

The Tryst with the BIG DAMS

Abstract India's water resources development has been dominated by large dams, to the exclusion of social and environmental concerns, to the exclusion of performance of created systems, to the exclusion of better options, to the exclusion of needs of the people of the country, to the exclusion of democracy or even transparency in governance. In recent years the situation has gone worse with accelerated pace for building large dams and dilution of the environmental norms. Available information shows that the dams are performing much below their projected or potential levels. Evidence from some community driven examples show that the water resources development need not be a game of trade off (benefiting the rich at a cost to the poor), but can be a win-win situation if there is informed democratic governance. If the lessons from past experience are not learnt and if there is no dramatic correction soon, the global warming will make the situation worse.

The tryst with the destiny, the famous words of Pandit Jawaharlal Nehru, India's first Prime Minister, on the midnight of Aug 14, 1947 has been unfortunately translated into the Tryst with the Dams as far as water resources development in India is concerned. As India celebrates 60th anniversary of independence this year, it is a good opportunity to take stock of the implications of this big dam centric water resources development that India's first government pushed the country into. Unfortunately, there has been no credible independent attempt to comprehensively assess the performance of large dams in India, though the India Country Study (1999) done for the World Commission on Dams (WCD) did attempt such an assessment. Let us look in some broad strokes where we stand.

The Dam Pace In 1950, India had a total of 346 large dams¹. That number has become 4525 as per the latest edition (dated July 2002, the fact that we do not have latest figures after that over five year old publication speaks about the state of information gathering and dissemination) of the National Register of Large Dams, published by the Govt of India's Central Water Commission. The pace of completion of large dams had peaked in 1970s (1263 completed between 1971 and 1980), and dropped thereafter (1186 in 1980s and 347 in 1990s), but evidently, seems to have gone up in the new millennium, considering that the 425 dams that were

¹ The World Commission on Dams and the International Commission on Large Dams both define large dams as one that is more than 15 m high from the deepest foundation. The National Register of Large Dams also includes dams with height of 10 m to 15 m under large dam if it complies with one of the special conditions, e.g. if the crest is longer than 500 m, storage capacity is over one million cubic meters, etc, (Preface of the CWC publication).

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under construction in 1999, have almost all been completed. Moreover, the CWC list does not include projects that are solely hydropower projects and the population of such projects has been going up in recent years. Large dams have thus dominated India's water resources development, to the exclusion of local water systems or groundwater recharging or repair and maintenance of created infrastructure and as if people and ecosystems do not matter. There is no credible attempt to look at the non dam options when a new dam is proposed. This has been officially accepted², "Secondly at present, detailed documentation regarding examination of alternative options to optimally meet the overall objectives and aspirations in the light of basin plan is not given in the Feasibility Report/ DPR. A detailed chapter analyzing the available options, even not involving large dams, should preferably be included in the DPR of future project proposals."³

NEW ATTEMPTS TO PUSH MORE LARGE DAMS

Some of the noteworthy recent attempts of the Govt of India to accelerate the pace of dam building in India are described below.

Interlinking of Rivers Through a strange sequence of co-incidents, as soon Dr APJ Abdul Kalam took over as India's President in July 2002, the mega plan to link up India's 37 major rivers through some 30 river links got a big and high profile push, which then involved many arms of Indian state. As one of the sharp observers of India's water resources scene observed, with the introduction of the Interlinking of Rivers (ILR) plan on the national scene, the water resources establishment seems to have got a new life, since the Narmada and

² See the Report from the Ministry of Water Resources for the 11th Five Year Plan that started in April 2007, page 53.

³ DPR stands for Detailed Project Report

other campaigns had put them on the defensive in 1980s and 1990s. With the new govt and the new President at the helm in Delhi after May 2004, the high profile that the ILR plan got earlier has gone away, but the new government continues to remain committed to the ILR plan.

