

Changing Perspectives - Water Resources in India

3rd Annual Lecture in Commemoration of Professor Prakash Gole's Work
Organised by Ecological Society, Pune and IIT Bombay Alumni Association, Pune Chapter

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Friends,

It's a privilege for me to be here and share some of my experiences and thoughts about water resources in India and the changing perspectives in which they are viewed. I would like to thank both, the IIT Bombay Alumni Association Pune Chapter, and the Ecological Society for giving me the opportunity to present this tribute to Professor Prakash Gole for his work in the field of ecology and ecological economics, though these few words do not capture the range and depth of Sir's work.

My first meeting with Professor Gole was sometime around 1987, when I was in a state of confusion and turmoil about my work. I had graduated about two years back and was working in Pune, and was greatly disturbed by the state of the environment around me. I wanted to do something to address the situation, but did not know what. Indeed, I had not even properly understood what "environment" and "environmental" problems meant. It was at this time, when I was meeting several people to seek advice and clarity, that I met Professor Gole. The discussions with him, and with several other people at that time, put me on to the track which ultimately led me to join the struggle in the Narmada valley just a few months later. So in a way, this talk is a closing of the circle for me.

It is interesting that the thing that troubled me most during those days was the state of the rivers in Pune. Even then, they were hardly more than sewers. I found it puzzling that a city that prided itself on being so progressive allowed its rivers to be in such a state. In fact, I was to see this apparent paradox at many more places, in many more ways. As I was to realise in the coming months and years, it was a direct result of the way we, as a society, viewed our rivers.

Perspectives on Rivers

For a country as large and as diverse as India, we can hardly talk about "a" perspective of looking towards rivers, or more broadly, water. But there are several common threads in the many perspectives and we can look at broad categories. Not surprisingly, the views and approaches of the establishment have dominated over others. By establishment, I refer not only to the government, but to the entire set of groups in society that dominate the decision-making and control what we do with our resources. What I would like to do is to try and outline this dominant perspective, what are some of the other perspectives, how the dominant view has been questioned and some of the interesting shifts that are emerging. Because my work has been mainly around rivers, I shall talk mostly about them; but what I say applies to water resources in general as well.

The central theme of the dominant perspective has been that any water that is not used for human needs is a waste. Its most common articulation has been that "any drop of water that goes to the

sea is a waste". This approach has been voiced in as many words, time and again, and this perspective has driven water resource development and management in the country for last many decades.

India's First Five Year Plan document, talking about irrigation, stated that:

"A more recent appraisal of the water resources of the country... gives the total annual flow as equivalent to 1356 million acre-feet for the Indian Union. Of this only 76 million acre-feet or 5.6 per cent are at present being used for purposes of irrigation; the rest flow waste to the sea".

One could argue that this notion of "waste" should be seen in the context of that time; and that indeed if only 6% of the waters were utilised, people would be justified in thinking that the rest of the 94% flowing to the sea is being wasted.

But the problem is that this notion of wasted waters persists even when far larger quantities are being used. And this leads to the practise of plans and projects geared to extract every last bit of water from rivers and other water bodies.

Take the case of the Narmada river and the use of its waters. The total available flow in the Narmada river has been assessed to be about 36 billion cubic metres (BCM). In 1961, Jawaharlal Nehru laid the foundation stone for the Sardar Sarovar Project (SSP) in Gujarat. Almost immediately after that, the three riparian states of Gujarat, M.P. and Maharashtra got into a long and bitter dispute about the sharing of the waters (and the height of the SSP) which led to the setting up of the Narmada Water Disputes Tribunal in 1969, which gave its Final Award in 1979. The Award distributed *all* the water of the river amongst the party states, and ruled and any surplus or deficit would also be shared in the same proportion. This effectively means that ultimately, when all states are using their share, virtually no water will flow below the SSP, which is about 150 km upstream from the mouth of the river at Bharuch. This sad situation is now coming to be true, with the flow of the Narmada river being reduced to a trickle below the dam, and sea water ingress deep into the river course.

