

Rural Water Supply

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The increasing gap

Despite good monsoons continuously for the last eleven years and high priority from Government of India for the programme of augmenting the supply of drinking water by way of funds and attention, the problem of potable drinking water has remained unresolved and in fact becoming more serious every year. Although, the Ministry of Rural Development claims more than 95% coverage, independent reports show scarcity of drinking water in about half of the villages of India. What is even more distressing is the fact that this gap has been increasing over the years, despite heavy investment.

In 1972, surveys had revealed that out of a total of 5,80,000 revenue villages there were 150,000 drinking water 'problem villages' in India. By 1980, some 94,000 villages were covered by government and 56,000 were left uncovered. But the 1980 survey revealed that the number of problem villages was actually 231,000, and not merely 56,000. By 1985, all but 39,000 villages were covered but the new survey revealed 161,722 problem villages. Again, by 1994, they were all covered leaving only 70 uncovered villages but the 1994 survey revealed 140,975 problem habitations. This time the number included both revenue villages as well as hamlets (the total of which is about 14 lakhs, henceforth called habitations).

Since 1994, state governments, with the help of funds from Government of India, have again provided clean water to almost all the habitations or would do so by the end of the current financial year, with only 5% more to be covered by 2001-02, but surveys hardly support this optimistic picture and on the other hand indicate acute hardship and quality problems in about half of the habitations. Why this extraordinary discrepancy between government records and reality?

We first describe the government data both for population covered and the number of habitations that have been provided with safe drinking water. Table 1 indicates the physical progress in terms of population coverage during the first two years of the Ninth Plan.

Table-1: (Cumulative % of 1991 Census rural population)

	Status as on 1.4.97	Target for 9 th Plan	Status as on 1.4.99	Likely to be covered by 31 st March, 2000
Rural Water Supply	86.74	100	98.04	100

At the beginning of the Ninth Plan, there were 0.85 lakh "Not Covered"(NC), 3.91 lakh "Partially Covered" (PC) and 1.40 lakh "Quality Problem" (QP) habitations. As per the reports, received from the States through Rajiv Gandhi National Drinking Water Mission, 0.505 lakh NC and 1.613 lakh PC habitations have been covered with water supply facilities during the first two years and 0.207 lakh NC and 0.721 lakh PC are targeted for 1999-2000. This will leave a balance of 0.138 lakh NC and 1.61 lakh PC as on 1.4.2000. All States except Rajasthan, Himachal Pradesh, Kerala and Nagaland are expected to cover all the remaining NC habitations as also very poorly covered (PC with 0-10 lpcd) habitations by 2000-01 and the other PC habitations (11-40 lpcd) by the end of the Ninth Plan. A very rosy picture indeed!

A large number of surveys have been done since 1996 to check the validity of government figures as also to measure the level of public satisfaction.

PEO survey (1996- 97)

87 villages in 29 districts of 16 states were studied by the Planning Evaluation Organisation (PEO). Although in the selected villages, the number of people who had access to drinking water from government sources had increased from 69 to 81% between 1986 and 1996, serious problems were noticed by the PEO, despite the fact that definition of 'providing' water is very liberal; source need to be within 1.6 km, one hand pump (HP) to suffice for 250 persons, and 40 litres a day per adult in a habitation would be taken as fully covered (FC).

19 of the 29 districts reported the problem of frequent water scarcity. Of the 87 villages 40% complained of shortage during summer months. 30% people reported that water supply was not dependable. There was frequent breakdown of power in case of piped water supply, and damage in pipelines led to leakages and contamination; for HPs quality of construction was not satisfactory in 47% cases, and there were frequent mechanical failure.

Agencies complained of untimely release of funds and shortage of staff – there was embargo on recruitment in some states. For instance, 11 mechanics looked after 4,000 pumps in Bijnore (UP) in the entire district. Often testing and maintenance are responsibilities of different departments, only in 27.6% cases routine maintenance activity of oiling etc. was undertaken. 87% of the districts reported breakdowns during the year, out of which only in 43% cases repairs were undertaken. Often spares were not available and funds were inadequate. Only in 12 out of 29 districts training was said to be imparted, although 12,191 people were claimed to be trained, the PEO team did not find them in any of the 87 selected villages.

Local communities participated only in 20 out of 87 villages, mostly in identifying suitable sites and contributing their labour, involvement in O & M was hardly observed. In 21% cases panchayats looked after O & M, in 9% cases panchayats supervised and regulated water supply, only in 3 out of 87 villages water committees were formed.

A large percentage of people in rural areas suffer from water water-borne diseases like diarrhoea and cholera indicating use of unprotected/unhygienic drinking water sources. Even in those villages where quality is sought to have improved after treatment, the incidence of water borne diseases had not come down, reasons identified were:-

- platforms for HP and pipelines were not well laid leading to contamination of water,
- drainage was not satisfactory,
- testing of water was not done,
- disinfection was not carried out, and
- people fall back to original contaminated source as water supply from new source is not dependable,

No source villages re-emerged because of depletion of groundwater, major mechanical defects or water being contaminated leading to disuse. 56% of the no-source villages were never covered under the schemes, as they were not approachable, they had peculiar topography, or were new habitations.

In many districts water table had gone down by 15 to 20 metres, increasing the problem of scarcity as well as quality. Programmes leading to charging of aquifers through water harvesting were needed, but these measures required inter-departmental coordination that was lacking. Legislation was needed to ban over-exploitation for irrigation.