Accelerating Hydropower initiative

In March 2001, Govt of India, in an attempt to formulate road map to accelerate the pace of Hydropower Development, asked the Central Electricity Authority to put together Ranking study of the remaining hydropower projects. That seven volume study was published by Govt of India's Central Electricity Authority in Oct 2001. "The Union Government is giving highest priority to the development of hydropower, keeping in view the need to double our power generation capacity in the next ten years to overcome the shortage of power", said the then Prime Minister Atal Behari Vajpayee while launching his government's 50 000 MW hydropower Initiative⁴. Under the initiative, 162 hydropower projects (identified through the ranking study mentioned earlier) in 16 states were to be completed in the next 15 years. The current government continues to pursue that path, as it evident from the Working Group Report for Power for the 11th Five Year Plan (2007-2012).

Private Hydro Initiative Since 1991, the government has been trying hard to push the private companies to take up large hydropower projects, so that more investment could be attracted into the area. The attempts were not particularly successful until recently, when the Electricity Act of 2003 and incentives offered by states like Himachal Pradesh, Uttarakhand, Sikkim and Arunachal Pradesh, a large number of hydropower projects have been and are being handed over to the private companies for development.

The NE initiative India's North East is considered to have huge untapped potential of hydropower development and the government have been trying various measures to push large dams here for hydropower generation ("Large Dams for Hydropower in North East India", SANDRP, June 2005). They have not succeeded in a big way here, but recently many MOUs (Memorandum of Understanding) have been signed for a few big Hydro Electric Projects (HEPs) here. The World Bank has also been trying to push this through the proposition of a North East Water Resources Authority,

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on the lines of the Tennessee Valley Authority (TVA) of the US. They too have not succeeded so far, but the attempts are still on. They have of course not bothered to say that the earlier very high profile attempt to replicate TVA model in India, in the form of the Damodar Valley Corporation (DVC), has largely been seen as disaster, even according to its first Chief Executive Officer Sudhir Sen⁵. As the World Bank's 2006 report agrees (p 73), the Damodar Valley Project was "the very first Bank financed project" in India. DVC continues to exist, but its future plans and current installed capacity largely comprises of thermal power projects and its mandate is much diluted from what was envisaged at the outset.

AIBP, Bharat Nirman India's current Finance Minister, Mr. P Chidambaram, a decade ago in 1996, when also he was a finance minister, launched Accelerated Irrigation Benefits Programme (AIBP), which was essentially a programme to push funding of Large Irrigation Projects. A decade later in 2005, to add to his options of funding more large dams, his government started Bharat Nirman Project, whose irrigation component had the objective of adding 1 crore ha irrigated area in four years, by 2009. This is another way to add to the funding of large irrigation projects.

The Farmers Suicide package One would have thought that at least a package designed to solve the crisis affecting India's millions of farmers and leading them to suicides in thousands would not be used as an opportunity to push more large dams. But one can be so wrong!!! When India's Prime Minister Manmohan Singh⁶, announced the Rs 3750 crore package for Vidarbha region in Maharashtra in June 2006, one was shocked to learn that Rs 2177 crores (over 58%) of that package was for large irrigation projects.

Attempts at nationalization In India's constitution, water being a state subject, the World Bank and the Government of India (GOI) has often found them handicapped by the divergent views of different states on various Water Resources Projects (e.g. ILR). One of

⁵ See for example, Sen Sudhir, *A Richer Harvest: New Horizons for Developing Countries*, Tata McGraw Hill Publishing Co, New Delhi, 1974, on page 86, Sen writes, "Thus, at the dawn of her independence India relied wistfully, on her high dam builders... it was a luxury India could least afford".

⁶ See for example: <http://www.thehindubusinessline.com/2006/07/02/stories/2006070202980300.htm>

⁴ see for example:

<http://www.tribuneindia.com/2003/20030525/nation.htm#2>

the ways to solve this *hindrance* that both the World Bank and GOI have been trying has been to push for Nationalisation of Rivers or alternatively to bring Water Resources into concurrent list from the present state subject in constitution. Various formulations are being tried in this regard, but nothing has fructified so far.

The World Bank's Storage advocacy In June 2005, when the World Bank circulated the draft India Water Country Assistance Strategy, titled *India's Water Economy: Bracing for a Turbulent Future*, (the Report was published in 2006 as listed in the references below) they launched a new way to push big dams, when they said⁷ that India has a very low per Capita storage capacity compared to US, China, Australia, Spain or even Morocco. This is very mischievous. Firstly, per capita storage capacity cannot be a measure of development. Storage capacity is only a means to an end and this advocacy is an attempt to make the means an end in itself. Secondly, it talks only about storage through big dams. But there are many options for storage, including small storages and also the best option of underground storages. Unfortunately, the World Bank's tendentious advocacy, happily adopted by Indian water establishment, does not look at these issues, it is basically driven to promote more big dams.

