14th WEDC Conference

Water and urban services in Asia and the Pacific

Kuala Lumpur 1988

Management of drinking water in drought

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The water crisis has become the central theme for Indian Planning process during this decade. Paradoxically this situation happens to coincide with the International Decade of Drinking water. Today in India we are face to face with an acute water scarcity that is posing a grave threat to the development and growth of the nation.

Drought

While drought means a deviation from normal rainfall the term is used rather freely in India. However the most alarming and exponential increase in water scarcity over the last few years cannot be linked exclusively to this factor as there has been no long term change in rainfall (Mooley, Parthasarathi 1984)[1]. It is the distribution of rainfall which is changing and as due to the deforestation surface run-off increases and top soil cover is removed fast, the recharging of groundwater proportionately reduces. Excessive pumping of groundwater can create an almost irreversible position even if the rainfall and soil condition remains good. Rain water, surface water, groundwater, soil moisture are part of a total water system and are inseperable, linked to each other and the problem has to be looked into in totality and not in isolation of drinking water scarcity only.

Although the surface water sources are the main water resources for urban and some rural drinking water supply, they are the primary victims of the drought. The maintenance of the hydrogeological capacity of these reservoirs has so far not been recognized as a step in sustaining water resources. Moreover in the summer the loss due to evaporation of whatever the water resources left out are to the tune of 60-70% and thus aggravate the problem.

Year round availability of surface water is not only essential for irrigation but it is the only source for large supplies to the urban industrial sector and for hydro-power generation. Surface water drought thus undermines all these activities as has been seen in the current year.

"The reason has been that water resources development in India has cognitively been limited to utilization and has not touched ecological husbandry. Thus we are left with increasing competition for a decreasing resource. The crisis in surface water is mainly due to the collapse of water conservation in the upper catchments. Large areas of the country are also affected by two other vital forms of drought - scarcity of moisture in soil for plant growth and scarcity of groundwater for both domestic and irrigational purposes". (Bandopadhyaya J 1987)[2].

1987 Scenario

With the failure of monsoon of 1987, 15 States of the Union including nearly 90,000 villages and 300 towns faced drinking water scarcity. In some areas like Gujarat, Rajasthan this year is the third drought year in succession and the surface water was almost totally inexistence in some parts in these areas[3].

Urban Water Supply

The fragility of the urban water supply system in tropic and semi-tropic region had been fully exposed when this sector faced serious crisis in recent drought. The rapid urbanisation, industrialization far exceeded the water supply systems established. Metropolitan cities like Madras, Hyderabad, Bangalore, Jaipur, Rajkot which in recent years had shown high growth rates faced serious crisis. For Madras and then for Rajkot water had to be moved through rail tankers over

long distance while in the same city of Rajkot a sewerage scheme based on 140 litres per capita water supply is crawling in its implementation! The emphasis laid on the distribution and purification system without a flexible source had exposed the weaknesses in areas of source development, source sustainance, recycling of waste water and above all planning for total water management.

Problem of Growth

The major problem these urban and rurban growth centres face today is the exponential increase in population due to migration as well as industrialization. Water was never considered as a finite natural resource and hence never was considered a problem to match such a growth. The water potentiality and the unit cost of water in a sustained supply basis was never taken into consideration in regional or town planning. The fragile eco-system on which such pockets of growth were based could not sustain and become highly sensitive. With slight variation in rainfall or a change in distribution, the systems tend to collapse. The earlier warnings of Madras or Hyderabad went without much notice. The degradation of urban ecological system was much more severe than the rural scenario. That the urban growth centres cannot have unlimited supply of the natural resource at the expense of rural areas and the growth has to be conjunctive to support each other has now been felt in time of crisis.

Immediate Government Action

To give a boost to the International Decade Programme in Rural Drinking Water Supply Programme and to develop an appropriate technology mix a "National Technology Mission on Drinking Water" had been launched by Government of India in 1986. The Mission was aimed to develop a holistic approach towards the problem though primarily the rural drinking water problem but focussed also to the total water management.[4] This National Technology Mission had been launched with a view to change the life of an ordinary man in the villages through the application of science and technology. Primarily however this Mission is a societal one. The ambitious goal of the Mission is to cover 2.27 lakh villages in the Seventh Plan, i.e., by 1990 which incidentally matches the International Decade. The target of the country of 100% coverage of rural population by supply of safe drinking water is the goal of the Mission. This will be achieved through development of appropriate cost effective technologies through community participation and development of a nation-wide management information system for project planning, implementation, evaluation and decentralised maintenance.

