

Sustainability and Water Conservation mentioned in the draft strategic plan of DDWS was not provided adequate coverage, though important for improving the supply. In view of the unpredictable rainfall, the problem of storage becomes critical. To meet increasing water demand in the rural sector, conservation practices need to be adopted on a larger scale. All water projects needed to have a component of conservation for the purpose of establishing sustainability. Conservation practices are site specific and may involve a combination of various sources and solutions including protection through adequate collection and storage of rain and flood water, preventing quality deterioration and large scale evaporation, demand management through allocation, substitution of once used water or water recycle and techniques to augment the supply,. In addition, feasibility of a solution needed to be studied for individual catchment's basin or sub-basin, as these may not be confined to a particular administrative area. To implement water conservation, adequate supervision & guidance, financial allocation and close coordination of the concerned agencies are important. It is imperative that full understanding and cooperation of the beneficiaries, in this case village communities and individuals, are necessary.. (for summary of the approach, please see note below on [“Water Conservation: Viable Option to Improve Water Availability”](#)).

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## **Water Conservation: Viable Option to Improve Water Availability.**

### 1. Managing Water Conservation

To fulfil water demand for the various sectors, policy makers must prioritise and pay special attention to water conservation. Water management experts need to develop strategies in line with current and future requirements and create social awareness on the rationale of water use. Due to water demand from rising population, along with expansion of irrigated areas and rapid industrialization, many parts of the country are likely to face increased water shortages. The conservation of water resources therefore seems not only appropriate but necessary for populous India, in the face of limited and uneven availability of freshwater and climatic vicissitudes. This short article was specially prepared for stakeholders, the planners, managers and consumers.

Water conservation practices must be encouraged and improved through research, effective regulations, information dissemination and incentives to the end user. In this endeavour, more emphasis needs to be placed upon adequate coverage, monitoring quality and precision of collected field data. The implementation of the design and efficient operation of the facilities are other important phases in this regard. There is an overwhelming need for a field oriented programme and its efficient implementation through national, state and local bodies. It would be appropriate to plan for its utilization in the basin and sub-basins.

Water conservation strategies may include (i) protection of fresh water sources (ii) managing demand through awareness, legislation, tariff improvement, use efficiency in agriculture, industry and other usage, improved allocation along with measures to make available additional water to existing supplies, (iii) substituting grey waters and treated waste waters for gardening, cultivation, forestry etc, replacing domestic water in non-domestic sectors, (iv) meeting future growth in water supply by empowering existing sources through additional recharge and storing rainwater, storm water, flood flows, as well as sea water desalination, desalting subsurface saline sources etc.

The future sustainability of water supplies should be efficiently managed by various combinations of management options. Some of them include collecting precipitation, recharging of ground water, dilution of contaminated surface waters using storm, flood flows and efficient farm water use etc. Among others, regulatory and economic incentives on rational irrigation & industrial use and attractive subsidies should become a part of an integrated management plan. River and ground water quality needs special attention to be dealt in the supply, in view of their contamination status. Groundwater use in coastal areas need preventive measures against sea/saltwater intrusion, by enabling increased recharge to coastal aquifers. A close monitoring of the changing quality and increased withdrawal from aquifers, both shallow and deep, seem to be quite necessary.

## 2. Participation of Beneficiaries

Conservation needs more emphasis at the community and settlement level, with active participation of people, particularly women. The apparent indications of water scarcity and inaccessibility experienced may include intermittent supply, marginal water quality, large scale contamination of surface water, low surface flows in river and their inability to dilute waste, rapid decline in aquifer water levels, insufficient irrigation etc. Under this scenario, water conservation appears to be the most viable option in the management with people's participation, depending upon the source, conditions and solutions.

Within the context of water saving practices, it can be suggested that a community based approach may be more effective, where the community as a whole is made to realize the importance of efficient use of water. People's awareness is necessary on the important role of water in rural communities and in the agrarian economy, through an educative campaign. Establishing water councils in villages and communities would be helpful. In urban areas, residents' bodies may take initiative in creating awareness and overseeing their use.

