

Lead Piece

Reservoir Siltation in India: Latest Studies

Revealing Results, a Wake up Call

Himanshu Thakkar & Swarup Bhattacharyya



Importance of Siltation Studies Siltation leads to deposition and accumulation of silt in the reservoirs behind the dams. This results in destruction of capacity of the reservoir to store water and hence reduction in benefits from the projects constructed at huge costs to the nation. Siltation of reservoirs can also have a number of other impacts, including increased evaporation losses, increased backwater flooding and also could damage the power house turbines. Periodical capacity surveys of reservoir help in assessing the rate of sedimentation and reduction in storage capacity. This information is necessary not only for efficient management of the reservoir, but should also help in taking a decision about treatment of catchment area. Periodical capacity survey of reservoirs in a basin is also necessary to arrive at a realistic sedimentation index for planning of future reservoir projects in the basin.

“Dams are uniquely different from engineering infrastructure such as roads, harbors, and cities, and which can be reconstructed on the same site occupied by obsolete infrastructure. Dams cannot be reconstructed at the same site once the reservoir has filled with sediment; the sediment must either be removed or the site abandoned. The cost of sediment removal at a large reservoir can easily exceed the original dam construction cost by an order of magnitude.”

Gregory Morris, (author of Reservoir Sedimentation Handbook, 1997) in a paper presented at the Sixth International Symposium on River Sedimentation in New Delhi in 1995 wrote, “Planned Obsolescence due to sedimentation affects most reservoirs worldwide, not just in India, and will render many of them unusable in the foreseeable future... Dams are uniquely different from engineering infrastructure such as roads, harbors, and cities, and which can be reconstructed on the same site occupied by obsolete infrastructure. Dams cannot be reconstructed at the same site once the reservoir has filled with sediment; the sediment must either be removed or the site abandoned. The cost of sediment removal at a large reservoir can easily exceed the original dam construction cost by an order of magnitude.”

The Latest Studies One would expect that such important studies would be in public domain. However, traditionally, Indian water resources establishment has

been secretive about all kinds of information, and siltation rates and studies are no exception. Recently, we received reservoir siltation studies for twenty seven reservoirs from the Govt of India’s Central Water Commission (CWC) after an application under the Right to Information Act. This article contains information from those studies and some other available information.

The studies quote the recommendation of the working group for “National Action plan for Reservoir Sedimentation Assessment using SRS”, sedimentation survey of 124 reservoirs are to be taken up during the 10th Plan. CWC & National Institute of Hydrology have to take up 25 reservoirs each & 20 reservoir studies are to be taken up by the Central Water and Power Research Station, Pune during the 10th Plan. The study of remaining 54 reservoirs is to be entrusted to the other agencies and to be coordinated by the CWC.

Continued on p 2

INDEX

| | |
|---|----|
| Reservoir Siltation in India: Latest Studies | 1 |
| AIBP: Why it is a complete misnomer | 8 |
| Surat Floods: Why it was a preventable disaster | 10 |
| The Polluted Hindon River | 14 |
| Tamil Nadu dams unutilized for two decades | 15 |
| Ghaghar: How Pursuit of Bhakra made it a bane | 16 |
| Dandeli: Forest clearance rejected, manipulations are on | 17 |
| Tehri Power: At what cost, whose cost? | 18 |
| Loktak Lake Protection Act: An anti people act? | 19 |
| Kol Dam scandal: <i>Forgot</i> to include 120 ha forest land? | 20 |
| Costly Lift Irrigation Schemes of Andhra Pradesh | 21 |
| BT cotton failure in China | 22 |
| Dabhol shut down for NO demand | 23 |
| Could we have reduced losses in Barmer floods ? | 24 |
| PAK PAGE: Can Indus be saved from the Big Dam lobby? | 25 |
| NEPAL PAGE: The Hydro Dollar Myth | 26 |
| WORLD DAMS: Australian dam threat to living fossil | 27 |
| Publications available with SANDRP, Responses | 28 |

(Continued from p 1)

CWC has entrusted Regional Remote Sensing Service Centre, Jodhpur to do "Satellite Remote Sensing Based Sedimentation Analysis of Twenty Reservoirs in India". Eighteen of the 27 studies reviewed here have been done by RRSSC, Jodhpur and the remaining studies have been done by CWC's Remote Sensing Directorate. The studies have been done during 1999 to 2004. These siltation studies were all done through Satellite Remote Sensing (SRS) studies. They also contained siltation rates assessed under previous hydrographic studies & in a few cases earlier SRS studies.

The trend That siltation is a serious issue and action is required to arrest the destruction of productive reservoir capacity created at such huge costs has been known for many years. Morris, in his paper in 1995 cited earlier had said, "the overall picture indicates that reservoir sedimentation is a serious national problem which requires immediate action..."

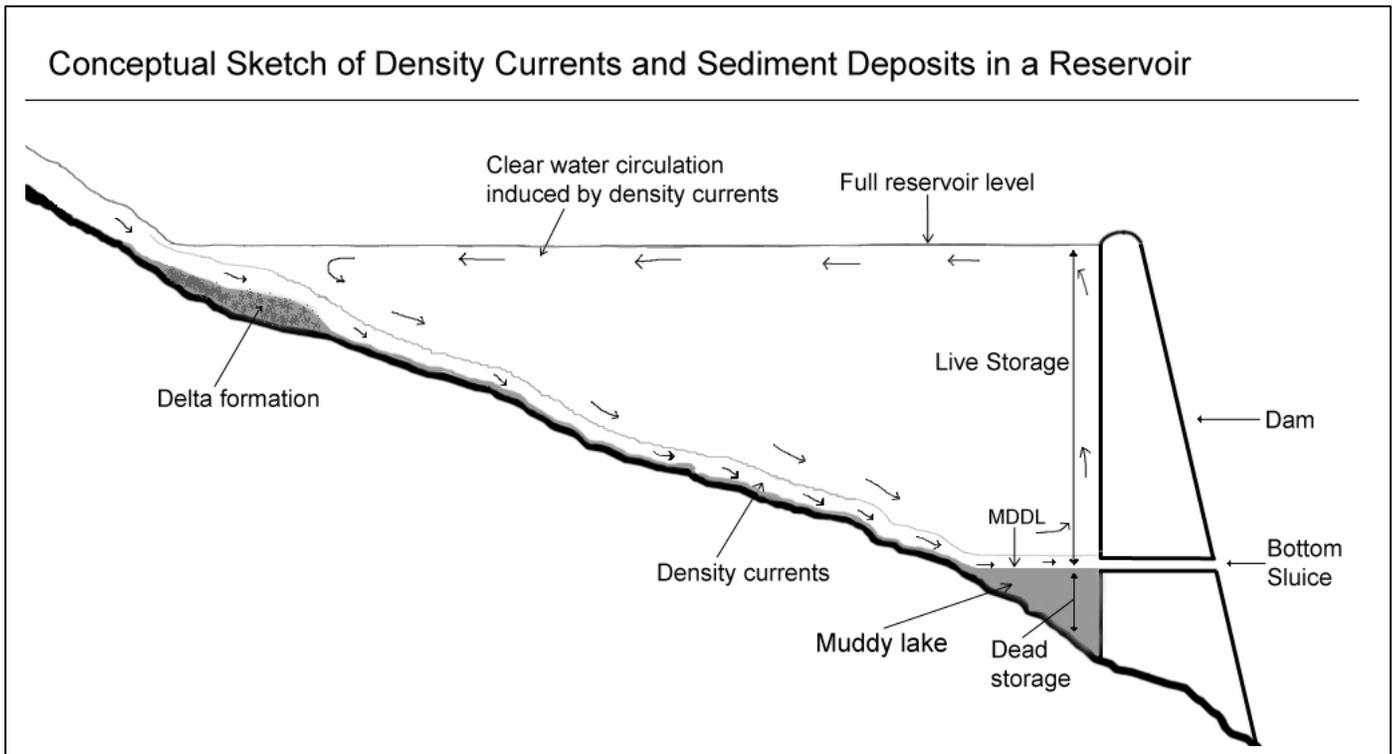
According to the 9th Five Year Plan, the country has been divided into seven regions and sedimentation rates have been decided to serve as broad guidelines:

1. The Himalayan region,
2. Indo-Gangetic Plains,
3. E flowing rivers excluding the Ganga, upto Godavari,
- 4 Deccan Peninsular E Flowing rivers including Godavari
5. West flowing rivers upto Narmada,
6. Narmada Tapi Basin & 7. The west flowing rivers.

The Mid Term Appraisal of the 9th Plan had also warned (Oct 2000, p 76), "there is an urgent need to review the status of reservoir sedimentation." However, most such warnings have gone unheeded and catchment area treatment that can help reduce the sedimentation, has largely remained non existent, except on paper.

The Report of the Govt of India's National Commission of Integrated Water Resources Development has said (p 85) that a total loss in Live Storage (LS) capacity of 65 BCM (Billion Cubic Meters) by the year 2050 would happen due to reservoir sedimentation. This implies that we are losing about 1.3 BCM of storage capacity each year. That should be alarming enough for everyone as at today's rates creation of 1.3 BCM storage capacity would cost Rs 1448 crores. That means that on an average, each day we are losing Rs 4 crores worth of storage capacity through siltation.

Planned Obsolescence due to sedimentation affects most reservoirs, and will render many of them unusable in the foreseeable future... According to National Commission report we are losing about 1.3 BCM of storage capacity each year (our estimates show this could be higher at 1.95 BCM per year). That should be alarming enough for everyone as at today's rates creation of 1.3 BCM storage capacity would cost Rs 1448 crores. That means that on an average, each day we are losing Rs 4 crores worth of storage capacity through siltation.



Reservoirs where LS increased after the survey

| Name of the reservoir | Year of impounding | Original live storage (MCM) | Reassessed live storage capacity through SRS | |
|-----------------------|--------------------|-----------------------------|--|----------|
| | | | Year | MCM |
| Dudhawa | 1964 | 284.130 | 2003 | 284.806 |
| Idukki | 1974 | 1461.81 | 2003 | 1464.385 |
| Jakham | 1986 | 132.28 | 2002 | 175.451 |
| Machhkund | 1955 | 892.55 | 2002 | 954.23 |

SRS methodology Reservoir sedimentation survey through SRS is essentially based on mapping of water spread areas at the time of satellite over pass. It uses the fact that water spread area of the reservoir reduces with the sedimentation at different levels. The water spread area and the elevation information are used to calculate the volume of water stored between different levels. These are then compared with the previously calculated capacity values to find out the change in capacity between different levels.