More recent surveys

Madhya Pradesh - An ORG study in MP conducted during 1998 in 8 districts of Rajgarh, Gwalior, Datia, Sagar, Jabalpur, Shahdol, Balaghat and Chhindwara revealed that nearly 30% of hand pump villages and 88% of piped water supply villages had been reduced from the status of FC to PC. Improper repairs and non-maintenance of pumps resulting in frequent breakdowns have rendered the water supply system non-functional. Every year on an average 5-10% of HPs become defunct which is quite significant and therefore should be taken into account while monitoring the progress. Moreover, there is no adequate data to suggest whether the covered habitations get 40 lpcd as per norms or much less. Monitoring mechanism therefore need to be improved.

Study of 75 districts in 1998

- 59% people felt supply was inadequate
- 12% house holds said that the quality of water was not potable
- 98% house holds reported that there is no regular water quality testing of drinking water sources
- 20% sources non-functional at anytime
- Of these, half have minor defects
- 35% defects remain unattended for mor than a month
- 83% people had never met a water official

- 54% villages willing to pay for water

Bihar - A study conducted in 1998 by Samtek Consultants in the districts of Samastipur, Gaya, Dhumka and Gumla in Bihar found that

- 55% households face scarcity of water for 1 - 2 months and 16% for more than 3 months;
- During the non-scarcity period 52% households receive only up to 20 litres of water;
- Even those villages which are reported by the State Govt. as "Fully Covered" (FC) are facing problem of getting safe and adequate water;
- Frequency of breakdown of HPs is very high and 40% of households reported that the HPs stop functioning once in 3 months;
- There are only one or two filters/technicians on an average for one block and they seldom visit interior parts of the villages. As a result a large number of defunct HPs remain unattended for a long time.

Andhra Pradesh - All villages in Andhra Pradesh should have been saturated by 1997, if the earlier survey done in 1991-94 and the coverage progress in the state is to be believed. However, in 1997 the state reported 380 not covered (NC), 31148 partially covered (PC) and 38204 fully covered (FC) habitations. More than two-fold increase in the number of partially covered habitations in a brief period of three years is a matter of serious concern. The state government also reported 12,686 habitations affected with quality problems out of a total of 69732 habitations.

Maharashtra - A World Bank assisted Water Supply and Sanitation Project was implemented in Maharashtra from 1991 to 1998. The major deficiencies brought out by the Implementation Completion Report of the World Bank Mission are:

- The design of the project did not incorporate intrinsic social, technical and financial complexities of rural water supply system and thus failed to introduce proactive measures for undertaking timely corrective measures;
- The Project Planning and Monitoring Unit (PPMU) during the first few years of the implementation of the project was not equipped to provide leadership role for implementing an innovative integrated project;
- The Government of Maharashtra did not provide adequate support to community participation, environmental sanitation and health education components of the project, especially during the first 4 years of the project implementation;
- Unwillingness of some Zilla Parishads and Gram Panchayats to take over the piped water supply schemes;
- Weak technical and financial capacity of the Zilla Parishads and the Gram Panchayats to take on the O&M of the water supply and sanitation facilities;
- Poor water demand management at the village level;
- Poor performance of the Zilla Parishads concerned in collecting water bills from the Gram Panchayats;
- Tariff setting rigidities that may have prevented full recovery of O&M costs in some instances;
- Uncertainty regarding timely tariff increases in the future;
- Poor incentives at the Zilla Parishads and Gram Panchayats level to carry out preventive maintenance of the piped water schemes since they were neither involved in scheme planning and implementation nor contributed towards the capital costs; and
- Deficient supervision of drainage and latrine construction in some instances.

The overall performance of the project was described by the Bank as only marginally satisfactory. It is significant that despite the Project, the number of habitations facing water shortage has been increasing as shown below:

**No. of habitations facing water shortage in Maharashtra
(Total number of habitations = 77,124)**

1980	17,112
1985	23,306
1992	35,216
1997	48,791

Rajasthan - In Rajasthan, the overall coverage on paper is impressive, as around 99% of the total habitations seem to have been covered. However, the survey done in the districts of Ajmer, Barmer, Churu and Dungarpur show that about 30% of habitations receive less than 40 lpcd. The percentage of defunct sources was as high as 33.6% in Barmer. Community participation in O&M was virtually non-existent. A previous survey of 682 habitations in Jaipur and Jodhpur during 1997-98 showed that as many as 28% fully covered habitations had relapsed into either partially covered or not covered. An additional 21% PC habitations became NC. Thus, as many as 49% habitations which were covered during 1994-97 had already suffered a big decline in water availability. This happened because proper care was not taken in identifying a good source or the material supplied was of poor quality because of which the shelf life of the project was extremely short. There was complete lack of integration of drinking water schemes with watershed development. Government staff paid very little attention to repairs of defunct sources as only 9% of them needing repairs received proper attention within a fortnight. The following table shows that 52% of sources remained unattended for more than a year:

Table: Days for which defunct sources remained unattended to by Government staff in Rajasthan

Duration range in days	Nos.	%
Upto 7 days	4	3
9-15 days	9	6
16-30 days	13	9
31-60 days	9	6
61-100 days	13	10
101-360 days	20	14
> 360 days	72	52

UP - Since people are not being asked to contribute to meet the cost of installation of handpumps, it has become another source for patronage distribution. Uttar Pradesh decided to allot a quota of 25 hand-pumps to each MLA and MLC. This was against the norms evolved by the Empowered Committee of the Ministry of Rural Development which had given the right to Gram Sabha to select the site for installation of hand pumps.

