

**Lead Piece**



## TERI Jury recommends withdrawal of award to NHPC

We have learnt from reliable sources that the jury of The Energy Resources Institute (TERI) has decided to ask TERI to write to the NHPC Limited to return the award for environment excellence that was given to NHPC. It may be recalled that on June 5, 2009, in a well publicized event, no less a person than the President of India conferred the TERI awards to various winners for environment excellence and corporate social responsibility. In presence of India's Environment Minister Jairam Ramesh, the Jury of the awards headed by former Chief Justice of India J S Verma and TERI director Dr Rajendra Pachauri, NHPC received the first prize for category III (companies with annual turnover above Rs 1000 crores). The award was supposed to be given for the "NHPC's case study entitled *Post Construction Environmental and Social Impact Assessment Study of 480 MW Uri Power Station in Jammu and Kashmir*."

However, after detailed study, a group of persons (see for details page 13-14 of the June-August 2009 issue of *Dams, Rivers & People*) wrote a letter on August 17, 2009 to Jury panel, saying that NHPC does not deserve this award in view of its poor performance in case of URI project and also in view of its shockingly poor track record on social and environmental issues.

Subsequent to our letter (SANDRP was one of the signatories), the jury panel met and examined the response from TERI and from NHPC to the issues raised in the letter. The Jury panel decided that the decision to give the award to NHPC was wrong. The Jury panel has asked TERI to write a letter to NHPC informing NHPC of the decision of the Jury panel and reasons thereof. The main reason given for the withdrawal is suppression of relevant details / facts of significant consequence, we learn from our sources.

Unfortunately TERI has not yet (till Sept 22, 2009, as we finalise this issue of *Dams, Rivers & People*) responded to our letter (dated Aug 17, 2009) to them, accept acknowledging (on Aug 21, 2009) receipt of the letter and promising detailed examination. We again wrote to the concerned TERI persons on Sept 18, 2009, requesting response to our letter, but that letter too is yet to be responded.

We are glad that better sense prevailed and jury took the right decision. It requires a lot of courage to accept the error, particularly when the issue is of such vital public

interest and involves such dignitaries. Hence the jury, led by Chairman J S Verma (former Chief Justice of Supreme Court of India and former Chairperson of the National Human Rights Commission) needs to be congratulated for the bold and right decision.

At the same time, we see that not only NHPC has provided misleading picture to claim the award, but it is guilty of bringing disrepute to the jury panel and the award. Since the President of India conferred this award, NHPC is also guilty of dragging that high office into controversy. NHPC had liberally used the photos and caption of the award during the issue of its Initial Public Offering in early Aug, 2009, which was also patently wrong.

Similarly, TERI is also guilty of not doing adequate due diligence before taking the questionable decision. In fact the TERI case study of NHPC put up on its website shows how shoddy work TERI did even in understanding the timing, relevance and details of the various claims made by NHPC and TERI staff seems to have unquestionably accepted all the claims of NHPC. There is also the issue of conflict of interest, since TERI has received over Rs 1 crore of funding from NHPC in recent years. This conflict of interest is not relevant to the independent jury members, but it is certainly relevant in the context of the TERI persons sitting on Jury Panel and also the TERI persons doing due diligence. We hope all concerned learn the right lessons from this episode. However, as we write this, TERI has not yet removed NHPC's name from the list of award winners on its website.

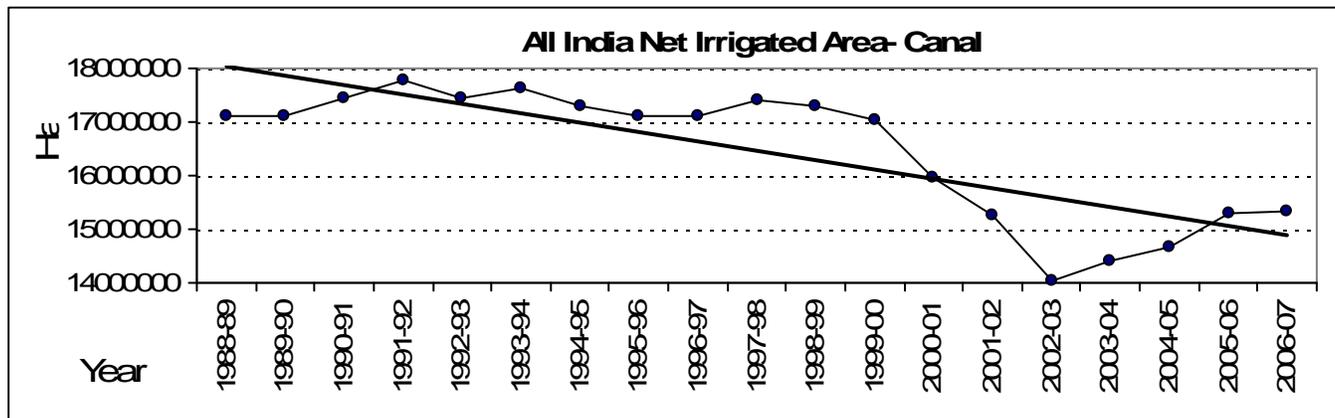
**SANDRP**

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**Shocking story of performance of large irrigation projects****No addition to Canal Irrigated areas for 15 years**

In fifteen years from 1991-92 to 2006-07 (the latest year for which figures are available), there is been absolutely no addition to net irrigated areas by canals from Major and Medium Irrigation Projects as per official data from the Union Ministry of Agriculture, based on actual field data from states. From April 1991 to March 2007, the country has spent over Rs 130 000 crores on Major and Medium Irrigation Projects with the objective of increasing canal irrigated areas.



Two years back (see cover story in Sept-Oct '07 issue of *Dams, Rivers & People*: [http://www.sandrp.in/drp/Sept\\_Oct2007.pdf](http://www.sandrp.in/drp/Sept_Oct2007.pdf)) we showed that this was the story for twelve years ending in March '04. Since then we have received information (under the Right to Information Act, also available on the official website: [http://www.dacnet.nic.in/eands/LUS\\_1999\\_2004.htm](http://www.dacnet.nic.in/eands/LUS_1999_2004.htm), the URL is correct) from the Union Ministry of Agriculture, which shows that the trend essentially remains the same, as can be seen from the graph above. The official data shows that this whole expenditure of over Rs 130 000 crore has not led to addition of a single ha in the net irrigated area by canals in the country for the whole of this fifteen year period. In fact the areas irrigated by such projects have reduced by a massive 2.44 million ha during this period.

This should be cause of some very serious concerns and the Ministry of Water Resources (MWR), the states and the Planning Commission will have to answer some difficult questions. But the MWR, Planning Commission and all the other official agencies have not realized the folly of continued investment of majority of our water resources investments for the big irrigation projects. About two thirds of all five year plan budget under water resources development continues to be used for M&M irrigation projects, including during the ongoing eleventh five year plan.

**Net Irrigated Area by source, All India, 1990-2006 (Ha)**

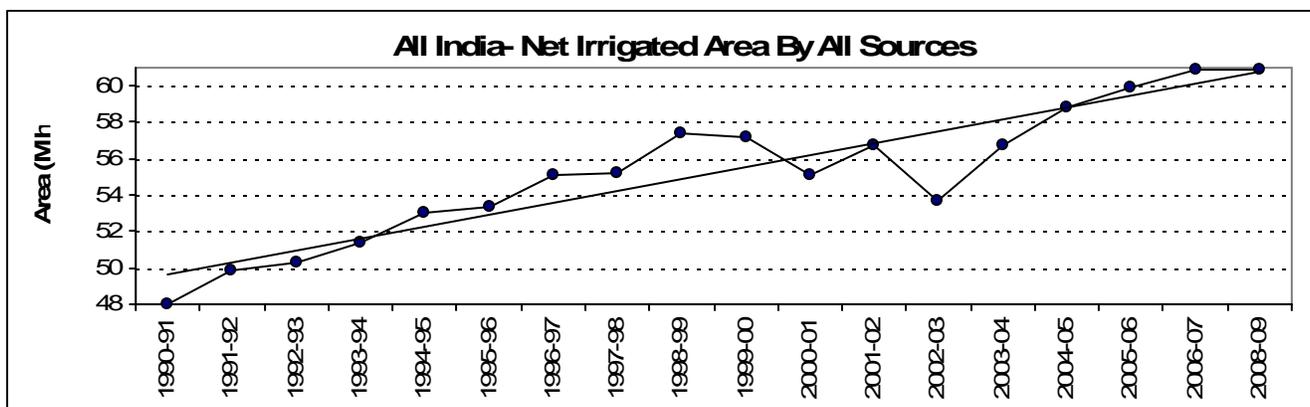
	Canals	Tube Wells	Other Wells	Total GW	Tanks	Other Sources	Total
1990-91	17453000	14257000	10437000	24694000	2944000	2932000	<b>48023000</b>
1991-92	17791000	15168000	10869000	26037000	2991000	3048000	<b>49867000</b>
1992-93	17457000	15814000	10569000	26383000	2854000	3599000	<b>50293000</b>
1993-94	17636000	16375000	10685000	27060000	2828000	3816000	<b>51340000</b>
1994-95	17280000	17190000	11722000	28912000	3276000	3533000	<b>53001000</b>
1995-96	17120000	17894000	11803000	29697000	3118000	3467000	<b>53402000</b>
1996-97	17109000	19338000	12457000	31795000	2821000	3388000	<b>55113000</b>
1997-98	17397000	19680000	12431000	32111000	2597000	3106000	<b>55211000</b>
1998-99	17311000	21394000	12606000	34000000	2795000	3329000	<b>57435000</b>
1999-00	17045000	22053000	12593000	34646000	2540000	2912000	<b>57143000</b>
2000-01	15965000	22569000	11260000	33829000	2455000	2885000	<b>55134000</b>
2001-02	15266000	23241000	11731000	34972000	2191000	4359000	<b>56788000</b>
2002-03 (p)	14042000	23479000	10660000	34139000	1804000	3667000	<b>53652000</b>
2003-04 (p)	14413000	24514000	11612000	36126000	1914000	4292000	<b>56745000</b>
2004-05 (p)	14649000	23063000	11834000	34897000	1725000	7546000	<b>58817000</b>
2005-06 (p)	15284000	23419000	11648000	35067000	2080000	7447000	<b>59878000</b>
2006-07 (p)	15351000	24056000	11853000	35909000	2044000	7554000	<b>60858000</b>

