

## CHAPTER 5.5

### RURAL WATER SUPPLY AND SANITATION

5.5.1 In line with the National Agenda for Governance, safe drinking water is to be provided in accordance with the stipulated norms on a sustainable basis to all habitations by March 2004. This is also one of the monitorable targets in the Approach Paper for the Tenth Plan.

5.5.2 The 54<sup>th</sup> round of National Sample Survey (July 1999) on drinking water, sanitation and hygiene in India provides data relating to source, quality etc. of drinking water, and conditions of sanitation and hygiene of households. This data was collected in the first half of 1998. Around 50 per cent of rural households were served by a tubewell/hand pump, 26 per cent by a well, and 19 per cent by tap. Only about 31 per cent of rural households reported having their source of water within their premises, the rest had to go out to fetch their drinking water. About 60 per cent did not have to go beyond 0.2 km for this. Seasonal disruption of supply was common, especially in the summer months. Households still depended on supplementary sources, especially where tubewell or handpump was the main source. Practices of filtering or boiling water before drinking were almost non-existent.

5.5.3 States have reported that more than 95 per cent coverage has been achieved. However, reliable data on the ground reality of rural water supply is lacking. A re-assessment survey of rural habitations has become necessary and the data should be updated periodically through a 'Return Filing' system whereby each panchayati raj institution (PRI) will report on the status of these services in its area. Random sampling will need to be done to validate this. In view of the importance of basic data, however, Central assistance for PRIs and urban local bodies (ULBs) could be made conditional on a 'Return Filing' system being established.

5.5.4 The following priorities will be set for achieving the objective of providing safe drinking water supply to all rural habitations:

- i. Highest priority to be given to ensuring that the 'not covered' habitations are provided with sustainable and stipulated supply of drinking water.
- ii. It will be equally important to ensure that all the 'partially covered' habitations having a supply level of less than 10 litres per capita per day (lpcd) and those habitations facing a severe water quality problem are fully covered with safe drinking water facilities on a sustainable basis.
- iii. Thereafter, other 'partially covered' and 'quality affected' habitations are to be covered.
- iv. Once drinking water supply facility is provided to all rural habitations as per the existing data by 2004, the remaining period of the Tenth Plan would be utilised for consolidation. This will involve covering newly emerged habitations and those which have slipped back to 'partially covered' or 'not covered' status due to a variety of reasons.
- v. Simultaneous action is needed to identify and tackle habitations where water quality problems have emerged recently.
- vi. It should be ensured that scheduled caste/scheduled tribe (SC/ST) population and other poor and weaker sections are covered fully on a priority basis. A systematic survey of all such identified habitations will be undertaken.

5.5.5 The stipulated norms of supply would be 40 lpcd of safe drinking water within a walking distance of 1.6 km or elevation difference of 100 metres in hilly areas, to be relaxed as per field conditions applicable to arid, semi-arid and hilly areas. At least one handpump/spot-source for every 250 persons is to be provided. Additional water is to be provided in the Desert Development Programme (DDP) areas for cattle, based on the cattle population. The water requirements for cattle need not necessarily be met through piped water supply and could be made through rain-water harvesting structures/spot sources.

5.5.6 In the states where 40 lpcd has been achieved in all habitations, the next step is to raise the level of availability to 55 lpcd. Population/distance/elevation norms for coverage may also be liberalised during the Tenth Plan for states which have achieved full coverage as per the existing norms, subject to cost sharing by the beneficiaries.

## DECENTRALISATION OF RURAL WATER SUPPLY

5.5.7 Though planning for rural water supply is made at the Central and State levels, responsibility for proper implementation has to be borne at the local level, by the PRIs, with the help of organisations of the users.

5.5.8 Under Article 243G of the Constitution, the State legislatures may, by law, endow the panchayats with the powers and authority necessary to enable them to function as institutions of self-government. Further, such law may contain provisions for the devolution of powers and responsibilities with respect to:

- (a) The preparation of plans for economic development and social justice.
- (b) The implementation of schemes for economic development and social justice as may be entrusted to them, including those relating to matters in the Eleventh Schedule, which include drinking water and maintenance of community assets.

5.5.9 As such, PRIs should be the key institutions for the convergence of drinking water

supply programmes at the ground level. However, the financial and administrative authority has not been devolved to PRIs to the extent needed.

