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Economics of Water in India: Why does it Matter?

Antara Dutta

Research Scholar, Department of Economics, Gauhati University, Gauhati, Assam, India

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ABSTRACT

Water is an essential element to maintain life on earth. Access to water can be regarded as a basic human right. Water is more or less regarded as free community in general. But around the world, water is now treated as more than a natural resource but as a socio-economic resource. It provides various economic benefits to individuals and industries through its use in productive activities. At present, India is facing a serious water crisis. At this point of time, India has 16% of total population of the world but only 4% of world's total water resources. Increase in demand and constant supply of water resources are contributing to increasing physical scarcity of water resources in India. The present paper analyzes the value of water resources and emerging issues related to water scarcity in India from an economic perspective.

KEYWORDS: *Scarcity of water, value of water, water crisis, India*

INTRODUCTION

Water is essential for economic development and growth in any country. Efficient use of water could contribute to poverty reduction, human development and environmental sustainability. In case of India, the water economy has vast scope for reducing problem of water shortage through water governance and water investment. Water resources provides wide range of goods and services to human and other species. Conservation and optimal utilization of water is needed because it is beneficial for irrigation, hydropower, navigation etc.

It can also provide scope for creating employment for people in rural areas and can contribute to rural development. But, at present, the scarcity of fresh water is the biggest challenge in the path of India's socio-economic development.

The economic value of water

Initially, water was only needed for basic activities such as transportation, drinking, cooking or fishing. With the passage of time, its use in agriculture, industrial and other domestic activities became more important. Economic value of a good or service is determined by its price. But as it is regarded as a free and renewable natural resource, people do not tend to reveal their willingness to pay for water in real world. Water has some unique physical, social as well as complex economic characteristics for which its management by market or administration is very complicated. It provides four kinds of economic benefits. These are- commodity benefits, waste assimilation benefits, aesthetic benefits and recreational benefits. The commodity benefits are the benefit one can derive from use of water for cooking, sanitation and productive activities done by individuals and industries. This type of benefits represents private use of water which is rival in consumption and excludable in nature. In addition, water bodies have significant but limited assimilative capacity. They can process, dilute and carry away wastes. Recreational and aesthetic benefits regarded as luxury goods because with increase in income of individuals, water based recreational becomes increasingly popular and it can attract tourist trading.

When the supply of water resources are abundant relative to the demand for water, the enforcement of water policies or laws are simple. However, as an economy grows; the water sector transformers to a "mature phase" from an "expansionary phase". According to this idea, at a certain point of the expansionary phase, the money cost and environmental cost of developing new sources for increasing supply of water resource tend to exceed the economic benefit of additional use of existing stock. In such a situation, to find the real location of such resources is the least cost method to maximize economic benefit. In Indian case, there is over exploitation of existing sources of both ground as well as surface water. It will definitely raise the cost of exploring the new as well as existing water resources. From the other side, the 'mature phase" leads to increase in the marginal cost of providing water and interdependence among users. In Indian situation, the present users deteriorating the water resources both quantitatively and qualitatively and it will surely raise the cost for users from future generations if no alternative solution could be found. Again, conflict among users is also complex in India. A number of regional and international conflicts are arising from the past due to scarcity of water in India. The Krishna-Godavari water dispute among Maharashtra, Karnataka, Andhra Pradesh (AP), Madhya Pradesh (MP), and Orissa; the Cauvery dispute between Karnataka and Tamil Nadu; The Ravi-Beas dispute between Punjab and Haryana are such examples of inter state water conflicts. In the similar way, international conflict between India and Pakistan over the Indus river and dispute between India and china regarding the Brahmaputra river are examples of international water conflict. Without effective management systems, it is not possible to solve this king of disputes.

