THE INCREASING DEMAND-SUPPLY GAP :
SCOPE AND POTENTIAL OF RAINWATER HARVESTING

In a survey conducted by us two years ago in Ahmedabad city, we found that the rate of water consumed by residential complexes was 496 litres per capita per day!! Sure, the complexes have their own borewell supply; but at what cost?

Similarly, the rate of water supply by municipal corporations within a city varies from a mere 25 litres per day for slums to 500 litres per day for VIP areas. This is true for every urban area-whether it be Ahmedabad, Bangalore or Hyderabad. That means, within a given city there is a great variation in terms of water supplied.

Country over, the drinking water supply situation has become too inadequate and irregular, and is worsening year after year. Today, inclusion of a borewell in a house construction has become very common. Thus, the dependence on ground water as a dependable source of water has become very high.

Let us look at the irrigation water supply. In a review conducted last year, we examined 28 case studies from all over the country to explore how water management is approached. It was quite revealing that in almost all the cases, hardly any attention was paid to the demand side management. Water demand management implies optimizing utilization of water-for drinking, agriculture or industry. The endeavour of all the case studies has always been to increase the supply. Let us look at what this means.

Till about three-four decades ago, open wells used to provide plenty of water for irrigation, industry or drinking water. Gradually, as demographic pressures upped alongside “wasteful” water use approaches, there was more and more demand for water. Open wells have become dug-cum-borewells, and to borewells, and now to deep borewells of unprecedented depths. A geologist will appreciate that in several parts of the hard rock country of south India, the borewells have reached the maximum depth of extraction-the unfractured bed rock is no more capable of yielding anything. Thus, a huge number of such water extraction structures have simply gone “out of use” due to deep water levels creating (to borrow a term from the banking sector) “Non Performing Assets”. The only difference is that these structures belong to individual farmers and represent the story of poverty for a majority of those small and marginal farmers who borrowed money and invested.

On the official side, the institutions responsible for drinking water, irrigation or industry have always-preferred infrastructure-heavy, high-budget approach for obvious reasons (No prizes for guessing!).

Pricing Policy

Now, if we turn our attention to the pricing mechanism, usually the farmers who consume anywhere up to 70% of the annual water consumption in any given year, are charged either on slab basis (based on Horse Power of the pump) or a fixed rate. Significantly, the policy is magnanimous enough to extend this benefit to both the poor and the rich farmer alike. In effect, all this has resulted in huge extraction rates and alarming depletion of water levels. The whole pricing issue has a serious implication of politics of power and vote.

In short, whether it is drinking water, irrigation or industry, the approach has always been to increase the water supply. This increase has to come broadly from types of sources-the surface reservoirs and the ground water. The official approach has always been to increase by tapping into these sources. Often, reservoirs originally meant for drinking water have been converted to supply water to cities due to the higher degree of meeting with political "obligations" leading to conflicts. These multi-pronged conflicts have now assumed serious proportions influencing politics at every level.

Efforts for Water Management

It is interesting to see that there have been some efforts made towards water management, but in bits and pieces. The mere presence of a policy instrument is a good beginning point, but providing a congenial climate for effective implementation and adherence is extremely critical. For example, we have the Participatory Irrigation Management introduced since mid nineties. The key concept is that farmers manage that portion of the canal which supplies them water. This approach is applicable only where canal water is available; and all the drought prone areas are excluded in this. This approach has tried to address issues of canal water supply in terms of its timeliness and quantity. Here too, no attention is paid to demand side management such as decisions on cropping systems based on water availability. The crops that farmers choose depend on their own understanding of the water availability and in a greater measure is influenced by market.

The second approach was the Watershed Management introduced in 1995. Large areas have been covered under this scheme at a huge cost but commensurate benefits have not accrued especially in terms of demand side management. Sure, there must have been some improvement in terms of soil moisture making reasonable difference in production and productivity of the land.

Recent Rooftop Water Harvesting Efforts

With increasing water scarcity in both rural and urban areas, combined with ever increasing demand, degraded natural environment, changing landuse and "vagaries" of nature, there have often been knee-jerk solutions, which have often become unsustainable. Examples are the several piped water supply schemes transferring huge quantums of exogenous water.

