

# Beneath the Water Resource Crisis

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The Twelfth Plan proposals for a new approach to the water resources management as put forward in the article by Mihir Shah (EPW, 19 January 2013) are a bold recognition of the serious problems in the area. But some of the author's ideas are less than convincing and the entire set of physical interventions that has been recommended seems to reflect a worryingly simplistic understanding of the realities of hydrology and hydrogeology. A comment and a response.

Mihir Shah's summary of proposals in the Twelfth Plan for a new approach to water resource management ("Water: Towards a Paradigm Shift in the Twelfth Plan", EPW, 19 January 2013) is a bold recognition of the serious problems faced by India in the water resources sector. Some components are to be welcomed; others are less convincing. Underlying the entire set of physical interventions (from water harvesting to recharge to improved performance of large-scale irrigation systems) is a worryingly simplistic understanding of the realities of hydrology and hydrogeology.

The first group – initiatives that should be welcomed – includes most notably the proposal to draft a national framework law that respects the constitutional rights of the states, while ensuring a more coherent response to the national dimensions of the water crisis. Supporting this, the proposal to develop a national water database will be critically important. All sound water resources management must be based on a clear knowledge of the extent and the current pattern of usage of the resource. Making this information public is the best way to ensure a sound political debate about where reductions in water use should be made to restore ecological and environmental flows, protect aquifers, etc.

Two ideas stand out among the less convincing proposals. First, introducing a massive central fund to "incentivise" state irrigation departments to collect irrigation service fee, with extra payments for states that introduce "volumetric water deliveries", and second, the proposed approach to limiting groundwater abstraction.

## Water Pricing and Deliveries

There is widespread confusion surrounding the phrase "volumetric water

deliveries". Here, the concept is linked to pricing, so it must be assumed that the idea is to link the volume delivered to the charge levied on the user. The two issues must be examined separately: rationing water as a means of encouraging farmers to appreciate the opportunity cost or value of the water to their enterprise is an excellent idea. That approach underpinned the *warabandi* system that was the most productive irrigation management system in India prior to the large-scale development of groundwater.

Pricing as a means of demand management for irrigation water, on the other hand, is by now a largely discredited idea<sup>1</sup> and also the latest World Bank policy advice<sup>2</sup> on charging for irrigation services. The most advanced system of pricing irrigation services is perhaps the Murray-Darling system in Australia where farmers actually face three potential charges for water: first, they all pay a fee for being eligible to receive water (regardless of whether water is actually available or not – that depends on the seasonal rainfall); second, they pay a volumetric charge related to how much water actually is available and delivered;<sup>3</sup> and third, if (and only if) the farmer wishes to buy additional water (or sell part of his allocation), he can enter a regulated market. Thus, the basic allocation system is volumetric (an allocation related to a proportional right). Pricing is not the dominant mechanism for allocation, and is certainly not set administratively to "manage" demand; and payment for the irrigation service is directly related to cost of provision, not to the value of the water.

Short-term "incentives" for collecting revenues will prove to be just that – short term. Much better to insist that the states fully fund the massive deficit in operation and maintenance funding (Rs 19,000 crore annually, as estimated by the World Bank), and see how the politics evolve in terms of allocating that cost among direct beneficiaries (irrigators), indirect beneficiaries (consumers), and non-beneficiaries (rain-fed farmers, who must compete when selling their produce against the subsidised irrigated sector).

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The second dubious proposal is the programme to “Break the Groundwater-Energy Nexus”. All observers would agree that the historic policy of unregulated groundwater development subsidised by free or nearly free power has been disastrous for both aquifers and state electricity boards. The programme developed in Gujarat involves a further capital subsidy of about Rs 70,000 per well for a new power distribution system.

Many wealthier countries would hesitate to build parallel, subsidised power distribution systems to service irrigation, and indeed, a similar approach failed some 30 years ago, promoted then to provide assured power to state tube well projects (Uttar Pradesh, Bihar, Punjab, Haryana, etc). Once the state power supply reflects actual power costs, plus power rationing, will farmers install community generators and resume unlimited pumping? Better to control and charge for power through the power sector, and control water demand through the water sector.

Beyond this the proposals recommend “energy-efficient pumpsets...[as] a better way of delivering power subsidies that cuts energy losses and stabilises the water table at the same time. Major investments are proposed in this direction in the Twelfth Plan.” Again, there are internal contradictions here: energy efficient pumpsets will only make pumping groundwater more profitable and increase the demand for groundwater.

### Physical Disposition

But the most worrying proposals relate to the aspects of the Twelfth Plan proposals that address the physical disposition of

India’s water resources. In major and medium schemes, a 20% increase in “water use efficiency”<sup>4</sup> is proposed as a means of both closing the long-observed gap between the area that projects are supposed to irrigate and the area actually irrigated, and releasing water to other uses.

The water apparently lost through seepage and run-off does not “disappear”; it either recharges the underlying aquifer or runs off via drains to local streams or rivers. Either way that water in all probability is abstracted for reuse – we know that water tables are falling and many rivers are dry for most of the year, so “saving” that water and delivering it to the unutilised potential is typically a zero sum game. Tail ends may be irrigated, but groundwater that is already in decline in most areas will decline even faster as recharge from “losses” is reduced.

Proposals “outside” the irrigated areas are also hydrologically suspect: a vast new programme of watershed development is planned together with investments to increase groundwater recharge. Again, whatever water is collected for local consumption (by water harvesting for crops or recharge to aquifers) will reduce flows to rivers, reduce inflows to dams, and reduce low-season flows to estuaries. Once the basin is “closed”, only reductions in consumptive use in one location will release water for additional use elsewhere.

Such issues are included in the proposed assessment of local aquifers (requiring assessment of “relationship between surface hydrologic units (watersheds and river basins) and hydrogeological units, and groundwater balance and crop-water budgeting at the scale of a village or watershed). Often this will reveal that

water resources are fully utilised – and the same is true at larger scales.

### Conclusions

The challenges facing water resources managers in India are enormous; one way forward will see chaotic deallocation of water as aquifers are pumped beyond economic use or become saline, while pollution renders rivers unusable. The proposals in the Twelfth Plan are notable in recognising the scale of the problem and the need for new, integrated national approaches. Putting all the ideas into a credible hydrological context will enhance the possibility of identifying approaches that minimise negative impacts of controlling existing overuse. But there will be impacts, and the more transparent the analysis is, financially and physically, the more likely that a political consensus can be constructed to address the vested interests that will conspire to defend the status quo.

### NOTES

- 1 “Water Pricing in Irrigation: The Lifetime of an Idea” in F Molle and Jeremy Berkof (ed.), *Irrigation Water Pricing: The Gap between Theory and Practice*, CAB International, 2007.
- 2 <http://water.worldbank.org/publications/achieving-financial-sustainability-and-recovering-costs-bank-financed-water-supply-and->
- 3 Note, though, that each farmer typically owns hundreds of hectares, so deliveries are large and quite easily measured at the farm gate. This does not apply in India. The combined revenues from the fixed and variable fee are designed to cover the costs of service delivery, including items such as rehabilitation and modernisation.
- 4 I assume that the author uses the phrase “water use efficiency” to mean the ratio between the water delivered to an irrigation project, and the water beneficially consumed by crops. In the scientific literature, “water use efficiency” is a productivity term (e.g., kilogram of biomass per cubic metre of water consumed) but the phrase is often confused with “irrigation efficiency”, which seems to be the case here, because an increase in productivity would have no impact at all on the area irrigated.