EXECUTIVE SUMMARY

Rural India has more than 700 million people residing in about 1.42 million habitations spread over 15 diverse ecological regions. Meeting the drinking water needs of such a large population can be a daunting task. The non-uniformity in level of awareness, socio-economic development, education, poverty, practices and rituals and water availability add to the complexity of the task.

Under Rural Water Supply Program, various schemes like Hand pumps, Mini pipe, Piped water supply schemes (Individual or Regional – Multi villages) are being taken up according to the technical feasibilities till time.

Approximately 4306 different water supply schemes were implemented in Gujarat till 2009 benefiting 7,544 villages, 47 towns catering to approximately 1 crore people in the rural and urban area. Local water utilities made significant investments to install, upgrade, or replace equipment in order to deliver safe drinking water and protect public health. These water supply schemes are primarily based on the traditional local ground water or nearby surface water sources depending on the available water resources. However, to overcome problems of adequate water or acceptable water quality in local source, the Multi village water supply schemes came into existence. Later with the development of supply of bulk water and involvement of more number of villages or towns in single water supply scheme, Regional Rural Water Supply Schemes became common.

The concept of monitoring and evaluating the performance of water supply system was not a common practice in rural water supply sector of India. This concept was considered hypothetical in past as every matter related to water supply was the liability of state government. Now

the state of affairs is pole apart, the accountability has come on elected committees. The Performance Evaluation (PE) through various Performance Indicators (PIs) grouped under different aspects give comprehensive appraisal of water supply system, the outcome of which can be used for proper management.

OBJECTIVES OF THE STUDY

- To undertake observations on available infrastructure and distribution networks of water supply in Gujarat state with reference to regional rural water supply schemes
- To analyze the performance of regional water supply schemes with special reference to its source of water, coverage, quality of water, treatment facilities, technical efficacy & adequacy for the distribution of water
- To develop the performance indicators for overall service performance and financial management performance of RRWSS (Source sustainability, Adequacy of water, Service reliability, Acceptable water quality, Capital cost of water, Operation & Maintenance cost, Recoveries of tariffs and Community participation)
- To develop an Index which help in quantifying the overall performance of an RRWSS against various indicators under consideration
- To scale up the potential for development of efficient & equity water distribution amongst the village in various RRWSS
- To identify the impact of implemented schemes on socio economic activities & the overall life of the rural habitants

METHODOLOGY OF THE STUDY

As the water is subject of state in India, therefore, the responsibility of water supply for various needs of the society is mainly dealt by the state authority. As the state cater the demands from various sectors such as Irrigation water, Industrial water, Urban and Rural water, number of Government departments or subsidiaries of state government are involved. For managing the supply of bulk water in RRWSS mainly GWIL, SSNNL, Irrigation water department, various dam authorities and GWSSB are responsible. While for in-village water distribution system often the local authorities such as Taluka/Gram Panchayats, Pani Samitis and/or WASMO and some NGO's are responsible. Therefore, to understand the overall scenario of rural water supply schemes in Gujarat, data collected from above agencies, interactions with the officials and field visit in selected RRWSS have been made.

The selection of the representative RRWSS for study is carried out based on the following points keeping in mind:

- **Hydrology of the area**: Rainfall varies highly in the state of Gujarat. South Gujarat receive more than 1500mm rain fall per annum, middle Gujarat receive around 1000mm per annum, the Saurashtra region receive less than 600mm rain fall per annum while Kachchh region is partly a desert area and receive minimum rain fall. The prosperity of the area and quality & quantity of water is also highly varying. Therefore, four major schemes for the detailed evaluation are selected, one from the region of South Gujarat namely, RRWSS Variav group, Surat, two from the Saurashtra region namely RRWSS Gadhada group, Bhavnagar & RRWSS Ishwaria group, Amreli and one from the Kachchh region namely RRWSS Mandvi group, Kachchh.

