

Lead Piece



Agriculture growth could reduce by over 6%?

The Prime Minister's Economic Advisory Committee in its latest estimates has projected that during the current financial year, the agriculture could experience minus two % growth. However, in a year when the monsoon deficit has been 23%, the highest since 1972 and when drought has been declared in 299 districts during the monsoon itself (a record by itself), this deficit seems to be a gross, misleading under-estimate.

India's finance minister has said that the rice production during the rabi could reduce by 16 million tons, which is 18.91% reduction compared to kharif rice production of 84.58 M T last year, as per the fourth advance estimates of Ministry of Agriculture. However, the area under paddy during kharif was 20.23% lower in current year at 27.2 m ha, compared to 34.1 m ha last year. Moreover, there was also damage to the sown crop due to drought and flood. Hence the Rabi rice production is more likely to be around 65 M T, about 23% lower than last year. In fact, the first estimates of the Kharif Production from the Union Ministry of Agriculture in early Nov 2009 showed that production in all crops is likely to go down by around 13%, with the exception of Cotton, which may see statistically insignificant tiny growth. These figures did not include the contribution of animal husbandry, fruits and vegetables. Secondly, these are physical production figures, the financial deficit figures could be somewhat different, as Prof Suresh Tendulkar, former chairman of the Prime Minister's Economic Advisory Committee suggested to this author.

Now the Union Agriculture secretary says that the ministry has raised the Rabi rice production target by around 1.5 MT from the production of 14.47 MT last year. The Ministry also hopes to produce 82 MT wheat in Rabi (Financial Express 28x09), up from 80.58 MT last year. However, these hopes seem unfounded since the level of water as on Oct 22, 2009 (the significant date from the point of view of Rabi season) in the 81 reservoirs

monitored by the Central Water Commission was 8% below the storage figure last year on the same date.

More significantly, the storage of water in the Indus basin reservoirs was massive 39.12% below the storage figure on the same date last year. Considering the importance of these reservoirs for the North West India states of Punjab, Haryana and Rajasthan, it seems that the hopes of Rabi production going above the last year figure seems like wishful thinking. It is true that with the predominance of groundwater irrigation in

NW India, the deficit in reservoir storage need to translated into deficit in irrigation or agriculture production in Rabi. However, it should be noted that the groundwater levels are plunging at alarming rates in Punjab and Haryana. Here it should shock all concerned that while normally the groundwater levels go up during the monsoon even in Punjab, this year, even *during monsoon*, the groundwater levels have *dipped in all districts of the state*, except Kapurthala.

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Dam displaced adivasis accused of forest encroachment

Poorly rehabilitated, adivasi families displaced by the Malay Dam in 1983 in Palamu of Jharkhand are now accused of encroaching on forest land. Report by Gladson Dungdung



The Chero Adivasi, displaced of Malay Dam

The adivasis, mostly the victims of the development



companies, power plants and other development projects but ground realities the displaced masses live with are different. The agony of 56 Chero adivasi families who were displaced in 1983 during the construction of Malay Dam, situated at Satbarwa

process in India, rarely reap the benefits of it. The three buzz words — compensation, rehabilitation and development—are widely propagated during the land acquisition for dams, industries, mining

The agony of 56 Chero adivasi families who were displaced in 1983 during the construction of Malay Dam, situated at Satbarwa block of Palamu district in Jharkhand, discloses the truth of how the displaced struggle for survival after being betrayed in the name of compensation, rehabilitation and development.

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These Adivasis had been living in Katautia and Dodang villages for generations, now submerged by the reservoir of the Malay Dam. They had adequate agricultural land, where they used to cultivate paddy, wheat, mustard, pulse and vegetables for their consumption and the surpluses were sold in the local market to meet other needs. 70 year-old Ganeshi who owned 29.85 acres of fertile land, received merely Rs 36,000 as compensation and became a daily wage labourer says, "My family members were never used to earning livelihood from daily wages. We had more than enough land to sustain our families for years." "None of 56 families had ever been labourers but we were simply betrayed in the name of rehabilitation. Now we have only daily wages as a major source to sustain our families," he added. According to the Land Acquisition Act 1894, the affected families must be served a notice prior to land acquisition.

Malay Dam Salient features:

Year of completion:	1985
River:	Malay
Nearest city:	Daltonganj
Ht above lowest foundation:	28.80 m
Length of the dam:	1684.15 m
Type:	Earthen
Purpose:	Irrigation
Submergence area:	346 ha
Design spillway capacity:	490 cubic m per sec

(Source: National Register of Large Dams, Central Water Commission, 2009)

Here, the construction of dam was initiated in 1980 without any information. The purpose of dam was to irrigate approximately 65 000 acres of land in three development blocks — Satbarwa, Lesliganj and Daltonganj. The Adivasis were promised adequate compensation for their land, government jobs to one person from all 56 families and rehabilitation with all facilities including hospital, school, drinking water, paved road and

electricity. Their village was supposed to be a model for the district.

But even these promises did not convince the Adivasis to leave their ancestral land. They resisted the displacement.

According to 65 year-old Budhan, their fight with the police with their traditional weapons including bows and arrows continued till the dam was almost ready in 1983, when they were asked to vacate the village.

When they refused, the police arrived at night, put them in trucks and were taken to the Land Acquisition Office in Daltonganj and locked up. They were threatened with dire consequences if attempted an escape. "Police told us if we agreed to vacate the village we are safe. Otherwise our remaining goods would go under water," said Budhan.

Finally, the Adivasis were dumped in a new area and the village was named "Kushikarma". They were compensated for their multi-cropping land at Rs 2000 per acre, plus the revenue from the Rabi harvest. All 56 families were given plots in the hilly area for their houses. But merely 34 of them were given government jobs as peons in the irrigation department, 22 of them are still in the waiting list. Their struggle for livelihood began in their new village situated in the hills, where only maize could be cultivated. They started clearing trees and bushes for agriculture to sustain their families, but the forest department termed them encroachers. They filed cases against all 56 families alleging they were cutting trees and encroaching on forest land. A few of them were put behind bars but escaped after bribing the forest officials.

When Bhudhan cleared bushes to grow crops, he was thrown behind bars for a year and is still not off the legal hook. He fears going to jail a second time. The nightmare of displacement has stayed with him.

He says, "We had demanded that they shoot all 56 families rather than move us to some barren land. This would have spared us of the pain of having to die

everyday. The local MLA Indarsingh Namdhari was for the dam. He had said that as long as the Palamu farmers got water for their land, the submergence would not be a cause for concern.

The water from the Malay dam never reached to the proposed areas of Lesliganj, where 10 Dalits families died of starvation in 2004. They were agricultural labourers but did not get work due to drought. Ironically, the canal from the dam passes close to the rehabilitated village "Kushikarma" but never reaches them. If the displaced people had gotten water to irrigate their barren land, they could have gone for two crops.

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The state cabinet of Jharkhand has passed the Resettlement and Rehabilitation Policy 2008, but this does not cover the already rehabilitated. But, if the government cannot rehabilitate a mere 56 families, how will they rehabilitate the huge numbers it is displacing in the name of development now?

35 year-old Lalan was merely 10 years old when his family was asked to part with their 21.62 acres of land, providing for their subsistence. Apart from the monetary compensation package and the plot for the house, his brother was given the job of the peon in the irrigation department. When the family settled down at Kushikarma village, Lalan started clearing bushes and prepared a few patches of land. But his desperate hunt for livelihood was soon declared illegal. The case against him, again, for encroaching on forest land was only withdrawn after bribing a forest department official.

Breaking the promises given to them, the Kushikarma village still does not have a school or a health centre.

Only 30 families remain in the village, others have migrated. A few of them returned to the dam site where they at least get the opportunity to cultivate the Rabi crop and fish in the reservoir. The state cabinet of Jharkhand has passed the Resettlement and Rehabilitation Policy 2008, but this does not cover the already rehabilitated. But, if the government cannot rehabilitate a mere 56 families, how will they rehabilitate the huge numbers it is displacing in the name of development? The 'development' and displacement have only begun.

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The Dal Lake: Looking Beyond Pollution

I am reminded of Bob Dylan's words "how many times must the cannon balls fly before they're forever banned...how many deaths will it take till he knows that too many people have died?" Likewise, I ask the state machinery of India, how many waters must dry up completely, for them to open their eyes...how many people must be left homeless before they wake up from their sleep?

One is amazed at the sheer indifference and unconcern displayed by the state machinery every time it pulls out yet another policy to displace the poor from their homes, in order to 'protect the environment'. This time it is the Dal Lake in Srinagar. In order to 'clean up' the lake, the Dal dwellers are being displaced from their homes and livelihoods in the lake, which has defined their identities and lives for generations, centuries. The lake will now be 'protected' from any human activity, and is thus 'safe'.

This notion of *protecting* the environment from *pollution* by rigidly divorcing it from humans who live off it is problematic. There are some basic assumptions this notion is guided by, which need to be questioned. To begin with, who is causing the real pollution? Why is it that the people who are in direct contact with the environment (the slum dwellers on the banks of Yamuna in Delhi or the Dal dwellers in Srinagar) are always the ones fingers are pointed at?

In the case of Yamuna's pollution in Delhi, dearly, a city that flushes out tonnes of untreated sewage in complete violation of all existing pollution control laws, everyday into the river is polluting it far more than a community that doesn't even have a regular source of water to flush out. Just by virtue of living by the river, the community is declared as the cause of pollution and dislocated. Of course, the river is only getting filthier by the day, their removal made no difference to it.

Similarly, the communities residing in the Dal Lake are being held responsible for the lake's pollution, when the truth is that the entire Srinagar's sewage flowed into the Dal till a few years back. Only recently has Srinagar acquired a sewage system that is supposed to handle the city's waste appropriately. And whether this is merely on paper or is really functional is still a question.

Besides, the siltation of loose soil caused by deforestation and other activities around the catchment areas of the Dal is a major factor polluting the lake, but remains ignored.

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Moreover, the sewage of the Dal dwellers can easily be used up or treated before it enters the lake. Each household and houseboat in the Dal lake can be provided with biogas plants (shared or individual) which will put the sewage to an effective use and provide the people with an eco-friendly and cheaper alternative to LPG. If this doesn't appeal, sewage

treatment plants are not rocket-science either. Why has the government failed to provide any such mechanism to the Dal dwellers? Sewage disposal and treatment is whose responsibility? Do we, in our city homes think twice before disposing our sewage? Do we treat our own sewage? No, because this is supposed to be the government's job. Then why do we expect the Dal dwellers to do this on their own, when anyway they survive on very meager resources? This is not to say that the community is not responsible for its actions and all public services are only the government's responsibility; but if any community initiative is expected, the government has to step up and support it, financially,

technically or otherwise. Particularly when governments have been saying that these are government monopoly areas and citizens have no role.

Since the government came up with nothing, an NGO called HOPE has been collecting sewage door-to-door from the Dal dwellers

for some years now. While a remarkable effort, the condition of the Dal Lake remains the same. This has proved that the real pollution is coming from elsewhere, for why is the Dal lake water quality not improving when so many Dal dwellers are now not throwing their sewage in the lake?

We come to the second and more important issue of going beyond pollution while looking at environmental problems. A water body is an ecosystem, not just a carrier of water that is susceptible to pollution. It is a system unto its own that is dependent on plant and animal activity around it. What trees grow around it, which birds nest in them, which seeds pollinate, what is the nature of the soil, what kind of fish breed here, etc.

