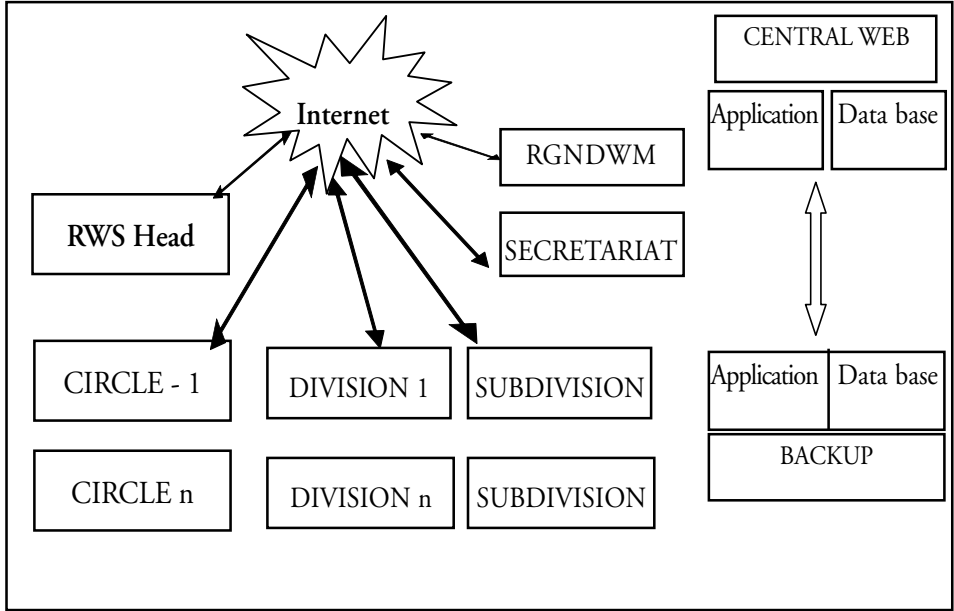
<sup>7</sup> Taken from Swajaldhara guidelines 2003 and ARWSP guidelines 1999-2000.

Table No - 2 : Contd...

Process Step	<ul style="list-style-type: none"> <li>● Key Process</li> <li>● Key Actors</li> </ul>	Process Description
13.	<ul style="list-style-type: none"> <li>● Up-gradation and rehabilitation</li> <li>● Individual Households/ Local Governance Institutions (Village/ mandal/ District Panchayati) with the support of RWSS</li> </ul>	<ul style="list-style-type: none"> <li>● As the time passes, the systems (infrastructure, quantity and quality of water) may not be adequate for the growing size and needs of population. In such cases, there would be efforts made by local governments/ households/ department to augment the available services.</li> <li>● In the above process, there may be several options such as complete re-habilitation of the existing system; up-gradation of existing systems.</li> <li>● Apart from political will, the innovations and technological developments also influence the choice of interventions for this purpose.</li> <li>● Sometimes, this process is completely designed/ implemented as a new intervention.</li> </ul>

# WaterSoft – A Tool for Project Management and Decision Support

## Tool Unveiling Watersoft :



The integration of IT infrastructure in the State PRED/ Boards/ Nigams was initiated in the year 1986, with special funds allocated towards this process for each state by the Department of Drinking Water Supply (re-named as the Rajiv Gandhi National Drinking Water Mission (RGNDWM)) under the Ministry of Rural Development, Government of India (GoI). After the computerization of the departments the next step was to encourage the development of Management Information Systems (MIS) in each state with special funds allocated towards procurement of hardware, software and “*emphasis on development of suitable Application software for the rural water supply sector of the State govt.*”<sup>8</sup>

For the MIS and computerization during the 9<sup>th</sup> Plan funds had been allocated to all the state PRED/Nigam /Boards. The total funds released by RGNDWM, Government of India were Rs 893.82 million and the total utilization was Rs 853.67 million (95.51%). During the 10<sup>th</sup> Five Year Plan the revised guidelines were issued on February 2003 and so far various state governments have been sanctioned projects totalling to Rs. 999.3 millions.

<sup>8</sup> Website of the Department of Drinking Water Department, GOI: [http://ddws.nic.in/mis\\_prog.htm](http://ddws.nic.in/mis_prog.htm)

As part of this upgradation process, Andhra Pradesh was allocated a total of Rs. 53.34 millions. Out of this sanctioned amount GOI released Rs. 52.48 million and the entire amount was spent by the department.

The department of PHED now branched into the Rural Water Supply and Sanitation (RWSS) department has installed new software and hardware, created network (LAN and WAN connectivity) at the head office and circle and division offices, created IT resources at the head office and conducted several training programs for the same.

Keeping in view the emphasis laid by the GOI on development of suitable Application software for the rural water supply sector the RWSS department submitted a proposal for the creation of an application software called Watersoft. The National Informatics Centre submitted the project proposal for Design & Development of Web application of Watersoft for complete automation of the RWS sector for an amount of Rs.6.99 million under MIS project.

The proposed activities under the Watersoft application are:

- Planning and execution of works under various grants
- Maintaining upto date Habitation Directory Status
- Monitoring with respect to progress of works and fund management
- Automate the work flow for generating the necessary reports at all levels

### **WATERSOFT Architecture<sup>9</sup>**

Watersoft is said to have several key features that include easy uploading of information from any of the key offices in the districts, generation of comprehensive reports which provides overall view of the state's status in regard to habitation status, assets available, water quality, etc. It also is provided with consecutive links that move into further details district-wise, mandal-wise, and so on.

It gives the officers at the RWSS department easy access to information from the software as it is a Web-based application. Armed with user name and password, it provides them access to the database contained within the software. Apart from easy access it also allows for immediate online reviews/ sanctions/ approvals, and monitoring with respect to progress of works and fund management. Based on the data fed into the watersoft

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<sup>9</sup> Diagram source: Presentation on "Watersoft web-based MIS" by NIC at RWSS Office.



person who wants to launch a complaint on the website could be easily dissuaded by the difficulty and time it takes to locate the related webpage.

WASHCost project has considerable potential to contribute to the evolution of this software and incorporate certain dimensions of costs, in delivering WASH services. WASHCost teams should develop deeper understanding of this software and relate the information base of this software with WASHCost project objectives. The decision support tools contemplated in WASHCost project need to be synchronized with the available WaterSoft packages of RWSS Department.

## SECTION - 3

# FACTORS INFLUENCING WASH SERVICES IN RURAL ANDHRA PRADESH - QUANTITY AND QUALITY

### DRINKING WATER – TRENDS IN PROVISION OF SAFE DRINKING WATER TO RURAL SETTLEMENTS

GoAP broadly followed the policies and program guidelines of GoI for providing drinking water to its habitations. Five Year Plans, Accelerated Rural Water Supply Program; Minimum Needs Program; National Drinking Water Mission; Rajiv Gandhi National Drinking Water Mission; Sector Reforms; Swajaldhara Project are some of the policies/ programs under which GoAP provided drinking water to its rural population, over a period of time. Recently, GoAP stated its own vision for drinking water and sanitation.

GoI conducted a comprehensive survey of all habitations to understand the status of coverage of drinking water provision in 2003. GoAP regularly tracks these villages and updates the situation. The following table gives the trend in coverage of villages under various drinking water schemes in the state for last five years. (Refer Table No- 3 ). It is clear that

- 2435 new habitations are added to the list of total habitations in last five years.
- About 3108 village were covered under Qualitatively Affected Villages, in last five years. About 65% of villages under this category were provided safe drinking water (either partially or fully) in last five years.
- However, number of villages under “Not Covered” category increased by 50% in last five years (3579 to 5380).
- Number of villages under “Partially Covered” category also reduced by 10% between 2003 and 2008. These villages either slipped to “Not Covered” category or to “Qualitatively Affected” category or to “Fully Covered” category.
  - Number of fully covered villages increased by 25% in last 5 years.

From the above analysis, it is clear that the fluctuation in the coverage of habitations for rural drinking water supply is a reality. Either these village “slip back” to no source village or “graduate” to partially or fully covered status.

**BOX No. 3**  
**Basic Understanding on**  
**Provision of WASH Services**

The WASH services provided by Rural Water Supply and Sanitation Department, GoAP could be broadly categorized into the following

**Drinking Water**

● **Single Village Schemes**

o Source is largely groundwater or surface water bodies in the village

o Hand Pumps

o Bore Wells; Bore Wells with Over Head/ Ground Level Storage Reservoirs with Distribution network and Taps/Public Stand Posts and/or Individual Connections)

o Pump House; Filtration Units, Over Head/ Ground Level Tanks with Distribution network and Taps (Public Stand Posts and/or Individual Connections)

● **Multi Village Schemes**

o Source is largely surface water bodies/ reservoirs/canals of medium and large irrigation projects

o Pump Houses; Filtering Units; Storage and Distribution Network; Over Head/ Ground Level Tanks with Distribution network and Taps (Public Stand Posts and/or Individual Connections)

**Sanitation and Hygiene:**

● **Total Sanitation Campaign**

o TSC has a special focus on "demand driven" approach and package of interventions to make villages into clean places. School Sanitation; Anganwadi Sanitation; Hygiene education of young children (IEC) are part of this campaign. Grama Panchayat is expected to develop a plan for maintaining cleanliness by establishing systems for garbage removal and drainage water disposal.

o Main intervention related to sanitation is individual sanitary latrines. Community latrines are not found to be effective and are not promoted anymore.

