

ROLE OF PARTICIPATORY GROUND WATER MANAGEMENT IN SUSTAINABLE AND EFFICIENT DOMESTIC WATER SUPPLY IN RURAL AREAS

Prabir Kumar Naik
SCIENTIST, RGNGWT&RI, CGWB, RAIPUR

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ABSTRACT

Participatory ground water management means the involvement of all people/ organizations who utilizes ground water. It is the management of ground water by all stakeholders. More than 2 billion people worldwide depend on groundwater for their daily water supply. This has in many areas come at a price such as falling groundwater tables and deteriorating groundwater quality. In many places Participatory Groundwater Management has a possible important role to play to address these issues - alongside other measures. The aim of participatory groundwater management is to bring together the scattered experience of ground water management and to train persons for participatory groundwater management. The National Water Policy, 2002 has emphasized that the management of water resources should incorporate a participatory approach by involving not only the government agencies but also all stakeholders in various aspects of planning, design and management.

In general any bore well having < 2.5 (litre per second) discharge is not economically viable for any water supply schemes taking into account the cost of the project. Wells having yield of 0.5–2.5 lps are not properly utilized. But in water-scarce areas and particularly during summer season, pumps can be lowered in these wells and in situ overhead tanks can be made, which rural people can utilize. Also this is the best feasible water supply schemes in habitations having population of less than 500. These wells have to be utilized only after proper pumping test to know the sustainability of the aquifer. Recently in the state of Maharashtra solar power based drinking water supply schemes is implemented in rural areas which gives uninterrupted water supply.

Also some of the drinking water projects implemented by government fail within first few years of installation due to non involvement of people. Also more than 70 % of the diseases are waterborne such as diarrhoea, cholera etc. People's participation is necessary to make any project successful. They should know different fundamental parameters like yield, drawdown, static water level etc. To cover drinking water security awareness at panchayat level is necessary. People should be aware regarding the importance of safe potable drinking water.

INTRODUCTION

India has 16% of the world's population and 4 % of its fresh water resources. Safe drinking water is a pre-requisite for better health and improved productivity, faster socio-economic development, and sustainable economic growth. Poor and deficient services or lack of it disrupts life and activities at all level, cause strain and slows down the economic growth, puts severe strain on systems to make emergency arrangements year after year. Drinking water has

emerged as a key rural ecological, social and political issue. As per the constitution, providing drinking water is responsibility of panchayats and they must shoulder it. But they must also be helped to shoulder it. Before you hand over things to the panchayats there should be capacity building. To increase economic productivity and improve public health, there is an urgent need to immediately enhance access to safe and adequate drinking water and government should give highest priority to the meeting of this basic need for the most vulnerable and deprived group of the society.

India is having 638, 365 villages, 265,000 gram panchayats 640 districts and currently facing a daunting set of water-related challenges as the demand for the fresh water increasing day-by-day. More than 75 % of India's population lives in rural areas and 85 % of rural water supply of India is ground water based. Therefore, bore well/ tube well with hand pump has got most importance in their life. Women have to face number of difficulties while getting water for drinking water. They have to carry water from a pump away from their houses.

Rural India has more than 700 million people residing in about 17,00,000 habitations spread over 15 diverse ecological regions. Meeting the drinking water needs of such a large population can be a daunting task. The non-uniformity in level of awareness, socio-economic development, education, poverty, practices and rituals and water availability add to the complexity of the task. Despite an estimated total of Rs 1,105 billion spent on providing safe drinking water since the First Five year plan was launched in 1951, lack of safe and secure drinking water continues to be a major hurdle and a national economic burden.

Around 37.7 million Indians are affected by waterborne diseases annually, 1.5 million children are estimated to die of diarrhoea alone and 73 million working days are lost due to waterborne disease each year. The resulting economic burden is estimated at \$ 600 million a year. While 'traditional diseases' such as diarrhoea continue to take a heavy toll, 66 million Indians are at risk due to excess fluoride and 10 million due to excess arsenic in groundwater. 195813 habitations in the country are affected by poor quality.

RESULT AND DISCUSSION

So far as water resources in India are concerned, we don't capture more than 35 % of the total precipitation and allow everything as run off. Almost 60% of the captured precipitation is lost again in evaporative transpiration due to open storage. Out of the total usage percentage of water by industry, domestic and agriculture, the highest is by agriculture (approx 80%) followed by industry (10-12%) and then domestic. If we see the percentage of utilization, the real culprit all over the world for poor utilization of water is not industry or domestic but is agriculture. Increasing water efficiency in agriculture would lead to bulk savings.

A question arises then how to motivate the stake holders including the large numbers of farmers owning the wells and industries to willingly adopt the reforms for management of ground water in stress areas. There may be requirement to go for demand side management requiring discipline in ground water withdrawal as per the availability of the resource.

The following aspects emerge from the above:

- a) The stakeholders should be made aware about the local ground water occurrence, issues, vulnerability, recharge and resources.
- b) They must be convinced for undertaking respective management measures willingly and collectively.
- c) Ground water management will be effective only when there is active participation and involvement of well owners and other stakeholders.
- c) Some institutional arrangement/mechanism should be developed to implement management measures.