(p): Provisional

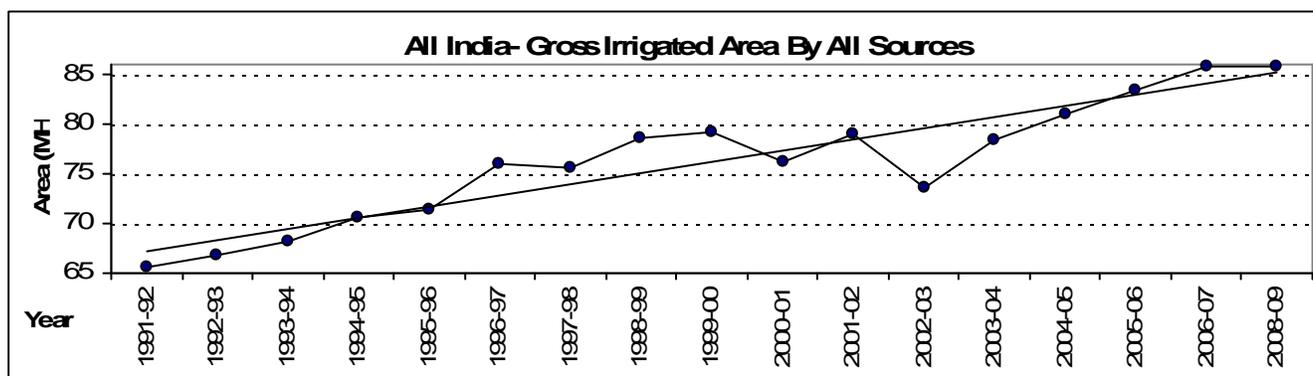
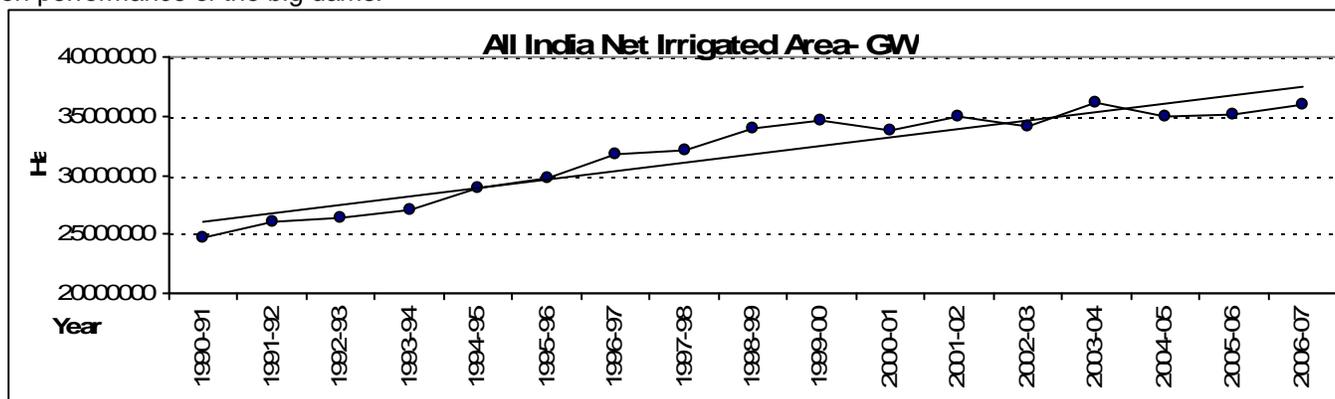
Source: Land Use Statistics at a Glance 1997-98 to 2006-07. Directorate of Economics & Statistics, Department of Agriculture and Cooperation, Ministry of Agriculture, November 2008 Page: 36.

In this period, the MWR has been claiming (e.g. in the working group report on water resources for the 11<sup>th</sup> Plan and additional information thereafter) that the country has created additional irrigation potential of 10.5 million ha and utilisation of irrigation potential of additional 7.82 million ha, but the official data from the ground show how false these claims are. The MWR has been using such claims to push more allocations for investment in M&M irrigation projects. The MWR has proposed, for example, that in the 11<sup>th</sup> plan, an allocation of Rs 165900 crores should be done for the ongoing M & M Irrigation Projects. The available facts show that this is likely to be a total waste of public money.

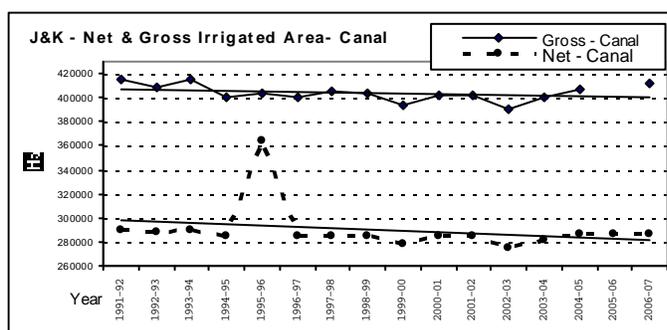
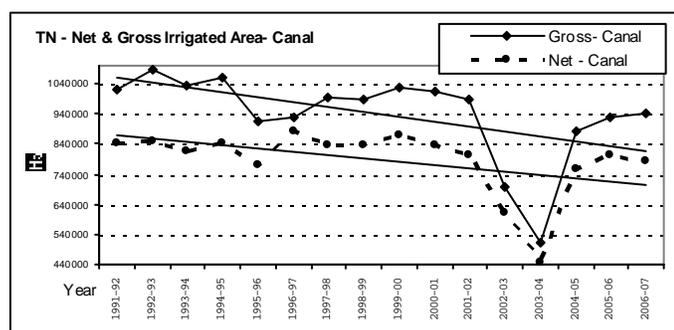
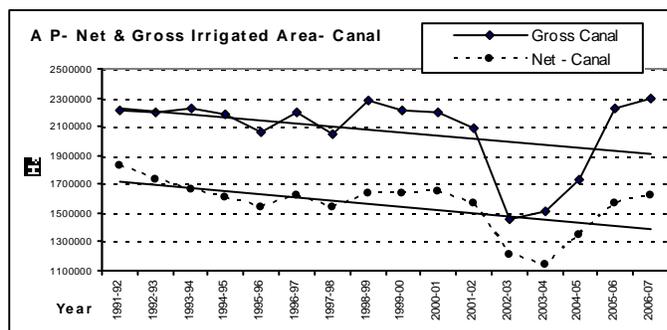
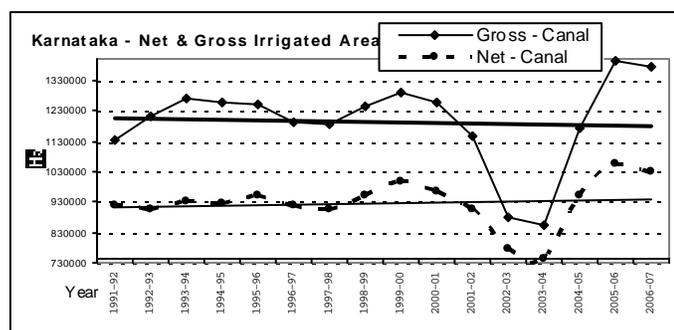
The net irrigated area by canals all over the country was 17.79 million ha in 1991-92. In all the years thereafter, till 2006-07, the latest year for which the data is available, the net irrigated area by canals has not only been lower than 17.79 m ha, but has been more or less consistently falling, as can be seen from the trend line in the graph above. The detailed figures of net irrigated area by source for the period 1990-91 to 2006-07 is given in the table above. It is clear from the above table that the Net Irrigated Area by all sources increased from 48.02 m ha in 1990-91 to 60.86 m ha by 2006-07, plotted on the graph below.



Similarly Gross Irrigated area (if two irrigated crops are taken in year on a give area, that area is counted twice in estimation of gross irrigated area, but once in estimation of net irrigated area) for total from all sources has been increasing during the period as seen in the graph above. This increase in all India net and gross irrigated areas have been possible due to the increase in groundwater irrigated area from 24.69 m ha in 1990-91 to 35.91 m ha in 2006-07, see the graph below. In fact the increase in groundwater irrigated area has helped the MWR suppress the reality of non performance of the big dams.



Figures of gross (& net) irrigated areas from canals for four major states (Andhra Pradesh, Tamil Nadu, Karnataka, Madhya Pradesh including Chhattisgarh) for the period under discussion for which necessary data is available also indicate this trend as can be seen from the graphs below. These graphs show that even gross irrigated area by canals has shown a consistent decreasing trend, even though we do not have nation wide figures for gross irrigated areas by canals for these years.



In majority of the years during 1991-2007 (with the possible exception of 2002 and 2004), the rainfall has been normal or above normal. So it cannot be claimed that this trend is due to low rainfall.