However, there is no attempt to analyse the performance of created storage capacity. When we analysed the figures for the last 13 years (1993-94 to 2005-06), we found that on an average, each year about 34.41 BCM of storage capacity (equivalent to six times the live storage capacity of the controversial Sardar Sarovar Project) out of only the monitored storage capacity is not filled up. That means that on an average an investment of Rs 34886 crores has remained idle in each of the last 13 years.

This happens when in 9 of the 13 years the rainfall was almost average or above. Should we not be trying to understand why this is happening? How we can make the existing storage capacities play the useful role it is supposed to play, in stead of pushing for more storages? But these questions are neither asked, nor an honest attempt made to find answers thereof.

Another indicator to assess the performance of the created storage capacity would be to see, to what extent the water stored in reservoirs is used before the next

monsoon. The water that remains in the storages when the next monsoon is about to set would generally indicate (except in dams that have carryover capacity in its design, which is the case for very few dams in India) that the water stored in the previous monsoon has not been used up. We saw that on the onset of 2006 and 2007 monsoon, a number of reservoirs had high water stored, some reservoirs having upto 60% water. This clearly indicates that existing storage capacities are not being put to useful purpose that it has been created for. This has another serious implication: this would also mean that the dams will have that much less storage capacity for the following monsoon, many times leading to sudden release of high volume water, leading to floods in the downstream areas. This was indeed the situation in a number of river basins in India in 2006 and 2007, including in Tapi, Mahi, Sabarmati, Krishna and Godavari basins. No questions are even asked as to what is the reason behind this non optimum use of reservoir capacities.

11th Five Year Plan Govt of India's 11th Five year plan is supposed to have started on April 1, 2007, but the plan awaits final approval. The report of the Working Group on Water Resources Development for the 11th Five Year Plan, chaired by Secretary, Union Ministry of Water

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Resources, recommends that there should be allocation of Rs 153000 crore for large irrigation projects and Rs 13500 crores for smaller projects. This again shows the continued heavy bias for big projects. This fails to recognize that groundwater is India's lifeline and that the only way to sustain this lifeline (in crisis situation today already) is to ensure maximum harvesting of rainwater locally and recharging of groundwater

aquifers.

Regulatory issues There are many regulatory issues that are relevant to water sector, including the social and environmental issues, which all are driven towards making it easier for large projects to go through. Another attempt in this direction is to create State level Water Regulatory Authorities (already created in Maharashtra, draft acts formulated in Gujarat, Madhya Pradesh and Arunachal Pradesh).

The 11th Five Year plan Water Resources working group report mentioned above recommends that all states should have a Maharashtra style regulatory authorities and that there should also be a national water regulatory authority. These institutions would bring sea change in

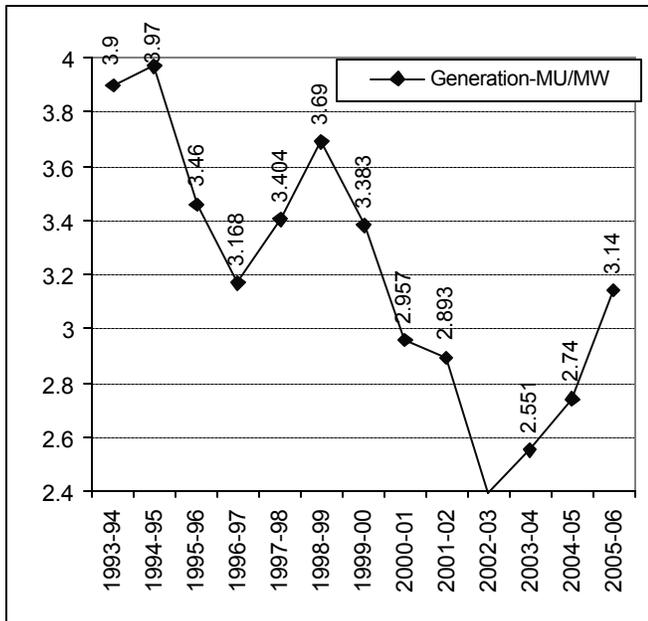
⁷ See page (xv) of the World Bank, 2006

the way water resources development and management happens in India, largely in favour of facilitating more large projects and also facilitating institution of entitlements and trading of entitlements. These institutions are full of bureaucrats with little role for anybody from outside the governments. Maharashtra seems to be the current laboratory of water sector reforms in India and recently that state has proposed first ever privatisation of irrigation project in India.