For successful partnership, all stakeholders must be involved in the decision making process. For example in Gujarat where for every decision or state planning, the local industry leaders, NGOs are all invited on the same platform. They contribute equally and the government listens at all levels. There is a need for fostering an open think-tank platform where people can discuss views and experiences. This platform can serve the dual purpose of developing a broader policy as well as starting the projects at local level. Places like Gujarat, in spite of very less water available are doing relatively better because they have adopted certain systems. Tamil Nadu is doing well and some other states also. Industrial use of water should rest on the principles of harvest, minimize, reuse and recharge. Use of water efficient technologies should be adopted to minimize use of water.

Loss of forest and biodiversity, changes in landscape has a great impact on water resources in and around industrial areas. Proper afforestation, slope stabilization, land management, development of wild life corridors are all important to sustain overall water management which obviously implies sustained and safe drinking water availability. Industry is often seen as a major threat to local water security and communities perceive that it shows concern only through the prism of profit. States are making transition from playing the role of 'Provider' to the role of 'Facilitator'. There is emphasis on empowering Panchayati Raj Institutions by capacity building and constant facilitation.

The number of habitations in India whose drinking water sources are polluted is nearly two lakhs out of seventeen lakhs in the country. Of course, most of these are naturally contaminated by elements like arsenic, fluoride, iron nitrate etc. Also there are a large number of rural schools that need to be provided with potable water and decent sanitation facilities. Through Corporate Social Responsibility (CSR) even a small business can adopt 20-30 schools. Problem of managing the water sector is very complex. We have to develop common strategy on the cautious use of ground water in critical areas, exploring the untapped water in the eastern region. They are floating on water but not using much of it. Creating storage capacity, in situ moisture conservation, rain water harvesting, ground water recharge, promotion of tank irrigation and participatory water management. We have lots of schemes but they are suffering on account of inadequate coordination.

Enhance community involvement in water management by generating awareness about clean drinking water and empowering local governing bodies i.e. panchayats, need for educating

panchayats for better management projects. Industry should develop innovative commercial and domestic solutions for optimal water usage. Also industry can play major role by offering technology, taking up water recharge and recycling initiatives. Addressing water contamination through low cost treatment technologies that are appropriate to rural areas where power and skilled manpower are not readily available is another area where industry can contribute. Indian companies can develop or modify or adopt various technologies that are available to make them appropriate for Indian rural conditions.

Promoting Partnerships

Public Private Partnership (PPP) denotes active engagement of both – public and private sectors for various development activities. This sort of partnership between governments at all levels and the private sector is proving to be beneficial for infrastructure and social welfare activities, thereby, improving state community arrangements. Corporate are also entering partnerships with NGOs, farmers and communities through Participatory Irrigation Management and Water Users Associations.

These engagements are proving to be successful for

- Increasing water availability- domestic as well as drinking water- and improving water quality.
- Promoting water saving techniques like drip irrigation etc. need for multi-cropping systems or crop diversification etc.

To enable the community to plan, implement and manage their own water supply systems the state should transfer program to the PRIs particularly to the gram panchayats. Based on the above paradigm shift in policy the “ Accelerated Rural Water Supply Programme” has been named as “ National Rural Drinking Water Programme (NRDWP)”

Adopting integrated approach by revival of traditional systems, conjunctive use of surface and ground water, storage of rain water, harvesting both at the community level and at the household level will ensure risk and vulnerability reduction. Storage of rainwater for drinking both at the community level and at the household level will ensure drinking water security even in adverse conditions for few months. For all ground water based water supply schemes, either old, new or defunct ground water recharging mechanism should constitute an integral part of the system design.

For surface drinking water sources, it is of utmost importance to protect the catchment to prevent its pollution from human and animal excreta and other types of bacteriological contamination. Well designed bunds, channels, bed protection, and convergence with Total Sanitation Campaign are a pre- requisite for surface drinking water source protection. Convergence with the NREGS program for construction of new ponds and rejuvenation of the old ponds including de-silting should be built into the system design and execution. Excess rain water at the household and community level should be recharged into the ground aquifer wherever feasible which will not only improve ground water quality but will ensure its adequacy.

Critical Issues

Despite the impressive coverage of provision of safe drinking water facilities in the rural areas, there is considerable gap between infrastructure created and service available at the household level. The issue of sustainability of source and system and ensuring supply of potable water are cited as the two major constraints in achieving the national goal for providing drinking water to all. Further the entire programme, so far has been totally managed by the government (except Swajaldhara projects), without the active participation of the stakeholders.

In the years to come, the rural water supply programme will face serious challenges by way of meeting the expanding needs of a fast growing population, as well as the increasing demand of the rural population for higher service levels in the given scenario of rapid depletion of fresh water availability for drinking.