A study commissioned by the Rajiv Gandhi National Drinking Water Mission (RGNDWM) to ascertain the impact of government investments on sustainability of drinking water and sanitation services in six villages of Chata Block of Mathura district in Uttar Pradesh has come up with the following findings:

- Piped water supply schemes, planned without consideration to groundwater conditions and socio-economic conditions, are facing threats due to brackishness/ salinity in ground water and poor utilization. Where possible, people have fallen back on the use of open (unprotected) dug wells.
- Links between the UP Jal Nigam (UPJN) and the users are minimal, as are its links with the Panchayati Raj Institutions. There was no user participation in choice of technology and service level. Dependence on the UPJN combined with irregular hours of supply and poor response towards repair needs have created a totally indifferent attitude in the minds of the users of the facilities.
- Sanitation service delivery has been top down and subsidy driven. Latrines have been provided under the Indira Awas Yojana and barely cover a fourth of each village. More than 70% of the villagers continue to use the fields for defecation.
- Users are habituated to the water supply agency – in this case the UP Jal Nigam – making all decisions and taking responsibility for water supply delivery. Despite facing unsatisfactory quality and supply of water, they await UPJN's intervention for corrective measures. Users are not aware of a possible role they can play in managing the water supply.
- There are no recognized user groups such as Village Water and Sanitation Committees or any sub-groups to the panchayats to oversee the workings of water supply and sanitation facilities.
- No cost sharing or recovery principles are in place. Gram panchayats have a meagre allocation for water supply maintenance which they sometimes use for minor repairs. A monthly flat fee is collected for household connections, which goes directly to the UPJN. It was found that collection was not regular and penalties were not imposed for non-payment. Payments were not linked to accountability to users in terms of quality of service

provided. Subsidies for latrines did not ensure utilisation of facilities.

Assam - The cost of per capita coverage has shown inordinate increase in Assam. Though, 80% of Assam's rural water supply is based on hand-pump technology which should not cost more than Rs.175-200 per capita, the actual cost in 1997-98 was Rs.1817/- per capita as against the All-India average of Rs.696/- per capita. Assam's per capita cost has increased by more than five times during the last 8-9 years against the two-fold increase in the All-India average during the same period.

The National Council for Applied Economic Research (NCAER) carried out a detailed survey of 1765 villages spread over 195 districts between January and May, 1994. The survey concluded that about one-half of all villages in India do not have any source of protected drinking water. Of the other villages 17% reported pipe water as the dominant source of drinking water, another 18% villages were using hand-pumps and 13% had other sources of protected water. The assessment of the NCAER is in sharp contrast to the official claims that in 1994 more than 80% villages were receiving adequate supply of potable water.

There are some states who have not been able to get the full release of allocated fund of Central assistance under the ARWSP particularly due to non-provisioning of matching State Plan funds and thus have lost quite a substantial amount of Central assistance during the 8th Plan as well as the first two years of the 9th Plan e.g. Bihar lost about Rs.400 crore of Central assistance during the last five years (see Table).

Table: Performance in Bihar: Utilisation of ARWSP Funds (Rs. crore)

Year	Opening balance	Allocation by GOI	Release	Total availability of funds	Expenditure	Closing balance
1994-95	30.58	54.70	28.04	58.62	38.40	20.22
1995-96	20.22	70.99	35.50	55.72	22.74	32.98
1996-97	32.98	77.95	31.13	64.11	34.24	29.87
1997-98	29.87	93.80	00.00	29.87	08.67	21.20
1998-99	21.20	117.69	00.00	21.20	08.50	12.00
1999-00	12.00	93.80	00.00	12.00	00.00	----
Total		508.93			112.55	

Thus the State has lost Central Assistance of almost Rs. 400 crore during the last 5 years which has resulted in a huge shortfall in physical coverage. Informal enquiries show that Bihar government has not been able to finalise procedures for buying pipes for the last three years. The general feeling among field officers in Bihar is that the secretariat is largely dysfunctional because of the long delays in financial approvals.

Success in the implementation of schemes depends upon the capability of the delivery system to optimally utilise funds meaningfully. The above however indicates that the implementation of the programme in Bihar suffers from systemic deficiencies in terms of staff morale, policy formulation, financial procedures, method of implementation, poor monitoring and evaluation practices.

Audit Review by A.Gs.

The Accountant Generals of the States reviewed in 1998 documents of Rural Water Supply Departments in 304 Divisions spread over 24 States, with a view to estimate to what extent the primary objective of providing safe drinking water in a cost effective manner has been achieved. The audit review has brought out a number of issues of serious concerns and shortcomings in the implementation of the programme involving misuse of Public Exchequer Funds of substantial order. These are:

- Re-emergence of habitations with no source of drinking water negating the impact of the scheme.
- Financial achievements were inflated in so much as it included advances, funds were diverted to other schemes or kept in Personal/Revenue Deposits. There was a persistent trend of over-reporting of physical achievements.
- Large funds were met irregularly out of the ARWSP funds, instead of from State Plan funds.
- Suspected mis-appropriation of funds/stores was reported by AGs on which Government failed to take

corrective action.