A water body is an ecosystem, not just a carrier of water that is susceptible to pollution. It is a system unto its own that is dependent on plant and animal activity around it. What trees grow around it, which birds nest in them, which seeds pollinate, what is the nature of the soil, what kind of fish breed here, etc. are the factors that determine the life of the lake.

are the factors that determine the life of the lake. All of these are highly interdependent. A change in any one of the factors affects all others, dismantling this delicately balanced system. Humans too are part of the ecosystem, not above it, not outside it.

However, unlike plants and animals, humans have the dangerous capacity to step out of the system, mould it for their own needs and therefore cause its destruction. An example is deforestation causing siltation – a permanent factor for the lake's deteriorating condition. The second one is building bunds and embankments along the lake for rigidly separating it from the land, which is very much a part of its ecosystem. Separating land and water in this way spells out doom for the fragile ecosystem of a water body. Damming rivers, cutting forests, building roads and constructing around the lake, all have had their share in dismantling the ecosystem in a way that a domino effect has taken place, spiraling out of control.

The lake is fast drying up and has reduced from 75 sq. kms. to just 12 sq. kms. When the lake has no water, how will it clean itself? The pollution will of course mount.

The real problem lies here – in an ecosystem that is rapidly vanishing, not just in a lake that is getting polluted (this is not to disregard pollution, but to place it

in the right perspective). And the truth is that the Dal dwellers are hardly responsible for this vanishing ecosystem – they didn't cut the forests, build bunds, construct on the banks or dam the rivers. It is the way

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our nation has industrialised that we cannot see nature as an ecosystem, but only as resources. The Dal dwellers on the other hand are much closer to nature and much more respectful towards it. They are much more in sync with the moods and temperaments of the lake than any of us 'concerned citizens' are. Their life is shaped by the rhythms of the lake and they are more concerned for it than we think.

The problem isn't always pollution and the solution isn't always separation of humans from nature. The solution lies in nurturing a healthy, democratic and accountable relationship between humans and their natural habitat, for the sustainable survival of both

Restoring the Dal lake as an ecosystem is more vital and complete, than just 'cleaning' it up. There are several ways to address pollution, but not many to restore a bionetwork before it is too late. The pressing issue for any water body today is not only pollution, contrary to what most of us think, it is the dams, embankments and construction on the banks that disrupt a fragile bionetwork. The problem isn't always pollution and the solution isn't always separation of humans from nature. The solution lies in nurturing a healthy, democratic and accountable relationship between humans and their natural habitat, for the sustainable survival of both; which is highly possible in case of the Dal, the Yamuna as also in the case of many other natural resources.

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High Court Intervention and aftermath Six months after Jammu & Kashmir High Court asked houseboats on the Dal lake to shut shop and clean up their act, it's back to square one. Just three out of the about 1200 houseboats have so far installed the drainage system. In fact, one of the houseboats, which had got the drainage system installed, is thinking of discontinuing it. The system has failed as it couldn't adjust to the varying water level. Far from improving the drainage, it has proved counter-productive thanks to the rotting stench it produces, said the houseboat association. For years, conservationists have cried hoarse and argued that the ornate, carved cedar houseboats are turning the lake into a weed-clogged swamp. The lake has shrunk to 12 sq. km. and lost 12 metres in depth in two decades. Houseboat owners say that the ban dealt a body blow to their business still grappling with the losses suffered after last year's Amarnath agitation. The association said that the court had never ordered the sealing and that Lakes and Waterways Development Authority (LAWDA), the nodal agency responsible for controlling the pollution, created a wrong impression to save its skin. LAWDA did so to justify crores spent on the Dal conservation, they said and added that the houseboats are mere scapegoats and according to an IIT-Roorkee report contribute only 3% to the lake's pollution. What about the hotels around the lake? One hotel has more capacity than the houseboats combined together. Neighbourhoods around the lake including the upscale Gupkar Road, where the who's who of the state including CM Omar Abdullah live, also direct their drainage into the Dal. The association was trying its best to save the lake. They have roped in a Chennai-based company to install the drainage system on 10 houseboats. IIT-Kanpur is also piloting a Zero Discharge System, which would cost Rs 65,000 per houseboat. Houseboat owner Altaf Ahmed said, "Our livelihood comes from the lake and we more than anybody else are for the lake's conservation. But 70% of houseboat owners aren't in a position to invest in the drainage system. We've hardly had any business in two decades. I tried to install the drainage system but the water level keeps changing rendering it useless. We've approached the authorities to subsidize the system suggested by IIT Kanpur." (The Times of India 280909)

BOOK REVIEW 'Water and the Laws in India'**Opening up Pandora's Box!**

Book: *Water and the Laws in India*, Edited by Ramaswamy Iyer, Sage Publications, 2009, 670 + (xiv) pages, Rs 995

Water today, isn't just a source of life and livelihood like it once used to be, but a far more complex issue than that – it is a technocratic venture, a resource to be harnessed for economic gain, a commodity to be owned, bought and sold and several other things to several different constituencies. Water therefore is at the heart of several legal debates and discussions, arising out of conflicts between opposing uses, opposing users and the fact that it is a scarce resource today.

This book, with contributions from twenty-five authors (coming mostly from a law background, but some also from activist and social work backgrounds), documents these conflicts, legal debates & all possible water related legal issues in India. There is a wide-ranging coverage of issues related to water & law. However, neither is it a book about water laws, nor about all water issues. It lies in between, where water and legality converge – a book dealing with legal questions over water related issues. Some of the major themes are – federalism & inter-state relations with regard to water, riparianism, ownership of water, gender & water, pollution, mega projects like dams & canals, displacement of project affected peoples, groundwater, law reforms, etc.

As each chapter deals with a particular issue, the focus is on exploring how law can address the challenges emerging from the aforementioned issues. What are the loop-holes in the existing legal system? Why have such conflicts and challenges emerged? To what extent will the laws have to change for any real solution to materialize?

What possible reforms in the laws can be thought of? These are some of the questions that seem to run across all chapters dealing with different aspects of water. In each context therefore, the adequacy and relevance of existing laws is examined.

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The tempo of the book is generally critical of the current legal scenario, adopted straight from the colonial laws. The critique is not only of the laws and policies, but also of the approach of the government and judiciary towards conflicts and of the entire ideological framework, giving weight to technocracy and economics but from which *people* are totally absent. There is largely a consensus against centralisation and state appropriation of a natural substance which should ideally have local and community based governance. The debate between eminent domain & public trust does come up quite often in the book.

The first chapter is an extension to the introduction, laying the ground for the debates to open by giving a broad overview. In the second chapter a case is built for legal pluralism and against centralisation. The third chapter deals with inter-state disputes and gives a detailed account of the mess which the judiciary has created in all. In chapter four the author uses inter-state disputes to argue a case for federalism and a greater space for people's voices. Chapter five is an account of riparian laws in India, their insufficiency and possible models for change.

The sixth chapter goes back in time to describe the process of state appropriation over water, a common property resource, and proposes a model where the state and communities work in liaison with each other at their respective macro and micro levels for water governance. The seventh chapter is based on the rights perspective – the human right to water is discussed here at length. Chapter eight is again a strong plea for community engagement in water governance, as opposed to state control. Chapter nine explores several and nearly all aspects of water use in the context of their legal questions, deconstructing all the problems associated with them.

In the tenth chapter the issue of drinking water still not being made a legal right of citizens and a legal obligation of local authorities is thrashed out.

Chapter eleven brings out a subject not touched by

any other author in this book, that of gender and water – the author here deprecates the complete lack of any gender sensitivity in the water issue, which in fact is a crucial aspect of any woman's daily work. The twelfth chapter is a critique of flood control policies and mechanisms and of the very idea itself. The author also draws attention to the poor state of relief and rehabilitation

after the floods. Chapter thirteen is a discussion on pollution of water and its implications on all fronts, deploring the state of pollution control laws that completely lack teeth. The fourteenth chapter is an incisive critique of environmental decision making in India. They expose the feeble and pathetic environmental clearance regime for hydraulic projects, which almost always get cleared without much ado. The authors give a set of recommendations to strengthen environmental decision making. Chapter fifteen is dedicated to describing the weak and loosely carried out EIAs, and to arguing for a better enforced law for greater EIA efficacy.

Chapter sixteen seeks to draw up a case against large-scale displacement for 'development' projects like big dams, irrigation canals etc. The author analyses the R&R policies in India so far, pointing out their infirmities and concluding that serious improvements are required. The seventeenth chapter covers the issue of groundwater, which is very contentious today over the question of ownership and use. The author suggests that it be made a common property resource like surface water. Chapter eighteen is a comprehensive account of traditional water harvesting systems in south-India used for irrigation, and why they have declined over time. The author stresses the importance of reviving them and advocates that the legal framework should ensure this revival. Chapter

nineteen draws attention to all possible legal reforms required in the water sector. The authors also draw attention to the reforms that have been attempted so far and why they have failed. Chapter twenty also

advocates restructuring by giving examples of reforms undertaken abroad, especially that of California. The author here also speaks from an earth-science perspective, by giving details of the hydraulic cycle.

The final chapter is an attempt to draw all the threads of this book together. This is a rather brave and well executed attempt, given the extensive scope this book

has undertaken. This chapter, written by the editor (a stalwart in the water sector in India, especially regarding its legal questions), is therefore a compendious account of all the debates and major themes that have emerged through all the various chapters. It culls out the major points to be noted from all these themes. The editor also juxtaposes his own views alongside.

The only drawbacks of this edited compendium are the overlaps and repetitions that many edited volumes suffer from, owing to the fact that different authors

sometimes tend to approach the same subject again and again. Nevertheless, this very meticulously researched book extensively covers all or most legal questions relating to water in India today.

Given the fact that water today is one the biggest

challenges before any government, the contemporary relevance of this book is obvious. It is however, not a general read for anyone. The excessive foot-noting, heavy usage of water jargon, scrupulous details of laws and the very subject of this book restricts its audience to only those who have a specific interest in the legalities of water. It is a purely academic reference book that can become a bible for activists, policy-makers, researchers and practitioners of law. Opening this book is literally like opening up Pandora's box as it throws open several debates that otherwise lie hushed up and unaddressed.

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BOOK REVIEW Water, Ecosystems and Society: A confluence of disciplines**The disconnect between the knowledge and the policy**

Book: *Water, Ecosystems and Society: A Confluence of Disciplines*, by Jayanta Bandyopadhyay, Sage Publications, Hardcover, May 2009, 212 pages, Rs. 550

One of the most impressive things about Prof Jayanta Bandyopadhyay's book *Water, Ecosystems and Society: A confluence of disciplines* is its timing. At a time when India is eager jump on to the Integrated Water Resources Management

(IWRM) bandwagon, Prof. Bandyopadhyay calls our attention to the severe disciplinary and knowledge gaps that exist in Indian water management, leaving world's largest irrigation system weak with inefficiency and inequity. Guidelines on the need and scope of 'integration' in the Indian context were sorely needed at this point, with emerging regulatory

authorities assuming that by simply putting in place river basin agencies which follow the same old *business as usual* approach, integration of diverse issues, problems and stakeholders can be attained. As the author asserts in the book, in face of the current global challenge of water resources, there is a need for a paradigm shift in the way we manage our water. The author underlines the need to shift from the traditional 'arithmetical hydrology' approach to the emerging eco hydrology approach, which embraces interdisciplinary knowledge.

With extensive research experience of integrating economics, ecology and social concerns in water management, Prof Bandyopadhyay is perhaps one of the most eligible persons to write on the need of an interdisciplinary approach to water in India. This book is based on a series of three lectures delivered by Prof. Bandyopadhyay entitled 'Knowledge for Water Systems Sustainability: A confluence of natural and social sciences' at the Indian Council for Social Research of the North Eastern Hill University, Shillong.