5.5.10 Emphasis must be laid on the participation of stakeholders at all levels, from planning, design and location to implementation and management. Presently, water supply projects are designed and executed by the implementing departments and passed on to the end-users. Experience has shown that panchayats are unwilling to shoulder the responsibility for operating and maintaining these projects. On the other hand, the State Governments do not have an effective machinery at the village level to maintain the assets.

5.5.11 This calls for a radical change in the management system. Rather than being supply-driven, the decisions relating to installation of water supply schemes, should be based on the level of local demand and capabilities to meet the responsibility for operation and maintenance. These decisions should take into account user preferences such as preference for shared hand-pumps or stand posts versus household connections, and other related issues which will emerge when people are taken into confidence and consulted. People should be aware of the technologies, and O & M costs involved in every available option, and given the facility to make their own choice, while a simultaneous exercise in capacity-building is carried out. People's participation at all stages of the project implementation is likely to help tackle the problem of sub-standard materials, poor workmanship and inadequate maintenance.

5.5.12 Besides, PRIs should meet part of the expenditure on the project. Being institutions of local self-governance, PRIs should be strengthened and entrusted with all activities relating to water supply, sanitation, hygiene and nutrition. Various development functions may be handled by the single institution of the gram panchayat, as this will increase the possibility of convergent planning and delivery of services.

5.5.13 The participatory approach, which is a part of the sector reform programme, must be seriously addressed in the Tenth Plan. However, while part of the project costs should progressively be borne

by the beneficiary community, the major source of funding for rural water supply schemes has to be the budgets of the Central and State Governments. The provision of adequate support under Plan provisions has to continue till all rural habitations are provided with a satisfactory and sustainable water supply arrangement.

## **INTEGRATED WATER MANAGEMENT IN RURAL AREAS**

5.5.14 The three major and widely prevalent problems in sustainable supply of drinking water — scarcity, brackishness and excess fluoride content — are manifested mainly in the low rainfall and high potential evaporation areas. An integrated water management approach is, therefore, necessary to solve these problems. 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 three problems.

5.5.15 Integrated water supply and sanitation programmes, with emphasis on conservation of water, will be increasingly implemented during the Tenth Plan. The implementing machinery in the Centre and the states will require organisational restructuring in order to work in a mission mode, guided by the Rajiv Gandhi National Drinking Water Mission Authority and its empowered committees. Micro watershed-based master plans should be prepared to ensure the sustainability of water sources by taking care of demand and supply. The inputs of professional institutions, non-government organisations (NGOs) and community-based organisations should be utilised in planning, development and management. All possible measures must be taken for rain-water harvesting and ground water recharging. Continuous monitoring of the sources is necessary, so that the habitations that are presently covered do not relapse into the category of uncovered. Inter-departmental coordination at the block level needs to be activated for this. Links of water supply schemes with watershed development programme should be made stronger for greater sustainability of drinking water sources.

5.5.16 As part of the integrated water management approach, traditional sources of water shall be identified, strengthened and developed with community involvement. Rehabilitating the existing village tanks, creating detention basins by storing rain water in local depressions, abandoned mines/quarries etc. for water harvesting needs to be encouraged for the development of water resources. In view of the higher efficiency of micro-watershed areas for water conservation, small dams should be built, wherever a suitable site is available. To avoid evaporation losses from such small storages, underground siphon systems which conserve water and recharge the aquifer should be used. As a general principle, open storage should be avoided and closed contour trenches should be developed as water harvesting structures in order to reduce evaporation losses which, at times, are as high as 30 per cent of the total storage.

5.5.17 The cropping pattern in drought-prone areas should be sensitive to local constraints with regard to availability of water. In areas where there is shortage of water, farmers should be discouraged from water-intensive cash crops. Agriculture borewells should not be allowed to be deeper than drinking water borewells. Recycling of waste water and use of such water for crop cultivation, should be encouraged as a part of enhancing the productive use of water.

## **INSTITUTIONAL FINANCE**

5.5.18 Currently, rural water supply schemes are conceived as grant schemes. However, it is necessary to get institutional funding for this sector in order to mobilise additional resources for implementation of projects. The role of financial institutions like the Housing and Urban Development Corporation (HUDCO), Life Insurance Corporation (LIC), Infrastructure Development Finance Corporation (IDFC), ICICI etc. would be vital in this task and their potential should be tapped. However, efforts should be made to meet a part of the project cost through recovery of user charges.