This is not an exception. Many rivers of the country face this situation. The mighty Krishna river has been declared a "closed" basin, that is, its water does not reach the sea in many years.

The impact of such an approach to river development is huge – dried and desiccated rivers, destruction of the riverine ecology along with the livelihoods it generates like fishing, loss of ability to dilute pollution and hence transformation of river courses into sewers and drains, impacts on the deltas as rivers no longer deposit valuable nutrients in the form of sediments, and of course, sea ingress. However, I shall not go into the details of these impacts, suffice to mention that their extent and severity is huge. For I want to focus more on the perspectives and approaches to water.

One aspect of considering any water that is flowing down to the sea as waste is its complete anthropocentric nature. For certainly, it's far from the truth that the water flowing down a river and into the sea has no use. The flowing water plays a critical role in maintaining and enriching the ecology of the river and of the river bank, the flood plains, and the deltas and estuaries, which are among the most fertile areas in the country. The flowing water maintains the fish, transports sediment from the catchment to the sea – preventing sea ingress and fertilising the deltas. In fact, even an anthropocentric view would not be able to dismiss the water going to the sea as "waste" for it provides so many valuable services to human society. But its role is much beyond that. Water – in

a river, in a lake, in wetlands, serves much more than just humans. But it's a defining feature of the dominant perspective that such roles are mostly dismissed, or at best seen as peripheral.

It's important to note that even where the use of water is solely determined for the needs of humans, it's often the needs of the elite, the powerful, the rich among humans. It's not a coincidence that massive interventions in water resource systems like large dams have tended to adversely impact tribals, the rural populations and the poor more than others. Dams upstream in the river, providing water to powerful farmers, conveniently ignore the impacts of declining fresh water flows in estuaries, which, for example impact fisher-people severely. The voice the fisher-people have in the scheme of things is a key determinant of this situation. The use of water by the politically, economically, socially powerful are important, the use of waters by other sections of the society are often bracketed as "water wasted". Inequity thus is as much a hallmark of this approach as is lack of sensitivity to ecological impacts.

Our way of dealing with pollution and contamination of water resources is also partly a manifestation of this. Often, pollution affects those who matter much less, and those in positions of power to take decisions are not affected by it. Or they can effectively insulate themselves from it – for example through bottled water or expensive water filters.

The anthropocentric nature of this approach is highlighted in cases where the water of a water body itself does not seem to have any use for humans, or at least, for those who matter. This is why we see many urban water bodies like lakes and ponds being encroached upon and converted to real estate, or coastal wetlands being recklessly destroyed to "reclaim" land.

Last but not the least is an important facet, that water resource management has often been seen in terms of "domination and control of nature". This of course is a characteristic that it shares with several other human endeavours. A result is that the scale and massiveness of the interventions have been increasing, and "bigger" is seen as "better", and "taming" of nature a virtue by itself. Thus, the Three Gorges Dam in China was for long being talked about in reverential terms. While interventions that mould natural processes to suit human needs are an important part of the human civilisation on the march, one has a nagging suspicion that the tremendous increases in the scale of the interventions are necessitated less by genuine needs and more by human ego. Bigger dams, long distance transfer of waters through interlinking of rivers, taller statues ... seem to somehow satisfy our needs better than smaller interventions. One effect of this perspective is that it always strives for a maximal intervention in nature.

Other Perspectives

While this broadly has been the dominant perspective –society has, and has had other ways of looking at rivers and water. We know that the earliest human settlements necessarily came up near water bodies, and rivers. Deep-rooted connections with water have permeated each and every aspect of human life. Culture, religion, rituals, customs, identity, livelihoods – each of this has water inextricably woven into it. For many societies, especially communities living close to water bodies and rivers, these connections even today are living, vibrant parts of their lives.