- Mis-directed application of funds without adequate planning and scientific identification of water sources resulting in time and cost over runs.
- Schemes were abandoned mid-way or became inoperative after spending huge amounts.
- Inadequate maintenance rendered water sources defunct and non-operative.
- Material purchased in excess of requirement was lying idle in stores/not accounted for in books.
- Water Quality Testing Laboratories were ill-equipped with inadequate facilities (non-creation /non filling of posts) and trained manpower.
- Water Treatment Plants installed to control fluorosis, remove excess iron and salinity were non-functional resulting in continued supply of unsafe drinking water to the rural population.
- Gross under-utilisation of rigs.

Water Quality

Another area of concern is a large number of Quality affected habitations with excess fluoride/arsenic/salinity/iron etc. Water quality concerns clearly have serious implications for the supply of rural drinking water and are important determinants of public health. Water quality issues are gaining recognition as ground water depletion worsens. The level of natural contaminants such as fluoride and arsenic and chemical pollutants such as pesticides and insecticides is high and rising. Lack of reliable data however makes it difficult to appreciate the magnitude and impact of the problem. Excess fluoride and arsenic in ground water based drinking water sources has given rise to crippling and incurable diseases like fluorosis and arsenical dermatitis. Fluoride contamination affects 150 districts in 15 States and excess arsenic affects 8 districts of West Bengal. Fluoride levels are high in Andhra Pradesh, Gujarat, Haryana, Karnataka, Punjab, Rajasthan, Tamil Nadu and U.P. and iron levels are high in the North-Eastern and Eastern part of the country. Similarly salinity is high in Gujarat, Haryana, Karnataka, Punjab, Rajasthan and Tamil Nadu. Number of Quality affected habitations with excess fluoride/arsenic/salinity/iron etc. based on 1% stratified sampling is about 1.54 lakh. Lists of such habitations based on actual sampling are yet to be prepared by the respective states. Number of such habitations is increasing due to a variety of natural and man-made reasons, particularly due to unscientific and over exploitation of groundwater for different uses including agriculture. Number of such habitations are likely to increase, when actual sampling is done. These habitations may also figure in the list of PC and FC habitations and thus there is likely to be duplication of efforts, which will mean more funds and time requirement. Although several studies and pilot programmes (sponsored by both the Government and various external funding agencies) are under way, proposed solutions have had mixed success. Technologies developed and tested to remove fluoride and iron have shown satisfactory results in a laboratory environment. The complexity, high cost and inconvenience of these technologies, however, have constrained their implementation and sustainability.

As per the report of the Expert Committee on rural water supply Programme (April 1994), constituted by the Rajiv Gandhi National Drinking Water Mission the Sub Missions have not succeeded in tackling the quality problems in a systematic manner except in the case of Guineaworm Eradication which stands out as an example of a well-coordinated programme. In Defluoridation, the Fill and Draw type of plants appear to have been acceptable at the community level. However, the Handpump Attached Defluoridation and Iron Removal plants have been failure due to inappropriate technology, unsuited to community perceptions and community involvement. The Desalination plants have been a costly failure mainly due to lapses at different levels, such as poor planning and implementation, technology inappropriate to the rural setting and high cost of O&M. A large number of administrative problems have also cropped up in his Sub Mission on Control of Brakishness. The Sub Mission on Conservation of Water and Recharging of Groundwater Acquifers has not been given any prominence. Among the coordinating agencies for Sub Missions, the National Institute of Communicable Diseases (NICD) has done well in Guineaworm Eradication, whereas the National Industrial Development Corporation (NIDC) and the Central Mechanical Engineering Research Institute, Durgapur (CMERI) have both failed to implement the Iron Removal, Defluoridation and Desalination programmes as originally planned and targeted. It has been found that a large proportion of treatment units installed in such habitations have become non-functional/non-working in a few years, particularly due to non-involvement of the communities. Out of 427, 150 and 9227 installed de-fluoridation, de-salination and iron removal plants, 350 (82%), 75 (50%) and 3485 (38%) respectively were reported to be non-working as on 31.9.98. These Sub Missions were mainly technology application experiments. It was sought to remove the quality problems through appropriate treatment methods. Alternative sources or a mix of both are being considered under the Sub Missions only from 1993. The States are therefore now going in for piped water supply schemes through alternative distant safe sources, which adds to the capital as well as O&M cost.

Other quality related issues include biological contamination. Indiscriminate use of fertilizers and various agro-chemicals along with un-scientificaly designed latrines and improper disposal of domestic waste water have further contributed to the deterioration of ground water. In Tamil Nadu, an immense growth in the tanning industry has resulted in polluted ground water far from the tanning sites. Percolating effluents reaches water table after being discharged from the tanneries into dry river beds. Ground water contamination is known to spread upto 5 kms from the discharge site and as there are many scattered tanneries, the effect is wide spread. The tanning process uses many chemicals including heavy metals such as cadmium, arsenic and chromium which can be toxic to people in sufficient concentrations. Many community wells are contaminated as a result of tanning practices. At a wider level community sources need to be protected from industrial pollution through enactment and enforcement of appropriate legal provisions. Communities have a role in monitoring polluters and lobbying for effective control measures. If measures are not taken to control pollution, the consequences could be serious..