**The Reasons** Some of the reasons for this situation include: Siltation of reservoirs and canals, lack of maintenance of the irrigation infrastructure, water intensive crops in the head reaches and non building of the canals and over development (beyond the carrying capacity) of projects in a basin, water logging & salinisation, diversion of water for non irrigation uses, increasing exploitation of groundwater. A reason cited by some: increased rainwater harvesting. In some cases, the additional area added by new projects is not reflected in the figures as the area irrigated by older projects (due to above reasons) is reducing. Indeed the World Bank's 2005 report *India's Water Economy: Bracing for a Turbulent Future* showed that annual financial requirement for maintenance of India's irrigation infrastructure (which is largest in the world) is Rs 17000 crores, but less than 10% of that amount is available and most of it does not result in physical maintenance of the infrastructure. In some over developed basins, the new projects are like zero sum games, since they would be taking away water for some of the downstream areas. Optimistic hydrological projections, which are almost universal in big irrigation projects, would mean that projects in any case there won't have sufficient water in the basin to provide the projected benefits. The climate change is likely to make this situation worse.

**The Implications** These findings have grave implications. Firstly, they very clearly imply that the thousands of crores the country is spending each year on big irrigation projects is not leading to any additional net irrigated area. Secondly, the real increase in irrigated area is all coming from groundwater irrigation and groundwater is the lifeline of irrigated agriculture. Lastly, this raises many accountability issues: Who are responsible for deciding on these wrong priorities and what consequences will follow? This trend indicates that in stead of spending money on new major and medium (M&M) irrigation projects, the country would benefit more (at lesser costs and impacts) if we spend money on proper repair and maintenance of the existing infrastructure, taking measures to reduce siltation of reservoirs and at the same time concentrating rainwater harvesting, groundwater recharge and on rainfed areas. On groundwater front, we need to make preservation of existing groundwater recharge systems and augmentation of the same our top priority.

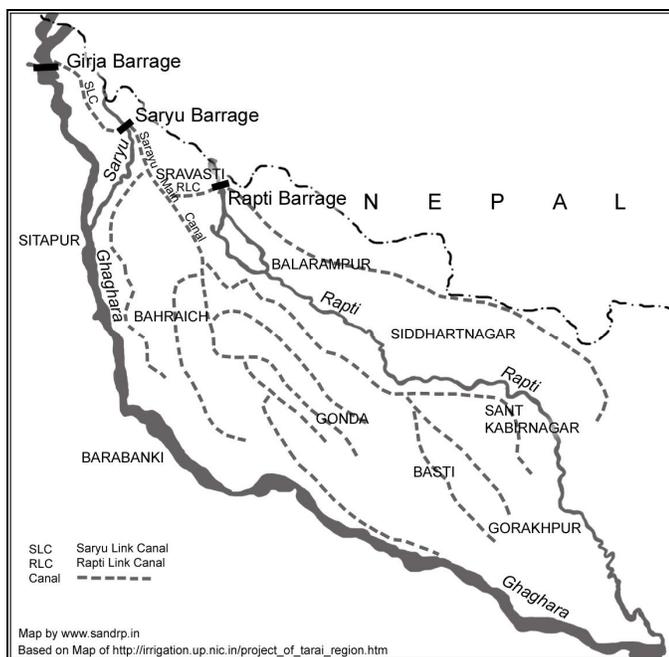
Even as the Planning Commission starts mid term review of the 11<sup>th</sup> Five year plan, this is a golden opportunity to make radical changes in our water resources development plans. If we miss this opportunity, the combined impacts of the wrong priorities we have pursued so far and the global warming will result in we having neither the water required for the people or the economy, nor the cash to maintain the and sustain the existing benefits, as the 2005 World Bank report concluded.

**After using Rs 2522 crores and 21000 ha land over 31 years, 4.93 % irrigation target achieved:**

## The Scandalous case of the Saryu Canal Project in UP

The report of the Comptroller and Auditor General of India, of performance audit of the Saryu Irrigation Project, as part of the audit of the Uttar Pradesh for the year ending in March 2008 has some scandalous revelations: 31 years after the project was started, after spending over 2522 crores (743% time over run), after taking away 20855 ha of land, the project could irrigate just 53000 ha of land, merely 4.93% of the *reduced* target. The CAG report goes on to show how a 100 tubewells were constructed, but never functioned, how thousands of kilometers of canals remains unused, how unviable portion of the project was declared unviable 22 years after the project work started and yet the construction continued even thereafter. Every ill of India's irrigation sector seems represented here.

The report of the Comptroller and Auditor General of India, of performance audit of the Saryu Irrigation Project, as part of the audit of the Uttar Pradesh for the year ending in March 2008 says by way of overview: "Saryu Canal Project started in 1977-78 envisaged initially to create 14.04 lakh ha irrigation potential in 12 lakh ha culturable command area of eight tarai and eastern districts of Uttar Pradesh by March 1989. Subsequently in 1998-99, the target of irrigation potential was reduced to 10.76 lakh hectares with culturable command area of 9.20 lakh hectare. As of March 2008, only 1.90 lakh hectare irrigation potential (18 per cent) was actually created. The Project was still (July 2008) incomplete even after time overrun of 19 years and cost over run of 743 % (2006-07 estimates). Performance audit revealed that improper planning and deficient implementation of the Project were the reasons for non-achievement of the envisaged benefits."



The CAG report goes on to reveal:

✓ As of April 2008, 30 *per cent* of canals remained to be executed whereas 97 *per cent* fund allocations (Rs 2,522.02 crore) had already been spent. This would necessitate revision of the cost of the project again and further delay in the completion of the project.

✓ Against the target of 7.53 lakh hectare of irrigation potential as of March 2008, only 1.90 lakh ha (25 *per cent*) was actually created, of which, 0.53 lakh ha (28 *per cent*) was utilized.

✓ The project comprised Saryu system (CCA: 9.20 lakh ha) and Rapti system (CCA: 2.80 lakh ha). Subsequently, in 1998-99, due to stoppage of work on Rapti system, CCA was reduced to 9.20 lakh ha and irrigation potential to 10.76 lakh ha.

In the Saryu system, water of river Ghaghara and Saryu was to be diverted to the Saryu Main Canal (SMC) by erecting two barrages- Girija barrage on Ghaghara and Saryu barrage on Saryu. Irrigation was to be provided through eight connected branch canals, distributaries and minors in trans-Ghaghara region in 9.20 lakh hectare CCA. Similarly, in the Rapti system, water of the river Rapti was to be diverted to Rapti Main Canal (RMC) by damming it at Rapti barrage to provide irrigation in 2.80 lakh hectare CCA in trans-Rapti region through its distributaries and minors.

	Saryu System	Rapti System
Components	Nos	Nos
Head works	2	1
Canals		
Link channel	47 km	21 km
Main canal	63 km	125 km
Eight Branch canals	915 km	--
Distributaries and Minors	6378 km	1865 km
Total Length of canals	7403 km	2011 km
Pump canals	4	--
Drains	7090 km	1910 km
Augmentation tubewells	3600	

The construction of 9414 km canals (Saryu system: 7403 km and Rapti system: 2011 km), involved acquisition of 27,500 hectare land (Saryu: 22,300 hectare and Rapti: 5200 hectare) and execution of 10,915 masonry works (Saryu: 9421 and Rapti: 1494). Besides, 4500 masonry works (Saryu: 3,275 and Rapti: 1,225) were also to be constructed over 9,000 km drains.

As per latest revision (2006-07), there was a time overrun of 19 years with the cost overrun of Rs 2,222.82 crore (743 *per cent*). The increase in cost included Rs 1,705.35 crore due to cost escalation and Rs 517.47 crore due to addition of new items.

Over two decades after the project work started, the Expenditure Finance Commission did not approve (February 1999) the Rapti system as it noted that the Rapti system was not economically viable on account of high cost involved on proposed construction of excessive cross drainages and ordered stoppage of work of this system and preparation of a separate project report for the same after detailed survey. The Department, however, did not stop the work of Rapti system and constructed Rapti link channel up to 17.82 km by 2002-03. Rs 68.65 crore were spent during 1993-2003 on Rapti system. The State Government suspended (2003) one Executive Engineer and two Assistant Engineers who were responsible for carrying out the works unauthorisedly. Further, the Department spent Rs 7.01 crore during 2003-08 on the maintenance of barrage and Saryu link channel and construction of spur (masonry work) to protect Rapti link channel from flood.

The CAG report does conclude, "Thus, improper planning and non-adherence to the instructions regarding phasing and stoppage of work on Rapti system resulted in blockage and unfruitful expenditure of Rs 93.84 crore (July 2008) besides recurring expenditure on annual maintenance of barrage and the Rapti link channel to protect it from flood." The CAG report does say that in spite of the EFC order of Feb 1999, the work continued on the Rapti system till 2002. However, CAG does not ask as to why did the EFC discover that the project was unviable, over 21 years after the work was started? Why did the govt start work on an unviable project?

Govt of India's AIBP (Accelerated Irrigation Benefits Programme) provided funding to the project between 1996-97 to January 2002 to the extent of 50% (loan), from Feb 2002 to March 2005 to the extent of 67% (loan), April 2005 to Nov 2006 to the extent of 67% (70% loan, 30% grant), from Dec 2006 to March 2008 to the extent of 25% (grant). Out of the budget provision of Rs 1,239.78 crore during 2003-08, Rs 758.43 crore were financed by GOI under AIBP, Rs 74.22 crore by loans from NABARD (during 2003-05) and Rs 407.13 crore by the State budget.

This raises many questions. Firstly, AIBP was meant to be for last mile projects, and SCP could not have been defined as last mile project at any stage since 1996-97 when funding from AIBP started for this project. Secondly, this also shows how unfruitful is the AIBP and NABARD (which funded the project from 1996-97 to 2004-05).