THE PERFORMANCE One of the stark realities of India's dam building has been that there is absolutely no attempt at credible, independent assessment of performance of the large dams. Let us see the limited evidence that is available about the performance of large dams in India.

- Out of India's net cultivated area of about 142 million hectare (m ha), the net irrigated area is 57 m ha as per working report (agriculture) of 11th Plan and has remained around that figure for more than 7 years now. Out of the net irrigated area, the area irrigated from large dams is about 17 m ha, the rest is either irrigated by groundwater or small systems. What this means is that after spending over Rs 200 000 crores on large dams and allocating 75-80% of available resources for large dams, the projects have benefited just 12% of net cultivated area.

- Here it should be remembered that the productivity



of area irrigated by large dams is lower than the

productivity of area irrigated by groundwater. In addition, the vast 85 m ha area remains rain fed. So what is the contribution of large dams irrigated lands to India's food production, the most celebrated reason for building these projects. Well, our calculation suggest that *gross* contribution of large dams irrigated lands to foodgrains production is 9.98%⁸, this was also the conclusion of India Country Study done for the WCD, mentioned

earlier. *Net* contribution, considering that these lands would have anyway produced some foodgrains and that in the process of building these projects, we have also lost large area in submergence (as per our recent calculation, a total of 4.42 m ha land has been submerged by India's large dams), canal building and for other related infrastructure, the net contribution would be even less. Remember that some of the lands irrigated

by large dams are also water logged and salinised, further reducing the contribution of large dams.

- On Hydropower front, India now has total hydropower installed capacity of 34476.1 MW as on March 31, 2007⁹ and the projects generated 113359 Million Units electricity in 2006-07 at the rate of 3.29 Million Units per MW installed capacity. What is interesting to note is that this performance of 2006-07 (a good monsoon year) in electricity generation from hydropower projects is lower than the performance of at least 13 of the last 22 years (for which we could get data). In fact if we plot the data, for 1993-94 to 2005-06¹⁰, there is gradual downward trend, see the graph alongside, the drop being a huge 20% between the two years. What this means is that each MW of additional capacity we are adding is generating less power. Member (Hydro) of Central Electricity Authority, government of India accepted at a meeting in Sept 2007 that indeed this decline is happening. There are many reasons for this trend, including silting of reservoirs, aging dams and machines, over development of river basins and so on. Here another related issue is that

⁸ See page 22-24 of Thakkar (1999) for detailed calculations. The contribution of large dams irrigated lands since then is likely to have gone down as the proportion of lands irrigated by large dams in total irrigated area has gone down and proportion of groundwater irrigation has gone up.

⁹ See the Monthly generation figures from Government of India's Central Electricity Authority for March 2007, www.cea.nic.in

¹⁰ All these figures are from Central Electricity Authority, Government of India.

hydropower projects are justified in the name of peaking power, but consumers do not pay extra for the peaking hour power consumption, time of day metering is being thought of only now.

- Coming to the issue of storage capacities, our study¹¹ (based on siltation data obtained from the Central Water Commission, government of India, under the Right to Information Act) shows that over the last ten years, India has added about 3 billion cubic meter of storage capacity through big projects each year and 1.95 BCM of that capacity (i.e. almost two thirds of the new capacity added) is getting silted up and nothing is being done on ground to arrest that destruction.