All states must come out with a clear cut water quality surveillance policy. They would include monitoring of water quality both at source and supply points in a specified scientific pattern and sequence. Also there is need to know the quality of water at the user's end before consumption. This will indicate the real success of the programme and point out whether special health education efforts are necessary.

What needs to be done?

To sum up, despite good monsoons since 1988, the availability of potable drinking water in rural areas, especially during the summer months, is not satisfactory. The number of problem habitations has not declined over the years (the EFC memo of 1998 admits this) although more than 50,000 habitations (out of a total number of 14 lakh habitations in the country) are claimed to be covered every year. The reason for re-emergence of uncovered villages are:-

- Fast depletion of groundwater level, which also increases incidence of quality problems of Arsenic and Fluoride etc.
- Sources goes dry and defunct due to deforestation and lack of protection
- Heavy emphasis on new construction and little attention to maintenance
- Poor quality of construction
- Non-involvement of people in design as well as operations and maintenance
- No recharging efforts undertaken particularly due to lack of inter-departmental coordination
- Neglect of traditional water management strategies

It is obvious that the past strategy of pumping money in this sector without looking at policy and institutional issues is not going to work. What we require is:-

- Restrictions on withdrawal of groundwater
- People's control over management of water supply schemes
- Water to be managed as an economic asset rather than a free commodity
- Increased attention towards recharge of groundwater through afforestation and watershed development programmes

The new policy parameters are discussed below.

1. Control on withdrawal of groundwater

Almost 90% of the drinking water needs are met from groundwater, although only 5% of total groundwater extraction is needed for domestic water supply. Irrigation accounts for 90% of all groundwater extraction, whereas industry takes the remainder 5%.

The rapid development in groundwater based irrigation in many states has caused groundwater depletion, because of which the life of drinking water supply source becomes short. Highly subsidised irrigation electricity tariffs have led to an indiscriminate and disproportionate level of groundwater extraction. Although significant areas in States, such as Punjab, Haryana, Gujarat, Karnataka, Maharashtra, Rajasthan, Tamil Nadu and Uttar Pradesh (in all 144 districts in 10

states) have been declared 'dark' and 'grey' zones, there has been no let up in the depletion of groundwater aquifers.

Recently, it has been noticed that groundwater depletion has aggravated water quality problems due to excess fluoride, arsenic and brackishness, in certain areas, forcing the Public Health Engineering Departments to abandon low-cost handpump based systems and to undertake costly and complicated piped water supply schemes.

The need for regulating the extraction of groundwater arises from the following considerations:

- Protection of resource against over exploitation
- Protection of resource against quality degradation
- To ensure social equity and to guarantee minimum provision to all sections of society

In view of the above and to regulate and develop groundwater resources in a scientific manner, a Model Bill was framed by the Government of India in 1970 and was circulated to the States. Based on the experiences in the past two decades, the Bill was revised and circulated to states in 1992. The Bill has again been recently revised and circulated to States in 1996.

The status of the legislation in various states has recently been reviewed and it was seen that except for Maharashtra, the implementation of the provisions of the legislation was not satisfactory. A meeting of state Ministers held in August 1997 resolved against any strong legal measures of controlling groundwater discharge and cropping pattern. Instead they wanted to rely more on improving recharge and arresting run-off through watershed programmes. Even such programmes are not very effective today, because of lack of people's participation. Besides these are being dealt with by four different departments in Government of India, with different guidelines.

2. Lack of People's Participation

The Engineering Departments in-charge of water supply have in the past concentrated their attention on new construction and buying of pipes, and there was hardly any people's participation in maintenance and operation of water supply schemes. Similar findings were reported by an earlier evaluation done in 1994, which stated:-

'It was not possible to see even a single model of community participation in any of the water supply models. The community was not made aware of its entitlements - that is, the right to know the details of the scheme and the funds being utilised, the right to be made aware of the technology aspects, the right to know of its new obligations'.

Water is today perceived by the rural public as a social right, to be provided free by the Government, rather than as a scarce resource which must be managed locally as an economic good in order to ensure its effective use. The present pattern is that systems are designed and executed by the Department and imposed on end-users, even when on paper these are transferred to the local Panchayats. Since the guiding principle for planning is that the government will provide a minimum supply of 40 lpcd and that it will be free, there is no attempt to ascertain demand or to respond to demand for higher (or even lower) service levels. As such, planning is not done on the basis of demand and does not take into account user preferences (and willingness to pay) for different service levels nor future demand from increasing incomes and expectations. The experience has been that Panchayats are most unwilling to take on the responsibility for operating and maintaining them. They would be happier if O&M continues to be the responsibility of the Government. However, State Governments have no effective machinery at the village level to maintain such works. The system, therefore, requires a radical change. Rather than being supply driven, it has to be demand driven and also take into account user preferences. A great deal of time should be spent with the communities so that user preferences are taken into account.

One of the characteristics of participation is that it cannot be turned on and off like a tap, that is, "now you participate, now you don't". Attempts to establish participation in the later stages of operation and maintenance are not only misguided but have contributed to ineffective projects. Participation should be viewed as a process that starts with planning and ends with operation and maintenance, rather than as an element that can be injected in the later stages of a project whenever outsiders determine.