Alignment of 76 km long Khalilabad Branch Canal (KBC) was approved in 1981. The Saryu Nahar Khand - 3, Sant Kabir Nagar started construction of the canal in patches by purchasing the land from farmers through mutual negotiation. The KBC could not, however, be completed in the stretch between km 38.200 and 38.800 as a

graveyard fell in this reach and the land owner did not agree to sell the land. The Division, after 25 years of start of construction of the canal, approached (Jan '06) the SLAO, Basti for acquisition of the land under Land Acquisition Act, 1894 (Act). The SLAO did not accept the case and stated (Jan '06) that the graveyard land could not be acquired under the Act. As a result, the KBC constructed from km 38.800 at a cost of Rs 27.6 crore could not be made functional even after 27 years of the commencement of the work on it.

The project envisaged construction of 3600 tube wells in its command area for augmentation of water supply in the canal system in Rabi season when water availability was estimated to be less than the requirement. These tube wells were to help in controlling sub-soil water table also in the command area. One hundred tube wells were accordingly constructed during 1991-93 in the command area of Imamganj branch canal at a cost of Rs 4.74 crore. In the third revision (1998-99) of the project, construction of remaining 3500 augmentation tube wells was dropped. Audit scrutiny revealed that the 100 tube wells constructed were not connected to canals through pipe line up to December 2002, therefore, the purpose of construction of these tube wells was not fulfilled. As per survey report (December 2002) prepared by the Department, 65 tube wells out of 100 had been declared non-operational due to theft of transformer/ conductor/ starter/ other accessories and in some cases almost completely damaged pump houses. Out of these 65 tube wells, 11 were not repairable. The Department did not take any action to make these tube wells operational as of June 2008. Further, the Department constructed link channels (pipelines) between these 100 tube wells including the above mentioned non-operational 65 tube wells and the canals during January 2003 to March 2007 for augmentation of water in the canals.

As of March 2008, 1445 ha of land remained to be acquired, 2220 km of canals, 3673 km of drains and 2549 masonry works remained to be constructed.

As of March 2008, the functional canal system was available in 1873 km only which could irrigate 1.90 lakh ha and the remaining 3,310 km canals had huge number of gaps and were unable to carry water till their tail end for irrigation. In the test checked divisions alone, 409 gaps existed in 1536 km canals constructed in these divisions. Due to non-use 3310 km canals constructed, as of March 2008, at an approximate cost of Rs 567.99 crore<sup>1</sup> for long periods, canals silted and shrubs grew on the bed of the canals. Against 1.90 lakh ha irrigation potential created, actual irrigation was being provided to 0.53 lakh ha only (28 %) as of March 2008. In reply, the Government stated (May 2008) that irregular supply of electricity to pump-canals, insufficient construction of field channels/outlets and construction of outlets below the field level were the reasons for underutilization of created irrigation potential.

## CLIMATE CHANGE & WATER SECTOR

**India's GHG emissions to Jump** India expects its greenhouse gas emissions to jump to between 4 billion tons and 7.3 billion tons in 2031, a report released by India's Environment Minister Jairam Ramesh and Vice Chairman of Planning Commission Montek Ahluwalia said on Sept 2, '09. Per capita emissions are estimated to rise to 2.1 tons by 2020 and 3.5 tons by 2030. The report is the nation's most sweeping emissions summary. In a 2004 report to the United Nations, the last time India published detailed emissions data, the government said total greenhouse gas emissions were 1.228 billion metric tons, or about 1.3 tons per person, in 1994. Total CO<sub>2</sub> emissions constituted 65 per cent of total GHG released in 1994. On a sectoral basis, the energy sector accounted for about 61 per cent, agriculture 28 per cent, industrial process 8 per cent, waste disposal 2 per cent and land use and land use change 1 per cent of total greenhouse gas emissions. CH<sub>4</sub> and N<sub>2</sub>O respectively account for 31% and 4% of the total GHG emissions in terms of CO<sub>2</sub> equivalent.

India contributes around 1853 million tons or 4.9% to global carbon dioxide emissions, a new government of India report showed on August 11, '09. The finding is based on the 2007 World Development Indicators figures of the World Bank. The report said the energy sector contributed 61 percent of total emissions in India. A separate government report said India's forests are absorbing about 11.25 % of the country's total greenhouse gas emissions (GHG) every year at 1994 levels -- or about 24 billion tons of CO<sub>2</sub>.

Data released on Aug 10, '09 by German renewable energy industry institute IWR showed India's emissions of planet-warming carbon dioxide grew 125 % between 1990 and 2008, while China's grew 178 % and the United States 17 %. Indian Environment Minister Jairam Ramesh, who released the report, said the government was setting up a national institute of Himalayan glaciology and would coordinate with China to study the health of glaciers. He said while "a couple of" Himalayan glaciers were receding, some others such as the Siachen glacier were advancing while others like the Gangotri glacier were receding at a decreasing rate compared to the last two decades. There is as yet, no conclusive robust scientific evidence to show that the receding of glaciers in the Himalayas is being caused by climate change," he said. (Reuters 050809, 120809, 030909) This sounds a rather shocking statement. Similarly his statement at another occasion that the irregular behavior of the current monsoon is not due to climate change is equally shocking.

However, Prof BR Arora, Director, Wadia Institute of Himalayan Geology (Dehradun) says that it is a fact that glaciers have receded due to global warming. But the studies on glaciers have been limited. "So far, only 40 Himalayan glaciers have been studied", Prof Arora said.

Their number is over 9000. Prithviraj Chavan, Union Minister of State for Science and Technology (independent charge), inaugurated the Centre of Glaciology in Dehradun on July 4, '09 at Wadia Institute of Himalayan Geology. At the initiative of the Department of Science and Technology under the Prime Minister's Council on Climate Change, the centre is to carry out studies on factors influencing the dynamics of Himalayan glaciers.

**Impact on flora and fauna** "Rise in atmospheric temperature by 1.5 to 2.5 degree Celsius will lead to extinction of about 22 % of plants and animals and 3.5 degree Celsius rise will lead to extinction of about 42 % of plants and animals," said Principal Secretary of the State Forest and Environment Department UN Behera, while citing human activities as the greatest contributor to the global warming and climate change. (Pioneer 060809)

**Climate Change affects taste of Assam Tea** Assam Tea is known for its strong body and flavour. But now, threatened by a long dry spell, Assam tea is facing the adverse effects of climate change. An official at the Regional Meteorological Centre in Guwahati says that the region has been rain deficient through the last decade. In fact, in its National Action Plan on Climate Change, the central government has observed a warming trend in the north-east that is linked to overall global warming. Now, scientists at Tocklai Experimental Station, the world's oldest tea research institute — based in Jorhat in Assam — have started exploring the overall impact of abiotic stress, climate change and temperature on the quality of Assam tea. Tocklai Director said this research into the effects of climate change is new. (Teheika 290809)

**Global Warming in the Himalayas** Nepal's Department of Hydrology has said average temperatures in the Himalayas had risen 0.06°C a year for the past 30 years. This is four times the world average. The glacial melt would not only lead to water shortages, it would also cause catastrophic flooding in highland regions. Glacial lakes high in the mountains are growing fast as the melt worsens. Scientists predict many will soon burst their banks, releasing huge amounts of water and wreaking havoc below. In 1985, Lake Dig Tsho in the Everest region released 10 million cubic metres of water in three hours in a 10-m high wall of water which swept away a power station, bridges, farmland, houses, livestock and people up to 90 km downstream. Scientists estimate that the most dangerous lakes today are up to 20 times bigger.

Across Nepal and Tibet, average temperatures have been up to six times warmer in the mountains than in the plains, triggering changes in regional weather patterns. Pradeep K. Mool, an ice-and-water remote-sensing specialist with the International Centre for Integrated Mountain Development, observed that "mosquito nets are now needed in Lhasa," Tibet's administrative capital.

Residents of the city, located 3,490 meters above sea level, have reported seeing mosquitoes for the first time ever.

There are similar reports of flies at Mt. Everest base camp in Nepal. The presence of these insects suggests the possible spread of vector-borne diseases, such as malaria and dengue fever, to areas where cooler temperatures previously protected people from these threats.

**Glaciers and GLOFs** Ang Tshering Sherpa, president of the Union of Asian Alpine Associations, observed that in 1960, Nepal was home to more than 3,000 glaciers and no high-altitude lakes. But today, "almost every glacier is melting, and we have between 2,000 and 3,000 lakes," he said.

The influx of sediment and boulders can also affect agricultural productivity, making it difficult for farmers to graze herds or grow crops.

More than 30 Glacial Lake Outburst Floods (GLOFs) have been reported in the Himalayan region since 1964.

Nepal alone has witnessed more than 13 of the disasters. Today, another 20 lakes in the region are "potentially dangerous" and six are "critical," according to ICIMOD's Mool.

The largest Himalayan outburst on record occurred in 1954, when China's Sangwang Cuo lake, located at 5,250 meters, released 300 million cubic meters of water into the Brahmaputra River basin. The flood discharged some 10,000 cubic meters of water per second and inundated the town of Gyantze, 120 kilometers downstream, depositing three-to-five meters of rock, sand, and boulders.

Remote-sensing analyses carried out in Nepal indicate that ice melt is currently "not" occurring above 5,400 meters. But reports from local farmers and mountaineers suggest that this may be changing. "Above 5,000 meters, it didn't use to melt in the old days," said the UAAA's Sherpa. "Now it is melting more and more every year. We can clearly observe the vast melting when we visit the mountain regions."

According to the IPCC's 2007 assessment, nearly 67 percent of glaciers in the Himalayan and Tien Shan mountain ranges have retreated in the past decade. An ICIMOD report released that same year concluded that some 90 percent of glaciers in the Tibetan Plateau are retreating.

