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Mihir Shah Committee Report (2016) on Water Reforms in India: A Critique

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Abstract

This paper is a critique of the report of the Committee chaired by Dr Mihir Shah on restructuring of Central Water Commission and Central Ground Water Board of India. The paper shows that the recommendations of the Committee are not based on any sound understanding of the federal nature of water administration in India, water sector performance and the problems confronting it. The 'paradigm shift' in the approach to water management suggested for the country are based on poor knowledge of water science, flawed analysis of the performance of surface irrigation systems and out-dated concepts of irrigation efficiency. More importantly, it reflects the professional bias of its members against large water infrastructure and wishful thinking about river rejuvenation and what schemes like aquifer mapping can achieve. The report failed to come up with any concrete proposal for institutional restructuring that would result in greater effectiveness of water sector institutions, as the new organizations proposed lacked clarity of purpose, and conspicuous by the absence of any suggestions for institutional and legal reforms that are required to empower these new agencies to perform their tasks.

Key Words: Inter-state River Basins; Institutional Reform; River Basin Organizations; Central Water Commission; Central Ground Water Board; National Water Commission; Irrigation Efficiency; Aquifer Mapping

1 Introduction

The major aim of this paper is to critically look at the Mihir Shah Committee Report on Institutional reforms in India's water sector. Our water sector today is facing insurmountable problems. A country with 130 crore mouths to feed, with rapid urbanization and industrialization and changing consumption patterns and life styles, the challenges facing the water managers of our country are immense. Managing water today is no longer only about developing new sources through conventional means by construction of reservoirs, digging wells and laying canals and pipelines, but also about

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finding new sources of water and allocating the limited water amongst various competitive uses, while protecting the hydrological integrity of our catchments, rivers, lakes and aquifers. Inter sectoral water allocation requires greater use of sound economic principles for efficient pricing, introduction of water use restrictions, etc. Water resource management requires application of ecological sciences, ecological economics and environmental economics. It is quite obvious that our water sector institutions have to be equipped with more technical manpower, with greater competence and with people from multiple disciplines. They also call for new institutions for basin wide water allocation and for undertaking resource management action.

It also needs to be appreciated that water being a state subject (except for the inter-state river basins) in India, most of the reforms have to happen at the state level, in order to affect changes in the orientation and working of these agencies, which plan, design, execute and run water projects. The role of the central level agencies such as Central Water Commission (CWC), Central Pollution Control Board (CPCB) and Central Ground Water Board (CGWB) is limited to: hydrological monitoring of rivers (for river discharge and sedimentation); flood forecasting; groundwater survey and assessment (recharge estimation and GW quality monitoring); and, water quality monitoring of aquatic systems. In other words, their role is advisory in nature and they have no direct stakes in the outcomes of their decisions. For instance, the CWC and CGWB can work jointly to come out with a basin management plan for an inter-state river basin, for the larger interest of the basin water economy. But, it is up to the affected parties (in this case, the riparian states), which have to agree to this plan. It is quite possible that one state has to forego some of its economic interests for the benefit of another. As a result, in the current institutional set up, the state may show no interest in such plans, as they are not statutory in nature.

2 Mihir Shah Committee Report on Water Reforms

The Committee, set up recently by the Ministry of Water Resources, under the Chairmanship of Dr Mihir Shah, which was to come up with specific recommendations for restructuring the CWC and CGWB, on the premise that these institutions are quite outdated and their work need to be made more relevant to the changing context of India's water sector, seems to have ignored these basic facts. The Committee, whose report titled 'A 21st Century Institutional Architecture for India's Water Reforms' is now available on the Ministry's website(http://wrmin.nic.in/writereaddata/Report_on_Restructuring_CWC_CGWB.pdf), made several recommendations based on its own diagnosis of the ailing sector. Some of the problems identified by the Committee are: 1)the efficiency in public irrigation schemes is as low as 35%; 2] there is a mounting gap between potential created and potential utilized in the irrigation sector, to the tune of 26 m. ha; 3) groundwater is a 'golden goose', which accounts for 2/3rd of India's irrigation, but its use is alarmingly unsustainable; and, 4] proportion of area irrigated by canals is declining fast; and,5] there is no scope for further development of surface water in the country, particularly in view of the fact that most rivers in Peninsular India, which are highly developed, are already facing severe environmental water stress.