Water harvesting and recharge has always been talked about in the context of rural areas while urban areas have brought forth change in land use thereby decreasing the net area available for natural recharge. Traditional recharge structures such as tanks have disappeared, leave aside creating new ones. This when combined with deep water levels has led to natural recharge becoming less effective, thus increasing the demand-supply gap.

For all requirements of urban water, there have always been piped water supply schemes for transfer of water from other areas or other basins through tens and hundreds of kilometers at huge costs.

Piped water supply schemes often impart a false sense of "water sufficiency" which soon turns out to be a myth. The water sufficiency tends to make people more indifferent to demand management upsetting the water balance. The schemes are generally not based upon any accurate, realistic estimates of the ground water reserves as the methods of estimation of components of water balance themselves are limiting in many ways. The limits include obsoleteness, insufficient equipment and data uncertainties. Thus, such schemes tend to become the key reason for failure of the schemes in the medium to long run.

The need of the hour therefore is for artificial recharge systems that *convey* the fresh rainwater to the "aquifer".

VIKSAT experimented with artificial recharge in Sargasan village in Gujarat which recharged almost 30 million litres in a rainfall deficient year. The paper presented in a pre-ISAR4 (International Symposium on Artificial Recharge)-UNESCO sponsored workshop at Adelaide, Australia, last year, proved that the "ground water recharge mound" created due to recharge extended to a distance of almost 800 metres from the recharge structure and remained available for at least 8 months. Carrying out such recharge measures on a scale would uncertainly lead to elevation of water table in the area and addressing the demand-supply gap. While this was proved in an alluvial aquifer situation, this needs to be improvised for hard rock areas of south India.

Rainwater for Drinking

During the past two-three years, roof rainwater harvesting has come into focus with increasing number of NGOs and the government agencies promoting it. This decentralized rainwater harvesting system in urban areas is a welcome step.

Roof top rainwater harvesting is not new; it has been traditionally practiced in several parts of India. For instance, Ahmedabad has several rainwater storage tanks constructed under old buildings some of which are still being used for storing and drinking water. This is also a very common practice in Rajasthan. In some states such as Andhra Pradesh, Tamil Nadu, Gujarat and Karnataka, building bye-laws have been modified to include roof water havesting; design of roof top water component has to be submitted along with the building plan for approval. However, it has been a common experience that anything taken up on a large scale without proper monitoring and evaluation systems has often not produced desired results. Thus, people have found ways to circumvent this condition. Hence, what is required is a combination of regulation and awareness, in the reverse order.

Once the awareness is generated, there arises the question of "how". One key reason why such policies do not become effective is the fact that people do not know how to go about it, who could provide technical design and above all, what does it cost.

Thus, rainwater harvesting offers great scope for recharge even in an urban situation. Several family households have stored rainwater and reused it for drinking water purposes with certain precautions under VIKSAT's guidance. There is a general decline in the ground water quality which forms a major source for residential houses and complexes in urban areas. Experiments have demonstrated a significant reduction in the total dissolved solids rendering water more potable. However, such efforts become significant only when done in significant numbers with strict implementation norms.

For the past few years, the Bangalore based Rainwater Club is reported to be promoting rainwater harvesting on individual households and has proved that it makes economic and ecologic sense to go in for such systems. It has also proved that rooftop rainwater harvesting has a tremendous potential in providing clean potable water meeting physical and chemical potable standards of IS 10500/1991.

Certain regions of Karnataka such as the interior south and northern parts are over-exploited and there is a dire need to take up recharge. For example, certain private efforts are being made to recharge borewells in Davanagere, Bellary and Chitradurga districts and are reportedly "successful". In Chitradurga district in particular, rainwater harvesting is proposed as a solution to the high arsenic content occurring in the deeper 'third aquifer" layer. The recharging is recommended to the weathered and the underlying zones.

In short, it may be stated that there are several efforts that are taking place that need to be explored further and a set of strategies to suit different hydrogeological conditions be evolved.

Large Campuses

Yet another scope for considerable recharge are the large urban campuses housing universities, institutions, private buildings, farm houses etc. Artificial recharge structures as that of Sargasan described above will help recharge huge quantum of rainwater into the ground. Not only does it check the ever decreasing ground water level but would even build it up.

Thus, there is a need to work towards self-reliance in terms of water conservation, use and management employing a combination of recharge measures, efficient demand side management practices and proper supply approaches.

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