SWAJAL PROJECT - A success story of community participation

The World Bank aided SWAJAL Project in UP aims to:

- improve sustainability by adopting a demand responsive approach which introduces partial recovery of capital costs and full recovery of operation and maintenance(O&M) costs;
- develop community participation so that communities play a major role in identifying planning, building and operating and maintaining their water supply and sanitation schemes; and
- create institutional structures to facilitate decentralised decision making and in so doing to test an alternative to the supply driven approach to service delivery.

For O&M mere handing over of asset to panchayats may be counter productive, unless the Panchayats/water user groups are adequately trained, prepared to take on the O&M. The Project emphasises community involvement from the very beginning even in planning and design and in choice of technology. The village community is involved with the help of NGOs and CBOs from the concept to commissioning and its O&M

Other Features of the Project are:

- Establish one NGO/CBO for 5-10 villages
- Heavy emphasis on promoting off-farm activities through training
- 10% capital cost and 100% O&M cost to be borne by the community
- A minimum of 22 months of preparatory activity for mobilising community support
- Village committee decides technology and places order

The community analyses needs, problems, solutions, technology options, costs to come up with a tentative "Feasible Technical Plan". The NGO and the CBOs, then give technical inputs to come up with cost and final technical Plan. By this time, there is a strong sense of ownership, which is further strengthened with the community being involved with implementation and nominal cost sharing and the community become ready to take up O&M, when the time comes.

The committee for village kamtoli consists only of women. When the time came for procurement of pipes, the Chairperson and the Treasurer travelled 350kms from the hills of Pithoragarh to the outskirts of Delhi with the engineer of the SO (NGO support organisation and after careful scrutiny and weighing of all the pipes took the goods back with her in a truck. As for the fittings, taps and specials, she opened the gunny sacks containing them and checked each item. When she found any item without the ISI mark, she insisted on a replacement.

All rural development programmes (health, irrigation, forests, running of schools) require a strong village community. Socio-economic developments in India in the last four decades starting with green revolution have unfortunately stressed the individual as opposed to the communal approach. People in the villages tend to see themselves as individuals, and seek vertical alliances with those with power over the rural society, rather than try to build horizontal ties within the village. They see more advantages accruing to them from hobnobbing with the Police or the revenue inspector or the MLA, and little in developing village capabilities. Therefore no programme which depends on social capital can be successful in isolation in the long run unless all development programs follow the community approach. For example, in Andhra Pradesh (and also in MP) the political leadership perceives political mileage in vigorously pursuing the agenda for building up of local communities and decentralisation. The Janma Bhoomi programme in AP requires people to contribute personal donation or manual labour before government releases funds to the community. Elsewhere, politicians have not put empowering the people, or community approach high on their agenda. They see greater political advantage in espousing schemes which bring individual benefits. In Andhra, on the other hand, the Janma Bhoomi approach which is being followed in all development programmes is based on the people contributing to and controlling government funds. This - besides strengthening better management of drinking water - would also lead to sustained reduction in poverty.

3. Should water be supplied free?

The conditions under which people would be willing to maintain and operate water supply schemes are:-

- If they own the assets,
- If they have themselves installed the hand pump, or being actively involved throughout,
- If they have been trained to do simple repairs,

- If they know that government will not maintain the asset,
- If they have sufficient funds for maintenance, and
- If they have to pay for O & M

Field research has shown that stakeholders are involved in O&M only when they pay for it; when they are certain that they will control the funds which are collected for O&M, and that water supply would be dependable. Except in a few projects (such as World Bank project in Uttar Pradesh), people are not made aware of the technology aspects or given the choice between different technologies and the right to know the details of expenditure on the project.

Non-involvement of people in the design and execution of project leads to sub-standard quality of materials used, poor workmanship and insufficient maintenance. If these problems are not addressed, the life of a project falls drastically, which requires huge expenditure later. On the other hand if the entire community is involved in decision making it may even be advisable to transfer funds to the user committees or Panchayats, who may be asked to buy pipes and install handpumps on their own.

The cost sharing arrangement would ensure involvement of the users and the supporting agencies (thereby reducing the down time of installations and reducing O&M costs) like Panchayat Raj Institutions to own, operate and manage the drinking water supply programme. The arguments are generally advanced that people in the rural areas due to lower level of income cannot afford to share the cost involved in capital investment and the operation and maintenance of the systems. Various field level studies indicate that the operation and maintenance cost for hand pump per person per year works out to be Rs. 5.8 and Mini piped water supply schemes Rs. 15-17 per person per year, and is affordable.

It is, therefore, clear that operation and maintenance cost and replacement cost is within the reach of vast majority of the rural population. It is also possible for the beneficiaries to share, at least portion of the capital cost which would also inculcate a sense of ownership of the systems among the stakeholders. The experiences of World Bank assisted projects in Karnataka, Maharashtra and Uttar Pradesh show that it is possible to institutionalise community based rural drinking water supply programme. If through adequate financial devolution package, the Panchayat Raj Institutions are empowered to generate resources as well as provide with sufficient loans and grants, they would be in a position to mobilise users contribution as well as would be in a position to contribute from their own sources.