The basic process is to find out the water spread area from satellite data for different water levels between

Minimum Draw Down Level and Full Reservoir Level. The methodology consists of following major heads: Digital database creation, Estimation of water spread area, Calculation of reservoir capacity, Comparison with previous surveys, calculation of live capacity loss.

Heavily silted reservoirs As revealed by the SRS studies, some of the heavily silted reservoirs of India are listed below.

⇒ **Matatila** 38% gross capacity lost between 1956 and 1998-9. The dead storage up to the original Minimum Draw Down Level (MDDL) of 295.66 m is completely filled with silt. Even further level upto 296.15 m is now completely filled with silt. Total capacity loss by 1999 = 430.47 MCM (million cubic meters).

⇒ **Gumti** (Tripura): Lost 63.83 MCM that is 20.4% LS capacity in 19 years.

⇒ **Maithon** 25.29% LS Capacity silted in 46 years.

⇒ **Kadana** 12.85% LS capacity (278.6 MCM) silted up in 11 years.

⇒ **Srisaillam** 2013.33 MCM or 28.096% LS capacity lost in 15 years.

Reservoir Capacity Loss (Live Storage)

| Name of reservoir | Year of impounding | Original LS (MCM) | Reassessed LS capacity through SRS/ earlier surveys | | Capacity loss (MCM) | Span | % Loss | Annual % loss | Siltation rate MCM/yr | Capacity loss anticipated till 2006 | |
|-------------------|--------------------|-------------------|---|-----------------|---------------------|------|--------------|---------------|-----------------------|-------------------------------------|--------------|
| | | | Year | MCM | | | | | | MCM | % |
| Bhadar | 1964 | 223.703 | 2000 | 187.79 | 35.913 | 36 | 16.05 | 0.446 | 0.998 | 41.916 | 18.713 |
| Damanganga | 1983 | 502 | 1999 | 464.46 | 37.54 | 16 | 7.48 | 0.4675 | 2.35 | 54.05 | 10.7525 |
| Gumti | 1984 | 312.9 | 2003 | 249.07 | 63.83 | 19 | 20.40 | 1.074 | 3.36 | 73.91 | 23.62 |
| Halali | 1976 | 226.940 | 2003 | 188.583 | 38.357 | 27 | 16.91 | 0.626 | 1.42 | 42.62 | 18.78 |
| Isapur | 1983 | 928.262 | 2003 | 899.629 | 28.633 | 20 | 3.08 | 0.154 | 1.43 | 32.92 | 3.55 |
| Kadana | 1983 | 1712 | 1994 | 1491.71 | 220.29 | 11 | 12.87 | 1.17 | 20.03 | 460.65 | 26.91 |
| Kallada | 1985 | 423.953 | 2003 | 376.705 | 47.248 | 18 | 11.14 | 0.62 | 2.62 | 55.13 | 13.00 |
| Krishnarajasagar | 1932 | 1275.70 | 2000 | 1215.94 | 59.76 | 68 | 4.68 | 0.068 | 0.88 | 61.96 | 4.84 |
| Kyrdemkulai | 1983 | 3.824 | 2002 | 3.414 | 0.410 | 19 | 10.72 | 0.56 | 0.02 | 00.49 | 12.81 |
| Lower Bhawani | 1955 | 780.546 | 2000 | 702.025 | 78.521 | 45 | 10.06 | 0.224 | 1.74 | 89.01 | 11.40 |
| Maithon | 1955 | 607.268 | 2001 | 453.69 | 153.578 | 46 | 25.29 | 0.549 | 3.34 | 170.25 | 28.04 |
| Matatila | 1956 | 1132.7 | 1999 | 702.33 | 430.37 | 43 | 38.00 | 0.884 | 10.01 | 500.43 | 44.18 |
| Mayurakshi | 1955 | 547.59 | 2000 | 474.82 | 72.77 | 45 | 13.29 | 0.295 | 1.617 | 82.47 | 15.045 |
| Narayanpur | 1982 | 867.889 | 1997 | 740.345 | 127.544 | 15 | 14.70 | 0.98 | 8.50 | 204.07 | 23.52 |
| Palitana | 1959 | 374.832 | 1996 | 304.226 | 70.606 | 37 | 18.84 | 0.509 | 1.908 | 89.69 | 23.923 |
| Panam | 1977 | 689.567 | 2003 | 660.993 | 28.574 | 26 | 4.14 | 0.16 | 1.09 | 31.88 | 4.62 |
| Parbati | 1963 | 102.893 | 2003 | 86.405 | 16.488 | 40 | 16.02 | 0.40 | 0.41 | 17.72 | 17.22 |
| Ramsagar | 1905 | 29.397 | 2003 | 24.663 | 4.734 | 98 | 16.10 | 0.165 | 0.05 | 04.88 | 16.60 |
| Ranapratap Sagar | 1970 | 1861.36 | 2002 | 1720.13 | 141.23 | 26 | 7.59 | 0.237 | 4.41 | 158.88 | 8.532 |
| Rengali | 1983 | 3412 | 2001 | 3217.74 | 194.26 | 18 | 5.69 | 0.32 | 10.79 | 248.85 | 7.29 |
| Sondur | 1988 | 179.611 | 2003 | 134.788 | 44.823 | 15 | 24.95 | 1.66 | 2.99 | 53.77 | 29.94 |
| Srisaillam | 1984 | 7165.83 | 1999 | 5152.50 | 2013.33 | 15 | 28.10 | 1.87 | 134.22 | 2952.84 | 41.21 |
| Umiam | 1965 | 131.70 | 2002 | 130.124 | 1.576 | 37 | 1.19 | 0.03 | 0.04 | 1.73 | 1.31 |
| TOTAL (23) | | 23492.465 | | 19582.08 | 3910.385 | | 16.65 | 0.912 | 214.223 | 5430.116 | 23.11 |

Remarks Four reservoirs (Jakham, Idukki, Machhkund and Dudhwa) not included here as their live storage capacity was found to have gone up following SRS survey and the original surveys were grossly in error. For five reservoirs (Bhadar, Damanganga, Mayurakshi, Narayanpur and Palitana) we have taken the siltation rate from the previous hydrographic survey as SRS survey discovered that the LS capacity has increased from the previous hydrographic survey, but there were sufficient reasons for deficiencies in the SRS survey. For Ranapratap Sagar Reservoir, we have assumed that siltation rate was same for 1970-1996 as that for 1996-2002. In case of Matatila reservoir, we have taken the loss from 1956 gross (only loss in gross capacity is given in the SRS survey for 1999) capacity and not 1962 gross capacity as recommended by the SRS report as the reasons put forwarded by SRS survey were not convincing enough. Srisaillam: Reservoir was built in 1984. SRS survey says that the original survey of 1990 was wrong. However, the 1990 survey being of doubtful accuracy, we have used the 1984 and 1999 survey results.

Other heavily silted reservoirs Following information is not from the SRS studies currently under reviewed, but from earlier CWC studies.

⇒ **Srirama Sagar** This 3.172 BCM gross storage reservoir lost 25% of its capacity (779 MCM) in just 14 years of its impoundment in 1970.

⇒ **Ukai** lost 11.09% capacity in 20 years by 1992.

⇒ **Dantiwada** lost 12.05% capacity in 26 years

⇒ **Maneri Large Dams in India** quotes Chief Engineer of Ganga Valley HEP, UP, saying that Maneri Dam on Bhagirathi (Ht 39 m) is already silted up to crest level.

High Siltation Rates In case of at least 14 of the 23 reservoirs, the actual siltation rate was found to be higher than the design siltation rate, as given in table below. The comparison was not possible in a number of other cases as the design rate is not given in the SRS reports.

Tungabhadra (Siltation rate 1.01 mm/year), Panchet Hill (1.05 mm/year), Pong (2.785 mm/year), Ramganga (2.294 mm/year) and Koyna (1.52 mm/year) are some other dams with high siltation rate.

Some absurd results from SRS studies We found that in case of a number of reservoirs, the SRS studies gave absurd results as described below.

⇒ **Dudhawa** (Dhamtari dist, Chhattisgarh, Mahanadi) LS in year of impoundment 1964: 284.13 MCM, goes up to 284.806 MCM in 2003. This is an absurd result as the Sondur reservoir in the nearby area has in the meantime lost substantial capacity.

⇒ **Idukki** (Kerala): LS in year of impoundment 1974: 1461.81 MCM goes up 2003 to 1464.385 MCM. The 2003 survey estimates that the submergence area at MDDL is 23.72% higher than that in original survey and the submergence area at FRL (Full Reservoir Level) is 13.38% lower than the original survey. If we go by what the SRS study says, the LS capacity and the submergence areas in the project plans were all wrong. Moreover, even though the submergence area at FRL is lower, the capacity goes up! This shows how wrong the

project plans were. The SRS study says the original survey and also the hydrographic survey done in 1999 by RITES (it found LS capacity at 1454.68 MCM) are wrong. Will there be any action against those that were responsible for these wrong surveys?

⇒ **Krishnarajsagar** The finding of the SRS study claims that the siltation is only to the extent of 59.76 MCM after a period of 68 years, i.e. just 0.88 MCM per year, is at variance with a CBIP (Central Board of Irrigation and Power) report (quoted in *Large Dams in India*, IIPA, 2002) that said that "occurrences of inordinate levels of sedimentation were also recorded for the Krishnarajsagar Dam in Karnataka. As late as 1992 catchment area treatment was recommended". The SRS study has a lot to explain, it seems. What is shocking is that the SRS study done by the CWC says (p 13), "As per the available information, no hydrographic study or sedimentation study for Krishnarajsagar Reservoir has been conducted so far". This is complete lie and CWC should know about the CBIP study findings, both being govt of India organisations.

In case of at least 14 of the 23 reservoirs, the actual siltation rate was found to be higher than the design siltation rate. In other cases like the Krishnarajsagar, the CWC Report give absurd report and also indulge in complete lie that no previous studies have been done, when CBIP has done siltation study for KRS and CWC should very well know about the same.