With the works of the Mission being under implementation and with the early indications of the drought Government immediately decided to have a contingency plan. The problem areas were divided into sub groups and action plan had been formulated to meet the crisis situation and to dovetail into the works of the Mission. Briefly the problems and the actions taken have been listed as follows:

Rural Drinking Water Supply: Problems due to Drought (a) Lowering of water tables, (b) sources dry up, (c) power shortages lead to lowering the capacity of the system, (d) systems based on surface sources dry up, (e) pollution problem aggravates, (f) problem of cattle drinking water becomes serious, (g) mechanical failures add to the problem, (h) lesser capacity of the system needs augmentation.

Urban Drinking Water Supply: Problems due to Drought (a) Mostly surface sources - dry up, (b) due to poor distribution system - unequal distribution, (c) more demand - less supply, (d) new sources located in rural areas - creates social tension, (e) high demand from industry, (f) sewerage system gets affected (g) shift from mechanical to manual distribution creates management problem.

Action Plan

The problem had been tackled in both short as well as medium plan action in the overall context of the long term plan and its objectives.

Short term measures include (a) Department of Rural Development

being declared as the nodal agency for both rural and urban areas for better coordination, (b) water targetting through satellite imageries, geophysical and geohydrological exploration started, (c) source development through proper scientific drilling, (d) reservation of all water in irrigation dams for drinking water purposes in difficult areas, (e) programmes for extension of pipelines, augmentation of source and massive rejuvenation programmes have been given priority, (f) completion of projects under implementation on priority basis in difficult areas, (g) concentration on most difficult areas like Gujarat, Rajasthan etc., (h) mobilisation of manpower and equipments in all sectors for drinking water programmes, (i) computerization of monitoring system.

Medium term measures include immediate action for (a) procurement of drilling rigs - indigenous as well as imported through UNICEF, and other bilateral programmes. The most important one is Indo-UK bilateral programme, (b) procurement of geophysical equipments like electrologger, terrameter, hydrofracturing equipments etc. (c) massive training programme organised for geophysical surveys as well as for drilling programmes, (d) large number of structures for both water harvesting as well as for artificial recharging of aquifer, (e) composite plan of water distribution made upto the next monsoon for both rural as well as urban areas, (f) strengthen urban distribution systems, (g) emergency distribution systems laid for new sources, (h) massive awareness programme for individual and community participation in water conservation measures started.

Long term measures include proper legislations introduced to control the ground water withdrawl for use of water for industry and water intensive agriculture and effective implementation of National Water Policy.

Non-conventional Measures

Various non-conventional measures have also been introduced like Reverse Osmosis or Electrodialysis plants for desalination, installation of solar powered deep drilling pumps, defluoridation plants and high iron removal plants.

Awareness Campaign

It was evident that such a massive drought fighting programme cannot be implemented without active copperation of people. Media campaign had been launched through Television, Radio, Newspaper, Advertisements and a large number of awareness camps through voluntary agencies to meet the situation, to take care regarding water borne diseases and to ration the supply in areas of crisis. The reaction of people is spontaneous, patient and highly cooperative.

Maintenance

Majority of the problem lies in not maintaining schemes properly. Rejuvenation works are mostly due to failure of maintenance. In normal years the schemes are neglected and only in time of crisis the need of rejuvenation develops. This is also due to lack of peoples' involvement at the stage of implementation of the scheme and its normal maintenance.

Funding

Every year a massive programme of Rs.1000 crores is being implemented in the water supply and sanitation sector in the country besides during the time of drought another Rs.200 - Rs.300 crores are being spent for emergency measures. The effect of this massive programme is evident from the fact that inspite of having 4 mm to 8 mm rainfall in some areas, the scientifically developed water supply schemes have been sustained. Water has been provided both for human as well as cattle population and it is a fact that even in urban pockets facing grave crisis, migration has not taken place. Immediate measures like conservation of water through spraying of cetyl alcohol, reduction in the cosumption and little change in practice of water use in day to day life has made all the change.

The major problem of water supply and sanitation in the country is the non-involvement of the community. This drought has given us a lesson that increased community involvement is a must for creation of awareness about the finite nature of the resource.

The National Technology Mission on Drinking Water has already focussed its objectives towards this goal. The salient changes which is taking place in water and sanitation scenario since 1986 has enabled the country to face the worst drought of the century. Water supply is no longer looked in isolation but a holistic approach of forest, environment, agriculture, science and technology has changed its dimension.

The Public Health Engineering Departments in the States have been strengthened with Geohydrologists, Geophysicists, Economists and even Sociologists. Water supply is not purely a hardware problem. Involvement of women, the community, maintenance through handpump mistry programme are the methodologies which is bringing the change.

Conclusion

Although the massive programme launched would certainly meet the crisis today, in the long run the conservation of water and rain water harvesting may be the panacea for the arid and semi-arid region. Besides the deep aquifer, the surface and sub surface moisture had to be tapped properly. The delicate supply - demand situation has to be carefully handled particularly in the case of fast developing countries.

Acknowledgement

I am grateful to Shri V.C. Pande, Secretary, Department of Rural Development, Government of India for encouraging me in writing this paper.

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