***Problem with Problem Villages:***

These fluctuations have another dimension also. This dimension is, however, very different from normal ones. The data related to number of problem villages, villages covered (fully and partially) and no source villages/ quality affected villages is very confusing and arguably undependable. It is interesting to note that all these sources are from the respective departments only (GoI level and GoAP level). The survey conducted by GoI in 2003 gave a picture of the situation. The data related to problem villages and various categories of villages is available from web sites of Rajiv Gandhi Drinking Water

**Table No - 3: Trends in Coverage of Habitations - Drinking Water Provision in AP**

Year (Source)	Quality Affected (QA)	Not Covered (NC)	Partially Covered (PC)	Fully Covered (FC)	Total
1.4.2003 (1)	4755	3579	34229	26739	69302
1.4.2004 (2)	2682	1651	34748	32459	71540
1.4.2007 (3)	1953	6255	32738	31292	72238
1.4.2008 (4)	1647	5380	31988	32722	71737
	<b>Reduction in QA Villages</b>	<b>Increase in Not Covered Villages</b>	<b>Reduction in Partially Covered</b>	<b>Increase in Fully Covered Villages</b>	<b>Total</b>
<b>Change in 5 years</b>	<b>-3108</b>	<b>1801</b>	<b>-2241</b>	<b>5983</b>	<b>2435</b>

Source: National Habitation Survey, GoI (1); Progress Reports Submitted to Task Force on Water Vision (2); Presentation by Principal Secretary, RWS, GoAP, July 2008 (3 and 4)

Mission. The RWSS Department also has been conducting similar surveys from time to time and produces the status of problem villages (on annual basis). The status of habitations is also available on website of RWSS Department (Watersoft, which is maintained by National Informatics Center). There is considerable variation between these reports from these two sources (Department Records and Official Web Site). This is evident from the following tables. (Table 4 to Table No - 7) (Also refer Box No-4)

### *Going Beyond the Definitions*

The root of confusions related to data bases is also related to definition of the terms. Though the definition of problem villages partially covered and no source villages are universal, there are operational problems in actually understanding these terms in reality. The surveys largely indicate the “provision” of infrastructure facilities such as hand pumps and other water supply systems at a habitation level. Habitation is taken as a unit for analysis. However, it is important to recognize that mere provision of infrastructure facilities at habitation level does not translate into “access” by all communities/ families in the habitation. Since households/ families are not the unit of analysis, the “actual coverage” such as caste discrimination; location disadvantages of certain families within habitations; seasonal variations in water availability; poor operation and maintenance of available infrastructure facilities are not known. It is important to understand how these “excluded” or “uncovered” families are actually meeting their drinking and domestic water needs. Some of the important concerns are: “What kind of costs are these families paying to get WASH services?”

## Box No - 4

### Standard Definitions of Problem Villages and Covered Villages Rajiv Gandhi National Drinking Water Mission, GoI

A 'problem' village was defined as one where no source of safe water is available, within a distance of 1.6 km from habitation in the plains or 100 mt elevation in hills or where is available at a depth more than 15 metres or water source has excess salinity, iron, fluorides and other toxic materials or where water is exposed to the risk of Cholera or Guinea Worm.

**Accelerated Rural Water Supply Project of GoI** aims to supplement the efforts of the State Governments in covering the rural habitations with drinking water supply. The following norms are being adopted for providing drinking water to rural population in the habitations:

- a) 40 liters per capita per day (lpcd) of safe drinking water for human beings.
- b) 30 lpcd additional for cattle in the Desert Development Programme Areas.
- c) One hand-pump or stand post for every 250 persons.
- d) The water source should exist within the habitation / within 1.6 km in the plains and within 100 mtrs. elevation in the hilly areas.

The habitations satisfying the above conditions are categorized as Fully Covered (FC). In case the availability of safe drinking water in a habitation is less than 40 lpcd, but more than 10 lpcd, between 10 and 40 lpcd, such a habitation is categorized as Partially Covered (PC). Habitations having less than 10 lpcd are categorized as Not Covered (NC).

In the light of confusing data bases and incomplete explanations of coverage, the outreach of WASH services in covered and uncovered habitations needs a fresh approach in conceptualization, understanding and policy framework. It is important to realize that there are several factors that influence the access, quantity and quality of drinking water by rural communities. WASHCost project aims at unearthing some of these issues, as part of the action research agenda. The field work, literature review and interaction with project managers/ policy makers broadly indicate the influence of following factors on the trends of coverage (availability of drinking water facilities) or slippage in the rural areas. This trend also has serious implications on the cost of WASH services. This section tries to project some light on the factors that are behind these fluctuating fortunes of rural habitations.

- Quantity of Drinking Water -Sustainability of Source
- Quality of Water
- Institutional Arrangements for Operation and Maintenance

**Table No – 4: District Wise Status of Habitations 1.04.08**

Sl. No.	District	QA	Status of habitations as on 1.4.08							FC	Total
			NC			PC					
			NC	PC1	Total	PC2	PC3	PC4	Total		
1.	Srikakulam	75	0	352	352	611	548	489	1648	1815	3890
2.	Vizianagaram	124	13	220	233	210	237	270	717	1799	2873
3.	Visakhapatnam	14	361	393	754	738	771	565	2074	2601	5443
4.	East Godavari	2	0	721	721	415	363	264	1042	1149	2914
5.	West Godavari	76	0	167	167	147	140	335	622	1293	2158
6.	Krishna	53	0	214	214	148	304	293	745	1473	2485
7.	Guntur	163	0	92	92	422	213	146	781	655	1691
8.	Prakasam	361	0	73	73	524	333	211	1068	833	2335
9.	Nellore	38	0	38	38	512	564	447	1523	1439	3038
10.	Chittoor	3	0	563	563	1683	818	476	2977	7086	10629
11.	Kadapa	11	0	423	423	1197	1003	578	2778	1302	4514
12.	Anantapur	24	0	18	18	148	482	652	1282	2002	3326
13.	Kurnool	19	0	6	6	236	269	312	817	678	1520
14.	Mahabubnagar	105	1	334	335	634	546	292	1472	1509	3421
15.	Ranga Reddy	36	0	130	130	400	390	323	1113	404	1683
16.	Medak	0	0	91	91	464	682	411	1557	680	2328
17.	Nizamabad	0	0	100	100	202	379	383	964	568	1632
18.	Adilabad	13	14	424	438	886	778	315	1979	1180	3610
19.	Karimnagar	143	0	110	110	379	650	667	1696	313	2262
20.	Warangal	4	0	263	263	908	658	459	2025	1240	3532
21.	Khammam	133	1	216	217	702	551	334	1587	1223	3160
22.	Nalgonda	250	5	37	42	331	719	471	1521	1480	3293
	<b>Total</b>	<b>1647</b>	<b>395</b>	<b>4985</b>	<b>5380</b>	<b>11897</b>	<b>11398</b>	<b>8693</b>	<b>31988</b>	<b>32722</b>	<b>71737</b>

*Source:* Presentation by Principal Secretary, RWSS Department, June 2008

Table No - 5: District Wise Status of Habitations 1.04.07

Sl. No.	District	QA	Status of habitations as on 1.4.08							FC	Total
			NC			PC					
			NC	PC1	Total	PC2	PC3	PC4	Total		
1	Srikakulam	76	0	360	360	615	553	495	1663	1839	3938
2	Vizianagaram	133	16	269	285	245	258	353	856	1600	2874
3	Visakhapatnam	10	389	453	842	780	792	565	2137	2459	5448
4	East Godavari	1	0	751	751	425	375	267	1067	1082	2901
5	West Godavari	76	0	167	167	147	140	336	623	1292	2158
6	Krishna	76	0	278	278	211	340	338	889	1248	2491
7	Guntur	181	0	89	89	427	218	148	793	633	1696
8	Prakasam	409	0	87	87	542	311	193	1046	796	2338
9	Nellore	75	0	42	42	560	613	468	1641	1296	3054
10	Chittoor	0	0	666	666	1892	834	492	3218	7023	10907
11	Kadapa	10	0	596	596	1284	985	460	2729	1207	4542
12	Anantapur	163	0	44	44	328	481	549	1358	1764	3329
13	Kurnool	20	0	11	11	288	276	306	870	620	1521
14	Mahabubnagar	95	0	453	453	631	524	275	1430	1443	3421
15	Ranga Reddy	34	0	148	148	461	384	290	1135	368	1685
16	Medak	0	0	104	104	509	687	404	1600	666	2370
17	Nizamabad	0	0	102	102	203	382	393	978	552	1632
18	Adilabad	22	14	532	546	878	743	281	1902	1140	3610
19	Karimnagar	144	0	125	125	445	622	611	1678	312	2259
20	Warangal	2	0	297	297	929	641	442	2012	1231	3542
21	Khammam	155	0	223	223	739	558	297	1594	1233	3205
22	Nalgonda	269	5	34	39	335	707	472	1514	1488	3310
	<b>Total</b>	<b>1951</b>	<b>424</b>	<b>5831</b>	<b>6255</b>	<b>12874</b>	<b>11424</b>	<b>8435</b>	<b>32733</b>	<b>31292</b>	<b>72231</b>