Actual Vs Design Siltation Rates

| Reservoir | River | Design rate, mm/year | Actual rate, mm/year | Actual rate as % of design rate |
|---------------------------|---------------------|----------------------|----------------------|---------------------------------|
| Gumti (Tripura) | Gumti | 0.362 | 9.94 | 2746 |
| Kyredemkulai (Meghalaya) | Umtru | 0.138 | 0.144 | 104.35 |
| Halali (MP) | Betwa | 0.476 | 2.032 | 427 |
| Matatila (UP) | Betwa | 0.132 | 0.370 | 280.3 |
| Parbati (Rajasthan) | Parbati (Chambal) | 0.157 | 0.524 | 333.8 |
| Ramsagar (Rajasthan) | Bamani (Chambal) | 0.081 | 0.274 | 338.3 |
| Kadana (Gujarat) | Mahi | 0.13 | 1.146 | 881.5 |
| Panam (Gujarat) | Mahi | 0.357 | 0.475 | 133.1 |
| Isapur (Mah) | Penganga (Godavari) | 0.357 | 0.379 | 106.2 |
| Mayurakshi (Jharkhand) | Mayurakshi | 0.364 | 0.696 | 191.2 |
| Maithon (Jharkhand) | Damodar | 0.905 | 1.282 | 141.7 |
| Sondur (Chhattisgarh) | Mahanadi | 0.357 | 5.768 | 1615.7 |
| Rengali (Orissa) | Brahmani | 0.39 | 0.427 | 109.5 |
| Kallada (Kerala) | Kallada | 1.45 | 4.78 | 330 |
| From Other studies | | | | |
| Ukai (Gujarat-1992) | Tapi | 0.149 | 0.814 | 546.3 |

Note: Most design siltation rates are given for gross storage, while the actual rates above are for live storages.

Years of negligence The following table shows different year of survey in respect of each reservoir. Remote Sending Directorate has stated that since 1958, when it was established that the live storage capacity of the reservoirs is getting reduced due to siltation, a systematic effort has been made by various departments/ organisations to evaluate the capacity of reservoirs. The table below shows how unjustified is the claim. Only in Matatila and Maithon reservoir, more than five surveys have been done. In case of Palitana three surveys has been done. Three reservoirs have been reassessed twice and six reservoir only once. Rest 15 reservoirs have been assessed for the first time through remote sensing survey recently. Ramsagar, Krishnarajasagar, Lower Bhawani, Dudhawa, Umiam - all these old reservoirs have been assessed for the first time. Ramsagar reservoir in Rajasthan constructed in 1905 has reassessed for the first time in 2003.

THE DAM BLUNDERS Reading the SRS reports, we found what serious blunders our dam planners are capable of. Here we are giving some of the big blunders of our dam planners, exposed by these reports.

⇒ **Jakhm** The SRS study says that the LS in 2002 was found to be 32.64% *higher* than the planned live

The siltation reports conclude that the original live storage capacities of Jakhm, Matatila, Idukki, Isapur, Machhkund, Ranapratap Sagar and Srisailam reservoir were wrongly estimated. This should shock everyone and raise very uncomfortable questions about the abilities of the govt water resources engineers and CWC in planning, designing and decision making about large dams.

storage area of 132.28 MCM, the first impoundment was in 1986. The submergence area at FRL is even higher at 14.923 km², 47.75% higher than the planned figure of 10.1 km². The recalculated water spread area at the time of impoundment comes to 16.218 km², which means the submergence area in 1986 was 60.57% higher than the planned figure. In other words, the project authorities submerged an additional 6118 ha of land, what happened to the people in this submergence zone is not known. The SRS study says (P 32) makes a shocking admission for these gross errors, "The results of Jakhm reservoir were discussed with many officials of the irrigation department.

They were of the opinion that there might be some error in conversion of area values from one unit to another." Can one entrust planning, construction and operation of large dams in the hands of officials who can present such excuse for the gross errors in reservoir designs? Will there be any consequences for these gross blunders?

⇒ **Matatila** According to the SRS study, the original surveys were inadequate: "Because of the capacity of the project purpose was estimated earlier in 1956 on the basis of inadequate survey, the gross capacity of 985.71 MCM has been taken as basis."

Years of Siltation surveys for various Reservoirs

| Name of reservoir | Years of survey | | Age of reservoir till the last survey | Total Number of survey except present SRS survey |
|-------------------------|-----------------|--|---------------------------------------|--|
| | Original survey | Reassessment | | |
| Matatila | 1962 | 1964, 1966, 1969, 1971, 1975, 1985, 1990, 1999 | 37 | 7 |
| Maithon | 1955 | 1963, 1965, 1971, 1979, 1987, 1994, 2001 | 46 | 6 |
| Palitana | 1959 | 1975, 1986, 1996, 2003 | 44 | 3 |
| Bhadar | 1964 | 1986, 2000, 2002 | 38 | 2 |
| Narayanpur | 1982 | 1991, 1998, 2003 | 21 | 2 |
| Mayurakshi | 1955 | 2000, 2001, 2003 | 48 | 2 |
| Damanganga | 1983 | 1999, 2002 | 19 | 1 |
| Idukki | 1974 | 1999, 2003 | 29 | 1 |
| Machhkund | 1955 | 1982, 2002 | 47 | 1 |
| Panam | 1977 | 1990, 2003 | 26 | 1 |
| Parbati | 1963 | 1998, 2003 | 40 | 1 |
| Ranapratap Sagar | 1970 | 1996, 2002 | 32 | 1 |
| Dudhawa | 1964 | 2003 | 39 | 0 |
| Gumti | 1984 | 2003 | 19 | 0 |
| Halali | 1976 | 2003 | 27 | 0 |
| Isapur | 1983 | 2003 | 20 | 0 |
| Jakhm | 1986 | 2002 | 16 | 0 |
| Kadana | 1983 | 1994 | 11 | 0 |
| Kallada | 1985 | 2003 | 18 | 0 |
| Krishnarajasagar | 1932 | 2000 | 68 | 0 |
| Kyrdemkulai | 1983 | 2002 | 19 | 0 |
| Lower Bhawani | 1955 | 2000 | 45 | 0 |
| Ramsagar | 1905 | 2003 | 98 | 0 |
| Rengali | 1983 | 2001 | 18 | 0 |
| Sondur | 1988 | 2003 | 15 | 0 |
| Srisailam | 1984 | 1999 | 15 | 0 |
| Umiam | 1965 | 2002 | 37 | 0 |

⇒ **Idukki** According to the SRS study, the original LS and submergence area of the reservoir were wrong.

⇒ **Isapur** The original LS and gross storage capacity of the project were found to be wrong. The SRS study says (P 15) "After a few years of Reservoir Operation it came to notice of authorities that there are certain discrepancies in the original stage-area-capacity table. The original values and survey details were submitted to the Central Design Organisation, Pune. Project authorities & CDO officials found out that there are certain calculation discrepancies in the original table. The values were recalculated & new gross and live storage were fixed at 1241.537 and 928.262 MCM respectively." This meant a reduction of 37.523 MCM in gross storage capacity and a reduction of 35.837 MCM in live storage capacity.

⇒ **Machhkund** Original LS capacity (1955): 892.55 MCM increased to 954.23 MCM under SRS study. As stated in the SRS study, the original survey is wrong. The original gross storage capacity also seems to be wrong.

⇒ **Rana Pratap Sagar** The SRS study concludes, "In view of the above findings it may be concluded that the results of earlier surveys of 1970 and 1996 (CES) are incorrect." This innocuous sounding statement is supposed to imply that the live storage and gross storage capacities of the project as planned were wrong, possibly some other parameters could also be wrong. Will there be any action against those responsible for the wrong surveys of 1970 and 1996?

⇒ **Srisailem** The SRS report concludes (p 41) that the correctness of the original survey is doubtful. Thus the actual original live storage capacity of the reservoir, if we go by SRS conclusion, must have been substantially lower (the reduction likely to be in excess of 1.5 BCM) than the figure of 7165.83 MCM used in the plans.

SRS siltation loss lower than earlier surveys

⇒ **Bhadar** LS (2000): 187.79 MCM goes up to 191.741 MCM in 2002

⇒ **Damanganga** LS (1999): 464.46 MCM goes up to 476.133 MCM in 2002

⇒ **Mayuraskshi** LS (2000) 474.82 MCM goes up to 485.41 MCM in 2003

⇒ **Narayanpur** LS (1989-91) 762.171 MCM and (1996-98) 740.345 MCM goes up to 842.254 MCM in '02

⇒ **Palitana** LS (1996) 304.226 MCM goes up to 324.304 MCM in 2003

⇒ **Rana Pratap Sagar** LS (1970) 1566.53 MCM goes up after 31 years to 1720.1 MCM in 2001.

In case of Narayanpur, the SRS mentions that "Water Spread Area of Narayanpur does not change in entire back water area". Since remote sensing gives accurate estimates for reservoirs with considerable change in WSA with water level rise, we can safely conclude that Remote sensing is not likely to give accurate siltation rate for Narayanpur.

The quality of siltation reports leave a lot to be desired. The Kadana and Lower Bhawani reports say that there have been no previous hydrographic surveys, when there have been previous hydrographic surveys. For both these reservoirs even the year of impoundment given is wrong. For Damanganga, the report says that it has installed hydropower capacity of 1000 MW when that project has no hydropower station as per CEA reports.

Limitations of SRS surveys Reading through the SRS survey reports, we found that the SRS surveys suffer from a number of limitations, some of which are described here. We have written to the authors of the SRS reports about these and other related issues, but

have so far received no response from them.

⇒ **Extrapolations** All the SRS surveys involve extrapolations for elevations between maximum elevation in the observations used and Full Reservoir Level on the one end and between the Minimum elevation in the observations used and the MDDL on the other end. Such extrapolations constitute significant range in most cases and this is likely to introduce inaccuracies in the estimations of siltation rates.

⇒ **Multi year observations** Since siltation is a dynamic phenomenon, the live storage capacities each year would be different. Thus for getting accurate results it would be necessary that the observations used are from a single water year (June to May). However, we found that in most SRS surveys, observations from two to four years are used, and this is bound to introduce inaccuracies as the submergence areas and live storage capacity for any level would be differ for year to year.

⇒ In a number of cases, significant discrepancy between water spread area at some levels was found between the satellite data and the area derived from best fit equation used (e.g. Bhadar).

⇒ In many cases, discrepancies in trend of water spread area wrt elevations for different surveys was found for which no explanation is given (e.g. Bhadar).

⇒ The SRS surveys note that check with ground truth for a number of factors like tail end levels, among others is necessary in a number of cases, but that has not been possible, as admitted by SRS surveys.

⇒ As noted by the reports, some of the SRS surveys have been found to be wrong. For example, in case of Narayanpur dam, the SRS survey of 1997 gave LS capacity of 740.345 MCM and the SRS survey of 2003 gave LS capacity of 842.254 MCM. One of the two must be wrong, and the latest study assumes that the 1997 study was wrong.

⇒ Even SRS studies, when confronted with unexplainable results, recommends hydrographic surveys to check the reality, thus proving that

hydrographic surveys are more reliable. (e.g. KRS, Machhkund, Rana Pratap Sagar, Srisailam, others.)