From another point of view, market system based on private property right and profit motive cannot be useful in

determining the true economic value of water. In practical world, the market economies experience the problem of market failures. In case of market failures, economic behavior of individuals or farms become inefficient for which the resulting outcome of markets cannot provide satisfaction to society. The water resource has externality and public good characteristics along with character of natural monopoly. All of these lead to market failure. Even sometimes "seem to be efficient" markets cannot meet the equity criteria from society's viewpoint as externalities are inherent in water sector economic activities.

The costs regarding scarcity of water resources are economic, social as well as environmental. These costs include threat to food security, poverty, migration, etc. Therefore, inefficient use of water resources often imposes cost on society and economy. On the other hand, water storage and flood control projects are examples of public goods. Market cannot provide this kind of goods because cost of providing such goods are very high and it is almost impossible to exclude non beneficiaries or to force the fee riders to pay. In this way, if a farm experiences decreasing cost of production in the production process; it enables the farm to capture the entire market and to become a natural monopoly. It is another common situation in the water sector. Natural monopoly can provide goods at very low cost but can also charge high price. Urban water supply, hydropower plants etc. are subject to this kind of monopolies. However if there is increasing returns, public regulation can minimize the undesirable effects of a profit oriented Monopoly. But the problem is that in case of market failures, non market responses may not lead to optimum solution in case of water resources in terms of allocative efficiency and distributional equity. Because in a developing country like India, there is corruption and long bureaucratic procedure often produce outcomes that are not socially desirable.

In any free market economy, price of goods, consumer income, taste and preferences, influence consumption or expenditure patterns and prices are high in case of highly demanded goods. In case of mixed economic like India, while the private market has the potential to produce demand driven private goods; public sector actions can provide wide range of social goods. Improving water resources requires the understanding about the economic value of water and knowledge of link between water sector and the economy. Saleth (2007) asserted that all the water markets in India are localized and fragmented and vary in terms of maturity. There is substantial efficiency and welfare effect in market institutions of India but prices fails to reflect region specific scarcity or productivity. Therefore water markets of India have limited allocative capacity. The author also emphasized that water markets of India are suboptimal not because of organizational or economic reasons but for legal and institutional reasons. Water resources have cultural, religious and social values in Indian society. Therefore, as it is more than a simple economic good; socio economic opportunity cost of using this resource should be given due importance.

India's water crisis: causes and consequences

Water is not properly a marketed good but a critical resource for human welfare. However, in India the availability and quality of water is uneven across states and the quality of water is deteriorating day by day because of both manmade and natural activities. The primary water source is precipitation which is confined to only 3-4 months. The problem of water regarded as "drought-flood-"drought syndrome is critical in India as about one third of India is drought prone while one eighth of it is flood prone. There are many reasons for this water crisis. The activities such as habitation and construction in flood plains due to increase in population, deforestation etc. factors are causing the problem of flood more egregious .A Niti ayog report predicted that 21 Indian cities by 2020 will arrive at "day zero". It is the situation when a city or place will have no water at all. At present Chennai, a major city of India is facing acute water shortage. The report says that 40% of population will not have access to safe drinking water in 2030 in India. . In this regard, lack of adequate government planning, increasing corporate privatization, corruption, industrial and human waste etc. are contribution to water pollution and water scarcity in India. Again, as India is agricultural country, excess water consumption for food production depletes the overall water quantity.

