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CONVERSATIONS 1: Water Governance

From Reductionist to Holistic Paradigm: Combining Ecology, Economics, Engineering, and Social Sciences in a Transdisciplinary Framework for Water Governance

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INTRODUCTION

Despite the ongoing paradigm shift in global water governance in favour of demand management and ecosystem restoration at the basin scale, South Asia adheres to its archaic and reductionist view of engineering perceiving water merely as a stock of resource to be stored and used.

The requirement of large constructions for "training rivers" was shown to the world by the USA during the first half of the 20th century, thereby promoting these structures as harbingers of progress. In South Asia, the structural interventions over the flows became integral components of the colonial legacy introduced and formalized under the British rule. Early British projects in India were exemplified by the Sarada Barrage, and the Upper Ganges Canal to divert water from the Ganges at Hardwar. This "structuralist" tradition continues even today, along with the tradition of the dominating numbers of civil engineers in the Ministry of Water Resources (MoWR). Mihir Shah, in this conversation, has provided a succinct analysis of the existence of the outmoded British Common Law as the backbone of the legal framework for water governance in India, as also the outdated knowledge of the present day bureaucracy and technocracy to address the new emerging challenges of water governance.

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Meanwhile, the perception of water governance in the US, EU, and other parts of the world has been changing with the realization that water conflicts, more often than not, are outcomes of the constructionist paradigm. Water professionals have been vocal about livelihoods problems that arise from the losses in ecosystem services resulting from ecosystem damages. This led to a trend of decommissioning dams globally. There is a strong feeling that reductionist engineering and myopic economics need to be replaced by a more transdisciplinary knowledge base that combines engineering with ecological sciences, ecological economics, and other social sciences.

ADHERENCE TO "ARITHMETIC HYDROLOGY"

Contrary to an integrated and holistic thinking, water governance in India relies on a few stand-alone numerical measures of physical state of the resource — a paradigm that Jayanta Bandyopadhyay described as "arithmetic hydrology". Interlinking of Indian rivers is based on the premise of transferring water from "surplus" to "deficit" river basins. This very definition of "surplus" and "deficit" river basins is a vital example of "arithmetic hydrology", attempting to classify rivers in terms of potential irrigability of land alone. In other instances, physical availability defined solely in terms of per capita availability becomes the decision variable for water management. These definitions are clearly bereft of understanding the broader ecosystems and livelihoods concerns in a river basin.

Again, the notion of 'environmental flow', defined in India as a certain percentage of the total flow, is plagued with scientific inaccuracy. In this Conversation, Angela Arthington—while authoritatively highlighting the central importance of environmental flows in basin governance—points out:

> Spatial patterns must be accommodated in basin-scale e-flow assessments. The desired social-ecological benefits are achieved by sharing the available basin water, in space and time, according to a balance decided by collaborative decision-making and trade-off processes. The challenge is to agree on a desired future state of the river basin's aquatic ecosystems, including their societal, cultural and spiritual values, and then to agree on a socially acceptable level of water diversion at basin scale.

Much in contravention to this scientific position, which calls for a negotiated approach to e-flows assessment, the National Water Policy 2012, of the Govt. of India, states, '[…] a portion of river flows should be kept aside to meet ecological needs ensuring that the low and high flow releases are proportional to the natural flow regime, including base flow contribution in the low flow season [...]'. This sentence, which reflects the ubiquitous perception of e-flows in the policy-making machinery in India,

gives the impression that as if a single number can ensure the entire working of a river system and dictate the norms of basin governance. The various functions of a river system for the ecosystem, society and culture, and the economy are erased out by this 'arithmetic hydrology' norm.

RELIANCE ON THE NEO-MALTHUSIAN THESIS

The water bureaucracy and technocracy in South Asia still believes that it is 'scarcity', delineated as scant physical availability of water, that leads to water conflicts. On the global academic front, despite this neo-Malthusian creed being popular till the 1990s, it is now heavily challenged by its detractors that include Simon Dalby and the Copenhagen School.

Even empirical evidences of conflicts of the Himalayan South Asian river basins reveal much broader forces at work than mere quantitative representations of scarcity. The conflict over the Farakka barrage between West Bengal and Bihar is primarily with the hypothesis that 'backwater flows' resulting from high sedimentation in the barrage are responsible for high-season floods in Bihar. On the other hand, the potential concerns in the Brahmaputra basin are also over floods, hydropower, and poverty.

Yet, the prominence of the neo-Malthusian thinking in the Indian bureaucracy can be witnessed in the ways water governance and conflict resolution are approached. The resolution mechanism worked out by the Cauvery Water Tribunal in 2007 was based on myopic number -games for sharing the waters, without much consideration about the broader institutions, economics, eco-hydrology, and holistic understanding of the conflicts. The recent Supreme Court order has attempted to correct this folly by reallocating water to urban use from agricultural use, thereby sending across a signal to the agricultural economy to practice demand management of water.

CAN CHANGE HAPPEN?

In 2016, the Ministry of Water Resources, Government of India published two important documents under the chairmanship of Mihir Shah: the *Draft National Water Framework Bill* and *A 21st Century Institutional Architecture for India's Water Reforms*. Both called for the much-needed change in the paradigm of water governance. The second document hit the hornet's nest by its call for dismantling the Central Water Commission (CWC) and Central Groundwater Board (CGWB), and replacing it with a more transdisciplinary National Water Commission (NWC). This attempt to

break the archaic dominance of engineers and hydro-geologists in water bureaucracy has ruffled a few feathers.

Despite resistance from corners of vested interests, the water governance policy narrative has to change from a reductionist paradigm to a more holistic paradigm based on transdisciplinary thinking, as also stated by Arthington in the context of e-flows. It is imperative that India leads the way for South Asia in water governance by evolving with a transdisciplinary knowledge base of rivers. Such a knowledge base needs to be developed by combining fluvial geomorphology, engineering, hydrology, hydro-geology, ecological sciences, tectonic sciences, ecological economics, law, international relations, political sciences, sociology, social anthropology, humanities and culture, and institutional theory so as to emerge with the appropriate institutional mechanisms for basin-level governance.