- **Land use pattern/Urbanization:** The RRWSS Variav group, Surat representing South Gujarat (rich in water resources) cover the combination of industrial, urban and rural areas.
- **Water quality:** The Saurashtra region has the 1100 Km long costal belt. Surface water resources are limited & local ground water resources are not adequate in catering summer demands. Also, local ground water is suffering the water quality problems such as salinity (Total Dissolve Solids), Fluoride, Arsenic and other mineral matters. Therefore, RRWSS Gadhada group, Bhavnagar and RRWSS Ishwaria group, Amreli, at later time, shifted on reliable bulk water supply from Saurashtra Pipe line project.
- **Geography:** Kachchh is the largest district (geographical area wise) of Gujarat, located on the border of India and Pakistan covers largely the desert land with negligible water resources. Even though after the earthquake in the year 2001 and with the development of pipe line project based on river Narmada water, rapid growth of industries and construction of ports has been observed in the region. So from this point of view, RRWSS of Mandvi group and Kachchh group are therefore selected for the study.

A house to house survey has been initiated largely to collect the responses of Users' in above four selected RRWSS. The users' data survey work has been allotted to the Advantage India Private Limited, Ahmedabad with the financial support of GWSSB. The users' data survey cover about 2465 responses of 61 villages of four selected RRWSS (RRWSS Variav group, Surat – 863 responses and 20 villages, RRWSS Gadhada group, Bhavnagar – 559 responses and 14 villages, RRWSS Ishwaria group, Amreli – 581 responses and 14 villages and RRWSS Mandvi group, Kachchh – 462 responses and 13 villages). While

planning the users' data survey, villages are selected as per its distances from the head water works (head village, intermediate village and tail end village). A care has also been taken for selecting the users that they should largely represent the business, caste & sex group.

Further, in addition to above four selected RRWSS, for evaluating certain PIs, the overall RRWSS operated in South & Central Gujarat are undertaken. For evaluation of financial performance of RRWSS relying on bulk water supply in Saurashtra region, a separate study has been carried out with the GWSSB (Rajkot zone office) and GWIL officials.

As Cluster Storage Strategy is an optional part of in village water distribution system, a separate study has been carried out in the seven villages of two districts, Surendranagar and Kachchh. Based on the influencing factors such as population size, variation in caste & inter-caste conflict issues, availability of water, topography of the area, economic conditions in terms of agricultural and industrial growth in and around village and the success observed in CSS model; villages are grouped and desk study of documents developed by UNICEF, WASMO & GWSSB are studied and field visits are made for interaction with users' and managers of the schemes.

Based on the observations & findings of above studies, Performance Indicators are identified which can be used to design, monitor and/or evaluate the performance of new or existing regional rural water supply schemes.

FINDINGS AND CONCLUSIONS

Based on a study carried out for the critical evaluation of various RRWSS in Gujarat mainly two groups of performance indicators namely Service PIs and Financial Management PIs are identified.

Service Performance Indicators:

- Sustainability of Source

- Adequacy of Water
- Water supply Reliability
- Acceptable Water Quality

Financial Management Performance Indicators:

- Capital cost of Water
- Operations & Maintenance cost of Water
- Cost Recovery & Water Tariff
- Participation of Community at planning & Operation levels

From the studies it is concluded that the developed PIs for evaluation of service performance and financial management performance may be used separately. To quantify the overall performance in each group of indicators, Service Performance Index (SPI) and Financial Management Performance Index (FPI) may be calculated as per following equations.

$$SPI = \frac{\sum_{i=1}^{4} Ii\,Wi}{Wmax\,x\sum_{i=1}^{4} Ii}\ x\ 100$$

$$and\ FPI = \frac{\sum_{i=1}^{43} Ii\,Wi}{Wmax\,x\sum_{i=1}^{3} Ii}\ x\ 100$$

Where, Where, W= Weights assigned to each of the indicators based on their ratings; and I= Importance factor for each of the indicators based on their impact on overall service/financial management performance and its interrelation to other group indicators. Value of Weights for each of the group indicators is suggested based on its ranking such Excellent, Medium to High, Low to Medium and Poor performance. Importance factor is also suggested for each of the group indicators for the quantification of overall service and financial management performance of an RRWSS.