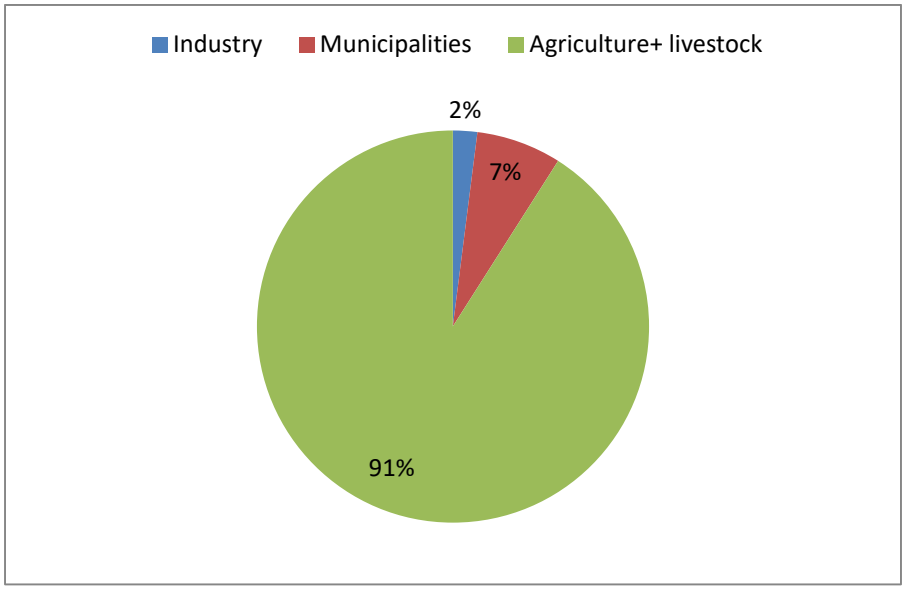

Figure-1: Water withdrawal sector in India in 2010
Source-www.fao.org

In 1990, total water withdrawal was estimated at 500 km^3, of which 92% was for irrigation. But the requirements have increased over time. From figure-1, we can see that the total water withdrawal was estimated at 761 km^3 in 2010 out of which 91%, or 688 km^3, are for irrigation. About 56 km^3 are for municipal and 17 km^3 for industrial use in 2010. Even now, the use of water for agricultural purposes is a challenge for conservation of water in India.

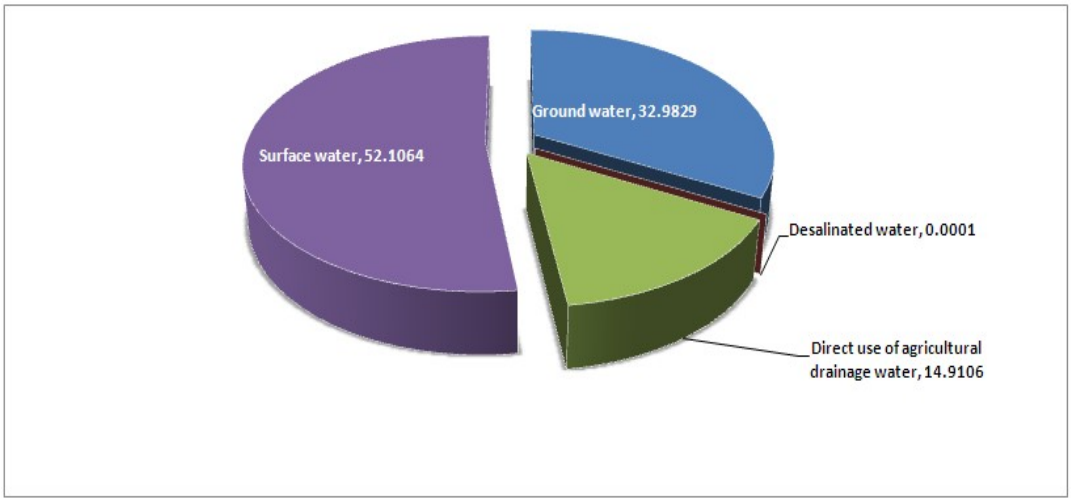

Figure-2: Water withdrawal by source in India in 20

2010 about 33% of total water withdrawal in India came from ground and about 51% from surface. Similarly the direct use of drainage water for agricultural purposes is 14% but use of Saltwater which is desalinated to produce water for consumption or irrigation is negligible.(fig-2)In the traditional agriculture sector, there is mis-management of water resources because traditional irrigation techniques cause water loss due to excess use of groundwater. Indian agriculture uses 90% of total water by groundwater depletion. The system of providing power subsidies for agriculture is another major cause of decline in water levels in India. India uses almost twice the amount of water to grow crops which are of similar quantity compared to China or United States and therefore it is less efficient in uses of water for agriculture. Power is main component of cost of groundwater extraction and the availability of cheap and subsidized power leads to greater extraction of groundwater resources. The need of the hour is to keep the balance between need of farmers and sustainable use of groundwater. Somewhat, there is possibility that this water crisis can lead to the rising costs and slowing growth and productivity in agriculture sector. Now, around 30% of the development blocks in India have been classified as semi-critical, critical or overexploited by government in term of depletion of ground water.