Without rapid action to curb emissions, the average temperature of the planet could warm by a disastrous 5°C by the end of the century. However, in March '09, climate scientist Professor Hans Joachim Schellnhuber pointed out that the temperature increase would certainly be higher in the Greater Himalayas region. "Five

degrees is the average because the continents heat up faster than the oceans," he said. "The continents would be warmer by 8-9°C, and the high-lying regions like the Tibetan Plateau would warm by 12°C. All the glaciers would melt. But these glaciers feed rivers that sustain two billion people, and they would run dry in the summer. This is not rocket science. This is probably the biggest impact of global warming if left unmitigated." (Green Left Weekly (Australia) issue #807 180809, [www.worldwatch.org](http://www.worldwatch.org) 140909)

**Finance commission & climate change** The mandate of the 13<sup>th</sup> Finance Commission has been enlarged to look at the need to manage ecology, environment and climate change consistent with sustainable development, while making its recommendations. (Mint 200809)

## WATER SECTOR

**Water Consumption measurement through GIS** The Idaho Department of Water Resources and the University of Idaho has developed a satellite based tool to measure the evapo-transpiration from a certain area. Using surface temperature readings, air temperature and a system of algorithms the calculation of water thus used in an area is done. The program is called METRIC – Mapping Evapo Transpiration with High Resolution and Internalised Calibration and has been in use since year 2000 and has helped resolve a number of disputes and problems. For example, the data have been used to help settle a century long fight between Colorado and Kansas over water in the Arkansas River and a dispute between Idaho irrigation districts. Previously, the officials had to look at well pumping records and electricity use to estimate each irrigation district's usage. (The Tribune 170909)

## HP thermal plant faces strong opposition, to hit ecology in Punjab

The proposed maiden thermal power plant of Himachal Pradesh, coming up at Tikri village (near Bagheri) in Nalagarh tehsil, will have serious implications for Himachal and Punjab in terms of environmental pollution and water crisis.

The project faces very strong opposition from the local people, as was reflected during the public hearing at the project site on Sept 7, '09. According to the Him Parivesh Environment Protection Society, the proposed plant will spell doom for water table in the region.

The Changar area already faces severe water crisis in summer and with the proposed power plant guzzling around 1,075 cubic metres of water daily, the situation is bound to worsen. Jaiprakash Associates Limited (JP), which was to set up the 30-MW project, had got Environment Impact Assessment report prepared from a Hyderabad-based company, which had reported false findings. (The Tribune 290809)

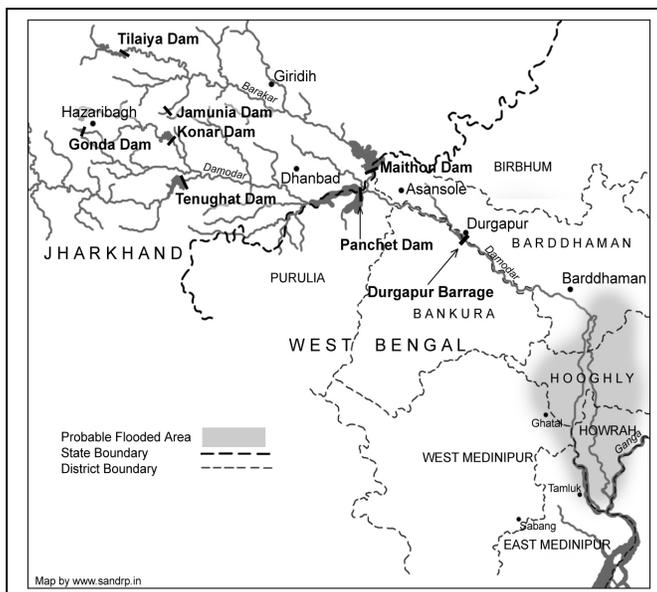
**DAMS****Ill-timed water releases from Damodar Dams creates flood disaster**

The Chief Minister of West Bengal Buddhadeb Bhattacharjee on Sept 7, '09 wrote to Prime Minister Manmohan Singh protesting against the release of water by the Damodar Valley Corporation a day earlier, saying it caused the floods in the districts of East Midnapore, Howrah, Hooghly and Burdwan. "Yesterday, the DVC released 18,000 cusecs of water from its dams and today it released 2.5 lakh cusecs of water, which caused this flood. It is most unfortunate. They could have done it step by step. We have told them repeatedly that they should inform us before releasing water. We are very much aggrieved on this and our chief minister has written to the prime minister protesting against this," state Finance Minister Asim Dasgupta said.

In the upstream Jharkhand, the releases triggered flash floods in low-lying areas of Bokaro, East Singhbhum and Dhanbad and fears of inundation in Seraikela-Kharsawan. Bermo in Bokaro was the worst affected. A swelling Damodar — flowing 12ft above the danger mark of 852 ft following release of water from Tenughat, Konar and Garga dams — has engulfed vast swathes of the Bokaro, prompting exodus from dozens of marooned villages. District officials said 10 sluice gates of Tenughat and two each of Konar and Garga were opened to stop the dams from flooding the thermal power station at Lalpania.

As reported by *The Telegraph*, the level at Maithon reached 4.9 ft above the danger mark of 490ft, forcing the Damodar Valley Reservoir Regulation Committee to release 160,000 cusec since Sept 7. Panchet, on the other hand, released 180,000 cusec (*Telegraph*, *Indian Express* 080909). The Panchet Hill dam has been filled to the full capacity since August 27, 2009, as per the weekly updates from the Central Water Commission. The Maithon Dam too was filled upto 88% by Sept 2, 2009 and 100% as on Sept 9, 2009. The Sept 9, 2009 bulletin also showed Tilaiya Dam filled to 100% capacity and Konar Dam filled to 91% capacity.

As can be seen from the map above, the releases from Maithon and Panchet Hill dams of Damodar Valley Corporation enter West Bengal directly. The massive releases of water from these dams, when the downstream area was already facing heavy rains during Sept 5-8 led to the floods in East Medinipur, Hooghly,



Howrah and Bardhaman districts in West Bengal in second week of Sept, '09. Since the possibility of heavy rainfall in the Damodar catchment in West Bengal was forecast well in advance, the operation of the Panchet Hill and Maithon dams and also the upstream dams should have been so adjusted that no major releases would have been necessary when there was heavy rainfall in the downstream areas. This has clearly not been done, leading to avoidable floods in the Damodar basin in second week of Sept '09.

Tenughat, the largest storage capacity reservoir (live storage capacity 821 million cubic meters) was still filled upto 48% capacity as on Sept 9, 2009. It is hence strange to hear that Tenughat dam had opened 10 sluice gates on Sept 7, '09, when the dam was just around half filled (50% as on Sept 2, 2009), which in fact must have added massive amounts to the river, triggering the flood situation in the downstream, when the downstream areas were also experiencing heavy rainfall. The releases from Tenughat thus could have been avoided during this period and that could have significantly reduced the floods in Jharkhand and West Bengal.

The Tenughat, Gonda and Jamunia Dams shown in the map are not under the control of Damodar Valley Corporation (DVC came into being on the 7<sup>th</sup> July 1948 by an Act of the Central Legislature and is an organisation under the Union Power Ministry), but are under the Jharkhand govt control. The Maithon, Panchet Hill, the Konar and the Tilaiya dams and also the Durgapur Barrage are under the control of DVC. This raises the question as to what sort of coordination exists between the DVC, the Jharkhand and the West Bengal government regarding releases from the various projects in the Damodar Valley.

**Subernarekha Dam Releases** East Singhbhum's worst fears came true on Sept 8, '09, with the Subernarekha and Kharkai rivers crossing the red line after release of water from the Bankabal dam in the upstream Mayurbhanj district of Orissa. On Sept 7 night, the Mayurbhanj irrigation department issued a communiqué to the district administration, as well as officials of Seraikela-Kharsawan, saying that it was releasing 45 cumec water.

SANDRP

**Chhattisgarh reservoirs for fisheries** The Fisheries Department of the Chhattisgarh govt plans to lease eight reservoirs for five years for fisheries development this year. These eight reservoirs, each with 200 to 1000 ha area include the Kirna and Ballar (Raipur dist), Chinkari (Raigarh), Gej (Korea), Matia (Rajnangaon - already leased), Behrakhar (Kabirdham - already leased), Paralkot (Kanker) and Kosarteda (Bastar). There are 22 reservoirs in this category in the state. In addition, there are twelve reservoirs with area between 1000 and 5000 ha, of which five have been given to the state fisheries federation and there are two (Gangrel and Hansdeo Bango) with areas above 5000 ha, which have also been leased out. The policy of the state in this regard is that decisions about reservoirs upto 10 ha area are taken by the village panchayats, 10-100 ha area by Janpad panchayats and 100-200 ha by district panchayats. (Jansatta 200909)

## HYDRO PROJECTS

**Agreement for Hydro project on Betwa** In a surprising move, the Uttar Pradesh government has signed an agreement with the Tehri Hydro Development Corporation for setting up a 30 MW Dhukwan Hydropower project, downstream of Matatila Dam on Betwa River in Jhansi district in Uttar Pradesh at a cost of Rs 150 crores. The agreement was signed on September 2, 2009 in Lucknow by the state energy minister. The tariff has not yet been fixed. The reason this proposal sounds strange is that the water flow in the Betwa River at the project site is likely to drop hugely once the Upper Betwa projects are implemented under the controversial Ken Betwa River Link proposal. What will be the hydrologic viability of Dhukwan project in that situation? (The Financial Express 030909)

## POWER OPTIONS

**CERC notifies tariff regulations for green power** Central Electricity Regulatory Commission (CERC) on Sept 17, '09 notified tariff regulations for green power generated from renewable energy sources in an effort to attract new investments in this sector. The regulations have been finalised keeping in view the statutory mandate to Electricity Regulatory Commission for promoting co-generation and generation of electricity from renewable sources of energy. CERC Chairman Pramod Deo said these regulations assumed special importance in view of the National Action Plan on Climate Change which stipulated that minimum renewable purchase standards might be set at 5 % of the total power purchases in 2010 and thereafter should increase by 1 % each year for ten years.