In addition to this the other factors which have also contributed to the rapid deterioration of the water supply facilities resulting in non availability of service for which it has been constructed are : over dependence on ground water and depletion of ground water level which also increases the incidences of quality problems. Also sources go dry leading to systems becoming defunct due to competing demand of ground water from other sectors, poor recharge, large scale deforestation and lack of the protection of catchment areas. There is heavy emphasis on creation of new infrastructure but poor attention to the maintenance of existing systems; poor ownership of water supply systems and sources by the rural community and poor operation and maintenance; neglect of traditional water resources, systems and management practices.

Solar Power based drinking water supply schemes in rural areas

In general any bore well having < 2.5 (litre per second) discharge is not economically viable for any water supply schemes taking into account the cost of the project. Generally, wells having yield of 0.5–2.5 lps are not properly utilized. But in water-scarce areas and particularly during summer season, pumps can be lowered in these wells and in situ overhead tanks can be made, which rural people can utilize. Recently in the state of Maharashtra solar power based drinking water supply schemes is implemented in rural areas. One H. P. solar power based submersible pump is lowered in the bore well. Water tank is installed and 3 to 4 stand post can be constructed. It is sufficient for a hamlet of population between 400 to 500. In rural areas particularly in summer season there is frequent power cut off and solar power based submersible pump is the most viable option. Groundwater Surveys and Development Agency (GSDA), of Water Supply and Sanitation Department of Govt. Of Maharashtra is pioneer in this project. Solar power based drinking water supply scheme is given in figure- 1.



FIGURE-1. SOLAR POWER BASED DRINKING WATER SUPPLY SCHEME.

Role of individuals in promoting participatory ground water management

Shri Anna Hazare in 1975 and Shri Rajendra Singh in 1985 are the pioneer of promoting participatory approach in water management. Ralegan Siddhi village in Ahmadnagar district of Maharashtra was a degraded village before 1975. He implemented different water harvesting structures to catch every drop of rain by developing drainage system, trenches, check dams, drainage plugs, percolation tank etc. by developing and designing micro-watershed specific schemes. After implementation of the project the crop production of the village increased and ultimately the livelihood of the people.

Magsaysay award winner Shri Rajendra Singh started rural development and employment generation in 1985 at Gopalpura village by water conservation through his NGO Tarun Bharat Sangh (TBS). He played a catalyzing role in the building of 8600 johads (water harvesting structures) in 1058 villages spread over 6500 sq.km. Out of these 3500 were built by TBS and as an after effect of these the community was motivated to build the remaining 5100 structures. For these 5100 structures only technical help was provided. The area covers parts of the contiguous districts of Alwar, Dausa, Sawai Madhopur, Karoli and Jaipur districts. Johads and the other appropriate water structures have also been built in the districts of Jaisalmer, Ajmer, Udaipur and Bharatpur. As a result of these efforts five seasonal rivers in the northeastern Rajasthan area, that had nearly dried up have now become perennial. These rivers are Ruparel, Arvari, Sarsa, Bhagani and Jahajwali.

Involvement and application of the people is possible provided there is a committed and sincere leadership to educate, organize and motivate the people for the attainment of a common goal.

CONCLUSIONS

Shri Anna Hazare in 1975 and Shri Rajendra Singh in 1985 are the pioneer of promoting participatory approach in water management. The most successful example of participatory water management is Andhra Pradesh Farmer's Ground Water Management System (APFAMGS). The core concept of APFAMGS was that sustainable management of groundwater is feasible only and if users understand its occurrence, cycle and limited availability, and they accept that groundwater conservation through collective decisions is ultimately a safeguard of their own interest. The corollary was that once concepts of hydrogeology and groundwater management which had hitherto remained in the domain of scientific communities were translated for and mastered by poorly literate farmers through what was called the "demystifying science" approach, groundwater users would agree to take appropriate action for its sustainable management. Awareness and participation of all people is necessary for ground water management for sustainable and efficient domestic water supply in rural areas. People should know the importance of safe potable drinking water. They should be made aware regarding different fundamental parameters such as yield, drawdown, static water level, capacity of pump etc. for long term sustainability of any project. Solar energy based drinking water supply schemes will bring drinking water security in rural India.

REFERENCES

- Deshpande S.V., 2011, Dual Pump Scheme a boon for Rural women, Use of Solar Renewable Energy, Directorate of the Groundwater Surveys and Development Agency, Pune, Govt. of Maharashtra.
- Drinking Water Quality in Rural India: Issues and approaches, Water Aid (www.wateraid.org).
- Movement Towards Ensuring People's Drinking Water Security In Rural India, 2008, Rajiv Gandhi National Drinking Water Mission, Department of Drinking Water Supply, Ministry of Rural development, Government of India.
- Naik P. K., 2008, Drinking water problem in rural India, Current science, Vol. 94, No.8.
- Naik P. K., 2010, Solving drinking water crisis in hard rock terrain of Peninsular India, Current Science, Vol. 99, No.10.
- Proceedings of National Seminar on "Government-Industry Interface for Drinking Water Security" on 21st November-2009, New Delhi.

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