Implementation of a participatory demand driven approach will ensure the public obtain the level of service they desire and can afford to pay. Further, full cost recovery of operations and maintenance and replacement costs will ensure the financial viability and sustainability of the schemes.. It would also ensure institutional sustainability, by supporting policy reform and institutional strengthening to assure that the devolution to the Panchayat Raj Institutions and the sector decentralisation both successfully reach their logical and intended conclusions.

4. Recharge of groundwater through watershed development

The three problems in sustainable supply of drinking water viz., scarcity, brackishness and excess fluoride are found to be manifested mainly in the low rainfall and high potential evaporation areas of the country. Solutions to all these problems should therefore involve an integrated water management approach. Discrete and pipe oriented solutions of these problems would not be very effective. Water harvesting and conservation measures in a watershed as a natural physiographic unit with emphasis on direct or indirect artificial recharge of aquifers by utilising surplus run off water can lead to a simultaneous mitigation of all the three problems.

In many parts of India where groundwater is becoming scarce, if forests can improve the availability of fresh water in the ponds and wells, people could be quite enthusiastic about forests. The complementarity between the two through watershed approach has been generally missed out. The poor would be quite willing to protect forests if it helps in improving moisture regime for their crops, or improves their incomes through wasteland regeneration. The West Bengal experience shows that people in Sundarbans (mangrove areas) were very enthusiastic on JFM, not because of any share from final produce, but because protection and regenerating forests helped in controlling floods and they are able to introduce new agricultural production. In addition, it enhanced the availability of sweet water..

Soil and water conservation measures such as contour trenching, vegetative bunding, and small check-dams can enhance soil moisture and recharge of groundwater, accelerating the rehabilitation of the micro-environment. Most funds for watershed development are spent by the Ministries of Agriculture and Rural Developments. They should rehabilitate lands in the upper catchment first for at least three reasons. First, so that the landless and the poor who depend on upper slopes can benefit; groundwater recharge begins at the earliest; and third, by the time the lower

catchment is treated any debris and erosion running down from the upper catchment has been minimized. However, upper slopes are typically under the control of FD, which does not permit other departments to operate on its lands. The Ministry of Rural Areas and Employment has recently permitted its funds to be used in watershed schemes by the FD, but similar initiative is needed from the Ministry of Agriculture.

The overwhelming evidence on natural resource management projects, such as forests and watershed management, is that the benefits are not sustainable in the long term. After the source of funds from government dries up, plantations disappear, committees are disbanded or abandoned, and the livelihood base of the poor remains only marginally improved, if at all. Perhaps in some cases they create some sustainable social capital by raising awareness amongst the poor. However the evidence suggests that most of the social capital which projects create is held by the rich, and that in fact most projects have contributed to a further entrenchment of their powers. Part of the reason given for NGO involvement in development projects is to ensure the sustainability of a project by threading it into the fabric of the local social and economic structure. Some NGOs have ensured the sustainability of some projects by creating participatory development and negotiating conflicts before leaving the village. This approach takes time and needs resources, hence the question of how to 'scale-up' this process to cover wider areas. Further, these success cases are drops in the ocean, and even then they are not problem free. A respondent from RDT, an NGO in AP with a very good reputation commented that there are a few villages in which the committees have the capacity to become partners of the government for development. But 60% of the institutions are not democratically elected. Another study of natural resource management projects found that after NGO support ranging from 7-12 years, 'the social organizations or community groups involved do not appear to have reached the stage yet where external support – whether operational or 'institutional' – is no longer required'.

5. Traditional technologies

Rain water harvesting not only supplements the domestic water supply, but also acts as anti-flood measures and recharges the ground water aquifers. Rain water has been harvested in India since antiquity. There is some evidences of advanced water harvesting systems from pre-historical times like canals, tanks, embankments and wells. India can be broadly divided into 15 ecological regions. In hills and mountain regions, natural springs were often harvested, rain water harvesting from roof tops and spring water is often carried over long distances with the help of bamboo pipes. In arid and semi-arid region, ground water harvesting structures like wells and step-wells were built to tap ground water aquifers like "bavdis" of Rajasthan. Rain water harvesting from roof tops e.g. tanks of pali, rain water harvesting using artificially created catchments which drain water into an artificial well like kunds of Rajasthan. Special rain water harvesting structures which help to keep sweat rain water mixing with saline ground water and thus providing a layer of potable water e.g. virdas of Kuchchh; horizontal wells similar to the "Qanats" of the Middle East to harvest seepage down hill slopes e.g. surangams of Kerala. With the fast declining ground water table due to indiscriminate ground water exploitation for agricultural use, it has become imperative to take curative as well as preventive measures to check further declining. Revival of traditional technologies for rain water harvesting can prove to be most economical, successful and long lasting measure and therefore should receive emphasis by all State Governments, particularly in the water scarcity areas.

Need for alternate planning & the new Water Policy 1999

Several problems/issues mentioned above connected with the sector contribute to unsustainability of the rural drinking water supply and systems. There is a general recognition that a transformation from a target based, supply-driven approach, which pays little attention to the actual practices and/or preferences of the end users, to a demand-based approach where users get the service they want and are willing to pay for is urgently required.

A number of steps need to be taken urgently in order to manage groundwater in a more scientific manner, especially in dark and grey zones. Firstly, there must be a Central legislation against subsidies on electricity tariffs for irrigation. One may mention here that although the World Bank had approved a drinking water project in principle for Punjab, further processing was withheld by the World Bank because of the Punjab Government's policy of providing free electricity and power for irrigation sector. Secondly, the Model Bill framed by the Government of India and circulated to the States in 1996 should be adopted by the States and implemented seriously. Thirdly, user groups should be formed on the lines of Joint Forest Management Groups, who should do groundwater monitoring and ensure that it is managed as common property resource rather than allow it to be over exploited as an open access resource.