Source: Presentation by Principal Secretary, RWSS Department, June 2008

Table No -6: District Wise Status of Habitations as on 1.04.2008 (WaterSoft) Year: 1st April 2008

Sl. No.	District Name	Total	Habitation Status						
			FC	PC4	PC3	PC2	PC1	NC	NSS
1	Srikakulam	3932	1883	483	544	607	344	13	58
2	Vizianagaram	2873	1802	271	241	213	223	13	110
3	Visakhapatnam	5442	2614	561	768	736	390	359	14
4	East Godavari	2910	1227	284	393	412	592	0	2
5	West Godavari	2158	1332	325	134	139	153	0	75
6	Krishna	2491	1564	250	287	136	207	0	47
7	Guntur	1696	655	147	213	423	94	0	164
8	Prakasam	2345	837	212	334	527	75	0	360
9	Nellore	3038	1473	446	556	493	34	0	36
10	Chittoor	10810	7162	496	852	1722	574	1	3
11	Kadapa	4329	1235	582	982	1149	372	0	9
12	Ananatapur	3326	2002	652	482	148	18	0	24
13	Kurnool	1518	677	313	269	235	5	0	19
14	Mahabubnagar	3420	1509	293	546	633	334	0	105
15	Ranga Reddy	1686	404	324	391	400	131	0	36
16	Medak	2356	676	468	674	468	70	0	0
17	Nizamabad	1632	659	348	352	178	95	0	0
18	Adilabad	3610	1172	313	781	892	425	14	13
19	Karimnagar	2262	312	666	650	380	110	0	144
20	Warangal	3542	1292	493	723	816	216	0	2
21	Khammam	3088	1195	329	540	676	215	1	132
22	Nalgonda	3264	1477	510	725	311	32	4	205
<b>Grand Total</b>		<b>71728</b>	<b>33159</b>	<b>8766</b>	<b>11437</b>	<b>11694</b>	<b>4709</b>	<b>405</b>	<b>1558</b>

Source: WaterSoft, Web Site of RWSS Department, GoAP (Nov 2008)

Table No - 7: District Wise Status of Habitations as on 1.04.07 (WaterSoft) Year : 1st April 2007

Sl. No.	District Name	Total	Habitation Status						
			FC	PC4	PC3	PC2	PC1	NC	NSS
1	Srikakulam	3891	1817	491	551	614	342	0	76
2	Vizianagaram	2874	1600	353	258	245	269	16	133
3	Visakhapatnam	5446	2458	564	792	780	453	389	10
4	East Godavari	2891	1073	267	375	424	751	0	1
5	West Godavari	2157	1292	336	140	147	166	0	76
6	Krishna	2479	1240	336	340	210	277	0	76
7	Guntur	1694	631	148	218	427	89	0	181
8	Prakasam	2338	796	193	311	542	87	0	409
9	Nellore	3053	1296	468	613	559	42	0	75
10	Chittoor	10670	6812	476	831	1887	664	0	0
11	Kadapa	4397	1167	450	957	1255	558	0	10
12	Ananatapur	3329	1764	549	481	328	44	0	163
13	Kurnool	1514	618	305	273	287	11	0	20
14	Mahabubnagar	3416	1441	275	524	629	452	0	95
15	Ranga Reddy	1684	368	289	384	461	148	0	34
16	Medak	2270	622	385	661	503	99	0	0
17	Nizamabad	1632	552	393	382	203	102	0	0
18	Adilabad	3579	1133	279	741	859	531	14	22
19	Karimnagar	2258	312	610	622	445	125	0	144
20	Warangal	3487	1216	437	633	910	289	0	2
21	Khammam	3073	1174	288	540	700	216	0	155
22	Nalgonda	3262	1454	472	697	331	34	5	269
	<b>Grand Total</b>	<b>71394</b>	<b>30836</b>	<b>8364</b>	<b>11324</b>	<b>12746</b>	<b>5749</b>	<b>424</b>	<b>1951</b>

Source: WaterSoft, Web Site of RWSS Department, GoAP

Designed & Developed by National Informatics Centre, AP State Centre

## QUANTITY OF DRINKING WATER - SUSTAINABILITY OF SOURCE

As mentioned, the source of drinking water is either groundwater or surface water. This section analyses the issues related to dependency on both groundwater and surface water sources<sup>10</sup>. (Please Refer Table No 8, 9 and 10)

- 72% of population depends on groundwater for drinking water purpose. Number of schemes that are based on groundwater are
  - No of Hand Pumps - 3,20,545
  - No of Single Village Schemes - 46,451
- 28% of population depends on surface water sources for drinking water purpose. Number of Schemes that are based on surface water are
  - Multi Village Schemes (Completed) - 386
  - Multi Village Schemes (On-going) -- 233
- Well population increased from 8.0 to 25.0 lakhs in last thirty years. Average annual growth rate of well population in the state is about 50,000 wells per year. Area irrigated through groundwater increased from 10 to 28 lakh hectares. This constitutes about 50% of the total area irrigated.

Table No – 8  
Changing Groundwater Scenario in Hard Rock Hydro Systems

Years	Type of Wells	Yield	Well density/ sq.km
1982	Dug wells	60 - 150 cu.m	< 5
1983-84	Dug wells/ Dug cum bore wells	60 - 150 cu.m	5 - 10
1984-94	Dug wells/ bore wells	40 - 100 cu.m / 150 - 600 lpm	> 10
1994-98	Bore wells/ Dug cum bore wells	50 - 400 lpm / 30 - 60 cu.m	> 15
1998-06	Bore wells/ Few dug cum bore wells	50 - 150 lpm / 20 - 40 cu.m	> 20

Source: Web Site of Department of Groundwater, GoAP

<sup>10</sup> Sources: Data available from Web Sites of Department of Groundwater; Presentations by Principal Secretary, RWSS Department (July 2008); Presentation by AK Jain, Secretary, Irrigation Dept, (July 2008)

4. On an average the density of wells increased from 5 wells per sq.km. to over 10 wells per sq.km. But, in hard rock areas it is over 20 wells per sq.km and in some pockets it is as high as 100 wells per sq.km. As a result of this increased density, the yields have decreased considerably and water levels have gone down alarmingly.
5. Agriculture practices (including horticulture) in various parts of the state are also an important influencing factor behind this trend. Groundwater based irrigation is most common in several drought prone districts. Water intense crops are grown irrespective of their suitability to local conditions. Continuous extraction of

Table No - 9: District Wise Types of Water Supply Schemes

Sl. No.	District	Multi Village Scheme	PWS Scheme	Hand Pumps	Water Quality Monitoring Labs
1	Srikakulam	12	531	12027	3
2	Vizianagaram	13	521	12281	2
3	Visakhapatnam	34	1588	15271	2
4	East Godavari	22	1113	8328	2
5	West Godavari	12	2002	3134	2
6	Krishna36	1302	9210	2	
7	Guntur50	869	12029	3	
8	Prakasam	30	1343	23028	2
9	Nellore29	2139	15932	2	
10	Chittoor9	7222	20149	3	
11	Kadapa15	3501	13256	3	
12	Anantapur	54	2894	14383	3
13	Kurnool	50	2093	13354	3
14	Mahabubnagar	14	3135	17724	3
15	Ranga Reddy	7	1402	11271	2
16	Medak19	1506	14229	2	
17	Nizamabad	22	2195	12548	2
18	Adilabad	5	2405	18222	2
19	Karimnagar	14	2057	19163	2
20	Warangal	9	2786	17285	2
21	Khammam	26	1434	19620	2
22	Nalgonda	8	2623	18470	2
	<b>Total</b>	<b>490</b>	<b>46661</b>	<b>320914</b>	<b>51</b>

Source: RWSS Department, Aug 2008

groundwater, application of high external inputs (chemical fertilizers and pesticides) and recurring droughts have influenced the soil moisture regime at root zone of crops, sub-surface levels and also at deep aquifers. This trend also influenced the surface hydrology, where the flow of streams almost stopped in several parts of the state. Rivers flowed occasionally and tanks got filled during rare heavy rains only. The new behavior of hydrology (groundwater and surface water) has a deep negative impact on the availability of water in the rural areas.

6. As the local groundwater resources drastically reduced, the drinking water schemes depending on groundwater became dysfunctional. This triggered the process of establishing Multi Village Schemes in rural areas. The number of schemes under Multi Village Schemes (MVS) is increasing and both urban and rural settlements are being covered by these schemes.