In the opening, the author makes a strong case for the need of an interdisciplinary approach, which he says "is a prerequisite for facilitating the emergence of the much needed new paradigm for water management in India." According to the author, practices based on the older paradigm are unable to ensure a socially equitable and ecologically sustainable water management; on the other hand, they have been expanding the scope of potential conflicts. In an interesting example, he talks about the basic difference between the policy measures like the Water Framework Directive in the European Union countries, which aims at "good status" of water

bodies, rather than increasing storages, and India's National Water Policy (2002), which still clings to the traditional, supply based, straitjacketed water management approach, epitomized in the Inter Linking of Rivers (ILR) plan.

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One of the most eloquent sections of the book looks at the reasons behind "disconnect between Water Systems Knowledge and Water Resources Development". It concludes that one of the major reasons for this has been our blind adherence to the "reductionist concepts of European engineering", making us non-receptive & wary of concepts like changes in property rights of water, water as a human right, recognition & valuation of ecosystem services, environmental flows, etc.

between Water Systems Knowledge and Water Resources Development in India". He concludes that one of the major reasons for this disconnect has been our blind adherence to the "traditional reductionist concepts of European engineering" which the British left behind in their colonies, making us non-receptive, even wary of emerging concepts like

changes in property rights of water, water as a human right, recognition and valuation of ecosystem services provided by water, environmental flow requirements, etc. This colonial culture reflects itself through attributes like 'obedience to authority', which negates new ideas and constructive criticism. Another reason for the growing disconnect is non availability of data and the secrecy maintained over hydrological data of some basins. One of the most crucial reasons is the absence of 'serious engagement of official policy makers and independent water researchers, which could have led to transfer of useful new knowledge between the two.' This has led to a disconnect between the transformations in conceptual frameworks at the level of independent experts and the actual practices in departmental water governance.

Though this section is very convincing, one of the main reasons for the growing disconnect: alienation of local communities from their natural resources has not been given its due attention.

The next section of the book deals with the analysis of disciplinary gaps which need to be filled in order to respond to the current problems of ecosystem degradation, inequity, natural and manmade disasters, climate change, etc. The themes, spread over natural, social and engineering sciences are:

1. 'Creation of eco hydrological knowledge on the surface water systems', in particular in the meteorology, ecosystems and environmental flow requirements, the author stresses the importance of an ecosystem approach to water management, which includes valuation of ecosystem services, allocation of environmental flow requirements.

2. Generation of eco hydrological knowledge base on groundwater systems to overcome the 'hydro schizophrenia' or the dichotomy in managing surface and groundwater.

3. Comprehensive Assessment of Water related Projects: this theme is further developed in the author's controlled but passionate critique of India's ILR project in which he systematically and coldly refutes each and every assumption underlying the plan.

4. Wider Application of Economics in Water Policy and Governance: Prof. Bandyopadhyay has worked extensively in the field of environmental economics and this can be seen in the way the theme is further developed in 'Valuation of Water and its Policy Implications'. This section provides an excellent starting point for practioners and students who have not been introduced to formal economic or ecological valuation tools. It provides a rapid review of diverse approaches to valuation of ecological and economic services provided by water. The author builds a strong case for 'reducing scarcity value of water rather than scarcity mitigation'. This is especially relevant for drought prone areas of the country.

At the same time, no attention has been given to virtual water trade and the energy-water nexus which are affecting the economics of water.

5. Promotion of an Ecological Perspective of Extreme Events: Rather than the 'relief-based' 'disaster' approach advocated by the government and some donor agencies, the author advocates a more holistic 'Living with floods' approach which looks at the ecological services provided by extreme events. Expanded later under the theme of 'Eco-hydrological perspective on floods', the author traces the historical responses of communities to extreme events. Through 'Anthropogenic factors of floods', the urgent need for interdisciplinary knowledge is highlighted.

Surprisingly, factors like little or no ground water recharge, encroachment on rivers through construction, reclamations, dumping of debris, etc, which were some of the most important factors in Mumbai floods in 2006 find no mention here.

6. Social Dimensions of Water System Use and Local Institutions: Despite being one of the most important dimensions in Indian water management, with its large informal water supply systems, private groundwater ownership, weak institutions, this section has received the least attention and should have been elaborated further.

7. Emerging Technological Options in Water systems Management: again this section is not elaborated further, but quick insight on scope for further research in end-use efficiency, desalinization, reuse of

water has been given. This author feels that more than the end-use efficiency (which, in the form of methods like drip, sprinkler, etc., is either subsidized or the cost borne by the farmer), issue of distribution losses, leaking dams,

unlined, leaking or nonexistent canals, etc., can have larger impact.

8. Global Change and Water Systems in India: Scenarios and Adaptation: Author talks about the research needed in

mitigation and adaptation methods in face of global climate change.

9. Water Laws and entitlements: Conflicts and their resolution: with increasing conflicts over the limited resource, author presses for a home grown approach to conflict resolution in the absence of which, donor suggestions may become the guiding principles.

It is interesting that Ramaswamy Iyer, in his recent book 'Water and Laws in India' has echoed a similar need of an interdisciplinary approach to water issues. All in all, these publications, work of independent water professionals, local communities, even donor agencies, has been converging towards a need for interdisciplinary, integrated, ecological approach to water management. But very little attention has been paid towards the robust and innovative institutional structure that will be needed to operationalise this. Will the recently set-up Water Resource Regulatory Authorities be able to do this? Looking at their straitjacketed structure, limited or no participation from the community and independent experts, a real 'confluence' which the author talks of seems difficult to achieve.

Considering this, one of the major limitations of the book is that it does not attempt to look at the institutional mechanisms that can be used/will be needed to achieve 'the confluence of disciplines'. Maybe that is not the scope of this book, but without a serious consideration of possible institutions/ tools required for integrating the available knowledge and fuel further interdisciplinary research in the field of water management, discussion about integration is incomplete.

Perhaps this is because of the nature of the book which is a compilation of three lectures. Prof. Bandyopadhyay has contributed interesting and innovative thoughts about institutional structures for equitable water management (some of which he has expounded in Water Systems Management in Asia: Need of a Research Framework) and also other research themes like social aspects of water management, response to climate change, etc. which have not been elaborated upon in this book. Academics, students, water practioners and hopefully policymakers will be waiting eagerly for his expansion on these themes. Together with the current book, such a compilation can provide some guidelines for working on IWRM in India.

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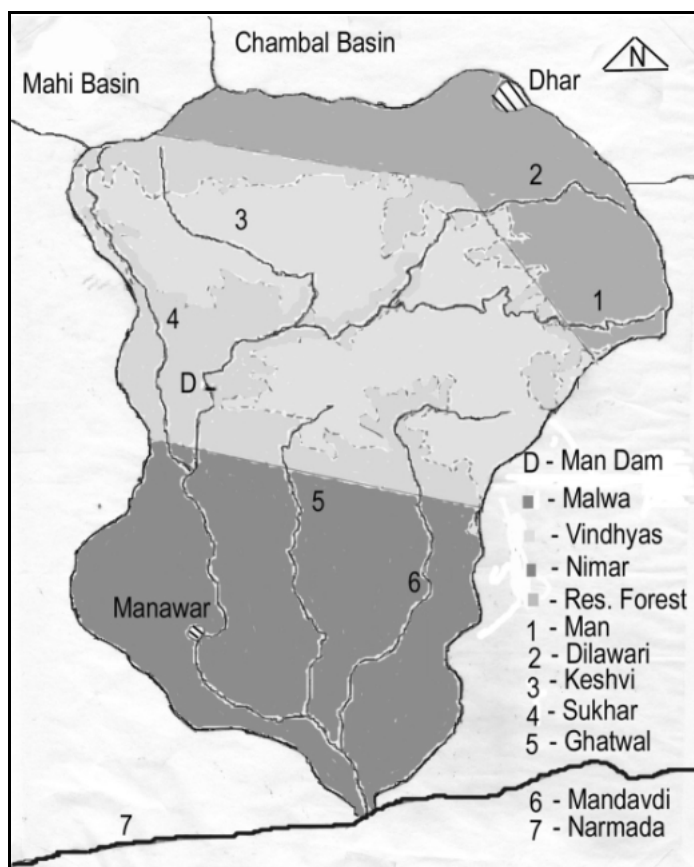
Considering this, one of the major limitations of the book is that it does not attempt to look at the institutional mechanisms that can be used/will be needed to achieve 'the confluence of disciplines'.

Status of Water Availability and Use in Man River Basin

Neither Water nor Governance

Rahul Banerjee (rahulindui@gmail.com)

The western Madhya Pradesh region is a naturally water scarce region due to four characteristics that are peculiar to it: The average annual rainfall is low, around 700 mm with the number of rainy days being around 50. Secondly, the soil is mostly dayey and so infiltration of rain water is low. Moreover such soils tend to get waterlogged if subjected to flood irrigation. Thirdly, the underlying rocks are basaltic and sedimentary having low porosity and permeability and so their capacity to store water in underground aquifers is limited. Lastly, the average evapo-transpiration rate for the area is very high at about 2100 mm and so a considerable amount of the rainfall evaporates immediately. In the dry periods during the monsoons and later the moisture retained in the soil gets evaporated. A large amount of the water stored in surface storages big and small too gets evaporated.



Thus traditionally the agriculturists of this region had adopted practices that made the most use of the soil moisture and conserved the ecosystem to ensure a sustainable output. However, from the decade of the 1970s a more intensive agricultural system was introduced involving the use of hybrid seeds, chemical fertilisers and higher irrigation either through canals from dams or through groundwater extracted with pumps. This has led to a growing shortage of water and the

need for water governance to regulate use. The effects of this new system on the availability and use of water in the basin of the Man River (a tributary of the Namada River) as revealed by a study are described briefly here (abridged from a larger study). The characteristics of the Man River basin which make it ideal for such a study of water governance are: the basin spans the three distinct agro-ecological zones of the Malwa plateau, Vindhya hills and the Nimar plains; there is a serious problem of over extraction of ground water in the basin; there is a large dam in the basin affecting water governance drastically; there is a significant tribal population in the basin; considerable soil and water conservation work has taken place in the basin; and the basin has a considerable reserved forest area which is mostly degraded.

The Man River rises in Lunehra village in a tank called Man Sarovar on the Malwa Plateau and then flows for about 12 kms eastwards before plunging down the hilly escarpment of the Vindhya Range for 35 kms upto the Man dam at Zirabad. Thereafter it flows for a further 44 kms through the Nimar plains to its confluence with the Narmada at Kothra village.

The water availability is more or less related to the rainfall in the area whose trends are given in Table 1 over the period from 1987 to 2006. As is evident in more than half the total number of years the rainfall is below the average values and these are the years when the kharif crop is also under water stress leading to lower yields.

Table 1: Annual Rainfall in the Man Basin

Year	(mm)		
	Dhar	Gan	Man
1987	739	640	602
1988	1099	483	907
1989	783	801	785
1990	1246	1017	1014
1991	596	574	535
1992	540	413	363
1993	969	665	694
1994	1416	1056	1147
1995	822	532	457
1996	1123	954	981
1997	1104	861	763
1998	916	742	709
1999	781	584	632
2000	524	328	385
2001	694	603	585
2002	725	868	619
2003	1091	1017	788
2004	874	590	626
2005	743	543	406
2006	1103	1171	1050
Average	913	738	711

The water use in agriculture in the kharif season in a normal year is well supplied by the rainfall and does not require the application of irrigation.

