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Abstract

In this paper the core issues that need resolution before water development especially by the private sector, and efficient usage can happen are very briefly outlined. These are Water rights have to be defined more functionally to include tradability. There is a need to move away from price based subsidies in electricity for irrigation and in irrigation water, to endowment based subsidies where these endowments can be traded.

Administrative and organizational reform of parastatals in water, is most vital. The starting point of the same would be to grant operational autonomy and empower the leadership of water development departments. Creating institutionalized rules to overlay endowments and rights in cooperative water systems that can put free these organisations from the free-rider problem to lead to efficient management of water and to the enhancement of its generation. A strategic shift to more storage especially in the Deccan and its extensions, and to counter opposition from the post-modernist NGOs both within and outside the country by having excellent policies and actions to manage displacement and rehabilitation would also be necessary. River training for storage, canals, and recreation and navigation along with urban renewal can be an important way to finance vast infrastructure to develop cities and add to water resources as well.

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The issue of water is a vexed one. Despite having ample rainfall India is short of usable water for a variety of reasons. Given the monsoon climate type, under which much of India falls, the rain is there for a few months in the year –June, July August during which all the rain falls. In a few areas - Punjab, North East and South East -the retreating monsoons give additional rain during a few weeks of the winter months. Also the variability over the years is very high in any particular region. Even at the larger national level the annual variations are quite high. Therefore the amount of storage needed for a given flow rate is much higher than in Europe, or the temperate areas, where the winds and rain are more evenly distributed through the year. Thus the storage required for irrigation and domestic use is high, and Indian civilization was based on tapping water and storing food.

The higher density of population over much of the territory means that the intensity of irrigation has to be high. While the irrigation intensity in India was better than in China, it has steadily fallen back due to a variety of reasons. These problems have little to do with environmental costs (as is usually made out to be): Dams, and particularly large dams having deep lakes, with the catchments correctly maintained can improve the ecology in India. (Morris, S. 2002a)

Undercharging for irrigation water is rampant in India. This tendency emerged, when starting from the mid-sixties, the irrigation rates were not increased in keeping with inflation so that by the nineties the charges were small enough to be ignored or not worth collecting. Over the period the idea of irrigation water as a free good emerged in the idiom of the people, so that it would be nearly impossible to suddenly raise the water rates. (Vaidyanathan, A. , 1999)

The wastage of water in part is due to these very low or negligible charges. They also result in large deficits of the irrigation departments and /or in winding down the rate of investments. Additionally, vast delays take place on account of complete dependence of the irrigation departments on the government for budgetary allocations and these delays in turn reduce the efficacy of investments. (Morris, S. 1986)

The World Bank, after the Morse Report (1992) lent support to the NGOs (erroneously as it later admitted) against dams in India, putting investments in surface water development entirely on the shoulders of the government. This further accelerated the spread of ground

water exploitation, which had been going on since the collapse of true planning in India in the mid-sixties. Ground water exploitation beyond optimal levels, has very high social cost in relation to a more judicious mix of and surface water and the positive externalities of surface water on ground water are well known. Ground water exploitation although very expensive both in terms of fixed investments and operational costs (where both are feasible) in not having large initial fiscal costs, in a fiscally strained situation, and poor project performance of the irrigation departments (IDs), seemed like the right option.

But the real villain was the regime of HP based tariffs (high connection charges but zero usage charges) which meant that the electricity demand for IP sets grew at nearly 13% when the agricultural output grew at an average rate under 3.2% over the seventies, eighties and nineties. The zero tariff also has resulted in wasteful usage (over draw¹, growing of water intensive crops, damage of aquifers etc, use of flooding for de-weeding operations). The connection charges which are high as also the large investments required especially when the water table is deep, makes the electricity subsidies highly iniquitous especially in drier areas where water, and not land, is the limiting factor. (Morris, S. 2007)

Not only that, but this perverse way of subsidization often and more so in the drier areas, makes the additional value of agricultural output of lower social value than the value of electricity used. Moreover there is also an interregional distortion in agriculture production. The high private profitability of electricity use especially in North and Central Gujarat, Rajasthan and the drier parts of Maharashtra result in wheat being grown there which, displacing wheat production in Punjab and Haryana to that extent, and Punjab and Haryana in turn with similar subsidization, grows rice to displace water rich eastern India's rice output, a region which could have with the least social cost grown rice. This interregional impact is also one of the reasons for the large poverty therein. (Morris, S. 2002, 2007)