Specifying capital cost norms and fixing tariff upfront for the whole tariff period are the two main features of the new regulations. The regulations provide normative capital costs for projects based on different renewable technologies. These capital costs are to be revised every year for incorporating the relevant escalations. The tariff

permitted to a project under these regulations would apply for the whole tariff period which is 13 years on levelised basis. The tariff period for solar power has been kept as 25 years and for small hydro below 5 MW, it has been kept as 35 years. The Forum of Regulators has also agreed to implement Renewable Energy Certificate mechanism which will be an alternative route for fulfilling renewable purchase obligations.

India currently has 14000 MW of installed power generation capacity (10 000 MW through wind power alone) through renewables, which comes to 8.5% of total installed capacity of 165 000 MW (including renewables). The share of renewable power generation though is less than half that figure. (The Hindu 180909)

## SOLAR POWER

**1 MW project in Chandrapur-Maharashtra** The Mahagenco of the Govt of Maharashtra has given a project to develop a 1 MW solar power project in Chandrapur, Maharashtra to Moser Baer. (The Financial Express 040909)

## RIVERLINK FOLLY

### Rahul's opposition to ILR, support to Ken Betwa link

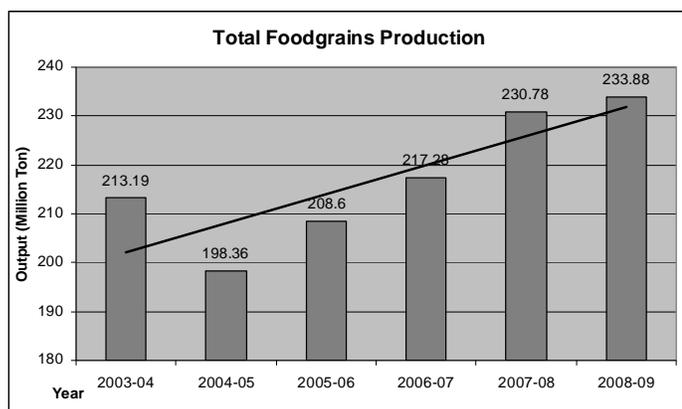
At a press conference, strategically in Chennai (the capital of the state of Tamil Nadu which has traditionally been the strongest advocate of the interlinking of rivers project), the Congress General Secretary and MP Mr Rahul Gandhi declared on Sept 10, 2009 he was strongly opposed to the idea of interlinking of rivers nationally: "my personal opinion is that such a move will be disastrous. Environmentally it is extremely dangerous...playing with environment (at that scale) is not a good idea." He added in response to a question, "At the local level, interlinking of rivers may have prospects of increase in irrigation. But it will be a disaster at the national level". (UNI 100909) It should be noted here that Mr Rahul Gandhi, in his memorandum to the PM in August 2009, had advocated implementation of the Ken Betwa River Link proposal, one of the first ILR links being proposed, should be taken up to solve the water problem of the Bundelkhand region.

**Local Planning and Ken Betwa Link** In an article advocating good local planning, a former Union Minister has advocated that "The Ken Betwa project could augment water resources in big way". Incidentally, Prof Y K Alagh in fact opposed this project in the past for the shoddy feasibility study and the project is going ahead based on the same feasibility study, now converted into a Detailed Project Report. It is possibly no coincidence that this comes even as Mr Rahul Gandhi's memorandum to the Prime Minister advocates this project. The article by Mr Alagh (The Financial Express, 040909) in fact mentions the name of Mr Rahul Gandhi more than once. However, with Mr Rahul Gandhi declaring his opposition to the river linking project in general, some such columnists may be in dilemma what stand to take.

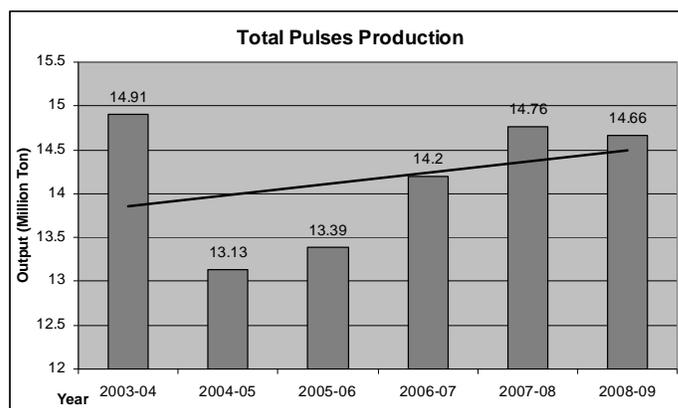
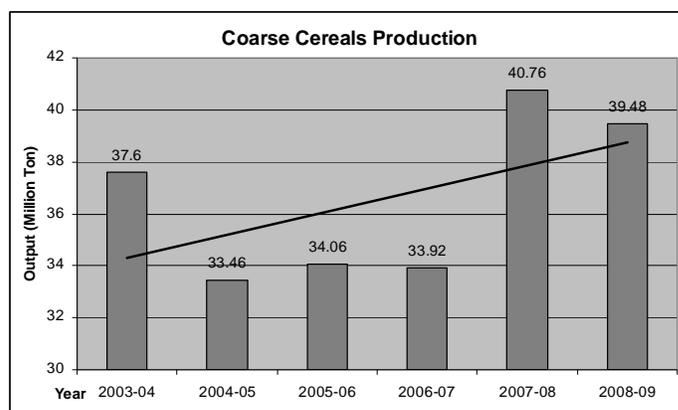
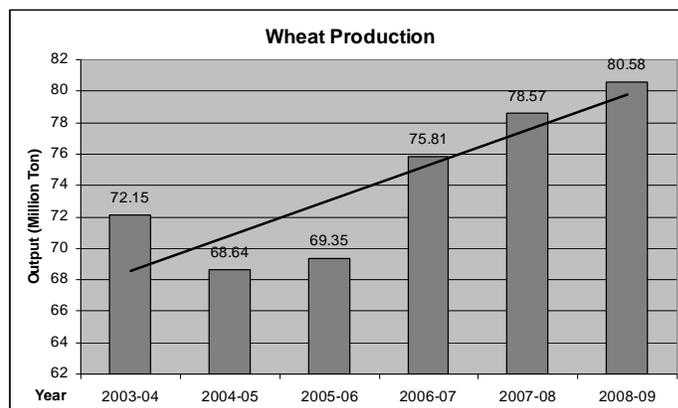
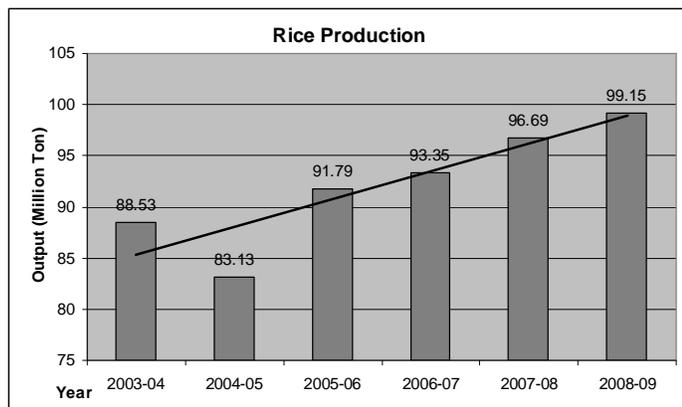
## AGRICULTURE

### What is driving recent spurt in India's foodgrains production?

In the latest two years, namely 2007-08 and 2008-09, India's foodgrains production has reached new highs of over 230 Million Tons (MT). Even in 2006-07, the foodgrains production was 217.28 MT, which was the highest till that year; the previous high of 213.19 MT was reached in 2003-04. The production figures of 2007-08 and 2008-09 are significantly higher than the previous levels, as can be seen from the following graph showing foodgrains production for the last six years. All the figures used in this article are from the website of the Directorate of Economics and Statistics, Department of Agriculture and Cooperation, Union Ministry of Agriculture (<http://www.dacnet.nic.in/eands/>). The figures for all years are the final figures, except for 2008-09, for which the latest data of fourth advanced estimates are used.



To understand this trend better, we looked closely at the figures production of Rice, Wheat, Coarse Cereals and Pulses production for these six years, and the figures for these are plotted in the graphs below. Close look at the figures in the graphs shows that while all the four components are showing rising trends, the maximum increase is reported in Rice production, around 6 MT over the previous high of 93.34 MT recorded in 2001-02. Wheat production has contributed around 4 MT over the previous high of 76.37 MT recorded in 1999-2000.



The Coarse Cereals have contributed around 3 MT from the previous high of 37.6 MT achieved in 2003-04. This is largely due to increase in Maize production by about 4 MT, the production of other coarse cereals have actually recorded decline. Interestingly, most of the increase in Maize production has been recorded in Rabi crop, Maize being grown in both Kharif and Rabi. The pulses production has increased by about 1.5 MT during the period.

Since India's Net sown area has remained stagnant around 141 M Ha since last several years, the increase

in the foodgrains production is more likely to come from the additional production from increase in yields and from additional area coming under irrigation. Thus, the foodgrains production yield increased by 36.67% from 1.2 T per Ha in kharif 1989-90 to 1.64 T per ha in kharif 2007-08 and from 1.54 T per ha in Rabi 1989-90 to 2.15 T per ha in 2007-08. (From presentation of Agriculture Commissioner, Union Agriculture Ministry at the National Kharif Conference on March 20, 2009)

Figures also show that more than half the increase in foodgrains production during this period has come in the Rabi season, which means irrigation is likely to have played a significant role. Considering the declining role of irrigation from Major and Medium irrigation projects as can be seen from another article in this issue, groundwater is likely to be the biggest contributor.

