Managing Water for Sustainable Development: An Economist's Perspective

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Abstract

Water is essential not only for the survival of all living beings but also for socio-economic development of households, communities and nations all over the world. It contributes to achieve the goal of sustainable development through ensuring the survival of all living beings, food security, ecological security and health and hygiene of people. Its judicious management is a prerequisite for sustainable development. At present, it is not managed at all; in fact, it is grossly mismanaged. It is estimated that India's total utilizable water resources would barely match the water requirement in the year 2050, and that the gap between the water requirement and availability will widen over time. The most serious challenge of the twenty-first century for India will be how to meet the deficit or demand–supply gap, especially the regional and seasonal deficits, and to mitigate the problems of increasing overexploitation and pollution of both surface and groundwater and recurrent droughts and floods. To meet these challenges, it is necessary that India's water resources are managed judiciously. For this, we need cost-effective and practicable interventions in both the water supply and demand management. The main instruments of water management include: (a) rationalizing of water prices; (b) drought and flood proofing; (c) use of water saving micro irrigation technologies; (d) internalizing of externalities in the use of water; and (e) enactment of ideal water laws by all state governments.

Keywords

Externalities, food security, ecological security, instruments of management, micro irrigation, water prices, water law.

Introduction

Water is a finite but renewable natural resource and, like other natural resources, it is an integral part of the environment. It is essential for the survival of all living beings on this planet and also for the socio-economic development of households, communities and nations all over the world. It is also necessary to maintain and enhance biodiversity and quality of environment. In a nutshell, water contributes to achieve the goal of sustainable development through ensuring survival of all living beings, food security, ecological security and health and hygiene of people.

India, as whole, is reasonably well-endowed with fresh water resources. But the distribution and availability of water is not uniform over space and time. This engenders the problems of droughts and floods which result in enormous loss to the affected people, mostly farmers, and threaten India's food security, which is essential for sustainable development.

The World Commission on Environment and Development (1987, p. 43) defines sustainable development as 'development that meets the needs of the present without compromising the ability of future generations to meet their own needs'. This definition emphasizes the need for the present generation to ensure intergenerational equity by safeguarding the interests of future generations through maintaining the natural resources capital of this planet intact. Economic sustainability implies the maintenance/constancy of produced capital and natural capital (natural resources and environment) used in the production of goods and services. Therefore, water being a natural resource must be managed in a sustainable way, if the goal of sustainable development is to be achieved.

It is well known and documented that all ancient civilizations evolved and flourished around water bodies.

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Irrigation had made it feasible then, as it does now, to produce adequate foodstuffs, without which it would not have been possible for those civilizations to develop and flourish. In future, irrigated farming will have to play an even greater role in meeting the food and fiber requirements of growing population, especially in Asia, where it is estimated to contribute around 60 per cent of the total value of crop production nowadays (Wolf & Hubener, 1999, pp. 84–85). The world history is replete with cases of mismanagement of water that led to retrogression of once highly developed societies/civilizations. Some people now believe that in the twenty-first century, there will be more water wars—both internationally and intranationally—than any other kind of war. This trend poses a real threat not only to sustainable development, but also to human survival.

Some Issues and Challenges

India has more than 18 per cent of the world's population, but has only 4 per cent of the world's renewable water resources and 2.4 per cent of the world's land area. The average amount of utilizable fresh water available in India at present is 1,086 cubic metres (m^3) per capita per annum. This is likely to go down further with the increase in population and growth of urbanization, industrialization and commercialization of agriculture in the future. The average quantity of water used in India at present is about 650 m^3 per capita per annum. According to the National Commission for Integrated Water Resources Development, the projected water use per capita per year in the year 2050 would be 725 to 750 m^3 (GOI, 1999). The country's total utilizable water resources would barely match the water requirement in the year 2050 and the gap between the water requirement and availability will widen over time. The most serious challenge of the twenty-first century for India will be how to meet the deficit or demand–supply gap, especially the regional and seasonal deficits. The present water scarcity and crisis in many areas of India is caused by increased overexploitation and pollution of both surface and groundwater, lack of rational pricing of water, lack of well-defined property rights in water backed up by law and the shortcomings in the National Water Policies.

Floods and droughts have been a bane of India's economy since time immemorial. It is an irony that in many parts of India, we have droughts and in many others, we have floods occurring almost concurrently every year. Yet, this kind of risk is not even recognized in India's policies and plans, not to speak of absence of any comprehensive national policy for their mitigation. Climate change, especially global warming, is likely to further increase the frequency and severity of droughts and floods, adversely affecting human health and sustainable livelihoods, and thereby sustainable development.

The Ways Forward

Water is too scarce and too precious a natural resource to be left unmanaged. At present, it is not managed at all; in fact it is grossly mismanaged. Therefore, it is high time that India designed and launched programmes aimed at judicious management of its water resources on a sustainable basis. We need cost-effective and practicable interventions in both the water supply and demand management.

The main instruments for managing India's water resources could be summarized as follows (Singh & Shishodia, 2007, pp. 251–256):

(i) **Rationalizing of Water Prices**
At present, water prices are highly subsidized and do not reflect the opportunity cost or scarcity value of water. This amounts to a huge burden on public exchequer. Pricing of water, therefore, needs to be rationalized. The price should reflect the scarcity value of water and ensure its efficient use and reward conservation. Externalities in water use should also be internalized while fixing price of water for different uses. For fixing water prices and ensuring equitable access to water for all, an independent statutory water regulatory authority should be set up by each state, after wide-ranging consultation with all stakeholders.