In the Narmada valley, where I spent many years, it is a custom that when there is a wedding in the family, the first card is offered to the river. She is the first to be invited for the occasion. In Arunachal

Pradesh, inhabited by several distinct ethnic tribes, the very identity of the tribes is inseparable from the river. The plans to build large number of hydropower projects on virtually every river in the state threaten to tear apart this identity. To give an example, the people of the Idu Mishmi tribe that live in the Dibang Valley, in a memorandum submitted by Kotige Mena and Ingore Linggi to the chairman of the state pollution control board of Arunachal Pradesh on January 29, 2008, regarding the 3000 MW Dibang project, state:

“The construction of the Talon/Dibang multipurpose project will completely displace our Idu people who are very much dependent on the river as a source of their livelihood. The Idu community’s tradition, custom, faith and beliefs are greatly attached to the river Talon/Dibang...The construction of the dam will herald the end of our culture and tradition as the river Talon/Dibang is as sacred to us, as is the river Ganga to the Hindus...we believe that after death the Igu-myi (1st Order Priest) Sineru carries forward our souls through this river...The hills, the rivers and the mountains are deeply embedded in our ethos. It is the life force of our community. Destruction or endangerment of these will be a threat to the community itself. Development at the cost of culture and tradition is not acceptable to us.”

As strong as these links are the links with water dependent livelihoods of the communities, including fishing, riverside and riverbed agriculture, navigation and others. There is also an appreciation of the role played by water in sustaining non-humans. All in all, taken together, these constitute a completely different perspective of looking at the river, or a water body.

Here, water is seen to have many dimensions, and plays multiple roles. The links therefore are multifarious in nature, and there is a focus on co-existence. This is unlike the dominant perspective, which is uni-dimensional, looking at water mainly as an economic commodity, playing a role essentially as an enabler of economic activity. I have no intention of romanticising the “traditional”, but there is no doubt that this perspective offers a much better chance for preservation of water systems even as they are used by human communities.

Unfortunately, in many cases, these perspectives have succumbed to the juggernaut march of the dominant one. There are several reasons for this. One is simply that the dominant perspective, by definition dominates because it has politically and economically stronger forces behind it, which have overridden other voices. At other times, there is support for the dominant perspective because of its beneficiaries and those bearing the brunt are different. Since the beneficiaries are insulated from the negative impacts – for example, farmers in the command of a dam do not even know what is happening to the river – these beneficiaries are often eager supporters.

Again, an example from the Narmada. The struggle of the displaced people has often received very aggressive and hostile response from the farmers in the command areas of the Sardar Sarovar; yet, when the time came to build the canals to take the water to the farms, many of these very command area farmers have been refusing to give their lands for the canals, forcing the government to seriously examine supplying the water through pipes rather than canals.

Last but not the least, several communities have also chosen to abandon traditional concerns and approaches in view of the immediate economic and commercial gains to be made. Sand mining by riparian villages is an example. Massive over-extraction and mining of groundwater (that is,

extracting water beyond the annual recharge, drawing from water that has been stored since ages) in Punjab and Haryana is another instance.

In the last few decades, we have seen the emergence of what we can call the ecological perspective of looking at water. As the word implies, the ecological perspective looks at water and water systems as ecosystems, simultaneously a part of, and sustaining the larger ecology.

At the centre of the ecological perspective is the preservation and enrichment of water bodies, rivers, water systems, even as judicious use is made of them. This includes not just the water bodies themselves but their entire support systems like catchments, forests, flora-fauna and so on. Thus, it advocates a holistic and comprehensive understanding of water resources as integral to the larger ecosystem.

In many ways, this perspective has emerged as people challenged the destruction caused by the dominant approach, or worked to suggest alternatives to it. Literally thousands of such efforts - of struggles and movements, independent researchers and concerned citizens - have contributed to the evolution of this perspective.

For example, the Narmada struggle has been not only about the displacement of the affected people, but what the project (and several other dams on the river taken together) would do to the river and the entire valley. One of the main issues raised by the movement was that one cannot take away all the water from the river, that the river must be kept flowing. To keep rivers flowing, to maintain water in water bodies, is one of the central thrusts of the ecological perspective. We shall come back to this.

Other struggles have raised other aspects. For example, the fight against the 3000 MW Dibang project in Arunachal has raised the issue of the destruction of very identity of the residents of the valley. In Kerala, the Chalakudy Puzha Samrakshana Samiti has carried out a long struggle challenging the 400 MW Athirapally project. One of the main reasons has been that it will destroy the glorious Athirapally waterfall. But the struggle has also taken a basin-wide perspective.