## **OPERATION AND MAINTENANCE**

5.5.19 More than 3.5 million hand pumps and over 100,000 piped water supply schemes have been

installed in the country under the Rural Water Supply Programme. The total estimated cost for operation and maintenance (O&M) of this, at the present value, would be around Rs. 2,000 crore per year (10-15 per cent of the capital cost). A majority of the schemes remain non-functional and many others become permanently defunct due to lack of proper maintenance and repairs for want of funds. It is, therefore, necessary to give highest priority to O&M. Most states face resource problems and, therefore, tend to neglect maintenance. Funds under the Minimum Need Programme (MNP) and the Accelerated Rural Water Supply Programme (ARWSP) are already available to meet some of the O&M costs.

5.5.20 Suitable institutional and funding arrangements through community participation need to be evolved to get the installations working. The problem of poor maintenance can best be tackled by decentralising O&M by making the beneficiaries and panchayats stakeholders in the system. The responsibility of O&M should rest with the panchayats, as already conceived in the sector reform programme. 'Village Water Committees' should be actively involved in the maintenance of drinking water supply schemes and a system of beneficiary participation introduced. Participation of village women and NGOs/voluntary organisations should also be encouraged. The mechanism and the funds available under the Training of Rural Youth for Self Employment (TRYSEM) programme should be used to impart training, so that trained manpower can be mobilised locally for the maintenance of the assets. Major repairs and replacement/rehabilitation projects may be allowed as Plan schemes.

### **WATER QUALITY MONITORING AND SURVEILLANCE**

5.5.21 In view of the increasing problem of water quality and the resultant health hazards, it is necessary to institutionalise water quality monitoring and surveillance systems. Water quality surveillance should be done by an independent organisation,

more appropriately by the Health Department which should be provided with adequate funds for the task. Routine analysis of water samples for their physico-chemical and microbial quality should be undertaken and monitored at the state level by the Public Health Department. Central assistance under the ARWSP shall be utilised for setting up stationary as well as mobile water testing laboratories in all district headquarters.

5.5.22 The community has to be made conscious about water quality through health education and awareness campaigns and water testing kits shall be made available to a range of institutions, including schools and colleges and qualified NGOs in the area.

5.5.23 All possible measures should be taken to remove the disparity in access to potable water across regions and socio-economic groups. A system of random checks should be developed to detect the poor quality of construction.

5.5.24 The choice of technology in case of schemes related to water quality (detection of fluoride, iron, arsenic), shall be district/block specific. Further research is required to improve available technologies for treatment of chemically contaminated water, in terms of their simplification and increased cost effectiveness.

### **Water Supply and Rural Development**

5.5.25 Rural water supply and sanitation facilities are vital elements in the overall programme for rural development. Other related elements include infrastructural issues like land and watershed management, soil conservation, afforestation etc. and social issues like primary health care, eradication of illiteracy, women's welfare, child nutrition, immunisation etc. It is desirable that the thrust and implementation of as many of these programmes as possible are converged in order to provide for integrated rural development.

### BOX : 5.5.1 ARSENIC CONTAMINATION

Arsenic-contaminated habitations have been identified in eight districts of West Bengal (North 24-Parganas, South 24-Parganas, Murshidabad, Malda, Nadia, Howrah, Hugli and Bardhaman), 65 blocks, 757 muzas, 15 non-municipal outer growth areas, and nine municipalities in an area of approximately 40,000 sq. kms. About 200,000 people are actually affected and a population of 5.3 million is estimated to be at risk. There are 22,000 public tubewells and 1,30,000 private tubewells in the affected areas. The range of arsenic content varies from 0.055 to 3.20 milligram/litre (mg/l).

Some of the options for providing arsenic-free water to the affected rural population are:

- Tapping a deeper third layer beyond 100-150 metres below ground level, which is found to be arsenic-free.
- Adopting arsenic removal technique through domestic filters, attached hand pumps and arsenic removal plants in piped water supply schemes:
  - i. Oxidation followed by coagulation and filtration – a widely popular option;
  - ii. Absorption, also widely adopted;
  - iii. Ion exchange; and
  - iv. Osmosis, which is yet to gain popularity.
- Utilizing surface water from rivers, lakes, ponds, which is normally free from arsenic contamination;
- Sanitary protected ring-wells tapping the shallow aquifers.