In years of less than normal rainfall there is little scope for providing protective irrigation and this effectively results in water stress and lower yields. Consequently what is more of a concern from the water governance point of view is the water used for the irrigated crops

in the rabi season. What has been attempted here first is a rough estimation and comparison of the amount of water used in irrigated agriculture in the Man River basin in 1989-90 and 2005-06 which were both years of normal rainfall. The estimation is based on an empirical formula relating the water requirement to crop coefficients, the potential evapo-transpiration in the different growing periods of various crops and irrigation efficiency as given below.

$$Q = 1/I.E. \{ \sum A_i (k_c \sum ET_o) \}, \text{ where}$$

Q = Total water needed for irrigation

I.E. = The Irrigation Efficiency given by the ratio of the water actually evapotranspired by the crop and the total water needed to flood the field. This ratio is assumed to be 60% as a considerable amount of the water is lost to seepage.

A_i = The area under a particular irrigated crop

k_{c_i} = Crop coefficient for the particular crop

ET_o = The daily Evapotranspiration rate for a theoretical crop during the different periods

The ET_o for the region varies from a high of 9 mm per day in October to a low of 5 mm per day in late December when the temperatures are lowest and these are summed up depending on the total life period of the crop from germination to harvesting. The average k_c value for wheat is about 0.8, for cotton it is 0.9 and for gram it is 0.7

The estimation is done by summing the total water use over the areas of cultivation of the different rabi season crops in Table 2.

Table 2: Estimation of Water Demand For Irrigation of Rabi Crops

	1989				2005			
	Area (ha)	k_c	$\sum ET_o$ (mm)	Q (mcm)	Area (ha)	k_c	$\sum ET_o$ (mm)	Q (mcm)
Wheat	43528	0.8	950	551.4	48843	0.8	950	618.7
Cotton	25894	0.9	900	349.6	39475	0.9	900	532.9
Gram	20107	0.7	850	199.4	17134	0.7	850	169.9
Total				1100.4				1321.5

Thus there has been an increase in water demand over the period by 20%. This water demand was being met in

the Malwa region mostly by groundwater and with some lift irrigation from streams in the Vindhya region. In the Nimar region the component of lift irrigation is higher

Thus traditionally the agriculturists of this region had adopted practices that made the most use of the soil moisture and conserved the ecosystem to ensure a sustainable output. However, from the decade of the 1970s a more intensive agricultural system was introduced.

because of the enhanced flow in the Man River downstream of the Man dam due to seepage under the dam and from the canals. This water demand has to be compared with the average annual precipitation on the total geographical area which is about 3000 million

cubic meters. Thus the water demand for irrigation in 2005 was 44% of the total annual precipitation and was mostly met from groundwater. Quantification of ground water recharge as a proportion of the precipitation is a problematic exercise. It is a complex function of meteorological conditions, soil, vegetation, physiographic characteristics and properties of the geologic material within the paths of flow. Soil layering in the unsaturated zone plays an important role in facilitating or restricting downward water movement to the water table. Also, the depth to the water table is important in ground water recharge estimations.

Table 3: Design Characteristics of Man Dam

Particular	Quantity
Total Catchment Area	69000 Ha.
Free Catchment	57680 Ha.
Command Area	15000 Ha., 48 villages
Height of Dam	53 m.
Max.Ht. Level	301 m
Full Reservoir Level	297.65 m
Dead Storage Level	273.0 m
Canal outlet Level	277 m
Full Reservoir Capacity	14503 Ha. m
Utilisable Capacity	12787 Ha.m
Dead Storage	1716 Ha.m
Full Reservoir Area	1094 Ha
Minimum Reservoir Area	283 Ha.
Total Submergence Area	1169 Ha of which - Res. Forest - 5 Ha; Agri. Land - 783 Ha; Waste Land - 381 Ha
Partial submergence villages	17
Number of Affected Households	993
R.B.Canals Flow	4.23 cumecs
L.B.Canals Flow	6.26 cumecs
R.B. Canal Length	11.64 kms
L.B. Canal Length	10.02 kms
R.B. Culturable Command Area	6053 Ha (27 villages)
L.B. Culturable Command Area	8947 Ha (21 villages)

Consequently it is not possible to accurately estimate what is the annual recharge in the Man basin without extensive physical measurements but estimates done in hard rock areas show that it is not more than 11% of the total annual rainfall. Thus, the current level of extraction being four times higher, the groundwater aquifers have become over exploited and the surface storages too are not capable of meeting this demand leading to water stress and lower yields of crops in the Rabi season in

recent years. Moreover, the nitrate levels in phreatic aquifer are also well above the permissible limit of 100 mg/l due to the excessive use of nitrogenous fertilisers.

On the surface water utilisation front the salient features of the Man dam at Jirabad are given in Table 3.

There are a number of points on which the operation of the Man Dam as it stands today can be critiqued.

Inadequate and Poorly Constructed Canal Network

Contrary to the design the Right Bank Canal Network has been developed more than the Left Bank Canal Network. In both cases the main canals, the distributaries and the minors have been built less than the design length. Moreover the construction of the canals is very poor and in many stretches the proper trapezoidal section and dimensions as per the designs have not been adopted, even for the main canal. Moreover, even though it is claimed in the final cost estimates that 18.42 km length of the main canal has been lined this is not the case in reality as only those sections of the main canal that have been constructed above the ground level through earth filling to maintain the level have been lined and this length is far less. In fact the total final cost of lining is a meager Rs 2.7 crores. This together has led to the main canals being unable to take the design flows and consequently the actual flow in the LBC varies between 2 - 3 cumecs and that in the RBC between 3 - 6 cumecs.

Seepage and Water-logging The Water and Power Consultancy Services (WAPCOS) was engaged by the Madhya Pradesh Government to study the problems that might beset the canal network in the form of seepage given the kind of soil through which the canals were to pass and suggest remedies. The WAPCOS report of 1980 assumes the following estimates for losses:

1. Lined System
 - a) Main Canal and Branches - 4 cusecs/million sq. ft.
 - b) Distribution System - 6 cusecs/million sq. ft.
2. Unlined System
 - a) Main Canal and Branches - 15 cusecs/million sq. ft.
 - b) Distribution System - 20 cusecs/million sq. ft.

The costs are then worked out for the canal system for different scenarios of unlined and lined systems. This is done by estimating the area of command for each scenario which goes on increasing as the system is progressively lined. Consequently even though the cost of lining goes up the cost per hectare comes down as the increase in the command area due to lining more than offsets the increased cost of lining as follows:

- | | |
|------------------------------------|--------------|
| 1. Wholly Unlined - | Rs 13,675/Ha |
| 2. Main Canals and Branches Lined- | Rs 12,380/Ha |
| 3. Lining upto 40 Ha blocks | Rs 11,033/Ha |
| 4. Lining upto 8 Ha blocks | Rs 10,607/Ha |

Table 4: Water use in the Man Dam Command

	Name of Village	No. of Farmers Irrigating directly by Canal	No. of Farmers Irrigating by Motor Pumps on Canal	No. of Farmers Irrigating by Siphons on Canal	No. of Farmers with plots Waterlogged by seepage
R B C	Karondia	7	17	29	28
	Chakrud	11	32	49	22
	Bargodra	4	7	16	6
	Awalda	71	38	89	51
	Khar ki	29	65	79	57
	Bhamori	2	15	15	33
	Panwa	83	60	34	63
	Lakhankot	5	27	73	25
	Baria	38	8	16	1
	Julwania	21	4	72	8
	Jaydi	23	19	51	52
	Kalwani	8	1	27	1
	Lunehra	93	8	9	1
	Chikhli	65	6	16	12
	Kustali	73	0	4	10
	Total RBC	533	307	579	370
L B C	Indiav	8	0	26	11
	Chirakhan	8	24	26	16
	Avral	3	0	23	3
	Borlai	25	51	29	47
	Temria	27	76	12	60
	Udiapur	31	0	21	9
	Muhali	30	8	23	54
	Jalkha	9	6	8	12
	Total LBC	141	165	168	212
	Total	674	472	747	582

The Detailed Project Report of the Man Dam goes on to say on the basis of this, "In view of this and the recommendations of the World Bank in their Staff Appraisal Report no. 3260-IN of February, 1981, lining of the whole canals system upto 5 to 8 Ha blocks is proposed in the Man Project."

Contrary to this, as mentioned earlier, only a small part of the main canal

have been lined and so huge seepage losses are taking place. So great are these losses, given the poor construction of the canals, that as soon as the main canals are charged the drainage nullahs begin to flow with seepage water and they continue to do so throughout the irrigation season. This huge amount of water then flows to the tanks that have been constructed in the command area and overflows from them finally reaches the Man River downstream of the dam.

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Naturally the command area has shrunk considerably as there is not enough water flowing in the canals and in the 2007-08 season the "Elan" was for only 5000 Ha or one third of the design command.

The actual irrigation took place in only 2765 Ha in 15 villages by the Right Bank Canal and 2153 Ha in 14

villages by the Left Bank Canal for a total of 4918 Ha. This includes, in addition to the irrigation from water taken from the distributaries through field channels, the irrigation done from the seepage water collected in tanks. The incompleteness of the canal network and the meager flow in the main canal itself, depleted by seepage, has led to the farmers using their own means to lift water from the canals quite audaciously. Moreover, the heavy seepage has also led to water-logging in several farm plots close to the main canals. A survey was conducted in the 2007-08 irrigation season of the ways in which water was being drawn by the farmers and the number of farmers who had been affected by seepage and the data is shown in Table 4.

Thus it is obvious that there are considerable problems with regard to withdrawal of water from the canals what with use by motor pumps and siphons exceeding by 80.8% that being supplied directly. There is also a large number of farmers affected by water-logging due to seepage. The proportion is as high as 30.1%. These farmers have had to either abandon this land or construct drainage channels to divert the seepage water.

At least a thousand hectares or so of land is so affected by seepage and despite several petitions given by the affected people to the administration; no remedial action has been taken.

Not surprisingly there is tremendous competition for canal water towards the lower reaches where the flow becomes very low due to seepages and unauthorised withdrawals are up. Regulatory structures have been broken by the farmers and they draw water at will.

Unsuitability of Command for Flood Irrigation 60.2% of the command area consists of land that is unsuitable

for flood irrigation without extensive land leveling and bunding work and yet the project was sanctioned without any provision in the budget for such land leveling work. In fact in addition to this considerable length of drainage channels also need to be built but this finds only cursory mention and a provision of a paltry Rs 9.42 lakhs in the original DPR of 1982.

However, later this absurdly low provision also has been done away with in the final cost estimate of 2004. This omission has obviously been done to keep down the costs of the project and artificially improve the cost benefit ratio. Costs of afforestation and soil conservation in the catchment have also been ignored and the oustees of the dam have been denied proper rehabilitation. All these economisations have added to the problems of the dam as the silt load has gone up and the oustees have not only remained in the submergence area to

practice drawdown agriculture but have also engaged in agitation and litigation under the banner of the Namada Bachao Andolan.

Thus, here the whole question of the appropriate method by which to ensure the presence of soil moisture in most of the lands in the command area during the Rabi season comes to the fore. Given that the final cost of the project in 2004 was Rs 176.75 crores (as compared to the design cost in 1982 of Rs 35.94 crores) and the additional irrigation achieved is only 4000 Ha (5000 Ha minus the 1000 Ha lost to water-logging), the cost per

hectare of irrigation provided turns out to be a whopping - Rs 4,41,875. This has to be compared with the alternative of the watershed plus approach which can ensure soil moisture for rabi cultivation at a cost of Rs 12,000 per hectare only, apart from social and environmental benefits of communitarian soil and

water conservation work. Even if we double or triple the allocation for watershed development, this option continues to remain attractive in comparison with the canal irrigation.