### *Implications of Unsustainable Sources on Cost of WASH Services*

The above dependency on and trend of groundwater development indicate the following scenarios

- Future of several groundwater based systems is in precarious situation. As the source itself is unsustainable, the systems dependent on precarious groundwater are likely to be dysfunctional very soon.
- As the groundwater based systems are likely to be unsustainable, the investment made on groundwater based systems is likely to be dead investment soon.
- There are two options at this juncture.
  - Option - 1: Management of groundwater resources through regulations and appropriate allocations to various users/ uses (irrigation, drinking water and so on) so that the resource is available to various users on a sustainable manner. These regulations could be enforced by local governance institutions such as Grama Panchayati or by Community Based Organizations such as Water Users Associations/ Watershed Committees/ SHG/ Others. Or the department of rural development could appropriately use Acts such as APWALTA to regulate groundwater, which are designed to address these specific issues.
  - Option - 2: Since local resources are exhausted, import water from other places (mainly from surface reservoirs) and establish Multi Village Schemes, which connect similar villages through a network of pipe lines; pumping houses and storage tanks.
- It is a common knowledge that the Option 1 is complicated and process intense. There are limited experiences related to this Option. It is unlikely that the

coordination among various departments improves in near future, in the absence of political will and administrative action. Given this background, Option 2 becomes the easy choice for the state. It is a common knowledge that these Multi Village Systems are complex in management and high on cost. However, this trend is clearly visible with increasing number of Multi Village Schemes in the state (in spite of questions regarding the availability of surface water resources).

- There are efforts on conserving water resources locally to enhance the chances of sustainability of various local sources by RWSS Department; Rural Development Department and other schemes. These efforts are obviously on the supply side of the problem. The quantity and quality of these efforts need to be improved and synchronized with the objectives of provision of safe drinking water to all. Even then, the demand side of the problem (regulated use of groundwater in a sustainable manner) is not yet addressed by rural development department or by RWSS Department.
- As indicated by several studies, the Multi Village Schemes also have a host of problems and do not serve the purpose in terms of quantity and quality on a consistent manner. Considering the cost implications of these changing priorities and technologies, the state has a challenge of finding out appropriate local solutions to complex problems.

**Table No 10: District Wise Assets for Drinking Water Supply- Protected Water Supply (CWP); Comprehensive PWS or Multi Village Scheme; Mini Protected Water Supply Scheme**

Sl. No.	Districts	PWS	CPWS	MPWS	Hand Pumps	Shallow Hand	Open Wells Pumps	Ponds	others
1	Srikakulam	279	103	14	10392	0	0	0	0
2	Vizianagaram	247	130	8	8981	0	0	0	0
3	Visakhapatnam	499	177	13	9404	0	0	0	0
4	East godavari	457	171	15	6051	0	0	0	0
5	West godavari	966	458	4	3087	0	0	0	0
6	Krishna	662	196	26	6574	0	0	0	0
7	Guntur	426	119	100	7850	0	0	0	0
8	Prakasam	699	108	23	14227	0	0	0	0
9	Nellore	786	426	20	10253	0	0	0	0
10	Chittoor	4832	475	16	19291	0	0	0	0
11	Kadapa	852	1659	22	13886	0	4		20
12	Anantapur	1788			11404	0	0	0	0
13	Kurnool	948	163	26	12007	0	0	0	0
14	Mahabubnagar	1504	609	54	14022	0	0	1	1
15	Rangareddy	660	620	3	9327	0	0	0	0
16	Hyderabad	0	0	0	0	0	0	0	0
17	Medak	1022	367	6	11248	0	0	0	0
18	Nizamabad	1054	641	97	7932	0	0	0	0
19	Adilabad	494	974	0	13429	0	0	0	0
20	Karimnagar	817	689	1	14513	0	0	0	0
21	Warangal	680	1131	1	18854	0	0	0	1
22	Khammam	601	504	21	17517	0	0	0	0
23	Nalgonda	0	0	0	16252	0	0	0	0
	<b>Grand Total</b>	<b>20273</b>	<b>9720</b>	<b>470</b>	<b>256501</b>	<b>0</b>	<b>4</b>	<b>1</b>	<b>22</b>

Source: Watersoft, Web Site of RWSS Department, GoAP (Nov 2008):

## QUALITY OF WATER

Quality of drinking water is a major and increasing concern for both groundwater and surface water based systems. Industrial Pollution; Pollution from urban settlements (untreated sewage); other problems like Fluorosis; Brackishness; Iron are some of the important causes for poor quality of ground/ surface water sources.

Management of local water resources and infrastructure has significant influence on the quality of drinking water at consumer level. The quality of drinking water is a dynamic phenomenon. One could see that the numbers under this category differ from source to source. Data from National Habitation Survey by GoI (2003) and AP Water Vision (2003) (Refer Table No - 11 and 12) differ in terms of "Quality Affected" villages. However, the fact that several habitations are not served with safe drinking water with required quality standards is a common understanding from these differing data sources. On the other hand, the recent (and regular) monitoring of groundwater by other departments also indicate that the quality of groundwater is deteriorating and newer pollutants are being added to the water resources (Agriculture and human settlement related pollutants such as nitrates and pesticides). While the quantity is not a problem, unregulated water resource use (disposal of waste waters) is causing a major threat to the sustainability of drinking water resources. This phenomenon is explained by the following statements.

**Table No - 11: Region-Wise Categories of Problem Villages in AP**

Region (No) (%)	Fluoride			Brackish			Iron			All Problems		
	Total	Covered	Balance	T	C	B	T	C	B	T	C	B
Coastal AP	3096 (14%)	1076 (5%)	2020 (9%)	6571 (31%)	2563 (12%)	4008 (19%)	0	0	0	9667 (46%)	3639 (17%)	6028 (28%)
Rayala Seema	2899 (13%)	1745 (8%)	1154 (5%)	976 (5%)	677 (3%)	299 (1.5%)	0	0	0	3875 (18%)	2422 (12%)	1453 (7%)
Telan- gana	6073 (29%)	1505 (7%)	4568 (21%)	972 (5%)	352 (2%)	620 (3%)	441 (2%)	0	441 (2%)	7486 (35%)	1857 (9%)	5629 (3%)
AP	12068 (57%)	4326 (20%)	7742 (36%)	8519 (41%)	3592 (17%)	4927 (23%)	441 (2%)	0	441 (2%)	21028 (100%)	7918 (38%)	13110 (62%)

Source: AP Water Vision 2003

**Table No.11a Total affected (NC/PC) habitations including Physical & Biological contamination in Andhra Pradesh**

Total	As per ARWSP Norms			Not as per ARWSP Norms
	Total	NC	PC	
4755	4658	1174	3484	97

*Source: Web Site of Rajiv Gandhi Drinking Water Mission (Data 2003)*

**Table No - 12: Quality Affected Habitations in AP (2008)**

Sl. No	District	No.of Habs Quality Affected
1	Srikakulam	58
2	Vizianagaram	110
3	Visakhapatnam	14
4	East Godavari	2
5	West Godavari	75
6	Krishna	47
7	Guntur	164
8	Prakasam	360
9	Nellore	36
10	Chittoor	3
11	Kadapa	9
12	Anantapur	24
13	Kurnool	19
14	Mahabubnagar	105
15	Rangareddy	36
16	Adilabad	13
17	Karimnagar	144
18	Warangal	2
19	Khammam	132
20	Nalgonda	205
	<b>Total</b>	<b>1558</b>

- Villages<sup>11</sup> affected by fluoride are about 57% of the total villages. Telangana occupies high share of problem villages (29%) and Rayalaseema and Coastal AP have also equal share of 14% each. Only, 21% of villages are reported to be covered under safe water supply. Predictably, the share of Coastal AP has highest number of brackish water affected village (31%). As a result, Coastal AP has 46% of total problem villages.
- However, the data from Rajiv Gandhi National Drinking Water Mission, GoI indicates a far lesser number of quality affected habitations.
- Recent surveys conducted on quality of groundwater by Department of Groundwater indicates<sup>12</sup>

*“Analysis of about 1000 water samples collected from Piezometers in the month of May from 2005 onwards indicates that the Electrical Conductivity (EC) is above permissible limit in 16% of the samples, Fluoride in 12% and Nitrates in 33% of the samples. This indicates that Nitrates are the major source of concern apart from fluoride...”*

Some of the key issues and concerns related to water quality are presented here in the form of key questions.

- What is the sample size for quality monitoring?
- Who should do this monitoring and at what frequency?
- What is the methodology of taking samples for water quality testing? Which method represents the true picture of the reality? (piezometers or bore wells or any other)
- How to consolidate the data of water quality and present it to the users/ policy makers/ project administrators?
- Is monitoring of source sufficient? Even if the source is safe is the quality of water at household level (at consumption level) safe?
- What should be the actual unit for monitoring of water quality (Habitation/ Sources/ Family)? And which season actually should be considered for analysis?
- What are the costs involved in monitoring water quality and what is the mechanism for using the water quality data?

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<sup>11</sup> Source: Water Vision, GoAP (2003)

<sup>12</sup> Source: Presentation by AK Jain, Secretary, Irrigation Dept, GoAP (July 2008)

## *Fluorosis in Andhra Pradesh*

While discussing water quality, it is important to discuss fluorosis. Fluorosis (dental & skeletal) is a crippling disability induced by drinking water (that contains dissolved fluoride). The concentration of dissolved fluoride in drinking water is found to be very high in several parts of Andhra Pradesh. This drinking water induced disability is a slow process and several able bodied persons become victims of this disability at an early age, as they consume contaminated water each day.