Reformers have seen the problem as one of reducing or eliminating these subsidies. However that is quite infeasible and there are ways of reaching the social optimum without rolling back the subsidies. It is crucial to cast the subsidies as endowment subsidies and bring the prices in line with efficient (allocative) prices. This would in the case of electricity mean subsidies that reduce the connection fee to below the cost to serve, and setting the user fee to the cost of the electricity, and handing over an endowment (defined in terms of electricity units) which the

¹ India withdraws more water than any country and perhaps almost as much as the rest of the world combined!

farmer can use to buy electricity. He should also be allowed to trade away these endowments since that would allow for optimal overall use of electricity and actually make the entire recast politically acceptable. (Morris, S. 2001a, Morris, S. 2001b).

Irrigation subsidies can be again recast as endowments of so many expected units (as a proportion of the reservoir capacity) distributed over the months in a pattern that is optimal with interbasin tradability across farmers and to industrial and municipal uses in free markets. Such a regime would raise the implicit allocative price of water discovered through trading to close to its marginal productivity, improving greatly the efficiency with which water is used. Additionally with (marginal) investments in interbasin transfers, tradability across basins would improve the efficiency in water use. In this regard the existing or defunct water user associations (WUAs) could play a very positive role in the development of markets across and within the WUAs. (Morris, S. 2007).

For inter (large) basin transfers, it would be necessary to define and ascribe the property rights in water. Water rights in India can be established by use on the part of the regional (state) governments. The rights today do not include the right to sell. It is logical that these rights to sell be also incorporated, subject to non-tradability of water up to a certain level which then has to be necessarily served or enabled to be served to the people (We would suggest 300 lpcd in urban India – for household use and about 500 lpcd in rural India – for household use including the needs of domestic animals). With such rights being bestowed on the people and held on their behalf by the state and municipal governments tradability would mean that states would not, waste water as they currently do. Since they can now gain by selling the water to a neighboring state which could have used the water better, if there are significant differences in the marginal productivity of water.

Similarly, inferior to superior use tradability ought to be allowed even over and above administrative allocations for superior use. Thus farmers should always be allowed to sell water to urban residents when they are not served by their own ULBs. Today though, given that the farmers' private marginal cost of electricity to pull out ground water is practically nil, that would amount to a private provision of household use water at high cost when the municipalities could have supplied at much lower production and supply costs using pipes, large wells and possibly other surface storage rather than tankers and shallow tube wells. The point is not to ban tradability but to remove the distortion of zero use price of electricity for farmers.

Indeed the proposals that government places administrative limits on the quantum of water that any farmer can extract, would be non-implementable in the rural areas, further adding to the mess, but could be considered in urban areas where rights to extraction are exercised by a few large water companies (whether publicly or privately owned).

With correctly priced electricity the over drawal of ground water would come down dramatically with very little sacrifice of agricultural output, but a longer term gain as the yields and outputs in the more agriculturally endowed regions would go up, and there would be significant gains from the push to optimal crop selection that correct pricing would ensure. Not only that but water saving technologies like drip and sprinkler systems would be the order of the day, in water scarce areas, since the capitalized value of the endowment subsidy would be best used by the land owning farmer to make these and related investments in the land.

The problem of tail enders in an irrigation system –typically being served very little water if at all- has been discussed ad nauseum. Direct administrative action to now serve the water in a more equitable way would come up against the resistance from non-tail end farmers who would lose much. Only by recognizing in part their illegal “right” established by use, can a feasible solution be worked out. But even more than removing the inequity, it is more important to remove the inefficiency and that fortunately would considerably reduce the inequity as well. This can be done by assigning a right to water equal to the legal quota of water that the farmer was entitled to and was using, and a part –say a third- of the illegal use of water. Two thirds of the water then illegally used could therefore now be allocated to those who were denied use. And then allow tradability among the farmers in the entire riparian stretch. That would lead to the discovery of an internal allocative price that is close to the marginal product of water subject to water transmission constraints. (Morris, S. 2007).