Thus prima facie it can safely be said that there is neither water nor governance in the Man River basin.

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**CLIMATE CHANGE & WATER SECTOR****Indian Govt report says glaciers are not melting due to climate change**

Jairam Ramesh, India's environment minister, released a controversial report on Nov 9, 2009, saying it would "challenge the conventional wisdom" about melting ice in the mountains. Two years ago, the Intergovernmental Panel on Climate Change (IPCC), the UN agency which evaluates the risk from global warming, warned the glaciers were receding faster than in any other part of the world and could "disappear altogether by 2035 if not sooner". Now Ramesh denied any such risk existed: "There is no conclusive scientific evidence to link global warming with what is happening in the Himalayan glaciers." The minister added although some glaciers are receding they were doing so at a rate that was not "historically alarming".

However, the conclusions of the discussion paper from the Ministry of Environment and Forests of Govt of India, titled *Himalayan Glaciers: A State-of-Art Review of Glacier Studies, Glacier Retreat and Climate Change*, authored by VK Raina, former deputy director General of Geological Survey of India is based on very thin evidence. Firstly, the study is based on GSI observations of just about 20 glaciers (there is different sample size of different observations) out of the total of 9575 glaciers only within Indian Himalayan territory (maximum number of glaciers - 2,053 - exists within J&K state and more than 90% (1,899) of these exist within the Karakoram ranges) and none from the over 46000 glaciers in the Tibet and Hindu Kush Himalayan region. And GSI currently monitors just one glacier. Secondly, the study provides no data as to what has been the trend of the snow fall over these regions, since snowfall is as much a factor that decides if the glaciers advance or retreat as does temperature. The discussion paper in fact notes that snow fall is very important factor in deciding the fate of the glaciers, "Studies have revealed that the major factor for the negative regimen of the glaciers in the Himalayas is the relatively less snow precipitation during the winter than enhanced glacier melting in summer... glacier mass balance has been found to show an inverse-relation with the monsoon precipitation," And yet, it notes, "Hardly any information is available regarding winter precipitation / accumulation."

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**Maharaj K Pandit, Director of the Centre for Inter-disciplinary Studies of Mountain and Hill Environment asserts: "We have found something startling. Some 115-odd plant species in Sikkim's Lachung Valley have shown a significant northward shift of 500 feet to 1000 feet in the past 200 years. This is an indication of how sensitive the Himalayas are."**

**What is a glacier?** A glacier is defined as a large mass of ice formed by compaction and re-crystallisation of snow, moving slowly by creep down slope, due to the stress of its own weight, and surviving from year to year. The flow movement differentiates a glacier from a dead ice body.

The paper accepts, "Glacier Monitoring in the Indian Himalayas started in the early 20th century, when 20 odd glaciers in the Himalayas, located across the Indian Himalayas, from Jammu and Kashmir in north-west to Sikkim in northeast, began to be monitored by the Geological Survey of India (GSI)... The analysis showed that most glaciers were retreating or showing degenerated conditions along the glacier front. The average annual retreat was around 5 m, although a few glaciers were observed to have higher retreat, such as the Pindari glacier in the Central Himalayas which was observed to have an annual retreat of 8-10 m... There was an enhanced focus on glacier snout monitoring in the Himalayas beginning the mid 1950s... This activity was extended - rather intermittently - till the 1970s. The glaciers covered during this period were: Siachen, Mamostang, Kumdan, Machoi in J&K, Barashigri, Sonapanii, Guglu in Himachal Pradesh, Gangotri, Arwa,

Poting, Milam, Pindai, Shankalpa, Kalganga, Bamlas, Safed, Bhilmagwar, Pachu, Burphu in Uttarakhand and Zemu in Sikkim. All these (20) glaciers exhibited continuous retreat as compared to their earlier positions, as well as considerable vertical shrinkage".

The paper notes that there have been some further studies during the last three decades of the 20<sup>th</sup> century, which conclude, "All the glaciers under observation, during the last three decades of 20th century have shown cumulative negative mass balance. Degeneration of the glacier mass has been the highest in Jammu & Kashmir (single glacier, 10 years record), relatively lower in Himachal Pradesh (3 glaciers, 10 years record), even lower in Uttarakhand (one glacier, 10 years record) and the lowest in Sikkim (one glacier, 10 years record), thus clearly showing a dedining trend from north-west to north-east. Irrespective of latitudinal differences, glacier

melt contributes to about 25-30% of the total discharge of glacier ice. Maximum discharge takes place from mid-July to mid-August".

About some specific glaciers, the paper notes, Sonapani glacier has retreated by about 500 m during the last one hundred years. On the other hand, Kangriz glacier has practically not retreated even an inch in the same period.

The 74 km long Siachen glacier is believed to have shown an advance of about 700 m between 1862 and 1909, followed by an equally rapid retreat of around 400 m between 1929 and 1958, and hardly any retreat during the last 50 years. The Gangotri glacier was believed to have once extended down to Jhala - about 47 km down stream of its present position, and this has now been confirmed by carbon dating. Gangotri glacier, which had hitherto been showing a rather rapid retreat, along its glacier front, at an average of around 20 m per year till up to 2000 AD, has since slowed down considerably, and between September 2007 and June 2009 is practically at a standstill. The same is true of the Bhagirathkharak and Zemu glaciers.

However, Raina forgets to mention that the Gangotri glacier has retreated by 2.29 km in 117 years but the highest rate was recorded between 1977 and 97 when it retreated by 92 metres a year.

*Business Standard* recently interviewed Maharaj K Pandit, Director of the Centre for Inter-disciplinary Studies of Mountain and Hill Environment, who also heads the School of Environmental Studies at the University of Delhi. Pandit has been conducting multi-disciplinary research on the changing Himalayan environment.

About Raina's study, Pandit says: "It talks about a decreasing change in glacial retreat from the Western to Eastern Himalayas - higher in Kashmir and the lowest in Sikkim. It is a bit of a contradiction. On the one hand the report says that glaciers closer to sea levels are depleting faster (disregarding the latitudinal aspect), and on the other, it states that Eastern Himalayan glaciers, which are closer to sea level, are better off. This anomaly needs careful deliberation." He asserts: "We have found something startling. Some 115-odd plant species in Sikkim's Lachung Valley have shown a significant northward shift of 500 feet to 1000 feet in the past 200 years. [In other words, the temperatures they

are used to are only available higher in the mountains now, a sure indication of warming.] This is an indication of how sensitive the Himalayas are. In the Alps, the average rate of such a shift is 65-100 feet. What we are witnessing here is colossal change, proof that the Himalayas are more sensitive to climate change." (Indiatgether.com, 251109)

**However, Raina forgets to mention that the Gangotri glacier has retreated by 2.29 km in 117 years but the highest rate was recorded between 1977 and 97 when it retreated by 92 metres a year.**

2035 and perhaps sooner is very high if the Earth keeps warming at the current rate." The Raina paper clearly tries to contradict IPCC conclusions.

However, as reported in *Science* magazine (1311109), "With ice and snowfields covering more than 30,000 square kilometers, the Himalayas are often called the 'third pole' [and 'the water tower of Asia']... Since 1960, almost a fifth of the Indian Himalayas' ice coverage has disappeared," according to Anil V. Kulkarni of the Space Applications Centre in Ahmedabad, who has mapped more than 1000 glaciers using satellite data.

Prof Syed Iqbal Hasnain (TERI), who is conducting studies with monitoring equipment in several glaciers in Himachal Pradesh and Kashmir, believes that Himalayan glaciers will retreat by 43 per cent by 2070 and 75 per cent by the end of this century.

**"It may not be far from truth to state that for the proper management of the Himalayan river system, which has a direct bearing on the National growth, the study of the fluctuation of glaciers, their annual balance, their hydrological behavior and the assessment of the winter snow pack is of great significance. The study attains further importance when it is faced with the ground reality of less annual snow precipitation over the last decade."**

There is no doubt that globally, temperatures are increasing due to climate change. There is also evidence that shows that the temperature increase in Himalayas is significantly higher than the increase in global averages. Under the circumstances, *if other factors remain the same*, the Himalayan glaciers will

retreat. But we have very little data about one of the most important *other factor* that decides the fate of the glaciers, namely snowfall. Our water resources establishment has little data by way of sub basin wise or basin wise snowfall data over the years. Under the circumstances, unless this crucial piece of evidence is factored in, any claim of glaciers retreating due to climate change or not cannot be accepted as credible claim.

There is a third factor affecting the fate of the glaciers that expectedly, the MEF discussion paper and the MEF minister are mostly silent about. The mad rate at which

Indian government is pushing and building large number of hydropower projects and related blasting, mining, deforestation, building of roads, townships, tunnels, drying up the river and so on, all close to the glaciers, is also accelerating the melting and retreating of the glaciers. The minister did not say anything on this, even as this goes against the objectives of the Himalayan Ecosystem Mission under the Government of India's much talked about National Action Plan on Climate Change. The MEF paper does say, however, "The regional and the local geomorphic features have been observed to have as much influence in the glacier snout fluctuations as the climatic parameters." This should make the government more careful about what the hydro projects are doing to the glaciers. The fact that local actions also have impact on climate change is indirectly accepted by the government when the Uttarakhand govt has restricted the tourist flow to the Gangotri Glacier.

Some of the most significant data in the paper about glacier melt is from a satellite based study by the Space Application Centre, Ahmedabad. The data for the Chenab, Parbati and Baspa basins, are given in the table below. It is interesting to note that while the glaciers in all the three basins have experienced area and volume reduction between 1962 and 2001-04, the % volume reduction in all cases is *higher* than % area reduction. Since volume reduction indicates reduction in volume of water held, this study shows that area reduction % does not give full picture of the loss due to glacier melt.

| Basin        | No of Glaciers | Area (sq km) |             |           | Volume (cubic km) |               |             |
|--------------|----------------|--------------|-------------|-----------|-------------------|---------------|-------------|
|              |                | 1962         | 2001-04     | Loss %    | 1962              | 2001-04       | % loss      |
| Chenab       | 359            | 1414         | 1110        | 21        | 157.6             | 105.03        | 33.3        |
| Parbati      | 88             | 488          | 379         | 22        | 58.5              | 43            | 26.5        |
| Baspa        | 19             | 173          | 140         | 19        | 19.1              | 14.7          | 23          |
| <b>Total</b> | <b>466</b>     | <b>2077</b>  | <b>1628</b> | <b>21</b> | <b>235.2</b>      | <b>162.73</b> | <b>30.8</b> |

| Area (sq km) | No in 1962 | Glacier area in km <sup>2</sup> |             | Change (%) |
|--------------|------------|---------------------------------|-------------|------------|
|              |            | 1962                            | 2004        |            |
| <1           | 127        | 68                              | 42          | 38         |
| 1-5          | 159        | 382                             | 269         | 29         |
| 5-10         | 48         | 329                             | 240         | 27         |
| >10          | 25         | 635                             | 559         | 12         |
| <b>Total</b> | <b>359</b> | <b>1414</b>                     | <b>1110</b> | <b>21</b>  |

The second table from the same study regarding disintegrated analysis across various area sizes of glaciers in Chenab basin given above indicates that glaciers in all area sizes have experienced reduction in

area. However, % reduction in area is the highest for the smallest area class and lowest for the highest area class. It is also clear from the table that 80% of the glaciers are smaller than 5 sq km area and only 7% have area larger than 10 sq km.

**The mad rate at which Indian government is pushing and building large number of hydropower projects and related blasting, mining, deforestation, building of roads, townships, tunnels, drying up the river and so on, all close to the glaciers, is also accelerating the melting and retreating of the glaciers. The minister did not say anything on this.**

important, but the paper says nothing about this!