For the first time, GoI recognized the presence of chemical contamination of water including fluorides in National Water Policy (1986). AP Water Vision (2003) does not make a serious mention of this issue, except that de-fluorinated water should be supplied. Concerted efforts to deal with this disability began only recently. Increased testing for fluoride and other chemical and physical parameters prior to accepting the source for consumption has brought Government of India's attention to the problem of excess fluoride. The technical solutions to de-fluorinate drinking water seem to have met with little success (community de-fluorination plants, domestic treatment options such as Nalgonda technique and so on). The main reasons are lack of community involvement, financial support and technical capacities at community level (K. Venkateswara Rao, 2003).

Srikakulam, Vizianagaram, Visakahapatnam, West Godavari, Guntur, Prakasam, Chittoor, Kadapa, Anantapur, Kurnool, Mehabubnagar, Nalgonda, Warangal, Medak, Khammam, Karimnagar, Adilabad, Nizamabad districts have reported the incidence of fluorosis in AP. Around 6000 villages seem to be having fluoride in groundwater. Estimates of persons affected by fluorosis vary. About 70000 persons in 215 villages of Nalgonda are reported to be suffering from this incurable disability (Let the Waters Flow, 2003). With the groundwater exploitation increasing, the concentration of fluorine increased in groundwater, spreading the disability into almost all districts of Andhra Pradesh. Seeley<sup>13</sup> describes the predicament of rural population, which does not have any option, in using this contaminated water.

*“The villagers knew which were the most fluoride-affected wells, and said that water was used for washing, not for drinking. But their part of rural Andhra Pradesh is hot and dry and prone to severe drought. Wells dry up during dry seasons and periods of drought, but it is not only the drying up of ‘good wells’ that may force people to drink contaminated water. Pump breakdowns are one of the biggest reasons for people drinking water that they know is contaminated. Caste restrictions on who uses which well will also affect access to wells with*

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<sup>13</sup> Seeley Janet, Discussion Paper on APRLP Pilots

*uncontaminated (or less contaminated) water. The demand for water increases with increasing population and when wells dry up in the dry season. More bore wells are then sunk which, because of the depletion of groundwater, may yield water that is more heavily contaminated with fluorine. Although the people of the village cited above wanted 'good water' piped from a distant river, the expense of such an undertaking, given the distance as well as the fact that their village would be 'the end of the line' (which may mean they end up with nothing as others have tapped it on the way) made this solution beyond their reach".*

The Multi Village Schemes, particularly in Nalgonda district had partially addressed this problem in about 300+ villages. The drinking water supply scheme that brings water to Hyderabad from Krishna River also provides safe drinking water to these flourosis affected villages in the district. While some of the quality parameters could be addressed by Multi Village Schemes, there are serious concerns about the ability of MVS on maintaining quality standards against several other important quality indicators, as indicated by recent studies by World Bank<sup>14</sup>.

*"The multi village schemes perform worse than single village schemes not only in terms of the quantity of water supplied but also in terms of some important parameters of water quality. A study of water quality for 56 single village schemes and 52 multi village (including regional) schemes in seven states reveals that in terms of total dissolve solids (TDS), nitrate, and fluoride the multi village schemes are doing better, but in terms of MPN coliform, the multi village schemes have a clear disadvantage.. MPN coliform exceeds the permissible limit in about 70 percent of water samples of multi village schemes".*

### ***Quality of Drinking Water and Health***

Quality of drinking water and its impact on health are established by several studies and observations. Even places where water is available in plenty, the quality of the same is questionable. This is particularly true in coastal villages/ districts. In the villages of coastal districts Naandi Foundation, Byrraju Foundation experimented in providing safe drinking water, at a price, through community level water treatment plants<sup>15</sup>. This established the following benefits:

- i) Health sector benefits due to avoided illness*
- ii) Patient expenses saved due to avoided illness*
- iii) Value of life saved*

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<sup>14</sup> Multi Village Water Supply Schemes in India, World Bank (June 2008)

<sup>15</sup> Source: Social Cost-Benefit Analysis of Improved Water Quality in Rural Areas: An Exploratory Study in Coastal AP by V Ratna Reddy and D Mohana Rao; Mohan Rao and M Kullappa (2008)

- iv) *Value of time savings due to access to water and sanitation*
- v) *Value of productive days gained due to averted illness*
- vi) *Value of days of school attendance gained due to averted illness*
- vii) *Value of child days gained of those with avoided illness.*

However, studies also indicate that the quality of water has a price too. When good quality of drinking water is supplied to families, they are expected to “pay” for the quality. The predicament related to provision of good quality of drinking water is aptly captured by the following statement<sup>16</sup>:

*Though all categories of families (Above Poverty Line and Below Poverty Line) are “willing to pay” for the good quality water that is being supplied through the community managed treatment plants, the BPL families are paying higher share of their incomes. These experiences clearly indicated that households incur substantial health costs due to impure water supplies. Poor bear disproportionately higher costs when compared to rich. Appropriate policies and institutional arrangements are required to mitigate these impacts and improve the microenvironment in the rural areas. This calls for better understanding of various dimensions of drinking water contamination and its impacts.*

It is also important to understand that the quality of drinking water has several costs such as transaction costs (participation in various institutional processes; sale price of water); capital investments; operation and maintenance of systems for quality control; others.

### *Implications of Poor Quality of Drinking Water on Cost of WASH Services*

The above analysis on quality of drinking water in various parts of the State and alternative models of providing safe drinking water project the following scenarios, which have considerable implications to cost of WASH services:

- Centralized systems for drinking water supply are likely get more support to ensure the quantity (Multi village Schemes). However, recent studies clearly indicate that the predictability, quantity and even quality of drinking water from these interventions may be a question in spite of heavy investments.
- Several local level initiatives are likely to emerge from development agencies/ markets/ private entrepreneurs, who promise safe water to its consumers at a “price”.

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<sup>16</sup> Source: Social Cost-Benefit Analysis of Improved Water Quality in Rural Areas: An Exploratory Study in Coastal AP by V Ratna Reddy, M Kullappa and D Mohana Rao; (2008).

Corporate/ Industrial groups (including those, which are polluting the ground/ surface water resources) are likely to get engaged with “quality maintenance” related initiatives (Eg: establishing water purifiers and so on) and take up the responsibility of providing safe drinking water as part of their “Corporate Social Responsibility”.

- There are additional costs that communities/ development agencies/ private entrepreneurs/ markets have to invest, which ride on the investments made by the state. Better services would be available to only to those places/ habitations, where such additional investments are organized. These additional investments require not only motivation from markets/ development agencies; but also considerable institutional arrangements for management of these systems. Habitations, which cannot mobilize these resources (financial and institutional), are likely to be excluded from these services.

Those who could pay get good and safe drinking water. Others are likely to be excluded from these services. In the absence of any regulation, there are possibilities of “poor paying disproportionately higher share of their incomes” for safe water.

- Studies and experiences only indicate that a better community managed drinking water systems are essential in making the entire system meaningful to the communities and keep them healthy. Even in such community managed systems, there is a need to incorporate “equity” and “sustainability” related considerations. Otherwise, community based systems might follow the “general” rules of the society, which could be inequitable and unsustainable, by default. Till such systems are not planned, the quality of drinking water remains to be a doubtful achievement.

## **INSTITUTIONAL ARRANGEMENTS FOR OPERATION AND MAINTENANCE**

This section of the report largely analyses the local institutional arrangements for maintaining the drinking water infrastructure. Creating physical infrastructure of rural drinking water facilities is not a big challenge. Maintaining these facilities to provide adequate services over a period of time is the real challenge. The focus of Panchayati Raj Engineering Department (PRED) has been on creating new infrastructure for supplying drinking water to rural areas. This preoccupation has resulted mainly in successfully covering majority of villages under drinking water supply schemes over a period of time. The department also had the responsibility of supporting local governance institutions such as Village Panchayati/ mandal/ district Panchayati in maintaining the infrastructure created. However, this has received a relatively low priority. The result of this tendency has its own implications on the effective utilization of infrastructure created over a period of time. This issue was clearly brought out by earlier studies.

“... The<sup>17</sup> PRED-RWS has been the main executing and implementing agency for all the works pertaining to drinking water supply in the rural areas of the state. This single-line-Department approach for dealing with various aspects of rural supply for more than four decades has produced a remarkable achievement in terms of increasing the coverage of water supply to over 90% of the habitations by providing drinking water to far-flung villages and habitations of the state. This laudable effort however, was a result of undiluted focus on the construction and implementation of the schemes and the operations and maintenance of the constructed schemes did not get the due attention. As a result, many of the schemes and sources could not be sustained and therefore, the ground situation regarding the coverage and availability of water in the State is much different from what is claimed in documents...”

This tendency is a common practice in several of the rural drinking water schemes in several parts of the country. The importance of operation and maintenance in sustaining the physical infrastructure facilities is undeniable and widely accepted. However, necessary instruments to ensure proper operation and maintenance are a challenge to the state/ departments. Sector Reforms Program (SRP), which focused on “demand driven approach” was mainly focusing on this gap. The SRP aimed at involving local communities and institutions (mainly Grama Panchayat) at all stages of the project (planning, execution and maintenance of drinking water facilities) through mandatory contribution.