In Sompeta, Andhra Pradesh, locals waged a fierce battle against a power plant being set up near the coast, on wetlands. The wetlands were a rich source of multiple livelihood opportunities for the people.

In many cities, people have been campaigning to protect urban water bodies. Our own city Pune is witness to the efforts to protect the Mula-Mutha rivers from further damage – from encroachments, for example, both, illegal encroachments by those builders who dump debris and carry out illegal construction on the river bed, but also against the “legal” encroachment as the Municipal Corporation itself tries to build roads and even parts of the metro on the riverbed.

Researcher and activists like Professor Gole and the Ecological Society have talked about – and demonstrated – the restoration of catchments. Others have, importantly, worked on showing how the ecological perspective about water resources can meet the needs of the people.

As these examples show, particularly in India, the ecological perspective goes beyond just ecology and integrates humans, other living and non-living beings, culture, society, religion, livelihoods. In this manner, it adds to and extends the “traditional” perspective we have talked about above.

This perspective has questioned the dominant ones at two levels. One is the questioning of the immediate impacts - like the submergence of farm land and forests behind large dams. At a deeper, more fundamental level, it has highlighted the long term unsustainability of the dominant model, as it destroys the very productive capacities of natural systems. For example, by stopping the deposition of sediments in the deltas, large dams lead to erosion of deltas and sea ingress, destroying some of the country's most productive systems. Likewise, the reckless extraction of groundwater in Punjab and Haryana is threatening the very support of their agriculture.

The efforts of thousands of people have contributed and added to building, enriching and evolving this perspective.

Elements of the Ecological Perspective

So what are some of the key elements of the ecological perspective? These include

- Recognition of the ecological nature and role of water, multiple roles of water, recognition of water as part of, as well as a sustainer of ecology
- Maintaining and restoring the ecology of water systems, water bodies, keep rivers flowing
- Human interventions to follow natural cycles
- Prioritisation of water uses, with basic needs getting priority
- Cropping pattern to follow eco-climatic characteristics of the region
- Promoting efficiency of water use
- Looking at all water together – soil moisture, ground and surface waters
- Less anthropocentric perspective
- Brining back balance in human interaction with and intervention into nature, principle of minimal intervention
- Natural cycles and pathways to be maintained as much as possible, equity to be a central feature, and judicious withdrawals and consumption the norm

Changing Perspectives

With a warning that I don't want to convey any undue optimism, I would still like to say that we are seeing a slow – may be very slow – but steady acceptance of many of these elements. Several of these are actually finding their way into policy, law and regulation.

One of the most important developments in this context is the incorporation of environmental flows, or e-flows, into regulation. As a concept, there is nothing new about e-flows. In essence, it means “keep the river flowing”. Since decades, riparian communities, people affected by dams and river diversions, activists and environmentalists have been maintaining that rivers must continue to flow, that one cannot divert all the water away from the river. And it needs to flow so as to enable it to perform the critical functions it does, to play the roles it has been playing.

The concept of environmental flows is a more structured and formalised articulation of the same principle. Over the last decade and a half, environmental flows has globally evolved into a well-developed, scientific, multi-disciplinary field where expert driven specialisations like hydrology, river morphology, biology, ecology, sociology, economics combine with the knowledge and understanding of riparian and other communities to create a scientific as well as a political process. Environmental

flows has emerged as the key framework for informed, participatory decision-making in river-basin planning.

A widely accepted definition of e-flows – from the Brisbane declaration is that e-flows describe “the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and well-being that depend on these ecosystems”. In the Indian context, the purposes to be sustained would also include cultural and social needs.

Since last few years, the Ministry of Environment, Forests and Climate Change (MoEF) has started prescribing the maintenance of e-flows as a condition when according clearance to dams and hydropower projects.