(ii) **Drought and Flood Proofing**
In the post-independence era, the Drought Prone Areas Programme (DPAP) was the earliest area development programme launched by the central government in 1973–1974 to tackle the special problems faced by those fragile areas which were frequently affected by severe droughts. But the DPAP has not been able to achieve its primary goal of drought proofing (GOI, 2002, pp. 114–117). India now has the requisite technology, manpower and material resources available for solving this problem. Gujarat provides several examples of successful experiences of non-governmental organizations (NGOs) and government agencies of the range of technologies that are available for water harvesting and artificial recharge of groundwater in different geological settings. NGOs such as N.M. Sadguru Water and Development Foundation, Dahod, Shri Vivekananda Research

and Training Institute, Mandvi, Kachchh and Aga Khan Rural Support Programme (India) have implemented several water management activities including artificial recharging of groundwater using small water harvesting structures, which have been proved very useful as instruments of drought proofing.

Many regions in India (over 40 million ha of land) are highly prone to floods. Although India had formulated its first flood policy as far back as 1954, even to date, floods continue to cause havoc every year; we have failed to achieve any semblance of flood proofing. What are needed urgently are a long-term policy and a plan for flood proofing. The policy should be backed by a floodplain management act as recommended by the Central Water Commission (Subbiah, 2004, p. 206). The plan should comprise, among other things, flood risk zoning, prepared by using satellite-based remote sensing, mapping of river configuration and flood control works, estimates of the area likely to be affected by floods, expected duration of floods, the measures required for control of floods and their cost implications.

(iii) **Use of Water Saving Micro-irrigation Technologies**

As we know, a lion's share of water in India is used for irrigation. Therefore, improving the efficiency of water use in irrigation would be the key to manage the demand of water to match with the available supplies in future. The existing irrigation practices are, by and large, traditional and wasteful, having very low physical efficiency in water use. Given the low physical efficiency of water use in the traditional irrigation practices, and given the fact that irrigation water is scarce in many regions of the country, it is imperative to increase the physical efficiency of water use, and thereby economic efficiency through use of appropriate irrigation technologies. Drip irrigation is one such technology. By using drip irrigation, the net saving in irrigation water can be as high as 40–50 per cent for most of the crops. Research has also shown that adoption of the drip system results not only in water saving and increase in yield rates, but also in reduction in input costs.

(iv) **Internalizing of Externalities in the Use of Water**

There are several externalities in the use of both surface water and groundwater. An externality is reflected in the divergence between the social cost and the private cost of use/extraction of water; the social cost is higher than the private cost if the externality is negative as is the case with water use. In the presence of externalities, private optimum rate of water use is higher than the socially optimum rate, which leads to overuse/misuse of water. There are two alternative approaches to abatement of externalities in the use of water, namely (a) Pigouvian Tax–Subsidy Approach and (b) Coasian Property Rights Approach. In the former, a tax is levied on the water user which is equal to the extent of externality (negative) and in the latter, property rights are created and assigned to a public authority or a water users' association (WUA). The public authority/WUA then can regulate the use of water in the best interest of society. Thus, the socially optimum use of water could be ensured.

(v) **Enactment of Ideal Water Laws**

Water resource development and management is now in the state list (List II) of Schedule VII of the Constitution of India. This means that water is a state subject and that only the state governments have the constitutional power to enact legislation and frame rules and regulations for development and management of the country's water resources. But given the importance of water as a critical natural resource for country, the Union Ministry of Water Resources lays down policies and programmes for the development and regulation of the country's water resources. Consequently, both the central and the state governments are responsible for framing policies and programmes for water resources development, use and management.

Rapidly increasing groundwater use and lowering water tables led the Government of India to take early notice of the need for a statutory framework governing groundwater. As a result, starting in 1970, the Government of India put forward a Model Bill to regulate and control the development and management of ground water for adoption by the states. This model bill has been revised several times (1992, 1996 and 2005), but the basic scheme adopted in 1970 has been retained to date. The latest in the series of model bills is the Model Bill, 2011, which is built around an understanding that it is the farmers and all persons living in rural areas that are most directly affected by the existing legal regime. It is thus

based on the idea that while protection of groundwater is the key to the long-term sustainability of the resource, this must be considered in a framework in which livelihoods and basic drinking water needs are of central importance. As of now, 15 states in India have specifically enacted new water laws, creating WUAs and supporting 'Participatory Irrigation Management'. But the implementation of the laws has been rather lax.

An ideal water law should provide for, inter alia, fixing water rates, taking into account the scarcity value of water and revising them from time to time, ensuring equitable access to water for all, creating appropriate organizations of water users at the national and state levels, vesting usufruct rights in them and helping them with technical information, funds and legal advice.

To sum up, we could say that managing India's water resources judiciously is a prerequisite for sustainable development. Now, we in India have the requisite technologies, financial and material resources and a legal framework for managing water in a sustainable way. What is lacking is the large-scale adoption of suitable water-saving technologies, as demonstrated by their several small-scale applications by NGOs and a few government agencies in the country.

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