Sector Reforms in Drinking Water and Swajaldhara projects largely aimed at creating necessary institutional arrangements at community/ Grama Panchayat level, which take care of drinking water facilities and supply systems. These projects have defined a clear process through which the community ownership is expected to develop. However, the experiences in Andhra Pradesh on Sector Reforms Project indicate that several processes were not followed in the state.

### *Sector Reforms and Swajal Dhara in AP*<sup>18</sup>

The Sector Reforms were introduced in Andhra Pradesh in drinking water supply department in the year 2000. The key differences between supply driven approach (the departmental approach) and the demand responsive approach (the core approach in sector reforms) is summarized by Dr Leela Prasad (2003) (See Table No - 13).

Though there are several concerns with this approach, one expected that the communities are involved in a better manner in drinking water supply projects and there is a possibility of achieving sustainable and people centric water supply systems. Studies conducted on

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<sup>17</sup> Source: Rapid Assessment Study of RWSS in Andhra Pradesh, Feedback Ventures (2005)

<sup>18</sup> Largely adopted from Testing Waters, Social Watch AP (2005)

**Table No - 13: Conceptual Differences Between Traditional Department Driven Processes and Processes Proposed under Sector Reforms**

Criteria	Supply Driven	Demand Responsive
Central Role	Government	People/ users/ clients
Dominant feature	Supply of Service	Demand based
Goal	Coverage	Sustainability
Basis for service	Affordability	Willingness to pay
Role of government	Provider	Promoter
Role of people	Recipient	Manager
Role of women	Nil	High
Actors and Scope for Partnership	State monopoly and Nil	Multiple Actors – User, State, PRI, NGO and High
Capital contribution	100% by Government	Minimum 10% by users
O&M	State	Users
Level of management	Higher level compared to users	Lowest appropriate level- habitation
Need for Users Capacity and IEC	Low High	
Dependence on Government	High	Low
Resource Management	Water is a basic resource to be provided free of cost	Water is a social and economic commodity
Basis for prioritization	Need/Problem	Demand/felt need
Surveillance and quality monitoring	Limited Put in place	
Life time cost of service	High leading to diseconomies of scale	Low because of preventive maintenance
Political patronage	High, because it provides for free riders	Relatively low because users have to pay
Incentive for officials	High because of their role in decision making	Disincentive, their power is taken away by users

Source: Adopted from Social Watch AP Report (2005) from Whither Partnership, VL Prasad (2003)

Though this conceptual difference is favorable to local level decision making in terms of drinking water supply systems, in reality the “demand driven” approaches are manipulated and “supply driven” approaches were followed in the name of sector reforms and Swajal Dhara.

Sector Reforms Program and Swajaldhara related experiences of AP are contrary to these expectations too.

Drinking Water Supply projects under Sector Reforms Program were mainly in seven districts. Each district received Rs 40 crores grant for generating "demand driven" projects. Initially, there was adequate emphasis on process of involving communities in planning for drinking water. Village Level Water and Sanitation Committees were constituted, after a brief communication campaign (The focus was mainly on messages such as "will you pay for safe, adequate drinking water and, if yes, how much?"). The response was reasonable and "demand" came from the villages in response to the promise of safe and secure drinking water.

The experiences in AP are mainly categorized into Chittoor and Khammam Models. In Khammam, the emphasis was more on completing the construction of drinking water supply systems, while in Chittoor the process of involving communities was emphasized. But, soon the department realized that this process is taking too much of time and they are not able to spend the money. The hastiness set in while up-scaling the project. The agenda of building communities capacities, participatory planning, and institution development were sidelined. Much of this work was completed on paper and the physical targets were completed. The support systems available in the projects to perform these functions such as involvement of NGOs, APARD and communication campaigns and so on are removed from the project. In a way, the people's participation was "made easy" by projecting the numbers of contributors, Committees and so on. In their place, contractors/ local politicians/ even department staff started taking up the work. Eventually they "supplied the demand", as per the norms of the project (in the form of contribution, formation of committees, so on which are supposed to be indicators of "demands" of community). Department allowed this to happen, even after a realization that the role of communities is limited in this entire process, against the spirit of the sector reforms. This entire experience in the name of sector reforms led to same old centralized delivery system and department got an impression that community's involvement is not possible. As Prasad (2003) aptly puts it 'in developing countries, efforts to improve governance typically translates to "more authority and less autonomy"'. In this process, Rs 280 crores were spent in the state and a make believe world was established, where demand responsive approaches are projected to be working.

## **SWAJAL DHAARA**

Swajal Dhaara is another scheme by central government for promoting drinking water supply systems that are "demanded" by the communities. Grama Panchayatis are expected to make proposals to address the drinking water supply needs of the village. They also

have to contribute 10% of the total cost. By Dec 2004, GoI approved an action plan of 90 Crores under this scheme and released Rs 56 Crores. The project was implemented in 1650 villages. This program was also conceived as a “demand responsive approach”. Only difference is that the PRI was expected to play critical role (in Sector Reforms, the Village Water Sanitation Committee had this role). Experiences in AP indicate that this project was also wrongly utilized by local powerful individuals. Applications from Andhra Pradesh seem to be in highest numbers compared to any other state in the country.

As in the case of sector reforms, demand was “manufactured” even in Swajal Dhaara case too. Local contractors, politicians, even powerful villagers seem to have made several proposals in the name of communities and sent to Central Government for approval (through proper channel, of course). As part of these plans, they made a wish list of activities that enhance the overall budget (as a result their own share). The mandatory contribution was also deposited with the government in anticipation of the approval. Since there is no ceiling on the budget, the sky is the limit. In this process several projects were sanctioned and implemented, in the name of community. In all cases, the Rajiv Gandhi National Drinking Water Mission (which approves the proposals) made an assessment of existing drinking water infrastructure in the village and juxtaposed the proposed activities as mentioned in the proposal. Based on this analysis, the overall budgets were drastically reduced. This reduction in the overall budgets put the contractors in an awkward position as they already paid higher amount in the form of advance contribution. (Ex: Typically, a proposal of 15 lakhs requires 1.5 lakh as contributions. The contractor would get a margin of about 5 lakhs. But when the total budget is reduced to say 5 lakhs, the required contribution is only 50,000 and contractor’s profit is about 1 lakh. In such case, the contractor already paid the advance contribution, which is almost equal or more than his profit. In such downward revision of budgets, several contractors sunk their money).

In this process, the roles of PRI, local institutions in planning, implementing and managing locally relevant decentralized drinking water supply systems are getting influenced in a negative manner. Crores of rupees are being spent on the drinking water systems in the name of different schemes and philosophies. But the condition of local institutions and drinking water seem to be not improving.

While the limitations of the line department in supplying assured drinking water to rural population is well recognized, the demand responsive approaches seems to spread the responsibility onto several groups including communities. Though the role of department is expected to be a facilitator and role of communities and Grama Panchayati as decision makers (demand generators), in reality this seems to be a difficult preposition.

Several critiques of the Sector Reforms, express the following concerns:

1. How is demand decided? Whose demand is it?
2. What about poor, who could not afford to “pay” for the services? (the argument is that they are not any way being served now)
3. Are capacity building inputs really provided?
4. Is it free from political influences?
5. Who manages the system in long run? What is the role of state?
6. Is the state (department and politically active leadership) able to decentralize power and decision making in the interest of equitable and sustainable resource distribution?

One could broadly conclude that there were several short cuts to and the focus still remained on construction of physical infrastructure. All stages of these projects (“Institutional arrangements, awareness generation, planning and option analysis of interventions, contribution from communities, role of communities in execution of works and maintenance of physical works”) followed different processes, which were not in the spirit of Guidelines of SRP/ Swajaldhara. Though Government of India up-scaled the project from Sector Reforms Project to Swajaldhara, the processes in AP largely remained the same. Over a period of time, the district/ mandal/ village level experiences largely gave an impression that the basic norms of Swajaldhara are not implemented in most of the projects. This entire experience could be considered as a missed opportunity in establishing a model for “operation and maintenance” of drinking water facilities in the habitations, that are controlled and operated by local institutions.