The Committee's recommendations, however, are rather mere reflections of the strong ideological bias and position of its members collectively than outcomes of any proper diagnosis of India's water sector problems. Some of them are: 1] 26.0 m. ha of additional irrigation can be achieved by filling the gap between irrigation potential created and potential utilized, which accordingly to the committee is easily achievable and therefore is a low- hanging fruit; 2] water demand management through promotion of Water Users Associations (WUAs) in irrigation commands; 3] participatory groundwater management through nation-wide aquifer mapping to be completed urgently; 4] river rejuvenation; and,5] integrated water resources management should be practiced by taking river basin as a unit for planning and management.

3 A New 'Water Management Paradigm' or 'Moratorium on Large Dams'

The Committee's suggestions for putting too many caveats on future 'dam building' by calling it a greatest source of human tragedy in the country in the form of displacement, and over-reliance on groundwater as a future source of water for all needs are preposterous. The problem with groundwater is that in the regions which have plenty of groundwater (like in the eastern Gangetic plains), the demand for water in agriculture and other sectors, is too low owing to very low landholdings, high rainfall and humidity and several agro ecological problems such as flooding. On the other hand, in the areas where the demand for water in agriculture and other sectors (urban drinking, industry) is excessive and unmet, the groundwater resources are over-exploited and millions of wells are failing every year (Kumar *et al.*, 2012). Clearly, the Committee hasn't understood the implications of this dichotomy for the feasible options for addressing future water scarcity problems.

Large water resource systems based on surface water are essential not only to take care of inter-seasonal variability in water availability in a region, but also to transfer water in bulk from water-rich regions to perennially water-scarce regions, a function groundwater based sources (wells) cannot perform in a cost effective manner. The Committee has not taken cognizance of this fact. This issue apart, the multiple functions of large water resources systems seem to be beyond the comprehension of the Committee. The water, when released through canals for irrigation purpose, meets a wide range of domestic needs of rural families--washing, bathing and watering of animals on its way to the field. Farmers divert water from canals to the farm ponds to raise fish. This is a common scene in eastern India and certain parts of South India as well. Millions of trees planted along the banks of the canals survive on the seepage from canals, as seen in Punjab, Gujarat and Maharashtra. Only a person with a myopic view can ignore these multiple economic, social and environmental benefits of large water systems.

The Committee went on to suggest CWC and CGWB to work under a single umbrella body, named the National Water Commission, with their present chairpersons as members, along with a few other members and wings for ecology, environment etc., and to be headed by a person from public administration background, a bureaucrat. The Committee assumes that such an institution can promote Integrated Water Resources

Management (IWRM) planning at the basin level, for both surface water and groundwater, and take their water management agenda forward. What the committee failed to understand is that the reason for lack of integrated planning is not the lack of coordination and data sharing, but lack of ability to foresee how future development of the resource is going to take place in different sectors and lack of control on that development, which still lies in the hands of the concerned state departments.

As clear from the several interviews of its Chairman, Dr Mihir Shah, the committee thinks that this would mark a major paradigm shift in India's water sector, and would have long lasting outcomes and impacts. Contrary to this claim, the fact, as also suggested by international experience, is that most of these solutions can only bring about cosmetic changes. Even if for a moment, one accepts these recommendations bundled under the 'new paradigm of water management' are capable of bringing about major reforms in the sector, the larger concern remains: can the two central agencies (CWC and CGWB) be held responsible for the poor state of affairs in the water sector and also be held accountable for implementing the new water management paradigm, as envisioned in the report, for the committee to justify the restructuring proposal? The report doesn't provide any analytical base to establish the link between the two. In the process, the committee has taken the wrong patient to the operating table. Ideally, reforms are required to affect changes in the working of the state water agencies which plan and develop the water resources. But, the committee has not made suggestions for improving their working.