⇒ In case of Srisailam SRS study for the year 1996, the report notes (p 30), "The study area could not be fully covered even under the three quadrant of IRS-1A LISS-II scene. A part of the portion between the dam location and the point from where real pondage start is missing." Such gaps are bound to add further inaccuracies in the study

No attempt to cross check SRS study reports should have been informed by additional information that would have also helped in cross checking the conclusions of the SRS study.

⇒ Performance of the project as against the plans.

⇒ Information about the Catchment Area Treatment Planned and actually implemented. The CAT is supposed to help in arresting siltation. Inclusion of this would have helped understand the siltation findings. The remote sensing pictures can give information about the CAT work done and its appropriateness and efficacy.

⇒ The information of the other reservoirs in the catchment as they significantly decide the siltation at the downstream reservoirs.

Quality of Reports Some of the more important problems found in the report are listed here. These only reflect how poor is the quality of the reports.

⇒ The Kadana SRS study says (p 6) the reservoir was impounded in 1983, when in reality the impoundment happened in 1977 (according to the CBIP and CWC sources quoted in *Large Dams in India* and also according to a paper presented at 1995 International Symposium by scientists from Gujarat Engineering Research Institute). Moreover, both these sources also say that there have been hydrographic surveys in the past, but the SRS study does not have any information about the same.

⇒ The Lower Bhawani SRS study says (p 7) that no previous hydrographic surveys have been done, which is a complete lie. As per a paper presented by scientists of the Maharashtra Engineering Research Institute, a hydrographic survey of the Lower Bhawani reservoir was done in 1983. The MERI report also says that the project was impounded in 1953 and not in 1955 as mentioned in the SRS study.

⇒ Damanganga Report says the project installed hydropower capacity is 1000 MW, when that project is not known to have any hydropower component.

⇒ Siltation data not given in uniform units in all the reports, creating confusion and difficulty comparing the rates for different reservoirs. In case of Lower Bhawani

reservoir, as in a number of other cases, the design siltation rate is not given.

⇒ While using the calculated values, simple scientific step of rounding the figures has not been done (e.g. siltation rate for Bhadar)

⇒ The report of Sondur Reservoir siltation (p 26) says the graph is for Umiam reservoir!

⇒ The report of Krishnaraj Sagar Reservoir SRS study (p 28) says that LS of Lower Bhawani reservoir is 1215.94 MCM when KRS should have been written.

⇒ The report on SRS study of Kadana reservoir ends with salient features of Mahi Bajaj Sagar (and preface for MBS) in place of salient features of Kadana.

For the 23 reservoirs (excluding the four reservoirs from the 27 SRS reports for which the SRS surveys give LS greater than the original surveys), the annual loss in live storage capacity is 214.2 MCM, that is 0.912% of the original live storage capacity. These 23 reservoirs have already lost 23.11 % of LS by 2006. At this rate we are losing about 1.95 BCM capacity annually from existing large reservoir capacity of 1.95 BCM.

The Big Picture Broadly,

the quality of SRS survey reports leave a lot to be desired. The reports from CWC are worse compared with those from the RRSSC, Jodhpur. There are many sources of inaccuracies in the estimations. In most cases, the actual rate of siltation is found to be higher than the design rate. For the 23 reservoirs (excluding the four reservoirs from the 27 SRS reports for which the SRS surveys give LS greater than the original surveys), the annual loss in live storage capacity is 214.2 MCM, that is 0.912% of the original live storage capacity. These 23 reservoirs have already lost 23.11 % of LS by 2006. The distribution is as follows.

| Loss % | > 40% | 25-40% | 20-25% | 15-20% | 10-15% | 5-10% | <5% |
|----------------------|-------|--------|--------|--------|--------|-------|-----|
| Number of Reservoirs | 2 | 3 | 3 | 5 | 4 | 2 | 4 |

Considering that we now have about 214 BCM of live storage capacity through large reservoirs and if apply the same loss rate (since the reservoirs in this sample are well distributed geographically and represent both small and large and also low and high siltation rate reservoirs, we may not be too much off the mark), we are losing about 1.95 BCM capacity annually. This shows that the annual loss figure of 1.3 BCM arrived at by the National Commission earlier may prove to be an underestimate.

This should alarm all the concerned, but there are no signs to show that the seriousness of the situation has dawned. The CAT continue to be neglected, and even in recently completed projects like the Nathpa Jhakri (no co-incident that the project was funded by the World Bank) and Baspa in Sutlej basin, one of the high silt basin, the CAT are yet to be implemented even years after completion of the projects. The consequences are there for all to see: Nathpa Jhakri had to be stopped repeatedly due to high silt in the river. If this does not serve as wake up call for the authorities, what will?

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**Accelerated Irrigation Benefits Programme****Why it is a complete Misnomer: No acceleration, little irrigation, miniscule benefit**

The Accelerated Irrigation Benefits Programme was started by the Govt of India as a way to open a new channel for funding large irrigation projects. It was supposed to accelerate the completion of what were to be last mile projects, which were expected to be completed in maximum two working seasons. The Scheme was started by the then finance minister P Chidambaram in 1996. Its no coincidence that in his present tenure he has managed to start another one on almost identical lines: Bharat Nirman. Chidambaram also tries hard to give the schemes he floats an aura of newness, an aura of justifiability. It seemed right in 1996 that in stead of starting new projects, it is better to complete the long pending ones and get quick benefits at marginal additional costs. Unfortunately, or may be as were the intentions, the norms were bypassed to fund schemes that could under no stretch of imagination be described as last mile projects.

Here we are giving information about the money spent on AIBP since its inception to March 31, 2006, as given by the official sources, the ministry of Water Resources and the Planning Commission. We are also giving the projects funded under AIBP in two states, namely Gujarat and Andhra Pradesh.

**AIBP Funding from 1996-97 to 2005-06**

(Amount in Rs Crores, Area in Thousand Ha)

| Sr No | State             | 1996-97 to 2001-02 | 2002-3    | 2003-4    | 2004-5    | 2005-6    | TOTAL      |
|-------|-------------------|--------------------|-----------|-----------|-----------|-----------|------------|
| 1     | Andhra Pradesh    | 630.615            | 33.186    | 205.5300  | 87.5470   | 311.3815  | 1268.2595  |
| 2     | Arunachal Pradesh | 30.00              | 1.50      | 20.0000   | 10.0000   | 18.0000   | 79.5000    |
| 3     | Assam             | 84.718             | 16.2738   | 19.2015   | 16.9300   | 34.9332   | 172.0565   |
| 4     | Bihar             | 339.725            | 14.4805   | 74.6440   | 37.2150   | 16.2380   | 482.3025   |
| 5     | Chhattisgarh      | 86.65              | 104.00    | 74.6300   | 2.9250    | 7.6645    | 275.8695   |
| 6     | Goa               | 128.40             | 0.0000    | 2.0000    | 0.6500    |           | 131.0500   |
| 7     | Gujarat           | 1971.733           | 1000.33   | 650.3590  | 530.5000  | 339.6000  | 4492.5220  |
| 8     | Haryana           | 44.50              | 18.00     | 7.7350    | 11.1350   | 6.0000    | 87.3700    |
| 9     | Himachal Pradesh  | 43.806             | 8.150     | 14.6920   | 3.6900    | 30.0785   | 100.4165   |
| 10    | Jammu & Kashmir   | 27.51              | 34.999    | 21.5450   | 12.7445   | 36.6878   | 133.4863   |
| 11    | Jharkhand         | 51.41              | 9.67      | 1.8330    | 21.2850   | 5.0370    | 89.2350    |
| 12    | Karnataka         | 1066.89            | 620.85    | 266.4780  | 396.2952  | 140.7759  | 2491.2891  |
| 13    | Kerala            | 52.425             | 5.665     | 31.0000   | 49.4400   | 9.3591    | 147.8891   |
| 14    | Madhya Pradesh    | 716.563            | 220.00    | 568.4400  | 516.7010  | 168.0966  | 2189.8006  |
| 15    | Maharashtra       | 305.855            | 133.1341  | 164.3950  | 529.2860  | 169.1822  | 1301.8523  |
| 16    | Manipur           | 73.75              | 19.50     | 15.5000   | 13.0000   | 75.7035   | 197.4535   |
| 17    | Meghalaya         | 12.6758            | 1.50      | 1.0880    | 1.7438    | 1.5750    | 18.5826    |
| 18    | Mizoram           | 4.866              | 0.75      | 9.3000    | 5.0000    | 9.3150    | 29.2310    |
| 19    | Nagaland          | 12.73              | 2.659     | 8.0000    | 4.0000    | 7.9987    | 35.3877    |
| 20    | Orissa            | 563.995            | 179.57    | 154.6850  | 24.2230   | 151.3742  | 1073.8472  |
| 21    | Punjab            | 378.81             | 36.66     | 0.0000    |           | 26.3166   | 441.7866   |
| 22    | Rajasthan         | 466.172            | 174.385   | 499.8370  | 352.9040  | 90.2952   | 1583.5932  |
| 23    | Tripura           | 82.477             | 13.3947   | 13.3769   | 11.0000   | 31.9950   | 152.2136   |
| 24    | Tamil Nadu        | 20.00              | 0.00      | 0.0000    |           |           | 20.0000    |
| 25    | Uttar Pradesh     | 1154.59            | 359.00    | 274.7850  | 175.9200  | 133.1280  | 2097.4230  |
| 26    | Uttaranchal       | 0.00               | 25.1625   | 25.5525   | 38.9917   | 80.4387   | 170.1454   |
| 27    | W Bengal          | 125.433            | 28.133    | 3.1440    | 13.4610   | 0.0287    | 170.1997   |
| 28    | Sikkim            | 3.76               | 0.75      | 0.7500    | 0.7500    | 0.9113    | 6.9213     |
|       | TOTAL             | 8480.0288          | 3061.7026 | 3128.5009 | 2867.3372 | 1902.1142 | 19439.6837 |

\*: The above figures are from the website of the Union Ministry of Water Resources.

We look at the performance of ABIP over the years, we see that it has failed to accelerate the irrigation projects, it has failed to achieve completion of most of the projects within two working seasons, as required or even within ten working seasons, as noted by the report of the Comptroller and Auditor General of India for 2004-5. It was expected that the marginal cost of completion would lower the cost of adding 1 ha to the irrigation potential, but that has not been achieved. For example, since figures for potential added are available only upto 2003-4, in case of Gujarat, the cost of adding each ha of potential irrigation developed has been huge Rs 187 594/-. It is clear that AIBP has failed on almost all objectives, but continues without any credible performance evaluation. Now a group of ministers are to meeting to further dilute the AIBP norms and now we have the additional scheme of Bharat Nirman, practically on the same lines. Here it may be noted that only a miniscule amount is spent on smaller irrigation projects or rainfed agriculture, with most of the money spent on AIBP, Bharat Nirman again goes for large irrigation projects.

