

WATER SECURITY AND GROUNDWATER AS A KEY PLAYER IN FOOD SECURITY

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1. Introduction

The three basic needs in human life are food, air, and water. Among which the water occupy one third portion of the whole globe. The main source of water supply is no doubt rainfall. But, the rainfall in India especially in Tamilnadu is not uniform. Human need for water can be classified as those of domestic, agriculture and industry. Water is essential for food security founded on rain-fed and irrigated crops. The world demand is already much greater than the available supply. This is not an issue that affects only developing countries, where water infrastructure is poor and where many people do not have access to safe drinking water, but also the developed world, where burgeoning demand simply cannot continue to be met. The water security is under severe pressure from many sources: a world population explosion, rapid shifts of people from rural to urban area, the impact of dietary changes as countries develops, increasing pollution of water resources, the over abstraction of groundwater and the insignificant issues created by climatic changes. Groundwater has emerged to occupy a dominant place in India's agriculture and food security in the recent decades. As groundwater plays a pivotal role in irrigation and is powerful tool for poverty reduction, it is much essential to develop and manage this resource in a sustainable way. The ultimate target must be reducing consumptive use and not simply improving irrigation water efficiency.

2. Objectives of the paper

1. To analyse the effects of water availability and water usage.
2. To analyse the current status of water sustainability and food security.

3. Methodology

The present study is descriptive based and collected from government reports, journals, articles, books, etc.

4. Importance of groundwater

Groundwater has become the main source of growth in irrigated area over the past three decades and it now accounts for over 70 per cent of the irrigated area in the country. Groundwater is vital for drinking water security of millions of rural and urban population. The development of groundwater irrigation has not largely been policy driven as it has emerged out mostly through private activity. Free and low cost electricity has further encouraged groundwater development in the irrigation sector to a greater extent. The groundwater development in the 1950s was dominated by traditional dug wells extracting groundwater with depths generally not beyond 30-40 feet. Groundwater based irrigation has reaped great benefits both to staple and cash crop agriculture. This is because the farmer has control, reliability during drought and sediment free characteristics. It is generating more crops and jobs per drop than most surface water irrigation. As groundwater plays a pivotal role in irrigation and is powerful tool for poverty reduction, it is much essential to develop as well as manage this resource in a sustainable way. Further, sincere efforts to regulate groundwater are the need of the hour. The large scale exploitation of groundwater resources is a consequence of the following three factors:

- An ever growing demand for groundwater mainly from within agriculture but increasingly now from growth in industrialization and urbanization.
- The economics of crop choice and intensification have not always matched the availability of groundwater resources.
- An existing power and input subsidy regime that promotes competitive and uncontrolled pumping of groundwater.

Changes in water consumption at an individual level will be crucial to tackling water scarcity. Achieving a significant reduction in demand represents a major challenge in raising awareness and changing people attitudes. The choice to adopt technologies and practices to reduce consumption lies, to a certain extent, with the individual who needs to be encouraged or encouraged or intensified to change behaviours.

5. Sustainable groundwater development for water and food security

Groundwater caters to irrigation requirements of more than 70 per cent of irrigated area, besides 80 per cent of water requirement for domestic use in rural areas and over 50 per cent in urban areas and 65 per cent demand for industrial uses. During drought, more dependence is laid on groundwater. As we all understand natural replenishment of groundwater is a slow process and is often unable to keep pace with the excessive and continued exploitation of groundwater resources in various parts of the country. This has resulting declining groundwater levels and

depletion of groundwater resources in such areas. This problem is more severe in coastal areas, which have limited thickness of good quality aquifer system, where in decline in water levels have led to ingress saline water from sea towards land also by upcoming of saline interface. The excessive salinity in groundwater ultimately leads to loss of agriculture apart from hardship to local population as they are forced to fetch good quality drinking water from far of places. Keeping view the concerns regarding the problems of over exploitation of groundwater resources and deterioration of groundwater quality, to ensure sustainability water resources management and assured irrigation facilities in such areas, the suitable techniques for management of groundwater are required to be implemented. National Water Policy, 2002 has highlighted 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. For effective and efficient management of groundwater resources, the stakeholders play a significant role. It is much essential to conceive several measures for capacity building of the stakeholders so that optimal utilization of groundwater resources can be achieved. The farmers are to be provided with sufficient information about the actual availability, quality and utility of the groundwater resources available within their reach.

6. Tamil Nadu Water Policy

Government of Tamil Nadu has formulated a water policy called “Tamil Nadu Water Policy”. The institute for water studies drafted this policy and submitted to the government, which has been approved. Under Tamil Nadu Water Policy, water allocation priorities in the planning and operation of systems should be broadly as drinking water, irrigation, and hydropower, industrial and other uses. The main objectives of this water policy are: ensure preservation and stabilization of existing water resources; provide adequate water for domestic users; preserve and enhance the economic fisheries; maintain water quality to be established standards; provide food protection and drainage; and provide mechanisms for the resolution of conflicts between users within and between intra- state river basins.

7. Groundwater regulation for irrigation

There are two administrative levels for the regulation of ground water for irrigation so as to have sustainable groundwater utilization:

Macro economic policy interventions at national level: Though water is a state subject, this is essentially required because groundwater demand is strongly influenced by national subsidies which affect groundwater based agriculture.

Local level management measures: This is essential to create effective institutional arrangements, to regulate and protect groundwater resources. Groundwater resource management in areas of groundwater irrigated agriculture can be regulated by locally based government agencies who shall acts as the “gaudiness of groundwater”, wherein full community participation is ensured however backed by a simple enabling legal frame work.

8. Suggestions

For effective regulation, it is important that groundwater resource availability is presented more clearly, so as to educate users to live within hydrological constraints. Addressing the hydrological constraints required more work on aquifers and more lately the impact of climate change. Without an active participation of local communities in management it is impossible to ensure long- term protection of groundwater resources. The ultimate target must be reducing consumptive use and not simply improving irrigation water efficiency. In Tamil Nadu, groundwater is a key role to ensure food for all livelihoods. The Tamil Nadu state is underlain by diverse hydrological formations, nearly 73 per cent of the state is occupied by hard rocks, the semi consolidated and consolidated formations are mainly confined in the eastern part including the coastal tract. In the hard rock area, groundwater is mainly developed through dug wells and dug cum bore wells tapping the weathered zone, the yield of open wells vary from 1-3 lps, whereas in dug wells tapping soft rocks including sedimentary, the yield up to 5lps. The annual replenish able groundwater resource of the state has been estimated as 22.94 bcm and net annual growth water availability is 20.65 bcm. The annual groundwater draft is 16.56 bcm and stage of groundwater development is 80 per cent leaving limited scope for further development of the dynamic groundwater resources. Out of 386 assessment units (blocks), 139 have been categorized as over exploited, 33 as critical, 67 as semi critical, 136 as safe and 11 as saline. Groundwater development is high along the western and central part of the state. There has been about 6 per cent decrease in the estimates of groundwater draft in 2009 as compared to 2004. This assessment is a vital statistics in groundwater governance.

9. Conclusion

Water security should become the core component of our water policy. As groundwater is vital player in water security, efficient and timely management of groundwater resources is must. Groundwater management is all about an integrated effort of understanding aquifers, managing demand and effectively implementing supply. Aquifer systems are different and so as the societies that depends upon them and uses them. Hence, detailed aquifer mapping exercise is required in order to customize the broad regional hydrological setting to local situations. The key issue of groundwater development and regulation lies in understanding pattern of the use of groundwater

within an aquifer system and exploring new strategies, norms and opportunities for people to come together and manage groundwater resources respectively.

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