The line agencies in the water sector at the state level (such as the water resources department, water supply department, watershed management agency, State Pollution Control Board) lack the incentive to perform due to the inherent problems with institutional design, which also reduce the transparency and accountability in the functioning of these agencies. These institutional design problems are: 1] single agency performing multiple functions; 2] fragmented, sectoral and supply side approach to water management; 3] poor water resource monitoring and assessment; and, 4] centralized nature of institutions and lack of well-defined water rights (Kumar, 2006; Kumar *et al.*, 2016).

4 Faulty Analysis and Flawed Recommendations

In long and short, the entire report is built on false premise, faulty diagnosis and mis-representation of facts. Firstly, the paradigm shift being advocated is based on neither a proper analysis of the problems nor an understanding of what needs to be done to rescue the ailing water sector in India. Instead, it echoes some of the out-dated concepts used for judging performance of irrigation systems and some of the stale ideas repeatedly tried for almost two and a half decades by lending agencies in India and many other developing countries with no significant positive outcomes. Secondly, the two agencies whose work is under review (CWC and CGWB) are neither linked to the problems identified by the committee, nor are parties for implementing the consequent recommendations for solving them, as it is made out to be. We will deal with them one by one

Using concocted data on ‘percentage area under surface irrigation’ (this will be dealt with it in the later part of this article), the Committee tries to build the argument that the era of dam building in India is over, as according to it the returns from continued public investments in irrigation projects has been negative during the past few decades, primarily due to incredibly low irrigation efficiencies (25-35%) and low utilization of the newly created potential. The Committee cite this as the major reason for reorienting the Central Water Commission, which in its opinion is more equipped to plan and design water resource development projects for supply management and “...current focus of the CWC on ‘development’ of water resources for supply-side management alone, the CWC is staffed exclusively with engineers drawn from the Central Water Engineering Group ‘A’ Service, and lacks almost totally a capacity in any other discipline that interfaces with water resource management” (Shah, 2016, p. 78).

5 Misconception of Poor Irrigation Efficiency

It appears the Committee is equating delivery efficiency of the irrigation infrastructure (Water received at a farm/water released from a reservoir) to water use efficiency. The efficiency in public irrigation is far higher than what is reported, if one assesses it at the basin scale (Perry, 2007; Perry, 2013). International agencies have long been using the concept of basin water use efficiency. A mere 25-35 per cent efficiency in public irrigation schemes, as noted by the Committee, means nearly 70% of the water released from the reservoirs or diversion systems would be lost. This works out to be around 280 BCM of water, annually. This ‘wastage’ should end up in the natural sink that is the rivers and the oceans. If we acknowledge the fact that most of the large irrigation systems are located in the water scarce states of India (Gujarat, Maharashtra, AP, Tamil Nadu, Karnataka and Telangana), most of this water should appear at the last drainage point of the rivers in these states. However, this doesn’t happen. Most of these rivers have no significant amount of water draining out in normal years, as noted even by the Committee. Hence, the efficiency argument is completely flawed.

6 Fictitious Gap between ‘Potential Created’ and ‘Potential Utilized’

As regards the committee’s remarks on the large gap between ‘irrigation potential created’ and ‘potential utilized’, they are only found in the administrative lexicons of India and not used in irrigation science. Moreover, the way estimates of ‘irrigation potential created’ is arrived at is nothing but fallacious. These figures are often unrealistic, heavily inflated, as they are based on the estimates of quantum of water available in the reservoir and a ‘design cropping pattern’ which never happens in reality. Water inflows into reservoirs can change depending on the amount of rainfall in the catchment and many upstream developments. In the water scarce north-west, west and south Indian peninsula, which experience high inter-annual variability in rainfall, there are huge year to year differences in annual inflows into reservoirs. It is quite likely that the area irrigated by surface systems during drought years is much lower than that in wet years and also the irrigation potential created. This was illustrated in a recent analysis of irrigation sector performance in Madhya Pradesh, wherein a substantial increase in area

under gravity irrigation and well irrigation was noticed in winter during wet year as compared to a drought year (Kumar, 2016).