## AIBP Funding for Andhra Pradesh

(Amount in Rs Crores, Area in Thousand Ha)

| Sr No                     | Project                 | Spent in 9 <sup>th</sup> plan | 2002-3        | 2003-4        | 2004-5        | 2005-6         | TOTAL           | Irrigation Potential |                 |                |                            |
|---------------------------|-------------------------|-------------------------------|---------------|---------------|---------------|----------------|-----------------|----------------------|-----------------|----------------|----------------------------|
|                           |                         |                               |               |               |               |                |                 | Total                | Pre AIBP        | Balance        | Created during 97-8 - 03-4 |
| 1                         | Sriramsagar I           | 219.22                        | -             | -             | -             | -              | 219.22          | 392                  | 255.04          | 136.96         | 70.516                     |
| 2                         | Cheyzeru                | 15.33                         | -             | -             | -             | -              | 15.33           | 7.89                 | 0               | 7.89           | 0                          |
| 3                         | Jurala                  | 99.88                         | 20.3          | 47.49         | 59.63         | 17.889         | 245.189         | 41.36                | 10              | 31.36          | 31.175                     |
| 4                         | Somasila                | 44.525                        | -             | 60            | -             | -              | 104.525         | 38.48                | 6.22            | 32.26          | 10.692                     |
| 5                         | Nagarjun Sagar          | 26.43                         | -             | -             | -             | -              | 26.43           | 895.28               | 848.85          | 46.43          | 16.634                     |
| 6                         | Madduvalsa              | 41.8                          | -             | 12.5          | -             | -              | 54.3            | 10                   | 0               | 10             | 9.392                      |
| 7                         | Gundalavagu             | 1.67                          | -             | 2.335         | -             | -              | 4.005           | 1.045                | 0               | 1.045          | 0                          |
| 8                         | Muddigendda             | 1                             | -             | 1.892         | 0.9           | -              | 3.792           | 1.62                 | 1.093           | 0.527          | 0                          |
| 9                         | Kanupur Calani          | 1.92                          | -             | -             | -             | -              | 1.92            | 7.638                | 7.077           | 0.561          | 0                          |
| 10                        | Yerra Kalva             | 2.17                          | 7.886         | 12.568        | 5.839         | -              | 28.463          | 9.996                | 3.035           | 6.961          | 0.809                      |
| 11                        | Vamsedhara I            | -                             | -             | 9.255         | 21.178        | -              | 30.433          | -                    | -               | -              | -                          |
| 12                        | Flood flow canal SRSP   | -                             | -             | -             | -             | 48.00          | 48.00           | -                    | -               | -              | -                          |
|                           | <b>TOTAL</b>            | <b>453.945</b>                | <b>28.186</b> | <b>146.04</b> | <b>87.547</b> | <b>65.889</b>  | <b>781.607</b>  | <b>1405.31</b>       | <b>1131.315</b> | <b>273.994</b> | <b>139.218</b>             |
| <b>FAST TRACK 2001-02</b> |                         |                               |               |               |               |                |                 |                      |                 |                |                            |
| 13                        | Nagarjunsagar           | 27.17                         | -             | 23.54         | -             | -              | 50.71           | -                    | -               | 14.47          | 7.243                      |
| 14                        | Somasilla               | 60                            | -             | -             | -             | -              | 60              | -                    | -               | 27.747         | 11.978                     |
| 15                        | Sriramsagar             | 72                            | -             | 35.95         | -             | -              | 107.95          | -                    | -               | 70.406         | 37.285                     |
| 16                        | Cheyzeru                | 5                             | 5             | -             | -             | -              | 10              | -                    | -               | 9.105          | 7.965                      |
| 17                        | Madduvalsa              | 12.5                          | -             | -             | -             | -              | 12.5            | -                    | -               | 3.036          | 0                          |
|                           | <b>Fast Track TOTAL</b> | <b>176.67</b>                 | <b>5</b>      | <b>59.49</b>  | <b>-</b>      | <b>-</b>       | <b>241.16</b>   | <b>-</b>             | <b>-</b>        | <b>124.764</b> | <b>64.471</b>              |
|                           | <b>Grand Total</b>      | <b>630.615</b>                | <b>33.186</b> | <b>205.53</b> | <b>87.547</b> | <b>65.889*</b> | <b>1022.767</b> | <b>-</b>             | <b>-</b>        | <b>398.758</b> | <b>203.689</b>             |

\*: This figure of AIBP funds for AP for 2005-6 is from the Planning Commission website as shown even as on July 1, 2006. However, the figure given on the Ministry of Water Resources website for AP for 2005-6 is 311.3815 crores. We have not used that figure in the above table as we do not know the project wise break up for this amount.

## AIBP Funding for Gujarat

| Sr No                     | Project            | Spent in 9 <sup>th</sup> plan | 2002-3          | 2003-4         | 2004-5       | 2005-6        | TOTAL           | Irrigation Potential |                |                |                             |
|---------------------------|--------------------|-------------------------------|-----------------|----------------|--------------|---------------|-----------------|----------------------|----------------|----------------|-----------------------------|
|                           |                    |                               |                 |                |              |               |                 | Total                | Pre AIBP       | Balance        | Created during 97-8 to 03-4 |
| 1                         | Sardar Sarovar     | 1805.25                       | 902.996         | 557            | 429          | 339.6         | 3920.746        | 1792                 | 0              | 1792           | 150.336                     |
| 2                         | Jhuj               | 4.74                          | -               | -              | -            | -             | 4.74            | 5.81                 | 2.912          | 2.898          | 2.907                       |
| 3                         | Sipu               | 6.455                         | -               | -              | -            | -             | 6.455           | 22.08                | 19.665         | 2.415          | 1.016                       |
| 4                         | Mukteshwar         | 9.748                         | 0.89            | 0.225          | -            | -             | 10.863          | 6.19                 | 0.565          | 5.625          | 4.566                       |
| 5                         | Hamav-II           | 0.065                         | -               | -              | -            | -             | 0.065           | 3.44                 | 2.94           | 0.500          | 0                           |
| 6                         | Umaria             | 0.135                         | -               | -              | -            | -             | 0.135           | 2.37                 | 2.062          | 0.308          | 0.162                       |
| 7                         | Damanganga         | 9.47                          | -               | -              | -            | -             | 9.47            | 51.65                | 42.594         | 9.056          | 6.686                       |
| 8                         | Karjan             | 7.6                           | -               | -              | -            | -             | 7.6             | 70.38                | 55.73          | 14.650         | 5.989                       |
| 9                         | Sukhi              | 5.65                          | -               | -              | -            | -             | 5.65            | 25.25                | 21.585         | 3.665          | 3.488                       |
| 10                        | Deo                | 0.5                           | -               | -              | -            | -             | 0.5             | 8.53                 | 7.58           | 0.95           | 0.103                       |
| 11                        | Watrak Kadna RBC   | 3.11                          | -               | -              | -            | -             | 3.11            | 16.87                | 12.574         | 4.296          | 3.714                       |
| 12                        | Aji-IV             | 10.35                         | 0.665           | 0.093          | -            | -             | 11.108          | 3.75                 | 0              | 3.75           | 3.75                        |
| 13                        | Ozat-II            | 10.66                         | 1.115           | 0.335          | -            | -             | 12.11           | 9.4                  | 0              | 9.4            | 1.8                         |
| 14                        | Brahmini-II        | 4                             | -               | -              | -            | -             | 4               | 2.062                | 0              | 2.062          | 1.00                        |
| 15                        | Bhadar-II          | -                             | 0.66            | 0.206          | -            | -             | 0.866           | 9.965                | 0              | 9.965          | 1.50                        |
|                           | <b>TOTAL</b>       | <b>1877.733</b>               | <b>906.326</b>  | <b>557.859</b> | <b>429</b>   | <b>339.6</b>  | <b>3997.418</b> |                      |                |                |                             |
| <b>FAST TRACK 2001-02</b> |                    |                               |                 |                |              |               |                 |                      |                |                |                             |
| 16                        |                    | 94                            | 94              | 92.5           | 101.5        | -             | 382             |                      |                |                |                             |
|                           | <b>Grand Total</b> | <b>1971.733</b>               | <b>1000.326</b> | <b>650.359</b> | <b>530.5</b> | <b>339.6*</b> | <b>4379.418</b> | <b>2029.75</b>       | <b>168.207</b> | <b>1861.54</b> | <b>187.017</b>              |

Source: Planning Commission website as on March 20, '06, same status shown as on July 1, 2006

\*: While the Planning Commission website gives the figure of 226.5 crores for AIBP release to Gujarat for 2005-6 even as on July 1, 2006, the website of Ministry of Water Resources gives this figure as 339.6 crores for the same. We have taken the latter figure in the above table, assuming it is updated figure and we have assumed that all that amount was given for SSP under CLA for 2005-6.

The strength of the Sardar Sarovar lobby is reflected in the fact that SSP has received more funding under AIBP than any other projects in India, this when the project could not have been included under the last mile project as required under AIBP. Even after all the inappropriate (or shall we say illegal) allocation to SSP under AIBP, the project, ten years since the AIBP funding started, has not been able to achieve even 10% of its projected irrigation. A clearer illustration of failure of AIBP would be difficult to find. Even the Report of the Comptroller and Auditor General of Govt of India, Ministry of Water Resources, for 2004-5 said that AIBP assistance to SSP without Planning Commission approval to its cost estimates was *irregular disbursement*. "The Planning Commission accorded investment approval to the project in Oct 1988 for Rs 6,406.04 crores at 1986-87 price levels. Due to disputes between the Govts of Gujarat & Madhya Pradesh, the cost estimates revised during 1991-92, 1996-97 and 1998-99 could not be approved by the Planning Commission. However, pending such approval, CLA of Rs 2,896.25 crores, was irregularly released during the period 1996-2003" under AIBP.