Hydropower is not clean, green, renewable or cheap

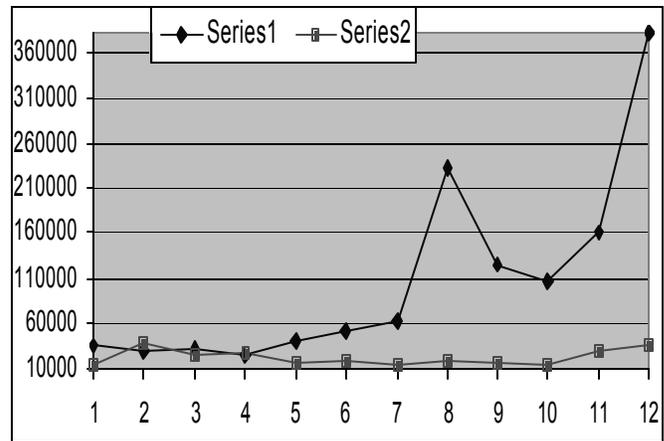
The claims that hydropower is cheap, clean, green and renewable are definitely unsupportable. The storages get silted, which means they have finite life, they are not renewable. The projects cause a lot of social and environmental impacts, which shows they are not green. The fact that the project developers do not pay for many of the costs (e.g. huge social and environment losses) involved in building the projects, means that some other people pay for it, which in turn means that they are not cheap as claimed. And research over the last decade has shown that storages in tropical countries can cause large amounts of green house gas emission¹² shows that they are not clean. In fact recent estimates suggest that methane emissions from India's dams may be contributing more to global warming than the dams of any other country and it could be almost a fifth of India's total green house gas emissions.

Cost of Irrigation: Minor irrigation could become major one In the alongside graph, series 1 is for the figures of per ha cost of irrigation for major and medium irrigation projects and series 2 is for the figures of per ha cost of irrigation through minor irrigation projects, all figures are from Planning Commission (GOI) documents. It is clear that adding a ha of irrigation potential through major project is now costing ten times the cost of adding 1 ha of irrigation through smaller projects.

¹¹ See cover story in Aug-Sept 2006 issue of "Dams, Rivers & People", available at www.sandrp.in/drpindex

¹² See May-June 2007 issue of "Dams, Rivers & People", page 5.

Per Ha cost of irrigated area over the years



- On the flood control front, very few large dams in India have provision of designed flood cushion storage, but it is claimed that the dams help flood control. However, there are increasing number of instances that show that the wrong operation of dams are actually creating flood disasters, as it happened in Tapi, Sabarmati, Mahi, Chambal, Krishna and Godavari basins in 2006 and Sabarmati, Mahi, Tapi Godavari and Krishna basins in 2007, as noted earlier.

The track record of environmental impact assessment, management of environmental impacts is dismal. As noted by Shekhar Singh et al in their review in 1999, "The findings of this study suggests that, in India, the environmental and Social impacts of large dams were inadequately understood, mostly ignored in financial and economic calculations, and the prevention and mitigation of adverse impacts usually ignored." Since that report was made public, the situation has only gone from bad to worse.

ENVIRONMENTAL

IMPACTS: Does anyone really care? It is well known that big dams can have significant environmental impacts in the reservoir area, upstream, downstream, command areas and at global level (e.g. emission of global warming gases like methane).

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The trouble begins at the stage of assessment of the impacts. Environmental impact Assessment reports are typically based on incomplete studies, reflect pro big dam bias of the authors, are often based on wrong facts and figures and reach unwarranted conclusions. They almost never include proper downstream studies, basin

wide impacts of the project, cumulative impact assessment, options assessment, downstream water releases, muck disposal plan or public disaster management plan. The question of assessment of global warming impact of the projects or how the project will perform in view of the global warming impacts possibly does not even cross the minds of the authors or the project authorities. These systemic appraisal problems are equally applicable to even World Bank funded projects as is clear from the experience of the World Bank funded 1500 MW Nathpa Jhakri Project on Sutlej River in Himachal Pradesh and the IFC (International Financial Corporation – the private sector arm of the World Bank) funded 192 MW Allain Duhangan hydropower project on Beas River in the same state.

The next important issue is that of implementation of the environment management plan as written in the EIA report and as generally required under the conditions of environmental clearance of the project. The official agencies have accepted for example, that the catchment area treatment plan required for ensuring that projects function as planned during the project life span, have not been implemented till the completion of projects and beyond even in more celebrated and World Bank funded projects like the Sardar Sarovar, Nathpa Jhakri projects, leave aside the lesser projects.