Drainage of chemical fertilizers and pesticides into water bodies and release of effluents from industries into water sources is another reason for pollution of water resources. Rapid urbanization and industrialization leads to decline in groundwater levels with improper planning and increasing population. By building storage capacity in drought prone areas, efficient distribution of water among urban consumers, agriculture sector and industry is needed in this aspect. Industrial policies encouraging water wastage threatening live and livelihood of both rural and urban people.

Lake of regulation for over extraction of water from traditional sources or ground for divorce and the situation and has made private ownership of groundwater common in rural and urban areas although national water policy 2012 recommended that over extraction of groundwater should be minimized by regulating use of electricity for its extraction but due to large number of small users it becomes increasingly difficult for government to identify those who are extracting more groundwater.

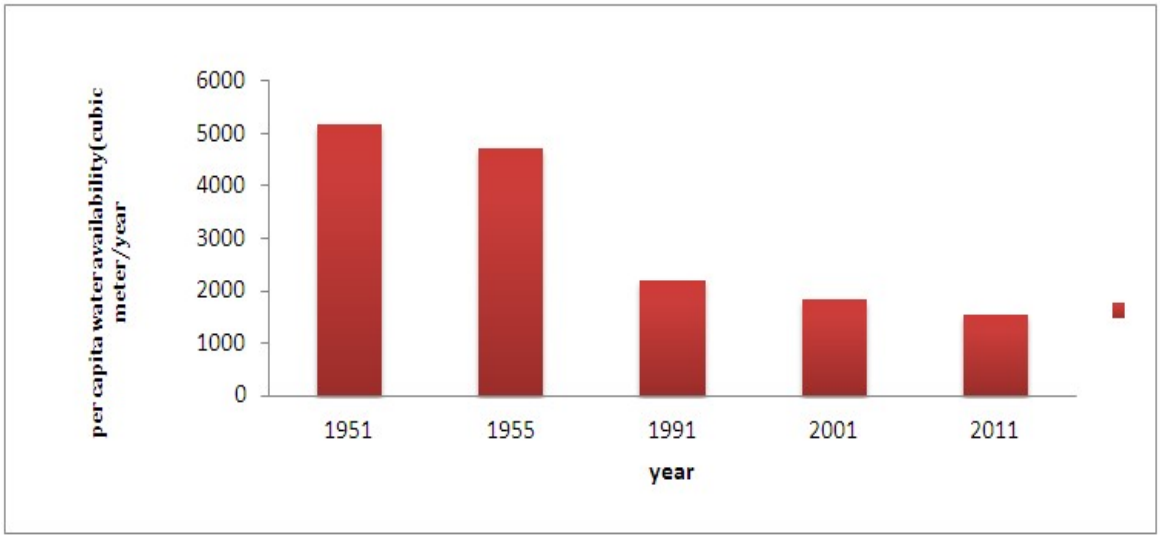

Figure-3: Per capita water availability in India
Source-EnviStats India2018

The per capita water availability in India is gradually declining as one can see from figure-3. With the increased demand for water resources to meet the requirements of increasing population along with agriculture and industrial growth, the supply of freshwater is more or less constant.

The problem of water scarcity in India is a threat to sustainable development of society, economy and environment. As per World Bank estimates, lack of hygiene practices along with unsafe water is responsible for 21% of communicable diseases in India. At the same time, more than 500

children of less than five years age die each day from diarrhea in the country. A NITI Ayog report revealed that 75% of household do not have drinking water on premise water. People should be aware of the economic value of water so that optimum utilization of water resources could be possible in the country without ignoring the sustainable development concerns.