SANDRP

## SURAT FLOODS: HOW IT WAS AN PREVENTABLE DISASTER

### Why was the water not released before allowing reservoir to be full?

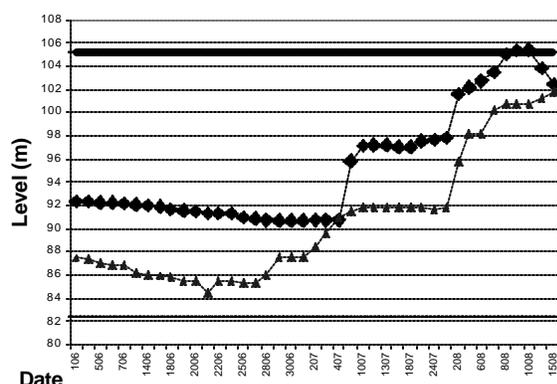
The unprecedented floods of Surat city and district in South Gujarat in western India in Aug '06 and the damages of over Rs 21 000 crores (according to Gujarat govt estimates, actual losses would be much higher if all the losses are properly accounted) were completely preventable. Had the authorities released even 3 lakh cusecs of water from the Ukai dam starting from Aug 1, Surat may not have experienced such a disaster. There was sufficient specific information available to take such an action, as is evident from the rainfall figures in Tapi basin talukas in Maharashtra. Due to lack of timely release of water by the Gujarat water resources department, the storage in the Ukai reservoir was allowed to go up beyond the levels it should have, leading to sudden release of unmanageable quantities of water from Aug 7, for prolonged periods. Since this coincided with the days of high tide when the river's drainage capacity is further reduced, the floods brought catastrophic results.

**Rainfall** As we can see from the salient features of the Ukai dam (Annexure 1, see [www.sandrp.in/new/surat\\_floods\\_aug08.pdf](http://www.sandrp.in/new/surat_floods_aug08.pdf)), 97.85 % of the catchment area upstream from the dam site is in Maharashtra and Madhya Pradesh, over 81.3 % in Maharashtra alone. We have compiled the list of dates when rainfall in the Tapi basin talukas in Maharashtra was more than 25 mm, during June 1, 2006 to August 14, 2006 (Annexure 2, see [www.sandrp.in/new/surat\\_floods\\_aug08.pdf](http://www.sandrp.in/new/surat_floods_aug08.pdf)). We can see that such instances were spread all over July-Aug.

It is clear from these figures that Ukai was going to get large inflows in the days to come and there was sufficient actionable information available with the Gujarat water resources dept to release water from Ukai Dam in July itself.

**Ukai Reservoir Level** This was all the more important considering the rapid rise in water level at Ukai dam as shown in the graph below.

**Level at Ukai Dam**



**Highest pre monsoon, highest July end levels** When we compared the Ukai reservoir levels just before the monsoon and at the end of July for the last four years (for which we could get the data from Central Water Commission and Central Electricity Authority bulletins) we were surprised to find that the levels at Ukai dam were the highest this year in last four years, both with respect to the level just before the monsoon and also at the end of July, as is clear from the table below.

| Year | Lowest level Before monsoon |         | Level (m) at the end of July |
|------|-----------------------------|---------|------------------------------|
|      | Level, m                    | Date    |                              |
| 2003 | 89.91                       | June 17 | 94.56                        |
| 2004 | 88.02                       | July 25 | 88.16                        |
| 2005 | 85.37                       | June 24 | 94.26                        |
| 2006 | <b>90.71</b>                | June 29 | <b>97.8</b>                  |

Source: Central Water Commission, Central Electricity Authority, Govt of India, bulletins of various dates

**Water release figures from Ukai reservoir** While the project authorities have yet to make public the hourly or even daily figures of inflows, outflows, levels and usage of water at Ukai throughout this monsoon, we could gather following figures from the govt statements and media reports.

| Date  | time    | Inflows, cusecs | Outflows, cusecs | Water level, m |
|-------|---------|-----------------|------------------|----------------|
| Aug 5 | 0800 am | 85 958          | 26 664           | 102.20         |
|       | 0800 pm | 48554           | 23 640           | 102.26         |
| Aug 6 | 0800 am | 75 087          | 124 920          | 102.14         |
|       | 0800 pm | 330 216         | 254 780          | 102.57         |
| Aug 7 | 0800 am | 853 679         | 409 004          | 103.46         |
|       | 0800 pm | 1 072 680       | 816 036          | 104.22         |
| Aug 8 | 0800 am | 1 053 133       | 844 092          | 104.97         |
|       | 0800 pm | 961 466         | 907 316          | 105.33         |
| Aug 9 | 0800 am | 856 000         | 850 000          | 105.34         |
|       | 0800 pm | 711 757         | 650 000          | 105.38         |

It is disturbing to know that even as late as on Aug 6 evening, the water releases from Ukai reservoir were just 254 780 cusecs when the level had already built up to 102.57 m, that is reservoir was 83.6% full at 5.528 BCM live storage. A day earlier the releases were shockingly low at 23640 cusecs. This was when during the eight days preceding this, all the talukas of Nandurbar district had received over 25 mm rainfall at least for 4-5 days including an instance of 260 mm rainfall in a day and seven instances when rainfall was over 100 mm. Surgana taluka in Nashik was also getting similar pattern of rainfall.

**WHAT COULD HAVE BEEN DONE?** Had the Ukai dam authorities released 300 000 cusecs of water starting from Aug 1, the reservoir level at Ukai would have been reduced by over 3 BCM by the morning of Aug 6 and the level of water at the dam would have been 94.2 m (about

2.34 BCM storage). After this even with all the additional water coming in, continued outflow of 34 lakh cusecs would have been sufficient to ensure that reservoir does not get full and there would have been no big flood disaster in Surat district.

**Sufficient actionable information available** As we saw above, there was sufficient information available with all concerned about the increasing water level at Ukai reservoir and also about the high rainfall in the catchment.

**Additional reasons** There were additional reasons why such water releases of 300 000 cusecs starting from Aug 1 or earlier were justified:

1. As per Ukai reservoir design, the reservoir is supposed to have a flood cushion of 1.332 BCM. That means that this amount of storage should not be filled till the end of monsoon. Considering the current live storage capacity of 6.615 BCM, water level beyond 102.07 m (5.283 BCM) should not be filled up, in anticipation of floods. Since level at Ukai was already near this level on Aug 1, water releases of 300 00 cusecs should have been started from Aug 1 or earlier to reduce the storage at Ukai.

2. Moreover, this flood cushion was designed assuming that Tapi River could drain 8.5 lakh cusecs water. However, as noted by the report of the Govt of India's National Commission for Integrated Water Resources Development (Sept 1999, p 131), Tapi river's drainage capacity has gone down substantially in view of the experience in 1998 floods when even with an outflow of 6.73 lakh cusecs, Surat was badly flooded. The National Commission had in fact recommended a review of all the parameters of the Ukai dam operation. This should have required even greater flood cushion at Ukai, but neither such a review of the dam operation rules was done, nor was even old flood cushion properly used. The reduced carrying capacity of the river downstream from the dam also warranted release of 300 000 cusecs from Aug 1 or earlier.

3. The Central Water Commission Chair has accepted, as was known to Gujarat water resources dept that current water carrying capacity of the Tapi river is just 3.5-4.0 lakh cusecs. But this crucial information did not seem to be part of the equation of water releases from the Ukai dam.

4. The siltation at the Ukai dam has further reduced Live storage capacity at Ukai dam. When water was first impounded in the reservoir in 1974, its live storage capacity was 7.092 BCM. CWC now reports LS capacity as 6.615 BCM. However, according to a report in 1994

**The Central Water Commission's performance about flood forecasting leaves a lot to be desired. It seems to have totally failed to predict the floods, both due to heavy rainfall and due to releases from dams from all over India. For example, even as a number of river basins in Gujarat were experiencing floods due to releases from dams, the flood forecasts at CWC website was completely silent on all these floods.**

**The inflows, outflows, levels, storages and forecasts at all reservoirs should be routinely made public on daily basis. The reservoir operation rules, the rule curves and disaster management plans should be in public domain for all reservoirs.**

by Gujarat Engineering Research Institute, done for Gujarat Govt, Ukai was losing LS capacity at the rate of 0.55% per annum. At that rate, the current LS capacity of the reservoir would be 5.77 BCM, which means that the reservoir has even lower water storage capacity, and hence the water releases should have been started as soon as available information indicate heavy inflows.

5. According to Media reports, Gujarat State Disaster Management Authority had before the monsoon '06, had asked the Ukai dam authorities not to allow dam level to go beyond 332 feet (101.19 m) before the end of Aug, but the dam authorities had clearly thrown this word of caution out of the window.

The Gujarat Govt has a lot to explain why they did not start release of 300 000 cusecs

from Aug 1 or earlier.

**Power Generation at Ukai** One reason why the dam authorities tend to keep high storages at dams like Ukai is for maximization of power generation. So we looked at the power generation figures from Ukai Dam and the figures we found from the Central Electricity Authority equally shocking.

| Month      | Generation, MU | Target, MU | % of target achieved |
|------------|----------------|------------|----------------------|
| Jan 2006   | 45.79          | 74         | 61.88                |
| Feb 2006   | 44.12          | 73         | 60.44                |
| March 2006 | 53.52          | 66         | 81.09                |
| April 2006 | 56.13          | 60         | 93.55                |
| May 2006   | 50.25          | 71         | 70.77                |
| June 2006  | 29.2           | 61         | 47.87                |
| July 2006  | 13.85          | 33         | 41.97                |

(Source: Central Electricity Authority ([www.cea.nic.in](http://www.cea.nic.in)))

We can see from the above table is that even as the Ukai reservoir had unprecedented water storage and Gujarat was facing power deficit of up to 1500 MW, Ukai was not being used to generate power. And this situation continued right up to July 2006, when the power generation at Ukai was the lowest in 2006 so far. Here it should be remembered that the target figures in the second column above are fixed by the project authorities and do not signify

the maximum power that Ukai can generate. In fact the potential of power generation at Ukai is much higher than these figures.

The loss of power generation benefit to economy is thus a big loss for the nation. The second consequence of this was that Ukai had unnecessarily high water levels throughout this period, leading, ultimately to disastrous floods in Surat district in August. Thirdly, this water

flowed away without generating any power, which is also a loss of potential benefit. Who will be held answerable for these losses? (For Power generation figures at Ukai in the recent years, see Annexure 3 at: [www.sandrp.in/new/surat\\_floods\\_aug08.pdf](http://www.sandrp.in/new/surat_floods_aug08.pdf))

**AVOIDABLE DISASTER** It is clear from the above account that the unprecedented flood disaster that visited Surat district, in Aug '06 was totally preventable with lower pre-monsoon storages (which could have been achieved by higher power generation at Ukai in pre-monsoon months) and by timely releases of around 300 000 cusecs starting from Aug 1, for which there was sufficient actionable information available with all concerned. The commission of enquiry set up by the Gujarat govt is not likely to inspire much confidence and what is required is an independent, credible investigation of the events leading to the disaster. In the meantime,

Gujarat water resources ministry would do well to release all the figures of inflows, outflows and levels at Ukai Dam from June 1 to Aug 15, 2006.