In spite of “not-so-good” experience with Sector Reforms and Swajal Dhara, RWSS Department formally transferred the “operation and maintenance” responsibilities of various infrastructure facilities (Hand Pumps; Single Village Schemes) to local governance bodies such as Grama Panchayat and Mandal Parishads. Annual cost norms were developed for maintenance of Hand Pumps, Piped Water Supply Schemes, etc., and formally these funds are being released to Grama Panchayat/ Mandal Parishads. The issues relate to maintenance of these facilities by these institutions are captured by some recent studies<sup>19</sup>:

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<sup>19</sup> Source: Rapid Assessments Study of RWSS in Andhra Pradesh, Feedback Ventures (2005)

## *Hand Pumps*

- *Funds for operation and maintenance grant to Grama Panchayat (600 Rs/Pump/Year) is considered to be low. These funds were also not released properly. The availability of funds from other sources (Mandal level sources) was also not very predictable. In limited number of cases, local contribution from Sarpanch (Village Panchayat leader/ others) was generated to maintain these pumps. There are large number of pumps that are dysfunctional due to poor maintenance.*
- *Reluctance on part of department to transfer the responsibility and reluctance on the part of Grama Panchayat to accept the responsibility of maintenance*
- *Non availability of spare parts; non availability of skilled mechanics and trained persons in maintenance of hand pumps at mandal/ Grama Panchayat level*
- *Poor attention to water quality testing by Grama Panchayat*

## *Piped Water Supply Schemes (Single Village Systems)*

- *Non availability of electric power for required number of hours is a common problem in several rural areas.*
- *Lack of facilities for disinfection (chlorination for water) and quality testing is a common feature. As a result, the quality of water is not ensured.*
- *Untrained and/or less qualified staff at local level for maintaining the infrastructure facilities*

## *Comprehensive Piped Water Supply Schemes (Multi Village Schemes)*

- *Maintaining MVS requires a fairly high level of technical and managerial skills. Role of communities in management and maintenance of these systems needs to be established through a systematic manner, after conducting pilots on this theme. The role of RWSS Department continues to be important in operation and maintenance of these systems.*

The Vision Document of RWSS Department makes a clear emphasis on the role of institutions to be created at Grama Panchayat/ mandal levels. Similarly, the role of RWSS Department in maintaining MVS is also clearly mentioned. However, the process of transfer of these responsibilities is expected to be *“progressive decentralization and devolution”*<sup>20</sup>. Better role clarity at various levels and differentiated roles of governance and execution are to be ensured in this process of responsibility sharing for maintenance of infrastructure facilities. The operational strategies for this seem to be better capacity

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<sup>20</sup> Source: Presentation by V. Vidyannath Sastry, Project Director, CCDU & Project Support Unit, APRWSSP, Rural Water Supply & Sanitation Dept, Government of Andhra Pradesh (June 2008)

building inputs and decentralized planning and decision making at district/ mandal/ village levels. The concern for equity and sustainability has to be an integral part of this process.

### *Implications of Poor Maintenance Systems on Cost of WASH Services*

As already mentioned, the poor quality of maintenance systems ultimately result in low level of service or no service. The institutional arrangements for operation and maintenance of rural drinking water facilities need to be carefully thought about. The main implications on the cost of WASH services, in the absence of weak Operation and Maintenance Systems are the following:

- Given the background of low level of performance of Sector Reforms/ Swajaldhara so far, it is important that RWSS Department ensures that participatory processes and principles are followed in true spirit at all levels in future. This internal preparation of the RWSS Department is an important requirement for ensuring that the created facilities perform to optimum level. It is important to develop process guidelines that ensure various stages of establishing and maintaining WASH systems follow participatory principles.
- There are several models, which demonstrate that the community participation in these projects made a clear difference in serving the communities at lower costs. Various models of drinking water and Total Sanitation Campaign clearly indicate that cost of WASH services are locally decided and managed by local communities. However, these models have made heavy investments on community participation, which is part of the project cost itself. This additional “Costs” need to be considered positively for ensuring that investments on drinking water sector are making sense for a longer period of time.
- It is also important to develop appropriate policy framework and financial norms for operation and maintenance of various types of schemes. Recommendations of earlier studies such as “Creation of adequate facilities” need to be part of this policy framework (Human resources, capacity building of various functionaries for proper maintenance; adequate facilities – testing, chemicals, etc; provision of electricity; etc). This provision of necessary facilities helps the stakeholders to perform their envisaged roles and responsibilities in maintenance of infrastructure facilities for supplying safe drinking water to rural communities.
- If these “necessary conditions” are not part of the policy and operational strategies in future, the life-cycle cost of sustainable, efficient and equitable WASH services would be very expensive and the services would be very low.

## ENVIRONMENTAL SANITATION AND HYGIENE

“Sanitation and Hygiene” are still not considered as part of basic needs in the minds of rural communities. The priority given by RWSS Department to improvements of sanitation conditions are also relatively low (when compared to provision of drinking water) in terms of allocation of budgets and coverage. Similarly, the priority and efforts to promote hygiene are also of low priority (in terms of budget allocations). However, this situation is slowly changing. RWSS has integrated sanitation and hygiene related agenda into various programs. RWSS Department largely follows the GoI policies/ programs such as Total Sanitation Campaign and has plans for moving towards “Open Defecation Free (ODF)” Villages/ Districts.

In 2003, RWSS, GoAP launched a major program to promote sanitation in the state. In the history of Andhra Pradesh, Total Sanitation Campaign is a large scale initiative to promote sanitation and hygiene by the state government. In this section, a brief analysis of Total Sanitation Campaign is presented.

### *Total Sanitation Campaign – An overview of Experiences in AP*

Andhra Pradesh was one of the forerunners of this campaign. Since the inception of TSC, AP has been a major player in the country and contributed significantly in generating new insights into promoting WASH services. Since the political will and support of state government is high to promote this agenda, the RWSS Department also made considerable efforts to promote sanitation and hygiene practices as part of this TSC. Several reviews and studies were conducted on the experiences of Andhra Pradesh in promoting TSC. The broad observations from the experiences of TSC in AP<sup>21</sup> are given in Box no. 4:

As part of TSC and sub-sequent interventions, RWSS Department was able to cover considerable ground in establishing physical infrastructure facilities (mainly in the form of Individual Sanitary Latrines and related facilities). These details are presented in Table N.14. ISL program aimed to cover “Below Poverty Line” Families on priority basis. School Sanitation Blocks were also given priority. List of families is obtained from another government program (Indira Kranti Padham / Velugu). 37.63 lakh Individual

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<sup>21</sup> These observations are mainly drawn from the following reports.

Report of the Review Team on Total Sanitation Campaign of Andhra Pradesh (Sep 2004) submitted to The Department of Drinking Water Supply, Ministry of Rural development, Govt. of India

Report of Review Mission on Total Sanitation Campaign and Sector Reform Projects in Andhra Pradesh (November,2003) submitted to the Department of Drinking Water Supply, Ministry of Rural Development, Government of India

**Box No. 4 Broad Observations from the experiences of TSC in AP**

Good Practices:	Not So Good Practices:
<b>On Commitment levels and Adequacy of Human resources</b>	
<ul style="list-style-type: none"> <li>o AP has one of the largest Total Sanitation Campaigns in the country.</li> <li>o This was possible because of serious commitment from Chief Ministers (of successive governments) and government officers at state/ district / mandal/ village levels. RWSS Department played a crucial role in the entire campaign.</li> <li>o Grama Panchayati and women SHGs (promoted by another government program) actively participated in promoting Individual Sanitary Latrines.</li> </ul>	<ul style="list-style-type: none"> <li>o Capacities of staff engaged in the TSC are a major concern. Understanding on social issues related to sanitation and hygiene and technology application in a given context were less than desirable levels.</li> <li>o Deployment of village based animators was less than adequate (time and number of persons).</li> <li>o District Support Units and mandal level units need to be strengthened for monitoring and supportive supervision.</li> <li>o Coordination with other departments was weak.</li> </ul>
<b>On Quality of Assets</b>	
<ul style="list-style-type: none"> <li>o Quality of the work is good in general.</li> <li>o Large coverage of households under Individual Sanitary Latrines scheme, in relatively short span of time.</li> </ul>	<ul style="list-style-type: none"> <li>o Standard models are used in case of School Sanitation, instead of linking the design with number of students in the school.</li> <li>o There is need to evolve gender sensitive locations and designs in case of School Sanitation, to encourage usage by both girls and boys.</li> </ul>
<b>On Systems</b>	
<ul style="list-style-type: none"> <li>o Record keeping &amp; reporting is good in several places.</li> </ul>	<ul style="list-style-type: none"> <li>o There was no comprehensive base line data/ survey conducted for all the habitations. So the changes could not be estimated effectively.</li> <li>o Integrated Plans for Water, Sanitation and Hygiene at village/ family level were not developed.</li> </ul>

Good Practices:	Not So Good Practices:
<b>On Systems Contd..</b>	
	<ul style="list-style-type: none"> <li>o Monitoring systems at district, mandal/ Grama Panchayati level are fairly weak and focused only on physical and financial aspects of TSC.</li> <li>o There was no plan for interim period between Sector Reforms Program and Swajal Dhara. As a result, the momentum is lost.</li> <li>o Toilet construction and usage by APL families is not monitored. Toilet usage by BPL families is not monitored systematically.</li> </ul>
<b>On Technology Choices</b>	
<ul style="list-style-type: none"> <li>o Individual Sanitary Latrine is promoted in a large scale.</li> </ul>	<ul style="list-style-type: none"> <li>o As far as the technology of Individual Sanitary Latrines is concerned there are very limited options - single pit / two pits. Options for home toilet is not available to the families.</li> <li>o Various models for home toilet were observed in the DWSC office at the District headquarters. These options were not disseminated at family level.</li> <li>o The pan size was found to be small in several cases. There was also scarcity of pans for construction of toilets. Rural Sanitary Marts were limited and there were no alternatives to the communities.</li> <li>o Depth of the pit was not appropriately designed to suit to local conditions (soil type, water table depth, etc). The distance between two pits was also not as per the standard norms.</li> </ul>