This controversy also reflects how poor is our knowledge base on the state of India's glaciers, on which so many people's water security depends. Some studies show that about 70% of the non monsoon flow of Himalayan glacier fed rivers is contributed by the glacier melt, as measured at the point where these rivers enter the plains. But there is little systematic data in this regard and whatever little data exists, is all state secret! The Economic viability of the hydropower projects also depend on the sustained existence of these glaciers. In fact, the Raina paper accepts, "It was realized (since mid 1970s) that these perennial ice masses mean a huge

reserve of fresh water with a tremendous potential for power production, irrigation & consequently a systematic monitoring was essential for the proper management of these water resources."

There is no doubt that the govt needs to put in efforts to address this huge

knowledge gap and that too in an open, inclusive way. So it is good to note that the Dept of Science and Technology, Government of India, has now initiated action to create an Institute exclusively for research on glaciers in the Himalayas. But there is no need to deny the obvious implication of increasing global and local temperature on glaciers. The ministry need not have come out with a paper on such an important subject, when the paper has not been peer reviewed.

How misguided the paper's conclusions are, can be gauged from this one: "It is therefore unlikely that the snout movement of any glacier can be claimed to be a result of periodic climate variation until many centuries of observations become available." The paper thus tries to imply that we need not worry about the glacier melting or its implications, nor take any action to arrest the melting of glaciers. To suggest this, when there is an *urgent* need to ACT on climate change, is clearly unacceptable.

**SANDRP**



**WATER SECTOR**

**Global actions underway to reclaim public water** On Oct 1, 2009, international water activists launched the fourth annual Blue October campaign. Blue October is a month of global grassroots action to challenge corporate control of water and to protect it as a commons, a shared natural resource.

This past year communities around the world have made significant gains in managing water equitably and sustainably. Water bottlers are on the defensive as public water has been proven in many places to be of better quality. It has been banned outright in one Australian community. At the World Water Forum, 24 countries signed a declaration recognizing the right to water. The state of Vermont passed legislation defining ground water as a public trust and requiring permits for large withdrawals. Blue October highlights examples of how communities take control of their water systems.

October was chosen because on October 31, 2004, the people of Uruguay voted to amend their constitution to recognize a fundamental right to water. The Constitution now guarantees that water be available to all Uruguayans, and it bans for-profit corporations from supplying this public good. This September, additional laws were passed in Uruguay to strengthen commitment to public water. Across the globe, one in 6 people lack access to safe, affordable water, and 2 in 5 lack access to adequate sanitation. The United Nations expects these numbers to dramatically rise--unless actions are taken now. World leaders will meet in Copenhagen in December to discuss climate change. Uncertain water availability & diminished water quality are some of the casualties of climate change, key discussion topics at the upcoming Copenhagen climate talks.

An international grassroots movement has been growing to defend water as a commons, a public good and an inalienable right. Citizens have come together in activists' networks such as Red Vida, Friends of the Earth International, the European Water Network, International Rivers and the African Water Network. To celebrate Blue October, communities around the world are drawing attention to water issues in their communities. Issues range from the big dams, big hydro, encroachment of for-profit companies on public water to citizen participation in water management.

Groups have been working with the U.N. to ensure responsible stewardship of our water commons so that water isn't treated as a commodity to be sold to the highest bidder, but rather that people and nature receive their fair share. But heads of state won't act without big and sustained pressure from the communities and the citizen groups. On Nov 20, 2009 recognised as Universal Children's day, the Global Water Challenge said that everyday, over 300 million children attend schools without safe drinking water or access to a clean toilet. (Press Release Blue Planet Project 01x09)

**DAMS****Shoddy WAPCOS report to BBMB-  
It also involves violations**

An incident in which certain Bhakra Beas Management Board officials bypassed the stipulated regulations by engaging public sector consultancy firm WAPCOS to draft a report on "restoring" the Nangal hydel channel has caught the government authorities concerned off balance. The channel, which delivers water from the Nangal reservoir to the Bhakra mainline canal at Ropar, is part of the canal network that supplies water from Punjab to Haryana and other states.

"We were upset to find the procedure laid down for such an important matter had not been followed," said a senior government official. However, what has further disturbed the officials concerned is that the decision to sign on WAPCOS to draft the report was taken even though there was no apparent need to "restore and rehabilitate" the Nangal hydel channel.

Official sources said a BBMB executive engineer, who was not at all connected with the issue, put up the proposal to engage the PSU. Approval for the proposal was secured from a top BBMB official without seeking prior advice, which is otherwise mandatory, of the financial advisor and chief accounts officer concerned. Later, the draft report submitted by WAPCOS was forwarded to the Bhakra dam chief engineer who informed the BBMB secretary that the technical problems highlighted by WAPCOS in its report were already being taken care of. WAPCOS had not suggested any remedial measures to solve those problems, he further told the secretary.

In fact, finding fault with the WAPCOS report, the chief engineer pointed out certain observations in the draft report had been made without going through the site conditions and facts. He concluded there was no need to engage WAPCOS at all. The official sources said had the chief engineer's observations been noted BBMB would have saved from making the 40 % payment to WAPCOS. State govt officials are now trying to find out who gave instructions to the Bhakra dam executive engineer, who was in no way connected with the matter, to engage WAPCOS' services and why was a meeting of BBMB chief engineers not called before going ahead. (The Tribune 01x09)

This is not the first instance of bungling by the WAPCOS, the agency has been known to indulge in such bungling in the past in many cases of EIA reports (e.g. the EIA of the controversial Athirapally Hydropower project on Chalakudy River in Kerala, where even High court had commented about the inadequacy of the EIA), among others. It is shocking that the govt agency gets away with such bungling, with making the responsible officers accountable for the bungling.

**HYDRO PROJECTS****Some Orders of the Supreme Court in Centre of Environment Law (WWF) Hearing on 11<sup>th</sup> August 2009 (Writ Petition (Civ il) No.337 of 1995)**

**I.A.No.37** It is alleged that the Uttaranchal Jal Vidyut Nigam Ltd. has constructed a power house within the boundary of Askot Wildlife sanctuary. We are told that the National Board for Wildlife has not taken any steps so far in this regard. Learned counsel appearing for the State of Uttaranchal contends that the boundary of the sanctuary has not yet been finally decided. The State shall file a fresh report regarding the determination of the boundary of the sanctuary.

**I.A.No.95** It is alleged that the Jal Vidhyut Nigam Ltd. and the Irrigation Department of the State have set up certain illegal constructions including shops in the Rajaji National Park but the State has not taken any steps in this regard. Learned counsel for the State submits that it had already issued notices to Jal Vidyut Nigam Ltd to remove the unauthorised constructions, including the shops.

**I.A.Nos.114-115** The National Hydro-Electric Power Corpn Ltd seeks to construct Pakal Dul Hydro Electric Project for which 1163.898 ha of land is required, out of which 386.186 ha land is within the Kishtwar National Park area. National Board for Wild Life has examined the same and has filed a report dearing this project subject to certain conditions. Subject to fulfillment of the conditions imposed by N.B.W.L. and on payment of Rs 236 crores for conservation purpose, the project is cleared as regards 386.186 ha. So far as remaining forest land is concerned, the matter is referred to C.E.C.

**I.A.Nos.126-127** The Lanoo Hydro Energies Pvt Ltd seeks permission to divert 17.78 ha of forest land, which is a part of Kedarnath Musk Deer Wildlife Sanctuary, Uttarakhand. The National Board for Wildlife has considered the Project and subject to fulfillment of certain conditions it has recommended that the Project could be deared. The Project is cleared accordingly. The Chief Wildlife Warden to monitor the Project and to see whether all the conditions are complied with and the provisions of the Scheduled Tribes and other Forest Dwellers (Recognition of Rights) Acts, 2006, are also complied with.

**I.A.Nos.128-129** About 180.79 ha forest land earmarked for construction of Adwa-Meja link canal is part of Bansagar Canal Project. The project was cleared subject to fulfillment of certain conditions. One of the conditions is relocation of 10 villages. Now, the State Government submits that villagers are not willing to move out of the villages and it is difficult to comply the directions issued by this Court. The matter is referred to NBWL as to what steps could be taken in this regard. The National Board for Wildlife to file report. (Forest Case Update September 2009)

**Protest against SJVN's Devsari HEP** In a strange move, the police administration of Chamoli has lodged FIRs against 11 protestors, who were peacefully agitating to put across their concerns to the Uttarakhand Pollution Control Board in the Environment Clearance Public hearing of the proposed Devsari HEP on 13 October, 2009. This is a completely unwarranted action on behalf of the State considering that the Public hearing is a forum for expression of disagreements and problems with the project. It is unfortunate that over the years the State Pollution Control Boards in connivance with the companies and Project proponents have ensured that the Public Hearings are orchestrated to favour the construction of the project. Further, the Pollution Control Boards have been downplaying the opinions expressed against the projects.

All efforts are made by companies like the Sutlej Jal Vidhyut Nigam Ltd (a joint venture of Central Govt. and Himachal Pradesh State), which is the project proponent in the case of Devsari, to ensure that the public remains misinformed about the project so that it does not raise the valid questions about the negative environmental and socio-economic impacts of Hydropower plants. The SJVNL has a history of doing this in neighbouring Himachal Pradesh. In the Rampur hydropower project the SJVNL has blatantly violated environmental norms dumping muck from the tunnels on the river bed and in front of people's homes.

Instead of repressing peaceful agitations against these projects by communities and activists, the government should attempt to review, with the participation of civil society groups, its Hydropower Policy and the impacts it is having on the Himalayan ecosystems and the livelihoods of the mountain people. The FIRs filed against members of Deval Sangharsh Samiti, Matu Sangathan and others have been strongly condemned. (Letter to Uttarakhand Chief Minister, October 2009)

**Allotment of Reoli Dugli HEP cancelled** In the dock for awarding the 268 MW Reoli Dugli hydroelectric project to the fourth highest bidder L&T, the government has decided to cancel the allotment and re-advertise the project. The project was allotted to the company after the highest bidder Moser Baer, which had quoted 14.4 per cent additional free power, backed out and the second highest bidder, Jindal Steel and Power Limited (12.9 per cent), refused to confirm the bid. Eyebrows were raised as L&T agreed to match the second highest bid instead of the first highest. The difference of additional free power quoted between the highest and the second highest was a significant 1.51 per cent.

Moser Baer has not been the only successful bidder to back out, it is the same story with most of the other projects in the tribal Lahaul-Spiti and the highest bidders have not come forward to deposit the upfront premium of Rs 20 lakh per MW to confirm the bid, despite repeated extensions. Fresh tenders are proposed to be invited for

10 projects. Besides Reoli Dugli and 960 MW Jhangi-Thopan-Powari, the allotment of which to the Brakel Corporation was cancelled by the high court, seven other major projects — Dugar (236 MW), Kilhi Bahl (7.5 MW), Mane Nadang (70 MW), Lara (60 MW), Tingret (81 MW), Kuling Lara (40 MW) and Suil (13 MW) — will be re-advertised. The 6.6 MW Khauli-II project is also proposed to be offered to the private sector as the state electricity board, which executed the Khauli-I project, is not very keen on what is considered an economically unattractive project. (Tribune 281109)

Fresh bids will be invited in accordance with the latest power policy. While the government maintains that the economic slowdown had dissuaded investors, unviable projects and the uncertainty over transmission network, without which power could not be evacuated from the landlocked area, are also major factors holding the companies back.