**Dams create disasters in other basins too** Mismanagement and negligent operations of the large reservoirs on Narmada, Krishna, Godavari, Mahi and Sabarmati Rivers have created man made disaster in Gujarat, Maharashtra, Madhya Pradesh, Karnataka and Andhra Pradesh. The Big dams that were expected to reduce the floods have actually been responsible for the flood disaster visiting these states now, the states that also happen to have the largest number of big dams.

**Reservoir storage before the monsoon** Following are the figures of the % water storage in live capacities of respective dams JUST BEFORE the monsoon '06, all figures are from the Central Water Commission.

| DAM                  | Reservoir Capacity filled up before monsoon | DAM               | Reservoir Capacity filled up before monsoon | DAM                  | Reservoir Capacity filled up before monsoon | DAM                    | Reservoir Capacity filled up before monsoon |
|----------------------|---------------------------------------------|-------------------|---------------------------------------------|----------------------|---------------------------------------------|------------------------|---------------------------------------------|
| <b>TAPI BASIN</b>    |                                             | <b>MAHI BASIN</b> |                                             | <b>KRISHNA BASIN</b> |                                             | <b>GODAVARI BASIN</b>  |                                             |
| UKAI                 | 21.56%                                      | KADANA            | 40.69%                                      | KOYNA                | 25.19%                                      | JAYAKWADI              | 28.33%                                      |
| GIRNA                | 10%                                         | PANAM             | 19.37%                                      | KHADAKVASLA          | 12.5%                                       |                        |                                             |
|                      |                                             | MAHI BAJAJ SAGAR  | 28.17%                                      | NARAYANPUR           | 44.15%                                      |                        |                                             |
| <b>NARMADA BASIN</b> |                                             |                   |                                             | SRISAILAM            | 17%                                         | <b>SABARMATI BASIN</b> |                                             |
| TAWA                 | 22.58%                                      |                   |                                             | NAGARJUNSAGAR        | 47.08%                                      | DHAROI                 | 42.59%                                      |

This situation of reservoirs having substantial water JUST BEFORE the onset of monsoon is a big loss to the nation in a number of ways. Firstly, this means that the water available in live storage before the monsoon could not be used (e.g. for irrigation, water supply, power generation). With the onset of monsoon, since the reservoirs had that much less capacity to absorb monsoon flows, they were bound to release large amount of water without use. The SUDDEN release of LARGE quantities of water from these dams has lead to big disaster in the downstream areas, thus DAMS in the current case are DIRECTLY responsible for the flood damages, and dam operators are responsible for this state of affairs. These disasters could have been avoided, had the pre-monsoon water level lower and had the dam authorities released water in time.

#### Releases from the

**reservoir** The second big factor that decides the floods in the downstream region is the releases from the dams AFTER the onset of the monsoon. Here this information is generally kept a state secret, so unless the Dam operators and governments make public as to how much

water was released, say for irrigation, power generation, water supply and for the downstream areas since the onset of monsoon, it cannot be ascertained if the dam operation has been done in an optimal manner. However, available evidence suggests that the dam operators are responsible for criminal mismanagement in this respect also. We have already seen the example of Ukai in this regard, let us see another stark example.

⇒ **Sardar Sarovar** On August 2, its been widely reported, SSP main canal was open by just 0.5 m, releasing just about 580 cusecs of water, when the dam

was getting inflows of over 98000 cusecs and downstream releases were just around 21 000 cusecs. This lead to water level behind the dam going up to 128 m, when it need not have gone much beyond 119 m. As a direct consequence of this build up, lands, houses and habitats of thousands of families faced

avoidable and illegal submergence. It seemed like the state bent on using submergence as a weapon to terrorise the affected people into accepting unjust displacement. SSP authorities need to answer as to what were the hourly releases into canals, riverbed

This situation of reservoirs having substantial water JUST BEFORE the onset of monsoon is a big loss to the nation in a number of ways. Firstly, this means that the water available in live storage before the monsoon could not be used (e.g. for irrigation, water supply, power generation). With the onset of monsoon, since the reservoirs had that much less capacity to absorb monsoon flows, they were bound to release large amount of water without use.

power house and inflow and overflow from the dam along with water level behind the dam. If Gujarat did not have the capacity to use water, why was the increase in dam height from 110.63 m to 121.92 m pushed?

The story is similar in Krishna, Godavari, Mahi and Sabarmati basins that are also facing floods. A related issue is the siltation of dams (as we have seen in case of Ukai), which is also leading to reduction in available LS capacity at reservoirs, and nothing is being done to arrest the siltation. According to the report of the Govt of India's

National Commission for Integrated Water Resources Development, the country is losing 1.3 BCM storage capacity every year, and the loss is about Rs 1600 crores of rupees.

**Met Dept (& others, including state govts) should give basin wise rainfall data and the rainfall forecasts should be done river basin wise and not geographic area wise as is done now. The UNDP needs to be more accurate in its flood situation report to reflect the ground realities when floods are brought because of releases from dams.**

The least one can demand is a credible, independent enquiry as to why such a situation arose which could have been substantially avoided with more optimal operation of projects. The dam authorities also will have to come out with full facts and figures about inflows, outflows, releases and reservoir levels and storage capacities on daily basis, so that those responsible for mismanagement can be identified and necessary action can be taken. The Nation has paid huge costs in creating these reservoir capacities and negligence of the dam operators is leading to disastrous consequences which are entirely avoidable.

**Recommendations** To reduce occurrence of such events in future, some immediate recommendations can be made:

⇒ **National Enquiry** A Nationwide independent enquiry should be set up on the issue of floods in India this year, particularly those from the sudden releases of dams all over India. With proper use of water in the reservoir before the monsoon and timely releases of water from the dams, many of these disasters could have been avoided or damages substantially reduced.

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⇒ **High Pre Monsoon storages** As shown by SANDRP press release on Aug 10 ([www.sandrp.in/new](http://www.sandrp.in/new)), a number of dams in these basins had high water storages, up to 47%. The investigation should also look into why this was the case, what were the consequences and how they could have been avoided.

⇒ **Transparency in Dam operations** The inflows, outflows, levels, storages and forecasts at all reservoirs should be routinely made public on daily basis.

⇒ The reservoir operation rules, the rule curves and disaster management plans should be in public domain for all reservoirs.

⇒ **Provide basin wise rainfall data, forecasts** Met Dept (& others, including state govts) should give basin wise rainfall data and the rainfall forecasts should be done river basin wise and not geographic area wise as is done now.

⇒ **Failure of CWC** The Central Water Commission's performance about flood forecasting leaves a lot to be desired. It seems to have totally failed to predict the floods, both due to heavy rainfall and due to releases from dams from all over India. For example, even as a number of river basins in Gujarat were experiencing floods due to releases from dams, the

flood forecasts at CWC website was completely silent on all these floods.

⇒ **Review Dam Operation Rules** As recommended by the National Flood Commission (1980) and also the National Commission for Integrated Water Resources Development, periodic review of dam operation rules and rule curves should be taken up in a transparent manner and the same should be made public.

⇒ **UNDP reports inaccurate** UNDP routinely puts out flood situation reports that seems to have no understanding of how the sudden releases of water from dams are leading to floods. It is expected that UNDP reports would give a more accurate picture of the situation.

⇒ **Review National Flood Policy** As Dinesh Kumar Mishra of Barh Mukti Abhiyaan said at a meeting in Delhi on Aug 31, the flood policy declared by the then Planning Minister Gulzari Lal Nanda in Parliament in Sept 1954 is the only National Flood Policy we have and this needs to be reviewed.

⇒ **National Drainage Commission** Mishra also recommended that there is need for a National Drainage Commission, as different from the National Flood Commission Report of 1980. The NFC made 202 recommendations, 25 of which were accepted by the govt, but all remain unimplemented.

⇒ **Citizens Groups** Most importantly, Citizens groups around the large dams in their respective areas all over India need to monitor the dam operations and flood situation and make the govt answerable for the avoidable disasters.

**SANDRP**

## The Polluted Hindon River

Once the lifeline of Western UP, the Hindon is a dead river today. The river after covering a distance of about 200 km travels through Saharanpur, Muzzafarnagar, Baghat, Meerut, Ghaziabad and Gautambudh Nagar

districts and is over burdened by the untreated effluents of a number of paper mills, sugar mills, distilleries, slaughter houses, agricultural run off and untreated domestic sewage released in it.

### Heavy metal concentration in River Hindon and it's tributaries

| Sr no                                           | Sample Code                                                             | Concentration of Heavy Metals (mg/l) |                 |              |
|-------------------------------------------------|-------------------------------------------------------------------------|--------------------------------------|-----------------|--------------|
|                                                 |                                                                         | Lead                                 | Chromium        | Cadmium      |
| <b>CPCB standards for surface water quality</b> |                                                                         | <b>&lt;0.01</b>                      | <b>&lt;0.10</b> | <b>0.005</b> |
| <b>River Hindon</b>                             |                                                                         |                                      |                 |              |
| 1.                                              | Star paper mill drain in Sharanpur                                      | 0.34                                 | 1.84            | BDL          |
| 2.                                              | River Dhamola in Saragthal Village (Sharanpur)                          | 1.79                                 | 4.15            | 0.017        |
| 3.                                              | River Hindon bridge on road from Budhakhera to Kashipur (Sharanpur)     | 1.50                                 | 3.17            | BDL          |
| 4.                                              | River Hindon in Titavi (Muzaffarnagar)                                  | 0.21                                 | 5.72            | 0.013        |
| 5.                                              | River Hindon in Titavi (Muzaffarnagar)                                  | 0.28                                 | 6.64            | 0.012        |
| 6.                                              | River Hindon bridge on Badot to Khatoli road in Budhana (Muzaffarnagar) | BDL                                  | 9.43            | BDL          |
| 7.                                              | River Hindon near Basi Village in Budhana (Muzaffarnagar)               | 0.04                                 | 12.25           | BDL          |
| 8.                                              | River Hindon in Pithlokar Village (Meerut)                              | 0.92                                 | 5.65            | BDL          |
| 9.                                              | River Hindon in Kaleena Village (Meerut)                                | 0.153                                | 4.84            | 0.005        |
| 10.                                             | River Hindon in Kinauni Village (Meerut)                                | 0.304                                | 2.80            | 0.011        |
| 11.                                             | River Hindon bridge on road from Meerut to Bagpat near Baleni (Meerut)  | BDL                                  | 3.02            | 0.001        |
| 12.                                             | Hindon barrage at Mohan Nagar (Ghaziabad)                               | 0.145                                | 4.53            | 0.016        |
| 13.                                             | River Hindon in Momnathal Village (Greater Noida)                       | 0.10                                 | 3.643           | 0.002        |
| 14.                                             | River Yamuna in Tilwara Village (Greater Noida)                         | 1.12                                 | 6.78            | 0.014        |

**BDL: Below Detectable limit**

The Historical Hindon River formally called *Harnandi* has hardly any dissolved oxygen content in it resulting non-existence of fish and other biodiversity. There is a heavy load of heavy metals like lead, chromium, and cadmium in the river water apart from deadly pesticides like Heptachlor, Heptachlor Epoxide, Fipronil, Eldrin, Endosulphan-I & II and BHC-? etc. These facts have been revealed in a report released by the Meerut based civil society organization Janhit Foundation in a study of Hindon River water quality. The detailed analysis of the river water samples were analyzed at the People Science Institute.