Having said that, one must also point out that the methods and processes of arriving at these e-flows are still *ad hoc*, crude and often unscientific. This is unfortunate as globally the methodology has developed considerably and even in India, several NGOs and civil society initiatives – and an occasional government committee - has shown much better ways to carry out e-flow assessments. There are ample indications that project related e-flow assessments are nothing but attempts to pay lip service without changing anything fundamentally – just like the way many project proponents treat the mandatory Environment Impact Assessment (EIA), mainly as a formality to get required clearances.

For example, many proponents still take e-flows to mean “minimum flows”. It needs to be highlighted that to really sustain the ecology and livelihood functions of a river, the seasonal variation in flows is crucial. Low flows play a different role as do high floods. Thus, true e-flows would need to mimic the seasonal pattern of a river’s flow. This is accepted by the Government of India, but projects still propose e-flows as a minimum (and really minimum) steady flow all year round.

But the e-flow assessments are evolving and one hopes that they reach the desirable quality soon. The importance of e-flows lies in the fact that they bring to centre the need to keep the river flowing, and thus, enshrine the ecological perspective to water resource planning. In doing this, they effectively overturn the fundamental premise of the dominant thinking that “every drop that flows to the sea is a waste”. In fact, they mandate that significant quantities of water need to flow all the way to the estuary and the sea.

There are several other important developments that indicate shifts from the hitherto dominant perspective towards a more ecological approach.

In July 2010, the MoEF commissioned a consortium of seven IITs to prepare a Ganga River Basin Management Plan (GRBMP). This GRBMP, in its Interim Report submitted in Sept 2013, put forward the idea that the main goal of the basin plan is to restore the wholesomeness of the river. The wholesomeness, according to it, is determined by the sanctity of the river imbibed in four elements, namely *aviral dhara* (uninterrupted flow), *nirmal dhara* (unpolluted flow), preserving the ecological integrity of the river, and preserving the geological integrity of the river. The Consortium has also put forward the notion that connectivity of the river – lateral – along the length, longitudinal- across the banks and with the flood plains, and vertical, must be maintained. This perspective, taken in its word and spirit, is nothing but a full ecological perspective of looking at the river.

What is important is that the Government of India has stated clearly that the long-term vision for the ambitious and prestigious program of Ganga rejuvenation “will emanate from the Ganga River Basin Management Plan being prepared by the Consortium of 7 IITs”. Of course, whether the Government will actually implement the fairly radical changes necessary to actualise the GRBMP is to be seen.

Another major initiative of the Government of India has been the proposal to enact a National Water Framework Law. Such a law would provide “an overarching national legal framework based on principles for protection, conservation, regulation and management of water as a vital and stressed natural resource, under which legislation and executive action on water at all levels of governance can take place.” This law had been first mooted in 2013 and the then government had also brought out two drafts of the Bill. In May 2016, the Government put out yet another draft of the Bill. The Bill incorporates many important elements of what we have called the ecological perspective of water management, including a recognition that water is an integral part of the eco-system, requires Governments to protect the ecological integrity of water systems, mandates minimum interference in existing natural river flows and maintenance of environmental flows.

A more recent development is the proposal by the Government of India, Ministry of Water Resources to restructure its two premier institutes, namely the Central Water Commission and the Central Ground Water Board. The report of the committee set up to suggest appropriate restructuring has recommended extensive restructuring, including merging the two into one National Water Commission. Two key changes proposed are the merging of the two organisations so as to enable looking at ground water and surface water in an integrated manner, and bringing in a diversity of expertise into the new organisation, as against mainly engineering and technical as currently is the case. Just these two changes – if implemented – are likely to cause a shift away from many of the elements characterising the dominant practises.

Pushing these developments are a number of civil society initiatives. I have just come from the Second India Rivers Week, held in Delhi, where a number of key river activists and researchers had come together. This gathering has for the first time in India brought out a Red (Critical) list of rivers in the country, and will soon publish a State of India’s Rivers report. These list and reports not only bring home the urgency to do something about the deteriorating state of our rivers, but also provide a useful framework and direction about how to proceed.

These are only some of the important developments at the official and un-official levels.

Challenges Galore

Lest this paints an optimistic picture, I would hasten to add that this is not the case. The dominant way of looking at water remains quite entrenched, and important as the above mentioned developments are, there are many challenges before their full impact can be realised.