### HYDRO PROJECTS: NORTH EAST INDIA

**CEA goes beyond its mandate: indulges in environment issues on Sikkim HEPs** In a very strange and shocking move, the Central Electricity Authority, endorsing the petition filed, earlier, by the Government of Sikkim has now requested the Ministry of Power to impress upon the Ministry of Environment and Forests to annul its previous decision to do away with development of six upcoming hydroelectric projects in the area above Chungthang in the North Sikkim. (Energy Line India 211009) This is indeed shocking, since, neither the CEA, nor the Ministry of Power have any expertise on environment issues and they should not be allowed to indulge in the decisions taken by the MEF based on environment considerations, and on the only river basin wide carrying capacity study having been undertaken in India so far.

**People Oppose Lower Demwe HEP** People of Arunachal Pradesh and environment activists have urged the Union Minister for Environment and Forests to reject clearance to the 1,750 MW Demwe Lower Hydel Project in Arunachal Pradesh on the Lohit river, arguing that it would seriously affect the Parshuram Kund, a site of Hindu pilgrimage, besides the highly inadequate EIA and the compromised decision making by the Expert Appraisal Committee earlier headed by Mr P Abraham. In a letter to the Union Minister on Oct 19, people said that the proposed power house of this mega project is just 150 -200 metres upstream of Parshuram Kund (dam axis is 800 metre upstream) and as such heavy blasting of the hills will take place in such close proximity of this sacred site. The 'diversion tunnel' of the project will be excavated in the mountains on the right bank of the river and will in fact only release waters downstream of Parshuram Kund. The project authorities have proposed another tunnel on the left bank to release waters into Parshuram Kund as a supposed compensatory measure. This tunnel will be 950 metres long (6 metres in diameter) and will release waters at a distance of 754

metres downstream of the dam axis. This is barely 6 metres upstream of Parshuram Kund and as such heavy blasting and excavation for this tunnel will take place in close proximity of this sacred site.

Lakhs of devotees throng Parashuram Kunda every winter around mid-January to take a holy dip at the river which is supposed to cleanse sins. According to the Hindu mythology, Parashuram, the sixth incarnation of Lord Vishnu, took a dip in Lohit River centuries ago to wash his hands of the axe with which he had killed his mother. This sin-cleansing spot is now known as Parashuram Kund in Lohit River which along with other two major rivers Siang and Dibang and numerous other tributaries forms the mighty Brahmaputra River.

The project is also going ahead without proper downstream impact study. The decision of the MEF's Expert Appraisal Committee earlier to give clearance to the Terms of Reference of the Environment Impact Assessment and preconstruction clearance of the project is tainted. This is because these decisions were taken when Mr P Abraham was the chairman of the EAC and he was also a board member of the Power Trading Corporation, which has invested in the Athena Power company, to whom the project has been allotted for development.

As has been seen in the 2,000 MW Lower Subansiri Project coming up on the Assam-Arunachal Pradesh border, the coffer dams get washed away in the monsoons leading to heavy sedimentation in the downstream areas. In the Demwe Lower Project the washing away of the coffer dams will mean that the muck and debris will directly impact this sacred site just downstream of the coffer dams. The sacredness of the site requires that the ecological integrity of the river system is maintained. But the dam will be destroying this ecological integrity which cannot be maintained simply by dropping water into the river through a tunnel. After power generation starts, the waters from the tail race tunnel will be released just upstream of Kund. But there will be huge fluctuation from the river flow regimes after the commissioning. This will drastically affect the natural flow regimes and the ecology of the area. It is indeed surprising that the Expert Appraisal Committee on River Valley and Hydroelectric Projects of the Ministry of Environment and Forests granted pre-construction clearance to this project directly affecting Parshuram Kund, said the letter. (Assam Tribune 231009, The Tribune 261009)

**Defying experts, NHPC fumbles on Subansiri HEP** The NHPC failed to give any satisfactory reply when the Assam Legislative Assembly Committee asked it as to why it had not stopped work of the 2000 MW Subansiri Lower Project even as the expert committee comprising representatives of Guwahati University, IIT-Guwahati and Dibrugarh University asked it to stop work till the expert committee submitted its report on the likely

downstream effects of the project. The apprehension of adverse downstream effects of the Subansiri Lower Project at Gerukamukh in Lakhimpur was raised many a time by the Jonai MLA in the State Assembly session with active support from the Opposition parties. The State Government then formed a House committee headed by Congress MLA Member Gogoi to assess the downstream effects of big dams. An expert committee comprising representatives of Guwahati University, Dibrugarh University and IIT-Guwahati was also formed to assess the downstream effects of big dams in Arunachal Pradesh. In its preliminary report, the expert committee had said that till it submitted its final report, the work of the Subansiri Lower Project should be put on hold, but NHPC went ahead with its works.

At its meeting with the Assembly committee at Dispur on Oct 22, NHPC tried to impress it that the project would not have any downstream effects in Assam. The Assembly committee wanted to know from NHPC as to why it had not stopped work of the Subansiri Lower Project. The NHPC team was confused and failed to give any satisfactory reply. Since its formation, the Assembly committee has interacted with the Power, Irrigation and Water Resources departments of the State and the expert committee. Besides House committee chairman Member Gogoi, the meeting was attended by MLAs Ananta Deka, Giiindra Kumar Baruah, Manoranjan Das, Abdul Khaleque, Binanda Saikia, Rajib Lochan Pegu, Dhruvad Borgohain, Mission Ranjan Das and Pranab Kalita. (Assam Tribune 231 009)

**Dam tragedy in Meghalaya** A departmental enquiry has been ordered into the tragedy triggered by flood at the under-construction 84 MW Myntdu-Leshka hydro-electric project in Meghalaya that has left at least seven workers dead and nine others missing. "The enquiry team headed by Meghalaya State Electricity Board member (hydro) M Bora will look into all aspects of the incident," additional chief secretary and MeSEB chairman WMS Pariat said. He said the panel would investigate the circumstances that led to the tragedy and its possible implications. So far, seven bodies were recovered from the dam site that was hit by flood on Oct 8 evening while nine other workers are still untraced. The landslides near the Rs 900-crore project in Jaintia Hills district triggered the accident. (PTI 131009)

**Greenko buys 96 MW Sikkim hydro** Energy producer Greenko Group said it agreed to buy a license for a 96 MW hydro project in Sikkim. The project will cost \$ 226 million, (up from \$154 million estimated at the end of Sept '09) to build, take four years to complete said Chief Executive Anil Chalamalasetty. "The project is in an advanced stage of development with necessary permits in place and land acquired in a region of proven hydrological data". Greenko expects to obtain debt to fund 70 percent of the Sikkim project cost in 3-6 months. It said it is in advanced stages of negotiation over similar assets. The company also announced that pretax profit

for the year to end March rose to 3.2 million euros from 2.8 million euros the year earlier as sales climbed 6 percent. Greenko, founded in 2006 to develop, own and operate projects in Asia, said it secured production capacity of 255.5 MW at the year end and aims to increase that to 1,000 MW by 2014 (changed to April 2015 in Oct '09). It also provides services to projects which capitalize on the compliance market around the Clean Development Mechanism of the Kyoto Protocol, as well as voluntary trading. (Reuters 280909, 23x09)

## POWER SECTOR

**Chhattisgarh UMPP needs new dam** The proposed 4000 MW Ultra Mega Thermal Power Project at Akaltara in Chhattisgarh has hit a road block as it needs a fresh water reservoir. (Mint 290909)

## RIVERS

**Brahmaputra's journey & controversy** The Brahmaputra River originates in the Kailash range of the Himalayas, south of Rake Kanggyen Tso (Gun Kyud) lake in south-west Tibet at an elevation of 5,300 metres, travels through the Tibetan Autonomous Region of China, passes through the Indian states of Arunachal Pradesh and Assam, before cutting across the length of Bangladesh to meet the Ganges, and finally plunges into the Bay of Bengal. It travels 1,625 km in the west-to-east direction (in China), 918 km east-to-west in India and then 363 km north-to-south in Bangladesh, making it one of the few rivers on earth to flow in such contrasting directions. In India, it has 105 tributaries, about 25 in Tibet, some of which are much bigger than most of the other Indian rivers, except perhaps the Ganges.

**Strategic importance** The sixth largest river in terms of water resources, it also stands second for its annual suspended sediment load at 1,128 tonnes per sq km per annum. The Brahmaputra also has one of the largest catchment areas in the world —about 5,80,000 sq km, of which about 2,93,000 sq km are in Tibet (China), about 1,95,000 sq km in India, about 45,000 sq km in Bhutan, and 47,000 sq km in Bangladesh. There are 612 glaciers in the Brahmaputra basin in India, 450 in the Teesta basin of Sikkim & 162 in Kameng basin in Arunachal.

**The River and Assam** Floods in the post-Independence era alone has caused damage worth more than Rs 5,000 crore while over 4 lakh hectares of land has been lost due to river-bank erosion in Assam. The main course of the river in the Assam Valley and Bangladesh are increasingly becoming important as waterways.

**Expert committees** A series of expert committees have been set up in the past 100 years to find ways to tame the river and to keep it under control. The Flood Enquiry Committee of 1929 was the first such committee, and it suggested dredging of the river bed to keep the river flowing. There have been at least a dozen other committees, including three US expert teams, which worked on various aspects of taming the Brahmaputra. (Indian Express 261009)

**AGRICULTURE**

Continued from p 1

Punjab govt has already set the target of wheat production at 14.66 MT, down from 15.73 MT last year (Financial Express 29x09). Even this 7% lower target seems difficult to achieve, considering the reservoir storage position in Indus basin. Similarly it is doubtful if Haryana will be able to realize its target of 11.46 MT.

Most significantly, it may be noted that the agriculture will also face implications of a high base this year since the foodgrains production last year at 233.88 MT was highest ever. Here the experience of previous years when country faced huge monsoon rainfall deficit could provide some guidance. The previous four such years of high monsoon deficits in last 40 years, along with the decline in agriculture production experienced in respective years is given in the table here.

| Year    | Monsoon rainfall deficit | Decline in Agriculture growth rate |
|---------|--------------------------|------------------------------------|
| 1972-73 | 24%                      | 4.6%                               |
| 1979-80 | 19%                      | 12.2%                              |
| 1987-88 | 19%                      | 0.8%                               |
| 2002-03 | 19%                      | 5.9%                               |
| 2008-09 | 22.7%                    | >6%?                               |

(The Hindustan Times 241009)

If we look at the above table, we see that the only year when high deficit has not led to high negative agriculture growth rate was 1987-88 (foodgrains production in this year fell by 2.1%), but this was possibly because of the low base effect, since agriculture production in 1986-87 had declined by 3.7% (foodgrains production declined by 4.7%), the agriculture production in 1985-86 grew by low 2.5% (foodgrains production grew by 3.4%) and the agriculture production in 1984-85 was also negative at 1.2% (foodgrains production fell by huge 4.5%). (<http://indiabudget.nic.in/es1990-91/1%20The%20Economic%20Situation%20in%201990-91.pdf>) Thus it is clear that low decline in Agricultural Production in 1987-88, in spite of 19% monsoon deficit was because the three previous years were also drought years.

Similarly the 1972-73 (foodgrains production fell by 7.4%) decline of 4.6% in agriculture production in the above table is deceptive, since the previous year of 1971-72 also faced a decline in agriculture production by 1.7% and decline in food production by 3.4%. (<http://indiabudget.nic.in/es1972-73/2%20The%20Agrarian%20Scene.pdf>)

When this author raised this issue with Planning Commission member Prof Abhijit Sen, he agreed that the deficit will be higher than 2% estimated by the PM's Economic advisory committee, but he declined to hazard a guess what would be the likely deficit. He said that the assumption that Bihar and Eastern UP will produce more wheat in current Rabi is unlikely to be correct.