Also, farmers shift to water intensive crops once irrigation water is made available, shrinking the area further (Kumar, 2016). A modern day water scientist with a good understanding of hydrology and socio-economic aspects would never resort to these numbers to critique an agency's performance (Perry, 2013).

On the other hand, as regards the potential utilized, there is heavy under-reporting of the actual area irrigated by canals, with no account for water lifted from canals and drains by engine owners, and the area irrigated by wells in the command which benefit from the seepage of canals and return flows from gravity irrigation (Kumar, 2016). A large amount of water from large reservoirs allocated for irrigation purposes is actually diverted for drinking and domestic uses and industry which never get reported in any of the data related to canal irrigation. The rate of decline in groundwater levels within canal commands account for only a small fraction of the consumptive water use for irrigation. The rest comes indirectly from canal water through irrigation return flows.

For example, evapotranspiration requirements of rice and wheat in Moga District of Punjab are 673mm and 268 mm, and the irrigation requirements (excluding effective rainfall) are 268 and 259 mm, respectively. Hence the total irrigation requirement is 527 mm. Assuming a specific yield of 0.25 and an average decline in groundwater level of 0.5 m per annum, the net discharge from groundwater per annum is only 125 mm. Therefore, of the total ET requirement, contributions from rainfall, canal water and wells are 414 mm, 402 mm and 125 mm, respectively. However, not all canal water is directly delivered through irrigation infrastructure. Canal water recharged groundwater from water distribution and delivery infrastructure, which is being recycled through pumping from wells (Prathapar *et al.*, 2012, Amarasinghe *et al.*, 2010). The water balance illustrated above shows that we need to review the way data on canal irrigated area is collected. Obviously, there is a need for proper accounting of water used in the basin, crucial for assessing the real performance of irrigation systems. In sum, there is no 'low hanging fruit'. Every drop of water in these water scarce basins is captured and used within the basin, though some scope exists for reducing non-beneficial uses of water such as evaporation from barren soil or fallow.

7 Water User Associations and Institutional Reforms

Most scholars in the water sector today agree that the key institutional reform needed in the water sector is to affect behaviour changes for regulating the growth in demand for water in various competitive use sectors. The foregoing analysis takes up to the point that WUAs in their present form, will have too little role in achieving water demand management, except taking care of the distribution issues to some extent at the level of the tertiary canals. In the absence of water rights and water entitlements, the WUAs cannot influence the water resources department on the amount of water that it plans to release through the outlets. They also cannot decide on the water prices. WUAs are almost defunct in all the states, in the absence of devolution of any kind of powers to

them. The state irrigation departments that are concerned with irrigation management are not willing to share any of their powers with the farmer organizations. Such delegation of powers happens only on paper.

Water demand management requires efficient pricing of water in irrigation and other sectors, and rationing of or fixing volumetric entitlements in water. These are long overdue. Only such measures can bring about improvements in water use efficiency, through optimal use of irrigation water for the crops, or allocation of the available water to more efficient crops, or saving water in the existing uses and selling it to alternative uses at a high price. But, these are political decisions, which need to be executed by the respective state agencies and are no way within the purview of the agencies whose work is under scrutiny. Legal reforms are needed for introducing water entitlements. The committee hasn't delved into these challenging issues and simply found refuge in the 'success' of implementing irrigation management transfer in different parts of the world documented by international agencies such as the Food and Agriculture Organization of the United Nations and the erstwhile International Irrigation Management Institute (see for instance, Garces-Restrepo *et al.*, 2007; Vermillion, 1997).