First of all, even where the central government has undertaken some important shifts, at least in its statements, we also have quite contradictory stances on other aspects of water resource management. For example, while the Government talks about protecting the ecological integrity of rivers and maintaining e-flows, it is also aggressively pushing the Interlinking of Rivers project, which in many of its elements is the very anti-thesis of these values.

Another important aspect is that most of these initiatives are coming from the central government, which, in the constitutional scheme, has limited jurisdiction on water. Water is in the state list, and so whether it's the implementation of the Framework Law or Ganga Rejuvenation, central legislation and regulations have limited impact. And most states are yet far away from accepting any shifts towards an ecological perspective. Witness the recent bitter and acrimonious fights over the Cauvery waters between Karnataka and Tamil Nadu, the root cause of which is that the demand made on the river by the two states together is much more than the waters carried by the river!

Last but not the least is a concern that the ecological paradigm will not be able to meet our needs. For example, an argument is made that if we let lot of our water flow into the sea, we won't have enough for irrigating our crops, and won't be able to grow enough food. Hence, we have no option but to squeeze out every drop of water from water systems of the country. We can either have food, or rivers. This is ample evidence to show that this apprehension is not justified. For example, Gujarat showed very high agricultural growth in the first decade of the 2000s. Reputed researchers have documented - in the Economic and Political Weekly - that this was driven not by the large-dam canal systems of the South – central Gujarat including the Narmada rproject, but by the large number of decentralised water harvesting efforts in the drier regions of Saurashtra. They have also shown that the latter used lesser water to yield larger production spread over many more farmers than the former.

So while there is little doubt that basic needs, the needs of decent living could be met by adopting the ecological perspective, ever-escalating demands or needs of profligate uses of water may be difficult to meet. Indeed, no system - not even the current dominant paradigm – can meet such needs. Since the dominant system is based on an implicit assumption that there is no need to talk about any limits on the demands we need to meet, it is repeatedly running into deep crisis and fierce fights – in areas where the limits of what the water system can provide have been reached, but where demand continues to escalate. Cauvery basin is one example. The Punjab –Haryana dispute is another, where Punjab passed a law annulling all its inter-state water sharing agreements. Wrangling over water releases in the Godavari basin and Krishna basin in Maharashtra also reflect the same underlying cause.

Thus, the ecological perspective can meet our needs, but we will have to look at what these needs are. The first step is to use water more efficiently. For example, the Kelkar Committee set up by the Government of Maharashtra to suggest ways for a balanced regional development has pointed out the huge imbalance caused by the cultivation of water-intensive crops like sugarcanes. It has suggested that "If sugarcane crop inWestern Maharashtra and Marathwada is convertedto fully drip irrigated crop, protective irrigation will be possible for 45 lakh ha rain-fed cropsin Western Maharashtra and 15 lakh ha in Marathwada". This is more than two times the area currently irrigated in the state. In other words, more efficient use of water could help us get much more agricultural production from the same amount of water, freeing some for ecological needs.

However, even efficient use has its limits. No system, no matter how efficient, can sustain profligate and ever-escalating demands. So we would have to move towards containing our consumption of water to judicious levels, what the late Ramaswamy Iyer, former Secretary, Ministry of Water Resources and a leading water expert called "water wisdom". Since it does not talk about such a judicious consumption, the dominant perspective is bound to fail, collapsing into crisis, acrimony and

wrangling. On the other hand, with such a judicious consumption, the ecological perspective offers an opportunity for not only meeting all our needs, but in a manner that protects, preserves and enhances our water systems.

Whether we can accept such judicious consumption is probably the biggest challenge before us today.

Some of the recent developments indicate shifts in thinking, if still not always in practise, about water resources in India. We cannot be overly optimistic, but the new developments offer spaces to leverage the shifts. Whether we complete the shift will ultimately be a function of choice – what we as a society choose - a path of ever-rising consumption, unrestrained extraction of water and an anthropocentric world view; or prudence and judicious use.

Thank you.

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