In tank water systems that are also penetrated by tube wells using zero priced electricity to draw water from wells in a regime of water rights (both for direct use of surface water of the tank, and for ground water extraction –in this observable by neighboring farmers), with royalties for such use going to a common pool –the cooperative- (along with the removal of zero priced electricity) would help to strengthen the cooperative that the tank management system, and put cooperation on an autopilot since the free-rider problem would then have

been overcome. Tradability would allow owners of these rights to manage their drawl in keeping with their own ability to do so.²

Government departments in water are among the very poorly performing departments, along with the PWDs of the various state governments. But they are not all uniform. Some departments by setting up entities (usually corporations) and granting them somewhat greater autonomy to work and execute projects than in general government departments have been able to work many shades better than others. Most notable in this regard are the Gujarat water corporations Gujarat Water Supply and Sanitation Board (GWSSB), Gujarat Water Infrastructure Limited (GWIL), and Water and Sanitation Management Organisation (WASMO), the Sardar Sarovar Nigam Limited (SSNL) which were set up and given the freedom to work without the petty interference from the local and small politician. Thus between the GWSSB and the GWIL nearly Rs. 30,000 crore were spent over the last ten years or so, to create the capacity to pump out nearly 1.04 Mm³ of water (the water awarded for household use in Gujarat by the Narmada Tribunal) from the Narmada main canals and pipe the same through closed channel flow to nearly all the villages and towns of Saurashtra, North and Central Gujarat besides Kutch. This has at one stroke eliminated the drinking water deficit in these regions.³ The supply is equivalent to over 115 days at 300 lpcd for the population of 30 million in these areas. With local supplies during the better months an assured 300 lpcd is well within the reach of all people in both urban and rural areas. The slowness of the last mile –which involves working with urban local bodies (ULBs) and Panchayat Raj Institutions (PRIs) – has kept this success on the bulk water side from being realized in high social value creation, a potential that is very much there through overcoming the poor water sanitation syndrome that characterizes nearly all habitats in India⁴. That step would require that the state government's WASMO which has the last mile responsibility is able to work closely with the PRIs and ULBs besides NGOs. The case above illustrates that that even moderately task oriented public organisations with a modicum of operational autonomy can with the commitment of the state government solve major problems.

² For a discussion of changes required in water management institutions see Bhaimoriya and Gandhi (2011).

³ Information gleaned from the website of the Gujarat Water Supply and Sanitation Board (GWSSB) and through discussions with officials of the GWSSB, Gujarat Water Infrastructure Ltd (GWIL) and through field visits.

⁴ It makes India a country with extremely high morbidity rates. That it does not result in a significant underperformance on adult life expectancy is because of cheap antibiotics and doctors in India.

The issue of large interbasin transfers is often raised in India. The Supreme Court in view of the continuous struggle for water between states, and the apparent scarcity especially during the lean months asked the government to seriously examine the idea and pursue the proposal. Of course the court had no expertise in the matter and should not have directed the government to a particular approach to overcome the problem of water shortage in India. But so discredited was the government on water and other public services, that the Court forced the government's hand⁵. The Government set up under the NWDA the Interlinking Project which came up with a series of potential projects with their estimates. There are of course possibilities in interlinking certain rivers, but it is unlikely that a grand interlinking would provide high social net returns. At a birds eye level the problem really is that only the melt waters of the Himalaya provide water in the summer months in the northern river systems – much of which except the Brahmaputra is already used, and there is little storage in the Himalayas except for the early Bhakra and the recently taken up Tehri.

Much of India's storage is in the peninsula and its extension. And to bring the Brahmaputra's waters anywhere would mean vast pumping since gravity flow is hardly possible and closed channel flows have limited capacity – the northern Indian plains are very low lying and the peninsula is at a higher elevation so that no Himalayan river can be brought to the areas without vast pumping and colossal works.⁶

On the other hand river training linked to storage on the lines of the Chaophraya in Thailand has much potential in the north Indian plains to augment the summer supplies of water and bring about navigation as well, with significant risks of flooding in case of breaks of the levee dams since the water level would be higher than the surrounding plains. However, financing the same by land recovery especially when the rivers flow through the large north Indian towns – Delhi, Kanpur, Lucknow, Patna, Kolkatta many more (practically all the towns in the plains of north India) –ought to be very easy. When closely integrated with the urban

⁵ The Court had been forcing the government's hand on a number of issues including right to life, automobile pollution in Delhi, sometimes with results but at great cost to the economy, as in the case of the Court mandated use of natural gas by buses in Delhi.