Further, from the findings, it is determined that it is not necessary that the RRWSS which are performing in a better way from service point

of view are also performing well from the financial management point of view. Further, the benchmarking values used for each PI may differ with site conditions. Therefore, benchmarking may be adopted within the group of schemes only and such PIs may be monitored continuously for the monitoring improvements in its performance. However, the same PIs may be used to set targets and policy guidelines. Based on the studies following policy guidelines can be set:

1. A district level (regional) planning is essential to identify areas where RRWSS would be more cost effective and sustainable. The bottom-up demand from the society for the scheme and top-down planning results in least cost option. Further watershed and aquifer information are important for the 'source' sustainability. Surface water based RRWSS justified mostly in areas marked by over exploited aquifers or by serious ground water quality problems with no alternate safe and sustainable source available locally (for eg. North Gujarat, Saurashtra and Kachchh region of Gujarat).
2. The present study reveals that the large scale RRWSS which usually serve urban population & industrial water demands in addition to rural domestic water demands often results in water scarcity to tail-end rural population due to continuous growing demands from urban population and rapid industrial growths, as the case observed in RRWSS, Variav group, Surat.. Adequate measures may be taken in decentralizing such schemes for rural and urban & industrial and other needs of water supply.
3. The analysis of survey data and analysis made on quantity of water supplied in various RRWSS determined that the actual water supplied is often less than the actual water demand. Therefore, household typically depends on multiple water source including private bore & tanker water supplies. This raises the overall cost

burden & less reliability of RRWSS with ultimate result of poor tariff recovery.

4. As per the norm of 250 persons per stand post which is based on assumption of output of 12 litres per minute. But, under study area at several villages, it was determined that the water pressure at stand post was low and the flow of only 3-10 litres per minute was available. This would not make possible for households to get 40 lpcd of water even if half of the persons have to share the stand post.
5. The findings of the survey determined that a large section of the rural people would like the convenience of a piped water supply connection in the house. This may lead in conflict with the norm of 55 or 70 lpcd of water in rural water supply. Such is the very common case with the most villages of Gujarat due to good agricultural & industrial growths taken place in last one or two decades, which lead the significant rise in per capita income of villagers.
6. The O & M cost needs to be properly assessed on regional basis and fully recoverable through tariff recoveries, except for high cost schemes. However, a transparent criteria needs to be developed based on local conditions to determine 'affordable' tariffs including criteria for socially disadvantaged groups. The O & M cost requirements in excess to affordable contributions may be provided through a subsidy scheme.
7. For better Operation & Maintenance of RRWSS, the bulk water supply and village level distribution may be unbundled. This may results in improved service delivery with feeling of own management for villagers. In such cases, GWSSB of state agency may control bulk water supply and Gram Panchayat or Pani

Samitis may responsible for equity water distribution & other M & R issues with tariff recoveries.

8. The low recovery of cost is often not due to non affordability or unwillingness to pay, but to do with the inadequate water supply services, the reluctance to pay of the household and the inability of the scheme management to collect the water charges. It is also found out that the stand post users are not charged at all in many piped or multi water distribution schemes (existence of private bore, pipe water supply by GWSSB & ESR with Stand post all together in the village) is also responsible for low cost recovery. On the contrary, there is strong demand from villagers for higher grade of services like piped water and more quantities with will to pay higher water charges also an encouraging to rural water supply sector of Gujarat.
9. Local watershed management plays an important role in catering the needs of water for drinking in most water scarce areas. Encouraging the construction of water recharging structures and adopting improved agricultural practices significantly changes the ground water quality and improves the water table in over-exploited aquifer zones.