... Ministry of Environment and Forests (MoEF) that is responsible for ensuring compliance with the conditions under which projects are given clearance has shown absolute inability to ensure compliance. An assessment done by Ashish Kothari, then member of the MoEF's Expert Advisory Committee (EAC) for the River Valley projects concluded in a study in 1998, "Data emerging from the records of the Government of India, collected by the regional offices of the MoEF, suggests that in a shocking 90% of the cases, project authorities had not complied with the conditions which their projects had been cleared... Our EAC assessed the state of monitoring and reappraisal of the dams cleared by the MoEF in the 1980s and 1990s.

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The most shocking fact that our EAC found was that, despite being told that the huge scale of defaulting (that) was taking place, MoEF rarely took stringent action, indeed on no occasion had it used its powers to halt construction and prosecute concerned officials even in cases of extreme violations of conditions".

As a Government of India Report (GOI Sept 1999, p 310), noted, "Environmental concerns continue to be regarded as disagreeable external imposition and they have not become parts of the project planning from the start, despite many guidelines and instructions to that effect." Indeed the whole

process of creating EIA and the public consultation process should be part of the decision making process, but that is far from the case even today.

In Sept 2006 India's Ministry of Environment and Forests amended the rules governing environmental impact assessment and public consultation process before projects are considered for environmental clearances, reversing some of the improvements achieved in earlier years. The changes involved significant dilution of the processes, reducing the possibility of proper environmental impact assessment or mitigation. Authors of a detailed review of the notification noted (ESG 2007, p iii), "The resulting legislation clearly subordinates environmental and social concerns to the interests of industry and investment".

To see if situation has improved in the twenty-first Century, let us take just one example, one of the largest dams being taken up in India in recent years, namely Polavaram Dam on Godavari River in Andhra Pradesh, also causing submergence in neighbouring (upstream) states of Orissa and Chhattisgarh. In that project, the environmental impact assessment is incomplete, is based on wrong and outdated data, full EIA has not been provided to the local people in the language

they can understand, there were serious violations in the public hearings conducted before the environmental clearance, in fact when people protested against violations, many were arrested, the neighbouring states have yet to give their clearances, and yet the project work has started and a few hundred crores have already

been spent, before court ordered stoppage of work¹³. It only goes to show where we stand even today.

Bhakra Dam: Environmental Impacts Bhakra Dam on Sutlej River in Northern India has been described in iconic terms among the large dams in India. A pioneering study of that project¹⁴ has described the serious environmental impacts of that project in terms of submergence of lands and forests, siltation in the dam, displacement, health impacts and downstream impact on fisheries and flood plain agriculture in India's Punjab. Most impacts remain unaddressed. Government of India's Comptroller and Auditor General has noted that though the money for the catchment area treatment for the project was spent, there was little credible evidence of its implementation. The report also notes¹⁵ that Bhakra had impacts across the border in Pakistan in terms of depletion of groundwater, decrease in soil fertility and adverse impacts on pastoral communities of Cholistan, in addition to other livelihood impacts.

Here it is worth noting that the people who suffer the ill effects of dams are almost invariably different than the people who benefit from the projects and people who face adverse impacts rarely benefit from the project. Decades after the Bhakra dam was completed, when in 1970s the then Union Irrigation Minister, Government of India, KL Rao visited it he recorded¹⁶, "it is curious how we handle our projects. The village of Bhakra on the bank of the river Sutlej was submerged. The Dam resulted in great suffering to the people of the village, but nobody took note of the people's representations. I found that the new village of Bhakra had neither drinking water nor electricity though surrounded by blazing brilliant lights. This was indeed unfair." The story is not much different for other large dams. Pong, Bhakra, Hirakud, Tawa, Bargi, Nagarjunsagar... - you name the dam and you will find that people affected there from are still fighting for R&R. Large dams also submerge forests, bringing further impacts in the process.

The work of Tarun Bharat Sangh in areas around Alwar District in Rajasthan over the last 22 years have shown

¹³ See for example, Gujja Biksham et al, *Perspectives on Polavaram: A Major Irrigation Project on Godavari*, Academic Foundation, New Delhi, 2006.