⁶ For a quick scientific consideration of the costs of relative options see Gupta and Deshpande (1995). While most environmentalists have condemned the project Cf. Bandopadhyaya and Perveen (2004). For an unbiased study see Alagh, Y. K., Pangare, G., & Gujja, B. (Eds.). (2006).

renewal of these very cities and towns, the public and social value propositions in these projects can be very large, with little or no spending from the exchequer.⁷

The Sabarmati Riverfront Project⁸ which is only a land recovery and a riverfront promenade development and rather small, nevertheless demonstrates the potential. Indeed, we would think that the now active pursuit to clean up the Ganges with vast budgetary allocations could be dovetailed into such even riverfront efforts over the bigger towns that generate much of the dirt and sewage that goes into the Ganges, to not only reduce the direct costs, enhance public value greatly but also to do the cleaning in the only sustainable manner.

But the capacity for such “strategic management” in the government⁹ to create public value, even if there was the vision and the political commitment is questionable. This is a general problem given the nature of the administration, the civil service and of expert services within the government all of which are cadre based without lateral entry, and lack the organizational structure and processes and administrative practices, for effective functioning¹⁰.

The untapped storage potential outside the Himalayas, is quite high and even a fraction of the same can easily cater to the needs of the projected stable population of India between 1.5 and 1.6 billion c.2035-2040. In the Himalayas the critical issue of seismic risk has been cited by many¹¹ as limiting storage development. Recognize that the water productivity of Indian agriculture is very low and about 40% at least of the irrigation water is wasted!

Nepal has a hydro-potential of over 150 GW which is very easily tapped which can hardly be directly consumed in Nepal. Its logical destination is India but Indian negotiation stances being hardly pragmatic and are prone to fail. Smaller and multiple lower level storage in the lower Himalaya, besides barrages can also help to add significantly more to the irrigation potential in central and eastern Ganges plains.

⁷ These ideas and approaches are almost unknown in India; hopefully they would be considered in the near future.

⁸ Interview with Dr. Bimal Patel, Chief Architect of the Project, field survey and documents pertaining to the project. See also <http://www.hcp.co.in/project-details/61/73/135/sabarmati-riverfront-development-project>

⁹ In the sense of Moore. See Moore, M. (1995).

¹⁰ This view is based on the authors long years of training senior servants in India and an understanding of the organization within which civil servants who bear the responsibility for strategic management work. See also Morris. S. (2002b).

¹¹ But that has not prevented the Chinese government from taking up projects including some originally proposed by the British India government – one in case is damming the Brahmaputra in Tibet to create as much as 80 GW of potential.

The system of addressing interstate issues on water through awards and tribunals to settle disputes is an excellent one. However their ability to make states adhere to their decisions and prevent game playing by the states, as for instance when states invest to establish the right by way of prior use (and thereby create inferior projects in terms of net social value), can be greatly enhanced when water rights are defined to include tradability outside the minimum necessary allocation of around 300/500 lpcd. Many states currently upper riparian would then be willing to consider storage projects on their territories with use in the lower riparian state, or even use of their share of water by lower riparian states if the traded price is good enough which it could be with more efficient use possible in certain areas of the command.

To conclude there is much reorientation in the water policies and governance frameworks that needs to happen in India to make way for enhanced water development and its efficient use. The most important of these without which there would hardly be a strategic shift for the better would be:

- Defining water rights more functionally to include tradability
- Moving away from price based subsidies in electricity for irrigation and in irrigation water, to endowment based subsidies where these endowments can be traded.
- Administrative and organizational reform the most important and the starting point would be to grant operational autonomy and empower the leadership of water development departments
- Creating institutionalized rules to overlay endowments and rights in cooperative water systems that can put free these organisations from the free-rider problem to lead to efficient management of water and to the enhancement of its generation.
- A strategic shift to more storage especially in the Deccan and its extensions, and to counter opposition from the post-modernist NGOs both within and outside the country by having excellent policies and actions to manage displacement and rehabilitation.
- Seriously considering the option of river training for storage, canals, and recreation and navigation along with urban renewal

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