Scarcity of water resources and socio-economic vulnerability in India

The social vulnerability is a situation where there is lack of ability of people or organization to cope with adverse impact from various factors arising from social interactions or institutional constraints. On the other hand, economic vulnerability is the condition when people do not have capacity to recovers from economics shocks. This shocks may arise due to trade or exchange related shocks, natural disaster etc. These kinds of shocks leads to vicious cycle of poverty and inequality for which poor becomes poorer and. One factor related to social vulnerability of people especially in rural areas is over exploitation of water resources. It is a challenge for protecting interests of rural communities and can have adverse impact on rural development. Water scarcity is related to various factors such a surface and groundwater extraction also affects the status of women in the society. Women mostly suffer from poverty and vulnerability in both rural and urban areas as women mostly need water for various purposes within the boundary of household. When water is scarce, women face time poverty due to spending more time on collecting water resources from other areas.

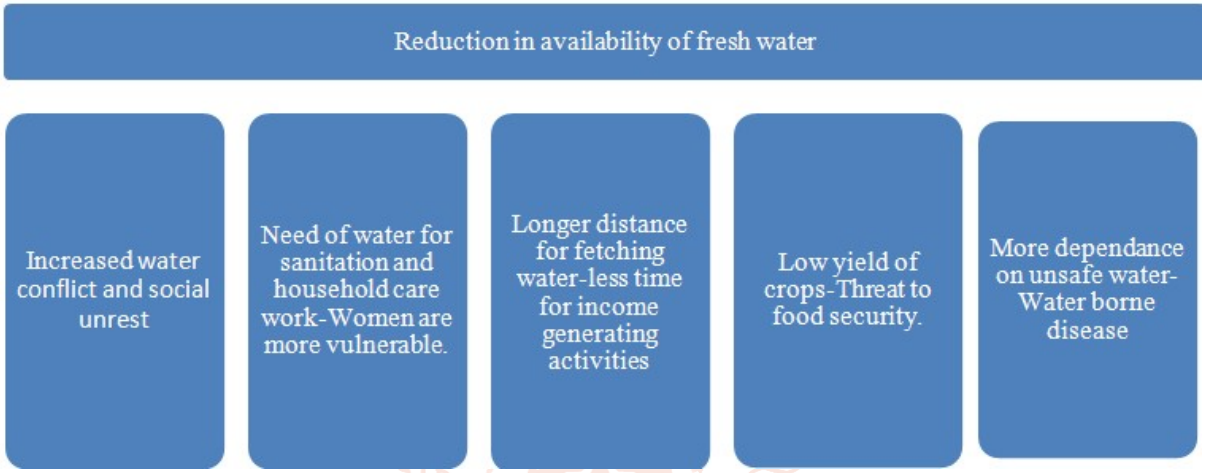

Figure-4: Impact of water scarcity and water pollution on wellbeing of people.
Source-Authors own

At present, the emerging challenges of equity and empowerment are closely related to access to water in rural areas. In the rural areas where there is problem of casteism or social exclusion, in such a situation equity and empowerment aspects. Again, it is often said that constructions of large dams have environmental and social risk as well as economic risk. The construction of large dams tends to be threat to survival of local people and biodiversity whose identity and livelihood depends on local economics systems. From losing of traditional means of livelihood to losing control of local resources such as land, forest, river etc. displacement make the families to suffer.

Another point to be noted is that in some other parts of India, people are exposed to risk of drought. Not only human but in such situation there is destruction of wildlife habitat. These issues pose potential threat to water future of India and its socio-economic development. From these facts, it is clear that water scarcity can harm the sustainable development goals in Indian perspective.

Is there any solution to this problem?