8 Telling a Statistical Lie

As noted by Darrell Huff in his book titled *How to Lie with Statistics*: "the secret language of statistics, so appealing in a fact-minded culture, is employed to sensationalize, inflate, confuse, and oversimplify" (Huff, 1991). This is precisely what was done by the Committee when it compared surface irrigation with well irrigation. It used figures of '% of net area irrigated by different sources' over a long time period (1951-61 to 2005-09) to show that surface irrigation has declined and well irrigation went up consistently, while knowing clearly well that the denominator, i.e., the 'total net irrigated area' over this time period had dramatically changed. Analysis of the actual gross irrigated area by different sources during 1950-51 to 2006-07 clearly shows that the gross surface irrigated area, after steadily going up, has stagnated in the recent years and the same has happened to well irrigation as well, though well irrigated area is much higher than the former (Kumar *et al.*, 2009: p 73). Stagnation in canal irrigation in the recent years is also due to diversion of water from reservoirs to non-agricultural uses.

This comparison by the committee is very unfortunate. Water available for canal irrigation in a reservoir is determined by the run-off generated in the upper catchment. Within the band-width of climate variability, the run-off volume from an upstream catchment is reasonably a constant. Furthermore, except in Ganga and Brahmaputra-Meghna and Godavari river basins, there is hardly any surplus water in Indian river basins that can be developed for surface irrigation. Therefore, the area irrigated with canal water cannot increase. If surface irrigation schemes are not maintained, area irrigated by canals will only decrease. On the other hand, well irrigation in areas underlain by alluvial and sedimentary aquifers depends on groundwater accumulated over several years. The consistent decline in groundwater levels observed across western and north western parts of India affirms that most well irrigators are drawing from this storage, and therefore this dependency is unsustainable.

Leaving such issues of misuse of statistics, such crude statistical comparisons should have been avoided by a committee which strongly considers groundwater and surface water as part of the same hydrological system and advocate integrated surface and groundwater management. Showing its clear bias against large dams, the committee doesn't make a mention of the fact that large reservoirs (most of which were primarily built for irrigation; excluding those for hydropower) today supply water to several large cities (Mukherjee *et al.*, 2010). Besides, in the absence of these reservoirs and command areas, groundwater development would have been less sustainable. These two factors would have been considered by any scholar who makes an objective assessment of the sector. Not doing that shows the professional bias against public irrigation.

9 'Participatory Aquifer Mapping' versus Groundwater Management

On the groundwater side, it is a well-established fact that the two major reasons for over-exploitation of aquifers are the absence of well-defined water rights in groundwater (Saleth, 1996) and inefficient pricing of electricity supplied in the farm sector (Saleth, 1997). The problem is surely not due to lack of sufficient information about occurrence of groundwater and its flows. The farmers as well as official agencies know well that the resource is fast depleting in many pockets. Participatory aquifer mapping can do nothing to halt this on-going menace. The Committee has neither suggested any model to fill this institutional vacuum, nor been able to visualize how the participatory aquifer mapping gets translated into participatory groundwater management under the much touted National Aquifer Management Programme with a budgetary allocation of Rs. 3539 crore under the 12th Plan. The actual expenditure under this programme by the state governments has been less than one per cent so far.

While we can invest some more resources in refining the current assessment methodology, we already have sufficient information to start initiating management actions in the problem areas. But, those actions are going to be institutional in nature, and what we lack is the political will from the state governments to do it. This is quite clear from the lack of enforcement of groundwater acts despite a number of states having these on paper (such as the Maharashtra Groundwater (Development and Management) Act, 2009 (GoM, 2013), which was enacted on 3rd December 2013). The experience of developed countries such as the United States, Australia, Mexico and Spain, dealing with groundwater management issues, clearly shows that the solution lies in creating robust institutions--which can clearly define water rights of individual users and enforce them or put tax on groundwater use based on volumetric withdrawal (source: based on Rosegrant and Gazmuri S., 1994; NWC, 2010; Rosegrant and Binswanger, 1994; Saleth, 1996). These institutions have to be supported by appropriate legal framework, which define, recognize and enforce use rights of individual water users or water user groups in volumetric terms.