It is clear from the above analysis that if the past experience is any guide, the agriculture production in

current fiscal is likely to fall by at least 6%, if not over 12% as in 1978-79. The foodgrains production in current fiscal is likely to fall by at least 10%, if not more. It may be better to be realistic in our estimates and prepare for the implications there of, than give unrealistic positive spin to these figures, as is the habit of many today.

**Himanshu Thakkar, SANDRP**

**Opposition to Bt Brinjal grows** Besides large number of farmers and civil society groups, now state governments have also decided to oppose the Bt Brinjal cultivation. Madhya Pradesh has now joined Kerala, Orissa and Chhattisgarh in saying no to Bt Brinjal. State agriculture minister said that it is "the latest version of East India Company type colonization of the country". (The Hindu 28x09)

**FAO And World Bank Back Food Pirates** The UN's Food and Agriculture Organisation has taken a U-turn in its clear position on the race by food-importing countries and private companies to buy land overseas for domestic food and agriculture needs. Terming this land grab as 'neo-colonial' system, the FAO chief Jacques Diouf had earlier said: The risk is of creating a neo-colonial pact for the provision of non-value-added raw materials in the producing countries and unacceptable work conditions for agricultural workers. But just prior to the Food Summit in Mid November '09 in Rome and ostensibly to please the investors as well as the food importing countries, the FAO has gone in for a complete turnaround, seeking now a voluntary code of conduct.

Jacques Diouf's that stand was however diametrically opposite to that of the International Food Policy Research Institute (IFPRI) in Washington DC, a think-tank that always thinks in favour of the agribusiness industry. Joachim von Braun, IFPRI Director General said importing nations realised that dependence on the international market made them vulnerable – not only to surging prices but, crucially, also to an interruption in supplies. "They want to secure the supply lines of food," he had said. IFPRI therefore had called for a code of conduct for the investing companies and countries.

In my opinion, these companies and food importing countries are no better than food pirates. They are literally snatching food from the hands of the hungry populations in the countries that are leasing or outrightly selling their limited land resources to foreign investors. I increasingly find the line that separates the World Bank/MNCs and the UN/FAO has now blurred considerably.

The United Nations has started drawing up a code of conduct to regulate overseas investment in farmland, but the voluntary rules will not be ready for at least a year. The code is the first attempt to control the growing trend of so-called "farmland grab" deals, which involve rich countries such as Saudi Arabia and South Korea investing in overseas farming to boost their own food security. (Devinder Sharma in Counter currents.org, 191109)

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**THE WORLD HYDRO**


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## Water interests argue for new dams in California

Thirty years ago, a chunk of chain, an eyebolt & Mark Dubois helped end the era of big dam building in California. Dubois, a bearded, 6-foot-8, 30-year-old river guide from Sacramento, chained himself to a rocky outcropping on the north bank of the Stanislaus River and stayed there for a week, determined to prevent the U.S. Army Corps of Engineers from filling the canyons behind New Melones Dam and submerging the limestone caves and verdant meadows of the river valley. Dubois lost that fight: New Melones had been approved in the 1940s and was well under way when he and the nascent Friends of the River got involved. But he and hundreds of others who celebrate the 30th anniversary of the Stanislaus Campaign next month believe their work is echoing through a new generation as another dam debate emerges in California.

"We didn't win 30 years ago, but the world has changed," Dubois said in a telephone interview from his home on Bainbridge Island in Washington state. "Even though (Gov. Arnold Schwarzenegger) is pushing these dams, people know they don't make sense." As California grapples with an aging water-delivery network, growing population, worsening water quality, a drought and the potentially far-reaching effects of global climate change, dams are again on the table. Last month Schwarzenegger insisted he would not sign off on any major overhaul of the water system without money for new dams and reservoirs. The governor has the support of conservatives and the vast Central Valley, where many farmers are convinced that new, man-made lakes will help offset dry spells and ease the federal rulings that have cut water pumped through the ailing Sacramento-San Joaquin River Delta.

**A costly option** But environmentalists and their liberal backers contend dams are a costly, ecologically dicey option set against the backdrop of California's unprecedented budget cuts and alarms over the decline of fisheries, waterways and water quality. By most accounts, New Melones was not the boon promised. When federal engineers studied the project, they wrongly estimated the water supply and demand. As a result, for years much of the water has gone to flush out the delta and to fulfill contracts in Stockton and elsewhere; little went to local water suppliers. "It wasn't surprising to us at all," said Steve Evans, conservation director at Friends of the River. "New Melones was a project looking for a purpose."

**Memories die hard** The several dams under consideration do not have quite the same scenic or recreational pull as the Stanislaus River. But memories of landscapes lost behind dams die hard. River advocates point to the flooding of picturesque Hetch Hetchy Valley for San Francisco's water interests and Friant Dam's catastrophic effect on salmon in the San

Joaquin River. Dams "make sense if you don't care about taking care of the natural world," according to Ronald Stork, senior policy advocate for Friends of the River. These days, however, the debate has shifted to the economics of dam building.

California already has upward of 1,000 dams that provide water supply, flood control and hydropower - built on the most productive and accessible sites, experts say. Each time another dam is added to a river, billions are spent and the water supplied is minimal. "We have to look further than this reflexive, historical impulse that says building dams will solve all our problems," said Assemblyman Jared Huffman, D-San Rafael. "It's not true. Water recycling, conservation, efficiency... dwarf the amount of water we could get through any (reservoirs) we build."

**Reasonable compromise** Conservatives however, think they've forged a reasonable compromise that, though expensive, will add an important tool for managing the state's water system. "The magnitude of the problem is so enormous that we can't afford to say no to one solution," said Chris Scheuring, environmental attorney for the California Farm Bureau.

Scheuring's group and others stand behind three big projects they argue would not inflict the environmental harm of past dams: The expansion of Los Vaqueros Reservoir in Contra Costa County, the Temperance Flat dam on the San Joaquin River above Friant Dam, and Sites Reservoir, which would flood the Antelope Valley in Colusa County. The \$3.8 billion Sites proposal, in particular, marks a departure from the norm because it is an off-stream reservoir that does not obstruct a river. Through canals connected to the Sacramento River, the Department of Water Resources says, water would be pumped into the lake where it would be used to supplement flows into the delta or allow deeper, colder reservoirs to hold back water for critical salmon runs.

Reservoir supporters say Sites presents the best of all worlds. And they seem determined to ensure that Sites and similar projects make it into any water legislation package. "We're not going to approve another water bond package for billions that haven't improved water reliability," said state Sen. Dave Cogdill, R-Modesto. "These are not high dams on wild and scenic rivers. We're talking about a very responsible approach."

**Not worth it?** Peter Gleick, president of Oakland's Pacific Institute, acknowledges that Sites or Temperance Flat could add a certain amount of flexibility to the system. But that slight improvement simply isn't worth the economic, environmental and political cost. "Many of dams we built in the last century brought us great benefit," Gleick said. "But I think the era of new dams is over in California." (The San Francisco Chronicle 290909)

## Philippines: Death, disaster blamed on dams

The unannounced release of water from dams at the height of tropical storm *Ondoy* may have caused the massive flooding that killed close to 300 people in Metro Manila and nearby provinces, according to some survivors, analysts and non government organisations.

"I think that what happened was not an act of God. I believe it was man-made and nothing else", said PO3 Rommel Habig, a senior investigator at the Malabon City police station and resident of flood-prone Barangay Tonsuya in Malabon. The men behind the release of water in the dams in Bulacan should take responsibility for what happened to us, he said.

The Angat Dam in Bulacan released water on Sept 26, '09 but authorities denied that it was the cause of the massive flooding. Habig's house was completely submerged in muddy floodwaters for two days over the weekend. He said that had the dam operators been more sensitive and responsible, the deaths and destruction would have been negligible.

There would have been enough time for the people to do what was necessary, if only they made an announcement earlier that the spillways would be opened, he said. There was still electricity then. There were news flashes on TV and they could have disseminated the information over radio, Habig said. They issued an advisory only after the flashflood, he said. Habig's neighbors said his allegation may have basis.

**Easing pressure** Meanwhile, for the second time in three days, Angat Dam in Norzagaray, Bulacan released water on Sept 28, '09 as threats of another tropical storm loom. Russel Rigor of the flood forecasting division of the National Power Corp., which manages the Angat Dam, said they would have to lower the dam's water elevation to 210 meters to accommodate more rainfall from typhoon *Pepeng*.

Rodolfo German, general manager of the Angat Hydro Electric Power Plant of Napocor, said the dam can hold water up to 216 meters. German also clarified that water release from Angat Dam would only affect towns along the 50-kilometer Angat River.

In the nearby Ipo Dam, water elevation reached 100.75 meters, or slightly above the spilling level of 100 meters. A large volume of water in Ipo Dam usually comes from the Angat Dam. The Pantabangan Dam in Nueva Ecija also opened its gates after its water level neared the spillway level of 221 meters. Living Jones Gacutan, officer-in-charge of the National Irrigation Authority's dam safety and flood forecasting group, said the dam's reservoir reached 219.83 meters, the highest recorded since 1978. The World Bank-funded Pantabangan Dam was constructed in 1975.

Meanwhile, the Cordillera Peoples Alliance (CPA) reiterated its position for the decommissioning of the San Roque Dam during the public hearing conducted by the Senate Committee on Climate Change, on the devastating effects of Typhoon *Pepeng* held in San Manuel, Pangasinan on November 25, 2009. The public hearing aimed to set directions for effective disaster risk reduction and climate change adaptation measures and strategies at all levels. It investigated the San Roque dam operations and the water releases of major dams, which contributed to the massive flooding in the province and other provinces in Central Luzon at the height of Typhoon *Pepeng*.

According to Jill Cariño, CPA Vice Chairperson for External Affairs, "The sedimentation upstream of the Agno River continues to fill the reservoir resulting in the decreased capacity of the San Roque Dam reservoir to hold water. Thus, water releases by San Roque Power Corporation (SRPC) are bound to happen as rainfall due to typhoons increases with the worsening of climate change. This is a serious concern of the indigenous peoples in Itogon Benguet, who are affected by the rising siltation along the Agno River upstream of the dam, as well as of the downstream communities in Pangasinan who are greatly affected by flooding as experienced during Typhoon *Pepeng*." CPA was invited as one of the resource persons for the public hearing. (The Philippine Star 011009, CPA PR 261109)

**Australian dam project shelved to save fish, turtles** Australia on Nov 11, 2009 rejected plans to build a massive new dam, despite pleas it is needed to provide water to residents, because of its feared impact on endangered fish and turtles. Environment Minister Peter Garrett said the 1.8 billion dollar (1.7 billion US) Traveston Crossing Dam, in Queensland state, would have had an irreversible impact on Australian Lungfish, the Mary River Turtle and Mary River Cod. "It is clear to me that the Traveston Dam cannot go ahead without unacceptable impacts on matters of national environmental significance," Garrett told reporters. "The area that would be flooded by this proposal is a critical habitat for populations of these species." The state government had pushed for the dam, with Premier Anna Bligh saying it was "absolutely critical" for the future of southeast Queensland. (AFP 111109)

**Victims of Hurricane Katrina win compensation** The US government faces billions of dollars in compensation claims from victims of Hurricane Katrina after a federal judge found that negligence on the part of the Army Corps of Engineers was directly responsible for some of the most extreme flooding. Judge Stanwood Duval ruled that the corps, which was responsible for maintaining the waterways and levees that protected New Orleans from flooding had known of the threat to areas of the city and yet had failed to act in time. (Guardian 191109)

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The Hindu, March 2, 2009

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