Another contributor is likely to be the increasing adoption of the System of Rice Intensification, leading to increased yield. For example, in Tamil Nadu, area under SRI was 4.2 Lakh T in 2007-08 and 5.11 Lakh T in 2008-09, with target up to 7.5 Lt in current year. This has led to significant increase in rice productivity at state level in Tamil Nadu, which reached a high level of 4.1 T per Ha in 2008-09, which was higher than the productivity of 4.03 T per ha achieved by Punjab and 2.726 T per ha achieved by Haryana in 2008-09.

The analysis so far, however, is not adequate enough to answer the question that was raised in the title of this article: What is driving recent (2006-07 to 2008-09) spurt in India's foodgrains production after it stagnated at around 210 MT for close to a decade? However, this provides some indications of the direction in which we may find the answers. More work is required, before we get full answer to that question.

**SANDRP**

**Drought** The number of districts where drought has been declared by the respective state governments have gone upto 299 (12 states) with Rajasthan declaring drought in 26 districts. The other affected states are: Assam (27 districts), Jharkhand (24), Himachal Pradesh 9120, Manipur (9), Nagaland (11), Uttar Pradesh (58), Bihar (26), Karnataka (20), Maharashtra (28) and Madhya Pradesh (37). The number has gone up from 141 districts on August 8 when the Prime Minister addressed a meeting of Chief Secretaries. On Sept 17, 2009, the empowered group of Union ministers decided that if any of the drought hit districts had already availed of the 100 day provision of employment under NREGA within the first six months of current year, the additional work for the rest of the year will be financed from the calamity relief fund kitty.

The rainfall was 27% below average in August, at 189.9 mm compared to average of 262 mm. The number of rainy days in Bhopal in monsoon was 44.3 per year in the period 1951-1980 period, which came down to 43.8

during 1990.99 and further down to 40.6 during 2000-2009. In fact in 2009, the number has been 31, the lowest in twenty years.

**Foodgrains production** According to the Union Finance Minister, the shortfall in foodgrains production in kharif this year could be 15 to 20%. Thus, the full meeting of the Planning Commission on Sept 1, 2009 was told that kharif foodgrains production may be down to 101 million tons, compares to 117 million tons. That meeting also noted that in the worst case scenario, the foodgrains production during 2009-10 may be 205 million tons, a drop of 12% from the previous year.

That figure may go up further, it seems. In Uttar Pradesh alone, the area under Paddy is down from 59.7 lakh ha last year to 32 lakh ha this year. This 46% drop is at variance with the 36% drop in UP as stated by Union Agriculture Ministry. The rice production last year was 13 million tons and is likely to go down to 8 million tons this year. The rice procurement target has been reduced to 15 lakh tons this year, down from 36 lakh tons procured last year, the procurement season ends in September. *Indian Express* reported (edit on 040909) that W Bengal, country's largest rice grower, has estimated that its rice production would be down 10%.

What this means is that the shortfall in rice production would about 5 million tons in UP alone, the national shortfall would be thus higher than 10 million tons, projected by Union Agriculture ministry.

Last year, the Food Corporation of India did not life the full quantity of rice available under levy scheme from the rice mills. It procured 14.5 lakh tons under this scheme when available quantity was 24.37 lakh tons. FCI did purchase 21.44 lakh tons from the mandis under the Custom Milled Rice system and got it milled, paying the incidental charges to the mills.

India's wheat production has gone up from 68.64 million tons (MT) in 2004-05 to 80.58 MT, an increase of 17%. Planners are hoping to increase this further during the coming Rabi season. (The Times of India, Indian Express 280809; The Financial Express 020909, 030909, 160909, 190909 Mint 020909, Bhasker 190808)

**Organic farming area up** The area under certified organic farming went up from 8.65 lakh ha in 2007-08 to 12 lakh ha in 2008-09 and is likely to go upto 20 lakh ha by 2012 according to National Centre for Organic Farming. Almost 5 lakh farmers have shifted to organic farming. The drought could help increase this further, since organic cultivation needs 20-30% less water. Input cost for organic farming is 40% less than conventional farming. (Financial Express 280809)

**NW Pacific convection's role in Indian monsoon** In a paper published in the September issue of *Meteorological Applications* journal, MR Ramesh Kumar (Deputy Director, Physical Oceanography Division,

National Institute of Oceanography, Goa) and his team have investigated the influence of low pressure systems (convective systems) which form over the North West Pacific (NWP) Ocean on monsoon activity over the Indian subcontinent.

They compared various parameters of the Indian South West monsoon conditions during excess rainfall years and deficit rainfall years in the light of convective activity over the North Pacific Ocean (0-50 degrees N and 100-180 degrees E) during the season (June to September). The time duration of the NWP systems during 45 days before and 45 days after MOK were investigated to understand the relationship between the two. **The study found that during excess monsoon years, formation of low pressure systems (cyclogenesis) did not occur over the NWP about 25 days prior to and after the MOK, barring an isolated case.** In contrast, during deficit monsoon years only the first 15 days were free from cyclogenesis. The number of days of all convective systems that formed during deficit years was also more, compared to that of excess years.

An examination of the study period (1951-2003) for the deficit and excess years shows that the mean of the number of NWP systems was much greater than that of Bay of Bengal (BB) systems for deficit years and reverse was the case during excess years. The number of NWP systems was 1.83 times more than BB systems during deficit years and in excess years the number of BB systems was greater.

In another analysis, of the convective systems that formed in the peak monsoon month of July in excess and deficit years, it was found that during excess years a majority of NWP systems formed close to the East Asian coast.

In deficit years the majority of systems formed much far away from the East Asian coast. According to Mr. Kumar this is the reason for monsoon deficit conditions as the NWP systems would have to travel a long way to reach and transport moisture to the Indian subcontinent and are unlikely to do so.

Another important finding was that in an analysis of evaporation rates in the Arabian sea for two contrasting monsoon years — 2002 (deficit) and 2003 (excess) — the rates were lower during active monsoon conditions and higher during weak conditions implying that Arabian sea evaporation is not important for the ensuing monsoon activity over the Indian subcontinent. Moisture transport, into the subcontinent was less during 2002 compared to 2003.

“The number of systems that formed in the Bay of Bengal was only two during the season of 2009 compared to the 15 that formed in NW Pacific,” said Mr. Kumar. “Hence we feel that the role of systems in NW Pacific was very important in the monsoon activity of Indian subcontinent. This could be the cause of deficit or drought-like conditions over India.” (The Hindu 170909)

## WATER BUSINESS

**Jusco gets Rs 64 Cr order in Jharkhand** The Jharkhand govt has given the Rs 64 crore contract for the Mango urban water supply re-organisation scheme to the Jamshedpur Utilities & Services Company (now working in seven states), a subsidiary of Tata. The 24 month project involves providing 140 lpcd water to the 2 lakh population of Mango Notified Area Committee, next to Jamshedpur. (The Financial Express 310809)

## QUOTES

“For these and other reasons, most experts also seem to want the ambitious river-basin-linkage idea to be scrapped. In most places, urban and rural, India’s state governments would do better to concentrate on building and restoring millions of small water storages, tanks and mini-reservoirs, and put local governments in charge of them. There is no simple solution to India’s complicated water crisis. **But if prayers are necessary, let them be offered in small shrines, not vast concrete temples.**” (Emphasis added.)

*The Economist*, 100909

([http://www.economist.com/displayStory.cfm?story\\_id=14401149](http://www.economist.com/displayStory.cfm?story_id=14401149))

I repeat here what Peter Salberg, a British engineer based in Assam had messaged to Patna Flood Conference in 1937 that "skills of engineers and resources of Governments have often played havoc with the people."

*Dinesh Kumar Mishra* (an email message on 150909)

## THE WORLD HYDRO

**N Korea Opens Dam Flow drowning 6 in the South** North Korea unleashed walls of water from one or more of its dams on Sept 6, sending a flash flood roaring through the heavily armed border with South Korea and sweeping away six South Koreans, officials in Seoul said. The six South Koreans, including an 8-year-old boy were camping or fishing on the Imjin River, which flows from the North, enters South Korea north of Seoul, and meanders close to the border before emptying into the Yellow Sea.

Officials said the Imjin River’s water level on the border doubled, after North Korea began releasing water without warning, either from its newly built Hwanggang Dam 17 miles north of the border or from a smaller dam downstream. No heavy rain was reported in North Korea in recent days, according to South Korean weather officials. Officials in the South accused the North on Sept 9 of intentionally unleashing floodwater and rejected the explanation from the North that water levels had risen dangerously, pointing out that no recent downpours could have caused that.

South Koreans have long feared that North Korea could unleash a water offensive by releasing monstrous columns of water from dams it has been building along the mountainous border in recent decades. (New York Times 070909, Christian Science Monitor 090909)

## World's River Deltas Sinking Due To Dams

A new study led by the University of Colorado at Boulder indicates most of the world's low-lying river deltas are sinking from human activity, making them increasingly vulnerable to flooding from rivers and ocean storms and putting tens of millions of people at risk. The researchers concluded the sinking of deltas from Asia and India to the Americas is exacerbated by the upstream trapping of sediments by reservoirs and dams, man-made channels and levees that whisk sediment into the oceans beyond coastal floodplains, and the accelerated compacting of floodplain sediment caused by the extraction of groundwater and natural gas.