10 Utopian Idea of 'River Rejuvenation'

While the Committee discussed about 'rejuvenation of rivers' at length, it failed to offer any practical suggestions on the ways to achieve it, except talking platitudes about integrated surface and groundwater development. To get water back in the river and to maintain the base flows from aquifers, we need to cut down groundwater and surface water withdrawals in the river basins drastically. But, the problem today is that most of the basins in the naturally water-scarce regions are 'closed', with no water going out of the basin, un-captured. Agriculture growth is suffering in these regions due to lack of water. Telangana, Rayalaseema and western Rajasthan are just a few examples. Cities located in these basins are not getting adequate amount of water to supply to their rapidly growing population, as they have to compete with agriculture sector. The rivers in these regions need water to maintain the ecosystem health. While the situation is very precarious, the committee doesn't offer any insights about the strategies for reversing the current negative water balance in these basins. One way we can achieve these multiple objectives is through inter-basin water transfers from water abundant basins, which is already happening in limited ways in different basins that are characterized by sharp differences in resource endowments.

We would require much larger and more sophisticated water infrastructure for inter-basin water transfers: to store, divert and transfer water from water-rich basins to distant regions that are perennially water-starved. Therefore, capacity building of state and central level institutions has to be in disciplines such as hydrology, hydraulics, groundwater modelling, water engineering, river morphology, environmental hydrology, dam safety, ecological and environmental economics and water law to take up the new challenges. There is no doubt that water demand management has to receive great attention in the coming years, with the cost of production of water touching astronomical heights. But, to achieve this, we need legitimate, regulatory institutions which can look at issues of water allocation and water pricing at the state level, with good understanding of economics of water.

11 Capacity Building

Capacity building of CWC and CGWB officials in the field of integrated water resources management (IWRM), as suggested by the Committee, is welcome. There is also scope for broadening the thematic areas of the training to cover environmental, economic and social aspects. But, the real question is how such training modules from the National Water Academy, the training wing of CWC, would find takers from the state water agencies which do not show any willingness to introduce water pricing and experiment with new approaches for basin planning and institutional models for water resources management.

Further, asking the National Water Academy to build the capacities of farmers and NGOs to undertake water management activities in the field is expecting too much. The report says: "It is not enough to train water professionals (engineers) within the CWC and in the States. Water resource management has to be a participatory process with all stakeholders (including NGOs) and local communities (particularly farmers at the Panchayat level) who should be made aware of the water resource issues and who need

capacity building for management of the limited water resources (e.g., participatory irrigation management, appropriate crop selection, micro-irrigation, conjunctive use, wastewater reuse/recycling, etc.). The present training activities of the NWA in this respect are practically negligible (Shah, 2016: p 85)". This is the mandate of Water and Land Management Institutes set up in different states nearly three decades ago.

12 21st Century Institutional Architecture?

The report has a lot of rhetoric about IWRM, but with less substance. It does not suggest any reform measures to operationalize the concept, which eventually has to happen at the state level. The IWRM is also a complex model of water governance and management. Water of varying quality is demanded by multiple sectors and in varying quantities by multiple users within a catchment. Allocating this water amongst various stakeholders involve trade off. Invariably, domestic and industrial sectors have the first call on available water. These sectors largely contaminate more water than what they consume, unlike agricultural sectors where water is evaporated or lost to saline aquifers. Therefore, the appropriate treatment of water used by domestic and industrial sectors will enable the reuse of water by another sector. Environmental flows, on the other hand often improve the quality of water, and this water too may be used by another sector when necessary.

Water management has time and quality dimensions, in addition to quantity dimension. By incorporating all three dimensions while allocating water, conflict among sectors can be minimized. This would not necessarily eliminate difficult, but essential, trade-offs between agricultural and environmental sectors. These trade-offs will affect a catchment's hydrological processes and outcomes accordingly. As water scarcity looms large, the paradigm of water management should shift from fresh water for all uses and users to 'timely supply of adequate amounts of water of acceptable quality' to each user. This will encourage water recycling within catchments, and the use of alternative water supplies for agriculture within catchments.