## 3. Saving Irrigation Water

The agricultural sector is the largest consumer of water and, therefore, needs to be focussed for water conservation practices. Saving water in agriculture involves a number of ways to effectively manage water resources. These aspects may include irrigation efficiency, drainage, and flood control, and specific measures linked with on-farm practices. Soil moisture conservation, developing hybrid seeds to grow in drier conditions and crop selection, are among other measures.

Water saving technology such as drip irrigation for orchards, sprinklers for crops and irrigation during night are among the more notable starting point for saving water in large scale farming as compared to traditional flood irrigation. Some notable advantages of using modern irrigation methods are the saving of water, uniform field distribution which can be used for pre-determined period, reduction of costs due to lower labour dependency. Preventive measures against water contamination from agro-chemicals must also be taken. To promote the application of water saving equipments, procurement of water saving appliances and equipment should be attractively subsidised.

Water use must be taken seriously from an economic viewpoint, and this concept should be introduced to farmers as almost free water induces excess use. Government agencies involved in supplying irrigation water have an important role to play, by means of timely supply, checking leakage or misuse, charging proper amount for water supplied, coupled with training in available technology.

## 4. Saving Industrial Water

Industrial water is important component in holistic management. Food processing not only require high purity, but are also in need of efficient effluent disposal techniques. For other usage involving cooling and washing, high purity may not be necessary. The industries should be encouraged to purify their water and to dispose off effluent

safely, avoiding natural water resources. They should also be reutilizing the once used water. Enforcement of environmental and pollution bye-laws should be ensured.

#### 5. Limiting Evaporation

Evaporation from open water bodies and reservoirs constitutes a major constraint in the efficient use of water. In view of the high evaporation rate in arid and semi-arid areas of the country, suitable evaporation retardation or suppression practices must be adopted for limiting evaporation. Studies using options to prevent evaporation should be carried out to determine adaptable ways to prevent wind, sunshine etc. contributing to evaporation from existing dam reservoirs, ponds etc.

#### 6. Augmenting Aquifer Recharge

Rainwater harvesting (RH) is spatially and temporally dependent, and can be utilized on a local basis to improve supplies at the household and community levels. RH may impede runoff to the natural surface water bodies in the vicinity. On the other hand, large scale artificial recharge has the potential of storing water underground with minimum evaporation and surface storage facility.

For sustainability, large scale pumping from groundwater from deeper and shallow aquifers should be compensated by increased recharge. In view of different hydro-geological settings in the country, the recharge has to be suitably implemented. Recharge using rainwater and storm water and seasonal flood water can prove useful in this regard.

Along with the human population, increasing number of animals do need water to quench their thirst. For obvious reasons, cattle have a larger share in this consumption. In planning for water resources availability, the animal consumption should be carefully accounted for.

#### 7. Use of Non-Conventional Sources

Non-conventional water sources, e.g. treated municipal wastewater, agriculture drainage and brackish/ saline ground water etc., should be assessed for quality improvement, where applicable, for supplemental use in agricultural irrigation after treatment.

In view of water resources limitation, and looming water crisis for the rapidly growing population, it appears that desalination of sea water will need to be considered for water scarce areas located in the vicinity of coastal areas. However, some reasonable solution to the constraints such as cost, marine ecology, effluent disposal, fuel, space for desalination project etc. needed to be worked out.

The desalting water technology has the potential to supply water for rural settlements underlain by brackish and saline ground water.

#### 8. Capacity Building

To develop skilled manpower, field programme, training and live demonstrations of rational water use through modern irrigation methods, advice on soil moisture & crop water requirement, should be organized as part of agricultural extension and awareness campaign.

There is an acute need to strengthen institutional capacity and human resources in agriculture water management and efficiency of application of various conservation methods.. Availability of trained manpower is likely to have a significant impact upon the availability of water resources. The potential users also need to understand its proper sustainable use.

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