The Government of India introduced an 'Arsenic Sub-mission' in 1994 under the Rajiv Gandhi National Drinking Water Mission to tackle the arsenic problem in West Bengal on a 75:25 cost sharing basis between the Centre and the State. A large number of projects with a total outlay of Rs. 372.70 crore have been sanctioned under this Sub-mission.

### BOX : 5.5.2 USE OF SOLAR STILLS

- In areas like remote islands, deserts and other inaccessible areas, where conventional energy sources are not available or would be a costly proposition, one of the options to remove chemical contaminants from drinking water could be solar distillation through 'solar stills' at the household or community level.
- The solar still is a simple device to distill water of its impurities. Larger solar stills are generally made of glass over a formed sheet metal. But the base can be made of any material that will hold up outdoors. The most important elements of the design are the sealing of the base with black, high-temperature silicone rubber. As sunlight warms the black silicone bottom and heat is transferred to the water, the top layer of water evaporates and covers inside of the glass cover, which is tilted towards the freshwater drain. Approximately, one sq. meter of glass cover will distill around 4.5 litres of water per day with five hours of full sunlight. The capital cost of a solar still with a one sq. mtr glass cover area would be around Rs. 4,000. With bulk production, the costs may come down.
- Though the technology is appropriate for the remote, inaccessible areas, the device may become dysfunctional, if sludge removal and cleaning is not done regularly. Community awareness, motivation and participation would, therefore, be a key to the success of the technology. This technology could also be used to meet the drinking water needs in schools.
- More work is needed to develop cost-effective models and propagate them. Leading scientific and technological institutions should be assigned the task of developing solar still models.

**BOX : 5.5.3**  
**WATER SUPPLY, SANITATION, AND HEALTH**

Water, which is essential for life, growth and health, can also be a source of spread of disease and cause of ill-health, if contaminated or improperly handled and stored. Safe drinking water and improved sanitation play a major role in the overall well-being of the people, with a significant bearing on the infant mortality rate, death rate, longevity and productivity.

The poor, both in rural and urban areas, bear a disproportionate burden of non-availability of water, as well as of poor quality. They often supplement public sources of water with supplies obtained at high prices from other sources. Women bear the physical burden of fetching water. Women and children are particularly vulnerable to the effects of water contamination.

Water-Borne Diseases: 70-80 per cent of illnesses are related to water contamination and poor sanitation. The national objectives of reducing morbidity and mortality largely depend on the reduction of diarrhoea and jaundice. In fact, no water supply and sanitation programme can be successful if water-related illnesses are not reduced. It is a matter of concern that despite the progress made with water supply, the level of water-related sickness continues to be high.

Causes of contamination of water are indiscriminate use of chemical fertilisers and chemicals, poor hygienic environment of the water sources, improper disposal of sewage and solid waste, pollution from untreated industrial effluents, over-exploitation leading to quality degradation. Thus, the supply of additional quantity of water by itself does not ensure good health; proper handling of water and prevention of contamination are also equally important.

Among the most important elements of the rural sanitation package are:

- ↓ Safe handling of drinking water.
- ↓ Disposal of waste water.
- ↓ Safe disposal of human excreta. Human excreta is associated with more than 50 per cent of diseases.
- ↓ Safe solid waste disposal.
- ↓ Home sanitation and food hygiene.
- ↓ Personal hygiene, particularly, washing one's hand with soap.
- ↓ Sanitation in community.

Recent studies have shown the importance of washing one's hands with soap as it reduces diarrhoeal disease by 43 per cent. Respiratory problems such as sniffles and coughs were also brought down by 45 per cent when hands were washed five times a day.

Safe sanitation practices should be made a compulsory part of school curricula, and of all programmes where women are trained in community, economic and health issues affecting the household.

## SECTOR REFORM PROGRAMME FOR RURAL WATER SUPPLY AND SANITATION

5.5.26 In order to address the problem of sustainability, the Government approved sector reforms programme in March 1999 to ensure the active participation of the community in rural water supply. The implementation of the new policy has already commenced. State Governments have identified 63 pilot districts for introducing reforms. The reform projects incorporate institutionalisation of community participation through capital cost sharing and shouldering of full O&M responsibilities. The experience gained during the implementation of these pilot projects would be utilised for expanding the reform package to other districts in the second phase. This will ensure a satisfactory and sustainable rural water supply programme in the whole country. For the success of the proposed reform process, however, complementary reforms are necessary such as increasing user charges for water used in irrigation and industry.