The challenge is in operationalizing the concept of IWRM through appropriate coordinating institutions at the river basin level. As discussed by Biswas (2008:12), "...operationally it has not been possible to identify a water management process at a macro- or meso-scale which can be planned and implemented in such a way that it becomes inherently integrated, however this may be defined, right from its initial planning stage and then to implementation and operational phases". This is in the realm of the state water agencies which have to create such coordination mechanisms. These challenges are time dependent. The Committee did not deal with these myriad issues. Instead, it passes judgements that these organizations have outlived their mandate, but recommends restructuring of these agencies into a NWC with basin-wise headquarters, without having any vision about future water management needs and the role they have to play to make it a reality. This can only demoralize the cadre of scientists and engineers in these institutions.

The report is vociferous about integrated development of surface water and groundwater at the basin level for optimal resource use and water resources management. But, it is silent on the institutional mechanisms to achieve it. The critical point is that various line agencies at the state level (water resources dept., groundwater departments and water-shed management agency, and local municipalities and corporations) are not confronted with opportunity cost of over-appropriating the resource or polluting water. When an irrigation department over-appropriates water from a catchment, it does not have to compensate for the damages caused by environmental water stress downstream. Further, when different sectors are competing for water, how allocation of water across competing sectors could be achieved at the basin-scale, without proper water entitlements? What will be the rules for allocation? Who defines those rules and entitlements, and who enforce them? In order for the line agencies (say water resources dept., water supply department, dept of environment and forests, industrial dept) to conform to these allocations, legal reforms are necessary for these entitlements to have legal sanctity.

If River Basin Organizations (RBOs) have to perform water resources management functions, including water quality management of rivers and streams, funds would be required. This can come from resource tax (from water users) and pollution tax (from the polluters), which are also part of institutional reforms. Legal reforms are needed to introduce such institutional changes. So, creating RBOs is not an end in itself. Institutional architecture is about making these RBOs capable of performing its functions. Even for the Water User Associations, on which the report puts a lot of emphasis, to function effectively by claiming the legitimate rights of water from the irrigation bureaucracy and to decide on the price for water and recover it from the users, changes in existing laws are needed. The change in legal framework would also be determined by the sociological context. But, the report doesn't discuss any of these. What it does is a discussion on some organizational forms, which will have no legal teeth or financial capabilities.

13 Conclusions

The Harvard historian David Blackbourn in his recent book, "The Conquest of Nature: Water, Landscape and the Making of Modern Germany", documents the way in which each succeeding generation takes the achievements of the past generation for granted and wonders how their predecessors could have been so stupid as to not have dealt with the new generation of challenges (Blackbourn, 2007). The state of art (of water management) is always provisional.

Finally, contrary to the Committee's claim, which is reflected in the title of its report, there is no '21st century architecture' in the institutional model suggested, but only wishful thinking. This is because the committee failed to recognize the fact that institutions cannot exist in a legal vacuum and without financial viability (see Saleth and Amarasinghe, 2010). In the absence of laws, which recognize water rights of individuals and user groups; legitimize institutions such as RBOs and WUAs; and give them authority to allocate water rights/entitlements amongst sectors and users and levy water tax and pollution tax, these institutions will only lie on paper and won't be able to perform their

functions. Without adequate financial resources, these institutions cannot undertake any of the designated functions. In other words, the institutional architecture that this report talks about should indicate the legal and economic architectures that underpin the former and also enhance its feasibility for practical relevance and policy impact. In this sense, the report can be taken at the most as indicative rather than conclusive.

To propose 21st Century architecture for water institutions, the Committee should have incorporated eminent experts on institutional economics and organizational behaviour, in its Sub-Committees. It has not done so. Instead, what it has done is incorporating many social activists, who are known for their strong ideological positions against large water infrastructure projects, in its Sub-Committees on 'capacity building' and 'institutional restructuring'. Although the report has intended to be an attempt at restructuring of water institutions, it has, unfortunately ended just as an exercise in restructuring 'water organizations', especially at the national level, though some attention is given to water user associations. As a result, the contents of the report get reduced to a mere 'preface' rather than a serious analytical attempt towards a practical approach to institutional restructuring in the water sector. Ironically, while the Committee is very vociferous in criticising the disciplinary bias of technical agencies such as the Central Water Commission, it also suffered from the same design deficiency!

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