To utilize the unexplored potential and efficient utilization of water resources in India, interlinking river system is beneficial for the country. Water resources of India also have huge potential for attracting tourists. To prevent overuse of water and water pollution, rainwater harvesting facility, water recycling for non drinking purpose should be adopted. Rainwater harvesting can be use for groundwater recharge which can increase in groundwater availability. Applying wastewater to agricultural lens is also ecologically sound for protecting environment. Clear government regulations regarding control of groundwater extraction and adoption of water preserving irrigation techniques along with crop planning for less water consumption can solve this problem to some extent.

Participatory groundwater management is a program that can help to solve the problem of water scarcity of India to a significant extent. It is a method in which there is identification, quantification and management of water resource are carried

out in such a way that can prevent over exploitation of these resources. It is a grass root level practice. It enables the community and stakeholders to monitor common resources themselves. In this process, social audit is done by members who are not involved in the implementation process. It also provides training to rural people to be the actors, facilitator ,trainer and data manager at the village levels.

To address the problem of urban waste water, the government subsidy for wastewater treatment and technical assistance to households and industry should be provided through a bottom down or decentralized process. In recent years, the "polluter pay principle" is attracting attention all over the world. It is a part of what we know as "Caose Theorem". The theorem explains that when there is conflict regarding property right, no matter which party is awarded property right; under assumption of no transaction cost; the beginning between parties leads to efficient outcome. The "polluter pay principle" requires that farms of industries have to bear full cost of the production. This full cost includes the external costs or the social costs of polluting water.

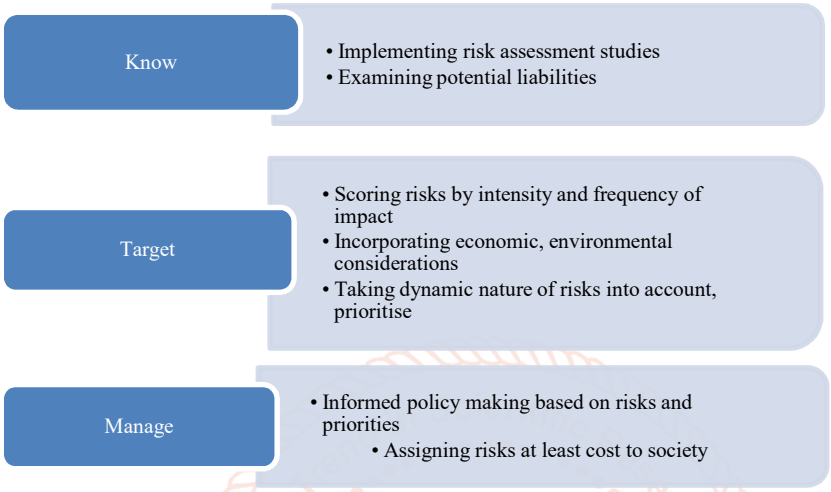

Figure-5: OECD risk based approach for managing water risks.
Source- OECD(2016)Water, growth and finance, Policy Perspectives

The OECD risk-based approach shows how to recognize, target and manage risks of water scarcity and water pollution. Considering both socio-economic and environmental aspects of these risks policy formulation for optimal utilization and conservation of water resources is possible.(Figure-5)

Therefore, there is need for different government policies and legal framework for water governance in India. Gender sensitive water policies should include public discussion including woman to better understand dynamics and necessities of water resources. Not only government or private sector is responsible for the management of water resources. But, the development strategies should influence general public so that water could be used in a way that minimizes the costs from environment and economic perspective.

Conclusion

The gap between demand and supply of water is widening in India in recent years. The surface water and groundwater resources are important for agricultural and industrial sector of a nation and for survival of human beings. But in India, the water scarcity and increased demand for water for various purposes have contributed to increasing cost of economic growth in India. Efficiency in utilization of water for household, commercial or agricultural use should be optimum. The traditional systems of society is affected by social structures having castism, low status of women, social exclusion etc. In such a situation, it is very much important to combine the people affected by this water crisis, government and private sector while designing the effective water policies.

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