- The new strategy thus relies heavily on the use of Central/State funding as a critical incentive to drive the reform process. As such, it is important that conditionalities for disbursement of Central funds to state administrations and from state administrations to PRIs and/or local administrations, be explicitly defined. The conditions which must be met and the activities for which funding can be applied must be clearly specified.
- Resources for information education communication/human resource development (IEC/HRD) now given for different sectors, particularly ,public health, nutrition, drinking water, sanitation etc. should be pooled together at the district/state level to the extent possible.
- NGOs are found to be particularly good at outreach and have the advantage of being able to sharply focus on and activate the participation of communities.
- All existing social organisations, women's self-help groups, cooperative societies,

civil societies, educational institutions, private institutions etc. should be involved for effective implementation of a large-scale sanitation programme.

## RURAL SANITATION

5.5.27 The existing Total Sanitation Programme should include safe disposal of night-soil, rain water, domestic liquid and solid waste. It should not be restricted to construction of latrines only. Awareness of sanitation standards and health impact of unsanitary conditions continues to be low. Rural sanitation is promoted as a total package consisting of safe handling of drinking water, scientific disposal of waste water, safe disposal of human excreta including child excreta, solid waste management, domestic sanitation and food hygiene, personal hygiene and village sanitation. However, there has hardly been any significant change in the sanitary conditions in the villages in India. The 54<sup>th</sup> round of National Sample Survey indicates that only 17.5 per cent of rural population were using latrines. There is a need to implement a revitalised programme for rural sanitation which must have the following elements:

- Preference has to be given to the twin pit model of water-sealed latrines. However, the cost of such a unit may be an inhibiting factor. The successful model of Midnapur in West Bengal, where a single pit is provided initially, may also be considered for adoption in other districts with appropriate changes to suit local conditions.
- School sanitation (providing toilets) should be given highest priority to inculcate safe hygienic habits among school children.
- Village Panchayats should adopt building bye-laws where dry latrines are not permissible. Any latrine to be constructed should be of the water-sealed type with a leach-pit. This will prevent the emergence of the problem of manual scavenging.
- Considering that the programme of installation of low-cost toilets has not made

the expected degree of progress, a fresh start is required. The State Council for Sanitation proposed under urban sanitation sector should also have the mandate for rural sanitation.

- Subsidy for the low-cost household toilets should only be given to rural below-poverty-line (BPL) families, and it should be on par with subsidy for the urban households. For the success of the scheme, a subsidy of 50 per cent of the cost of the unit inclusive of sub and super-structures for the basic twin-pit pour flush system appears to be necessary during the Tenth Plan.
- A quick exercise to arrive at the realistic present costs in different regions, terrains, soil conditions, etc., should be carried out so that the subsidy amount can be estimated. This exercise should be completed by March 2003.
- In order to mobilise the required funds for rural sanitation, financial institutions/banks including HUDCO and the National Bank of Agriculture and Rural Development (NABARD) should extend loans at lower interest rates to states for provision of sanitation facilities. Low cost loan schemes like micro-credit through NGOs should be adequately supported. Various fiscal concessions such as reduced excise duty/sales tax and lower electricity charges

should be made available to the manufacturers of low cost sanitary materials. Private participation should be encouraged in setting up of building centres and sanitary marts in rural areas to provide cost effective sanitation technology to the rural households.

- The recommendations made with regard to urban low cost sanitation also apply to the rural segment. Creation and maintenance of a record of locally relevant information regarding various technological options, hydro-geological information, availability of building materials, choices in design and implementation etc. at the block level should be organized through the panchayats, sanitary marts and building centers.
- For the success of the scheme, and to overcome the huge problem of insanitary practices in the country, a large programme of education, propagation, training, designing and development, production, and installation, needs to be taken. NGOs should be mobilised to support to the programme, especially for supervision, monitoring, training and development work. A suitable provision for the participation of the non-governmental organizations in the sanitation programme should be made in the project costs.