Good Practices:	Not So Good Practices:
<b>On Technology Choices Contd...</b>	
<ul style="list-style-type: none"> <li>o Individual Sanitary Latrine is promoted in a large scale.</li> </ul>	<ul style="list-style-type: none"> <li>o Depth of the pit was not appropriately designed to suit to local conditions (soil type, water table depth, etc). The distance between two pits was also not as per the standard norms.</li> <li>o There was only single pit in several cases and there was no junction chamber for future expansion either. The leach pits were generally in the range of 6-8 feet deep. The pit depth could be reduced or two pits could be constructed in almost the same cost. Toilet owners were not properly educated on the basic features of the technology.</li> <li>o The size of the pan was small in general and also rural pan requiring less quantity of water for flushing was not available in most of the districts and hence this option is not available to the user families.</li> </ul>
<b>On IEC and Capacity Building:</b>	
<ul style="list-style-type: none"> <li>o A variety of IEC interventions were made in several districts for a reasonably long period (Eg: Kalajata, wall paintings on hygiene messages, etc). This created a positive hype on the TSC in the rural areas and brought visibility to the agenda.</li> </ul>	<ul style="list-style-type: none"> <li>o Limited investments on training/ retraining of masons on various options of home toilet, low cost option of soak pit, smokeless chulha. Trainings largely focused on male masons and did not adequately trained women masons. Masons who were trained were not aware of various options of home toilet.</li> <li>o Training on Book keeping, Technical aspects of O&amp;M of water supply system were fairly limited.</li> <li>o Similarly, estimates were not prepared in local language.</li> </ul>

Good Practices:	Not So Good Practices:
<b>On IEC and Capacity Building: Contd...</b>	
<ul style="list-style-type: none"> <li>o A variety of IEC interventions were made in several districts for a reasonably long period (Eg: Kalajata, wall paintings on hygiene messages, etc). This created a positive hype on the TSC in the rural areas and brought visibility to the agenda.</li> </ul>	<ul style="list-style-type: none"> <li>o IEC interventions largely highlighted the toilets and did not adequately focus on hygiene aspects viz: hand washing practices, safe handling of water, disposal of wastewater.</li> <li>o There were considerable gaps in community/family level contact.</li> <li>o Use of toilet is visible but children are yet to use these toilets in many villages. Promotion of health and hygiene is missing especially handling of safe drinking water.</li> <li>o IEC activities remained like sporadic interventions and did not adequately help in internalizing the WASH practices. There are limited skills and capacities among government staff (particularly of RWSS Department) as a motivator and educator. Since the TSC is largely dependent on the government staff, their effectiveness is limited.</li> <li>o The role of village level animators and motivators in promoting hygiene practices is not adequately supported.</li> <li>o The village/ Grama Panchayati level institutional arrangements were weak in promoting and sustaining WASH services.</li> </ul>

Box No. 4 Contd..

Good Practices:	Not So Good Practices:
<b>On Operation and Maintenance:</b>	
<ul style="list-style-type: none"> <li>o Not many.</li> </ul>	<ul style="list-style-type: none"> <li>o The IEC interventions and community mobilization attempts hardly focused on “operation &amp; maintenance” related issues. As a result, the villagers were little informed about their role in O&amp;M related issues.</li> <li>o The training and capacity building inputs (to local functionaries and youth) on O&amp;M of various interventions are limited. There is a scarcity of skilled persons on O&amp;M related issues.</li> </ul>
<b>On Incentives and Local Contribution</b>	
<ul style="list-style-type: none"> <li>o The strategy of clubbing 2.5 qt. Rice with Individual Household Latrines motivated the families to construct the toilets. But there was a concern, whether this incentive is in tune with the overall objectives/ philosophy of TSC.</li> <li>o It was also observed that in many cases the users have contributed to expand the toilet room size to accommodate additional facility of bathroom or they have constructed additional room for use as bathroom. This serves the privacy need of women and it also provides learning to promote toilet from the perspective of user’s preference.</li> </ul>	<ul style="list-style-type: none"> <li>o Process of revision in cost estimates for water supply schemes was ad-hoc and response to community was not timely in most of the cases. This de-motivated several interested families.</li> </ul>

sanitary latrines were built. 46,000 schools and 3000 Anganwadis were covered under institutional sanitation facilities. About Rs. 542.18 Crores were spent for creating the above facilities.

**Table No – 14: Coverage of Population under Rural Sanitation in AP**

Sl. No.	Description	TSC targets	Provided with sanitation	% achieved
1	Below Poverty Line (BPL) Individual Households (IHHL)	6,521,091	3,736,955	57%
2	Above Poverty Line (APL) IHHL	3,629,688	1,586,793	44%
3	Schools	113,861	64,291	56%
4	Anganwadis	15,040	3,101	21%

*Source:* Presentation by V. Vidyath Sastry, Project Director, CCDU & Project Support Unit, APRWSSP, Rural Water Supply & Sanitation Dept., GoAP(June2008).

When the experiences related to promotion of sanitation and hygiene practices are juxtaposed with the actual use and maintenance of these facilities, a different picture emerges. The usage of Individual Sanitary Latrines (which is a substantial part of the campaign) is well below 30%. Increased coverage did not translate into increased usage. Increased access also did not meet that sanitation is achieved. Programmes are yet to address the core problem of sensitizing people on sanitation behavior and linking it with public health. Recent studies<sup>22</sup> and discussions with senior officers in RWSS Department indicate the following reasons and concerns related to rural sanitation and hygiene in rural areas (Refer Table No- 15). These studies clearly indicated that several of the projects implemented by RWSS Department and others (Health and Education Departments) have given low priority to the following aspects of environmental sanitation:

**Table No – 15:  
Reasons for Non-Use of Sanitary Latrines**

Sl No	Reasons for Non-use of Sanitary Latrines	% of House Holds
1	Pit Not Completed	29%
2	Faulty Design	18%
3	Habit	18%
4	Latrines are put to other use (Store; bath room; etc)	14%
5	Others	21%

*Source: Rapid Assessment Study of RWSS in Andhra Pradesh, Feedback Ventures (2005)*

<sup>22</sup> Source: Rapid Assessment Study of RWSS in Andhra Pradesh, Feedback Ventures (2005) and Presentations by H Umakanth Rao, SWSM, RWSS, GoAP (June 2008)

- Facilities/ arrangements for safe disposal of waste water and garbage through construction of drainage lines
- Educating children, adolescent girls, women, young mothers, leaders in the village on hygiene practices (personal, household and neighborhood levels)
- Better practices for keeping animals and animal wastes
- Eliminating caste discrimination in the provision, access and use of sanitation facilities and services

Given the above analysis of TSC related experience in Andhra Pradesh, one could broadly conclude that “hype” dominated the agenda of providing sustainable and equitable WASH services in rural areas. Though the campaign brought the much needed visibility to the agenda, the physical infrastructure is not translated into sanitation outcomes (improvement in health and hygiene, quality of life and so on). It is interesting to note that there is a general consensus that “sanitation is beyond sanitary latrines”. However, the major focus is still on construction of latrines in all the sanitation projects. There is a need for making considerable efforts to ensure that this “comprehensiveness” is actually practiced, at habitation/ community/ family level.

## CONCLUSIONS

Institutional Mapping of WASH Sector in Andhra Pradesh highlights the evolution of policy and programs related to WASH services in the state. Government of India has evolved various policies and related programs for promoting safe drinking water and sanitation facilities in the rural areas. Several state governments follow these policies and programs, including Government of Andhra Pradesh. However, given local needs, problems and leadership (political and administrative) in the state, Andhra Pradesh could take lead in establishing various models in WASH sector. Experiences in AP have both positive and negative sides. Sector Reforms Programs, Swajaldhara, Total Sanitation Campaign are some of the examples, where one could see both extremes of good and poor experiences in the state. The Institutional Mapping paper made a systematic assessment of these policies and programs, based on the available data, reports and interactions with concerned officers from RWSS Department.

As part of institutional mapping, the expected roles and responsibilities of key departments and institutions (including civil society organizations and markets) were profiled. The paper also made an inventory of issues and concerns related to institutional convergence in the context of WASH Services. It is observed that there is a weak institutional convergence at this point of time. This has severe implications on the

overall policy framework for WASH services, including choice of technologies, investments and prioritization of regions. As a result of weak institutional convergence, there is an increasing trend towards establishing multi village schemes, while local water resources/ facilities are being neglected. The priority to promotion of sanitation and hygiene education still deserves better attention. The hype of construction activities is still dominating the actual promotion of sanitary and hygiene practices in rural areas.

A hypothetical exercise was conducted to understand the "life cycle" of drinking water facilities to see the roles performed by various departments and institutions at various stages of this life cycle. This hypothetical exercise brought issues like absence of departmental coordination and community participation in the life cycle of drinking water facilities. The new institutional arrangements of the RWSS Department are expected to make some differences in these decision-making and participation related processes.

This institutional mapping paper also helped in getting few inputs to future strategies of WASHCost related action research. The issues related to availability of data bases; process of enquiry; framework for action research (Common Information Framework) were discussed. It is argued that the agenda of WASHCost and its data bases are very different from the general research projects. The data bases for WASHCost related action research need to be created at various levels (State/ District/ Mandal/ Panchayati/ Habitation/ Neighborhood/ Family/ Individual Levels) and most of this data bases could relate to costs as defined in Common Information Framework. This agenda requires methodological innovations and capacities for all concerned partners in the project.

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