The study concluded that 24 out of the world's 33 major deltas are sinking and that 85 percent experienced severe flooding in recent years, resulting in the temporary submergence of roughly 100,000 square miles of land. About 500 million people in the world live on river deltas. Published in the Sept. 20 issue of *Nature Geoscience*, the study was led by CU-Boulder Professor James Syvitski, who is directing a \$4.2 million effort funded by the National Science Foundation to model large-scale global processes on Earth like erosion and flooding. Known as the Community Surface Dynamic Modeling System, or CSDMS, the effort involves hundreds of scientists from dozens of federal labs and universities around the nation.

The Nature Geoscience authors predict that global delta flooding could increase by 50 % under current projections of about 18 inches in sea level rise by the end of the century as forecast by the 2007 Intergovernmental Panel on Climate Change report. The flooding will increase even more if the capture of sediments upstream from deltas by reservoirs and other water diversion projects persists and prevents the growth and buffering of the deltas, according to the study.

"We argue that the world's low-lying deltas are increasingly vulnerable to flooding, either from their feeding rivers or from ocean storms," said CU-Boulder Research Associate Albert Kettner, a co-author on the study at CU-Boulder's Institute of Arctic and Alpine Research and member of the CSDMS team. "This study shows there are a host of human-induced factors that already cause deltas to sink much more rapidly than could be explained by sea level alone."

"Every year, about 10 million people are being affected by storm surges," said CU-Boulder's Overeem, also an INSTAAR researcher and CSDMS scientist. "Hurricane Katrina may be the best example that stands out in the United States, but flooding in the Asian deltas of Irrawaddy in Myanmar and the Ganges-Brahmaputra in India and Bangladesh have recently claimed thousands of lives as well." (Science Daily 210909)

## US renewables include only *incremental* hydropower

The U.S. House approved climate change legislation on June 26, 2009, including a renewable electricity standard that would require utilities to increase the amount of power they obtain from renewable energy sources.

Earlier, a US Senate committee approved a broad energy package on June 17, 2009, that would require utilities to increase the amount of power they obtain from renewable energy sources. The Senate Energy and Natural Resources Committee sent the full Senate a package that would establish a renewable electricity standard, create an independent agency to foster clean energy investments, and give the federal government authority to expand the nation's transmission grid over state objections. The package would require firms that sell more than 4 billion units a year to obtain a portion of their electric supply from new renewable energy resources. They would be required to deliver the following percentages of renewable energy: 3 % 2011-2013, 6 percent from 2014-2016, 9 percent from 2017-2018, 12 percent from 2019-2020, and 15 percent from 2021-2039. The legislation defines eligible renewable energy sources to include incremental hydropower, ocean and other hydrokinetic energy, and wind, biomass, solar, geothermal, and landfill gas sources.

Before that, the House Energy and Commerce Committee voted on May 21, 2009, to advance the American Clean Energy and Security Act containing a "cap and trade" climate change initiative backed by President Obama.

It is interesting to note that the *Incremental hydropower* is defined as improvements to existing hydro projects since Jan. 1, 1992 and addition of new generating facilities to existing water resources projects. Such projects also must be licensed or exempted by FERC and be "operated so that the water surface elevation at any given location and time that would have occurred in the absence of the hydroelectric project is maintained, subject to any license or exemption requirements that require changes in water surface elevation for the purpose of improving the environmental quality of the affected waterway." The bill also would allow utilities to exclude existing hydropower from their base amount of electricity when calculating the amount of renewable energy they must obtain. (Hydro World.com, various dates)

## Plan to power EU from WB supported Congo dam

Plans to link Europe to what would be the world's biggest hydroelectric dam project in the volatile Democratic Republic of Congo have sparked fierce controversy. The Grand Inga dam, which has received initial support from the World Bank, would cost \$80 bn. At 40,000MW, it has more than twice the generation capacity of the giant Three Gorges dam in China. It will involve transmission cables linking South Africa and countries in W Africa. (The Observer 230809)

## The World Bank and funding of Large Dams

Earlier this year, the World Bank announced that it would “scale up” lending for dam projects “to maximize the strategic value of hydropower”. Yet new figures show that in 2009 (July 2008 to June 2009), the Bank’s lending for large hydro has reached its lowest level in ten years.

Since the adoption of a new water sector strategy in 2003, the World Bank has been a strong cheerleader for building more dams. In March 2009 the Bank in a new report committed “to exploit the maximum strategic value of hydropower resources” through increased lending and non-lending services. Lending for large hydropower projects amounted to less than \$250 million per year in 2002-04, increased to approximately \$500 million per year in 2005-07, and reached \$1,007 million in 2008. (Large hydro is defined as more than 10 megawatts. The Bank’s financial year is from July 1-June 30.)

In a sharp drop, the World Bank’s lending for large hydro declined to \$177 million in 2009. This is the lowest figure in ten years. The 2009 portfolio consists of \$ 43 million in direct World Bank lending (probably for the 117 MW Shihutang Project in China) and IFC support of \$135 million (probably for a series of projects of 6-32 MW in Chile and China).

Only two years ago, the World Bank approved more funding for large hydropower than for all renewable energy and energy efficiency projects combined. In 2009, the Bank’s support for efficiency improvements and renewable technologies jumped to more than \$3 billion – almost 20 times the lending for large hydro. The portfolio includes solar panels for rural electrification in Bangladesh, biogas digesters in China, and renewable power supply for schools and hospitals in Tanzania.

Will this trend continue? Has the house bank of the global dam industry recognized that on social, environmental and long-term economic terms, renewable energy technologies are preferable to large dams? Unfortunately, the 2009 figures look more like a statistical outlier than a new trend. Now that wind energy has become commercially competitive, we can expect sizable World Bank investment in renewable energy to continue simply because governments and private borrowers will ask for it. But the Bank’s support for large dams is bound to pick up again.

Since July 2009, the World Bank has already approved \$85 million in additional support for the Felou Hydropower Project on the Senegal River. And the Bank says it has hydropower projects to the tune of \$2 billion under preparation. Its current pipeline includes projects such as the large Khudoni Dam in Georgia (which would seriously impact a World Heritage Site), the Adjarala Dam in Togo, the medium-sized Rusumo Falls Project on the border of Rwanda and Tanzania, an extension of

the Tarbela hydropower project in Pakistan, and the monstrous Gibe 3 Dam in Ethiopia.

### The Scent of Money and the Stench of Corruption

When there is a chance to push a big loan out the door, some people just can’t say no. Every World Bank President since James Wolfensohn has committed to fight the cancer of corruption. For more than ten years, the Bank has talked the talk, but has not walked the walk. In April, an internal evaluation gave the institution the lowest possible grade for its anti-corruption efforts. As if to prove the point, the World Bank is now considering support for a multi-billion dollar project which squarely violates its procurement guideline and shows all red flags of corruption: the Gibe 3 Dam in Ethiopia.

With a price tag of \$1.7 billion, Gibe 3 is the biggest dam and possibly the largest infrastructure project in Ethiopia’s history. According to scientists working in the region, the dam will push the fragile ecosystems of the Lower Omo Valley and Lake Turkana to the brink of collapse and undermine the livelihoods of 500,000 people. In July 2006 the Ethiopian power utility EEPSCO awarded the contract for Gibe 3 to Salini Costruttori, an Italian construction company, without any competitive bidding. According to Transparency International, no-bid contracts are an open invitation to bribery in this environment, and international competitive bidding is the most basic measure to curb corruption.

The Gibe 3 Dam not only violates Ethiopian regulations, it also contradicts the procurement guidelines of multilateral development banks. The African Development Bank is currently considering support for the dam project. Friends of Lake Turkana, a group of affected people from Kenya, filed a request for investigating this breach of the procurement guidelines with the Bank’s Integrity and Anti-Corruption Division in May 2009. Around the same time, an anonymous letter from inside the Bank warned International Rivers that opposition against the dam was useless since the project had been “greased by a few million dollars”.

The World Bank’s procurement guidelines are less strict for projects supported by guarantees than for loans and credits. The reason for this double standard is not clear, but this is a moot point. The Operational Summary states explicitly that the Bank is considering a credit for Gibe 3, for which open bidding is required. The Bank knows this has not happened. According to a manager in its Africa Energy Group, it still considers a credit “for environmental and social aspects of the project”. The World Bank’s seal of approval would open the door for support from other lenders which have so far stayed away from the Gibe 3 Dam because of the project’s serious social and environmental impacts and corruption risks. **(Peter Bosshard of International Rivers 080909, 110909)**

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**YOUR LETTERS**

This is with reference to your write up on Sri Shekhar Gupta's Article (Ref: June-Aug 2009 issue Dams, River and People). What has to be explained to the people is what happened to trillion of rupees spent since 1950s to make available to cultivators water for farming. It is high time that a time bound judicial enquiry should be instituted to find out who gained by these huge spending of taxpayer's money. It is high time people should ask the Centre and the States to put a blanket ban on big projects-both hydro and irrigation till the judicial enquiry is not over.

**Dr N K Bhattacharya, Delhi**

My compliments on a very useful and informative issue (June-Aug 2009) of "Dams, Rivers & People". On Hirakud, one aspect that deserves focus is the social cost in terms of opportunistic (and sometimes even planned) and hence often ignored replacement / dislocation of unsuspecting local farmers from the command area by outsiders who then reap the actual benefits in the command areas of such dams. I was informed (still to be confirmed) that a powerful bureaucrat in Orissa was instrumental in large scale settlement of people from his region (from outside the state of Orissa) in the command area of Hirakud immediately after its commissioning. It was mostly at the cost of local farmers. Such social upheavals need as much post facto scrutiny from social scientists as much the sad fate of people relocated and dislocated as a result of such mega projects.

**Manoj Misra, Yamuna Jiye Abhiyan, Delhi**

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