The Chief Ministers' Conference on Basic Minimum Services held on 4-5 July, 1996, recommended that all Not Covered habitations(NC) habitations, Partially Covered (PC 0-10 lpcd) Habitations should be covered by 1997-98 and rest of the

PC habitations(10-40 lpcd) should be covered with safe drinking water at the existing norms of 40 lpcd by 2000 AD. This was reiterated in 1998 by the present government. However, this would be realised only when policies and funds proposed in this paper are accepted.

It should be noted that the ongoing Centrally Sponsored Accelerated Rural Water Supply Programme (ARWSP) has now been modified w.e.f. 1.4.99, incorporating most of the suggestions made above. In consonance with the adoption of need-based approach, it has been found desirable to give appropriate weights (10%) for NC/PC habitations in the ratio of 2:1 based on data received from States as on 1.4.98. Two more new criteria viz., "overall water resources availability" and " Number of quality problem habitations" have also been included. The former is reflected by ratio of un-irrigated to irrigated area and will take care of special needs of area with overall water scarcity on account of poor rainfall, low groundwater potential and the latter reflects concern for adoption of need based approach. In this criterion, differential weights have been given based on severity of the problem to fluoride (40%), arsenic (40 %), brakishness (15%) and iron (5%). The old criterion of rural population and special category areas (HADP/DPAP/DDP/Special Category Hill States) have been found relevant and therefore retained. Limit of ARWSP fund utilisation for O&M has been raised from 10% to 15%

The most important element of the new Policy is that incentive is to be given to States, who will adopt "Sector Reform" measures and will implement the adoption of a demand-driven approach based on empowerment of village water and sanitation committees, 10% of capital cost sharing and 100% sharing of O&M cost by users etc. 20% of the GOI funds would be reserved for those states which adopt these measures.

The new strategy thus rightly relies heavily on the use of central/state funding as a critical incentive to drive the sector reform process at both the state and local government levels. As such, it is important that funding conditionality for disbursement of central funds to state administrations, and from state administrations to Panchayat Raj Institutions and/or local administrations, be explicitly defined both in terms of conditions which must be met and activities for which funding can be applied. However, the impression gathered during Working Group discussions with the States held between June and September 1999 was that the impact of the programme is yet to be seen. The Ministry has also not identified states which have introduced or have promised to introduce sector reforms, and therefore it is apprehended that the 20% funds rather than inducing reforms would again be distributed to the states on the basis of the fixed criterion with no emphasis on performance.

It must be recognised that sector reforms such as improving capacity of the local people to manage water resources and to make them pay for the supply are politically or administratively not popular decisions. In the absence of requisite political and administrative will it is feared that the unpopular measures of the new Policy may not be implemented. Two steps are therefore immediately called for. One, the Prime Minister should call a meeting of Chief Ministers and put his weight firmly behind sector reforms. Two, the Secretary of the Administrative Department must work out the details of the new institutional arrangements of greater control and responsibility to user groups, and monitor its follow-up on a monthly basis. Today the Water Engineers have little clue as to how to operationlise decentralisation. Case studies of success should be disseminated through the electronic media. Training institutions should launch special five day programmes of institutionalising people's participation in drinking water and groundwater management. The modalities of collecting water charges and its use should also be thought through. So far the panchayats have relied too heavily on central and state funding leading almost to spoon feeding and weak implementation capacity. For their capacity building they too should get into the mould of collecting user charges, which is so far avoided by the panchayats being an unpopular measure.

It is relevant to recall here that many of the issues and constraints which have now been incorporated in the 1999 Policy were recognised and identified way back in 1992 in the Government of India's Eighth Five Year Plan too. The relevant extract from the 8th Five Year Plan document is as under:

- "Water has to be managed as a commodity in exactly the same way as any other resource".
- "Supply of water to consumers should normally be based on the principle of effective demand which should broadly correspond to the standard of service that the users are willing to maintain, operate and finance"
- "Local bodies (Panchayati Raj Institutions/local administrations) should be made responsible for the operation and maintenance of the system installed"
- "Local bodies (Panchayati Raj Institutions/local administrations) should be free to levy and raise appropriate user charges for drinking water and sanitation services, whereby at least operations and maintenance, if not further development become self sustaining.

- “Private sector efforts for constructions and maintenance should be encouraged and mobilised to the maximum extent feasible”.
- “Appropriate links should be forged between water supply and environmental sanitation”.

The need for policy changes is thus fairly old and well recognised. Whether these changes would be institutionalised during the 9th Plan or continue to remain a mere rhetoric is yet to be seen. In the ultimate analysis management of water is really a question of good governance of a natural resource - which includes a variety of issues ranging from the establishment of proper property regime and good stakeholder involvement to the establishment of varied forms of institutions - from the state level to the private and community level, proper pricing, transparency and accountability, strict regulation, comprehensive environmental management, appropriate choice of technology, and good research, data collection, monitoring, and mass education. The problem of drinking water cannot be seen in isolation or reduced to merely buying more pipes.



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