¹⁴ *Unravelling Bhakra*, p 193-205

¹⁵ *Unravelling Bhakra* p 206

¹⁶ See Rao, 1978, p 79

what dramatic changes are possible when communities take up building, rejuvenating and managing local water systems on a large scale. Such examples are available from a number of different regions in India, including from Gujarat, Tamil Nadu and others. They all show that non large dams options exist, they are viable, desirable, sustainable and more equitable than dams. Moreover, they do not involve the trade offs in terms of serious social and environmental impacts in one region to benefit another region.

From Prime Minister and the President of India to the farmers, everyone is certain that India's agriculture is in crisis. That is indeed the case. Everyone also agrees that every farmer would benefit from better water management. But the water resources development and management policies continue to be a prisoner of the agendas of large dam lobby, neglecting the other water resources development options, including new water saving technologies like the System of Rice Intensification

Impact on Rivers The World Bank in the 2006 report *India's Water Economy* said that India's rivers are *fetid sewers*. The GOI's Central Pollution Control Board said in 1981 that no rivers have potable water in plains area of the country. Dams in fact kill rivers – in case of most large dams, no water is allowed downstream from the dams for the river, for the environment or even for

downstream communities & economic / livelihood activities like fisheries. In India there is no regulation for downstream releases from large dams and as the World Bank noted¹⁷, "An important area where mindsets have to change is that of in-stream flows. Any water flowing out of a river basin is still seen by many water engineers as 'wastages'."

Social Impacts: who pays the costs Total reservoir area of India's 4528 large reservoirs is 4.42 million ha as per the latest estimates¹⁸. In 2000, the Planning Commission acknowledged¹⁹ about Water Resources Development that upto 25 million persons have been displaced by big water resources projects since 1950, "Almost half of the displaced persons are tribals who have least resources". Less than 50% have been rehabilitated – the rest pauperised by the development process. The actual numbers are more likely to be nearer to 35-40 million and proportion of those rehabilitated much lower.

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¹⁷ World Bank, 2006, p 61

¹⁸ *Dams, Rivers & People* My-June 2007, page 8

¹⁹ Govt of India, Oct 2000, p 89

of Rice Intensification and also not bothering about export of virtual water through export of water intensive products like Sugar and Rice.

So much so that even after statements in Five Year Plan after Five Year Plan, there is very little attempt to get better results from existing water infrastructure. India now has the largest irrigation infrastructure in the world. That infrastructure is giving some of the poorest results, India's Finance Minister said in his budget speech in 2005. The mid term appraisal of India's 9th 5 Year Plan had noted, "With a 10% increase in the present level of water use efficiency, it is estimated, an additional 14 m ha can be brought under irrigation from existing irrigation facilities". Gap between potential created and realised is over 25 m ha and is growing.

The World Bank report of 2006 quoted earlier said that annual requirement for repair and maintenance of India's water infrastructure is about USD 4 billion, that is about Rs 17 000 crores. That is less than the total annual water resources budget of India during 10th Plan. A tiny fraction of the required amount is being spent on actual repair and maintenance of that infrastructure. That is one of the reasons why India's irrigation infrastructure is performing so poorly. The 11th Plan working group report quoted above says that 15 % of all water resources budget should be reserved for Irrigation Maintenance Fund. That will be far from sufficient considering current investment levels and the resources required for repair and maintenance, but it is doubtful if the big dam lobby would allow even that.

And the paradigm shift to make people at the centre of water resources is not even on the agenda.

I guess we will learn the hard way.

In the End In the famous James Bond film *Golden Eye* Bond repeatedly destroys the vehicles he uses. A stunned computer programmer Natalya Siminova asked James Bond, "Do you destroy every vehicle you get into?" The answer of Bond, pointedly precise, was, "Standard operating procedure". India's water resources establishment is not known to act in James Bond style, but, if one were to ask them, "Do you destroy every river, every community you touch?", the answer should not be much different than that of the Bond in *Golden Eye*.

Famous Indian writer Arundhati Roy wrote²⁰ in the last monsoon of the twentieth Century, "Whether you love the dam or hate it, whether you want it or you don't, it is in the fitness of things that you understand the price that's being paid for it". The trouble is that there is little readiness to understand it even today.

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