The river originates from the waste water drain of the paper mill located near Peragpur village in Saharanpur district. The samples collected from this point have revealed presence of lead which is 35 times more than the permissible limit and Chromium is 19 times more than the permissible limit. According to Anil Rana, Director of Janhit Foundation "Untreated waste water of the sugar mills and other industries is causing serious health hazards to the residents of the villages located on the bank of this river. Large number of farmers on both sides of the river use this contaminated water for irrigation purpose which has also leached into the aquifers. The domestic cattle is also facing serious digestive problems".

Thousands of patients are suffering from cancer, neurological disorders, stomach ailments and serious skin diseases which are directly linked to the alarming levels of heavy metals and pesticides in the river. Presence of even the internationally banned pesticides

called Persistent Organic Pollutants should be a matter of concern for everyone.

In Muzaffarnagar district, the highly polluted *Kali* (west) river also meets the Hindon river at *Pithlokar* village and after its merger the river water has Lead more than 92 times and Chromium 56 times more than the permissible limit. Excess of Lead and Chromium can create serious health problems including cancer, skin and kidney problems. The level of pesticides is more than 2000 times than the permissible limit at a number of sites.

The *Hindon* meets the *Yamuna* near Noida and the *Yamuna* water sample there has confirmed a heavy presence of Endosulphan-II, BHC-a, Heptachlor and Fipronil many times more than the permissible limit. The Hindon river is diverted as a canal at the Mohannagar barrage which reaches *Kalindi Kunj* and meets the *Yamuna* river. The presence of lead, chromium and cadmium is much more than the permissible limit here too.

According to Anil Rana, 'the principle of Polluter Pays has to be applied and the polluting industries have to be made to pay for the damages caused to the community and also to the ecology of the region apart from immediate installation of the Effluent Treatment Plants. Periodical monitoring of the river water quality should be done by an independent committee. After all the life line of the region needs to be saved. Janhit Foundation would also launch an awareness campaign, amongst the masses to educate them about the importance of pollution free river, said Raman Tyagi, coordinator of the study.

(Janhit Foundation Press Release, 160806)

**DAMS****POLAVARAM OPPOSITION**

**Orissa Opposition** The Orissa govt reiterated its opposition to the Polavaram Project. However, the govt's belated resistance and efforts to seek the Centre's intervention have not brought much relief to the people of Motu area. The dam on Godavari, to be set up some 80 km from Motu, will affect at least 292 families in Motu tehsil area. Malkangiri district administration sources said if the reservoir level was maintained at 182 feet, seven villages -- Motu, Banibachha, Binayakpur, Muraliguda, Modiguda, Kataguda and Peta -- would be completely submerged while Alma village would be partially inundated. At least 2,053 ha of land would also be submerged. If the height was reduced to 150 feet, Motu would be partially affected. The State has proposed for a fresh agreement with AP over submergence of villages and lands. In 1982, the Central Water Commission gave hydrological clearance to the project after the Godavari Water Disputes Tribunal Award. The Orissa govt had objected to the project in May '05 at an inter-State Council meeting. Orissa CM, in a missive to his AP counterpart, had demanded a review of the project, but does not seem to have bothered to follow it up.

The issue has reached the court with Adivasi Mahasabha, an organisation affiliated to the CPM, filing a PIL in the Orissa High Court. The petitioners alleged that while granting environmental clearance to the project, statutory norms and legal procedures were not followed. The High Court had issued notices to the Secretary of Union Ministry of Environment and Forests, Ministry of Tribal Affairs, Central Water Commission, Chief Secretaries of AP & Orissa and the Orissa Pollution Control Board.

**Fate of Rajahmundry** Meanwhile a National Institute of Hydrology-study on Polavaram project has warned that Rajahmundry city could get submerged if the project was constructed, according to noted environmentalist and former principal of Andhra University engineering college T Sivaji Rao. Quoting a June 1999 study of the NIH, Rao told a gathering of experts and scientists attending a UGC-sponsored regional seminar that the study had failed to see the light of the day for reasons better known to the rulers.

**CEC visit** The Central Empowered Committee of the Supreme Court of India visited the tribal pockets in Bhadrachalam and Palvancha divisions of Khammam district on July 30. The committee led by PV Jayakrishnan was greeted by demonstrations and rallies against the project. Members of the Adivasi Samskema Parishad took out a huge rally opposing the project and presented a memorandum emphasizing the need for obtaining acceptable of the tribal groups, living in the scheduled areas, likely to be displaced. The Bhadrachalam MLA and MP and also the CPIM leaders staged protest against the project. Strangely, some congress leaders expressed support for the project. (Indian Express 220706, 290706, The Hindu 310706)

**SSP The Dam Lobby is happy: Fertiliser Consumption to jump in Gujarat** The fertilizer lobby is very happy that in the coming five years, consumption of fertilizer is to go up to nearly 17 lakh T from the current 11.46 lakh T with the irrigation starting in the SSP Command Area. Even at current growth rate of 5.13%, the fertilizer consumption would go up to 14.72 lakh t in five years. With SSP, it is expected that an additional demand of 2.2 lakh T will be created. Gujarat farmers currently consume 107 kg fertilizers per Ha, higher than national average of 97 kg per ha, but lower than the consumption in Punjab (196), Haryana (166), AP (156), W Bengal (129) and UP (128).

**Satyagraha in the Narmada Valley** The Narmada Bachao Andolan is launching satyagraha in the Narmada Valley at three places: Rajghat (on Aug 5, near Badwani), Bhitada (in Alirajpur tehsil, tribal village in M.P. on 6 Aug) and at Chimalkhedi (Maharashtra, on Aug 7), where affected people their supporters will face rising water behind the Sardar Sarovar Dam, to oppose illegal and unjust submergence. (The Economic Times 250706, NBA PR 290706)

**TN Dams unutilized for two decades** Water was released for irrigation simultaneously from Vaigai (900 cusecs, to irrigate 45 041 acres in Nilakkottai, Nadipatti and Madurai North) and Periyar (200 cusecs, to irrigate 14707 acres in Theni, Uthamapalayam and Bodi taluks) reservoirs on June 1, '06 after a gap of 20 years. The water is to be released for 120 days.

⇒ This raises serious questions about usefulness of building dams that remains unutilized for twenty years. Why were such projects constructed? Who really benefited from building such dams? Who will be held accountable for the wasteful expenditure? Many questions, no answers, as usual. (Indian Express 020606)

**NARMADA VALLEY Maheshwar: HC stays MEF order** The Indore Bench of the MP High Court has stayed the order (dated June 9, '06) of Union Ministry of Environment and Forests, which had asked the work to be stopped for violations under Environment Protection Act, 1986. This was following a petition by the Shree Maheswar Hydro Power Corp, saying that Rs 360 crores has been spent on the Rs 2450 crores project and stopping the work would have impact on some workers. (Dainik Bhaskar 200606)

**RIVERS****Ghaggar River: How Pursuit of Bhakra converted a boon into a bane**

THE Ghaggar river basin, measuring 42,174 sq kms, is located between the two mega basins of Indus and Yamuna river systems. The Ghaggar originates in the Shivalik hills some distance above Kalka and enters the plains near Surajpur. After flowing through Punjab and Haryana, it disappears in the sand-dunes of the Thar desert.

During the British rule the waters of the river Ghaggar were considered to be a boon and were used for irrigation. But the situation underwent a complete change after independence, when planning for the Bhakra-Nangal Project was taken up and it was thought that non-perennial irrigation should be replaced by perennial irrigation. So we went in for the gradual "freeing" up of the Ghaggar waters of the duties assigned to it earlier.

In the head reach of the river Ghaggar, near Nada Sahib Gurdwara, there existed a set of Khuls, which irrigated large areas in 1947. These Khuls were privately operated and maintained and there existed a fine set of rules for fixing the share of each Khul. The dispute resolution was quite effective.

In the 1960s East Punjab decided to investigate a proposal for building a 290 ft high 'Earth Dam' on the river Ghaggar and the axis of the proposed Ghaggar Dam was located near Chandi Mandir. The project report was completed with the estimated cost of the dam put at Rs 28 crores. Most of the benefits were to be reaped by the area below Mubarakpur and the upcoming capital township of Chandigarh.

Before formal submission of the Ghaggar Dam report, the reorganisation of the Punjab state took place and the dam site fell in the area going to the new state of Haryana. The new State had different priorities, the Ghaggar Dam project came to be shelved and the catchment area of the dam came in for colonisation at a very fast rate. A military station came to be established near the dam site, so it became clear that there was no chance of building a dam on the river Ghaggar as proposed in the report.

The net effect of the above was that the irrigation through Khuls came to be discarded and the area handed over to contractors responsible for supply of building materials, sand and gravel. The mining of the bed material went on at an uncontrolled scale and this provided additional destructive potential to Ghaggar waters to flow in any direction and attack anywhere.

Engineers were enthused with the benefits of large dams like Bhakra and took steps to takeover the non-perennial canal systems and tried to convert those areas into perennial irrigated areas. This resulted in a complete "Shifting of load" from the Ghaggar to the river Sutlej. This resulted in an increased flood potential of the river Ghaggar. The boon of the pre-independence era has become a bane. In the current scenario of states squabbling over utilisation of precious and limited water resources, it is a shame to let the Ghaggar waters go waste. (The Tribune 150606)

**INTER STATE ISSUES****Chambal: Rajasthan threatens MP with legal action**

The Rajasthan govt has threatened legal action against Madhya Pradesh if MP refuses to immediately dismantle about 1500 check dams in the Malwa region in Chambal basin. Rajasthan feels that due to these dams the inflow of water into Gandhi Sagar Dam has reduced. Rajasthan says it has started debiting such estimated water stopped by the check dams, from MP's share and started releasing water to MP after such deductions. MP has refused to dismantle the check dams, saying they do not reduce inflow into Gandhi Sagar, but has agreed to ban any new check dams in Chambal basin in the state and has said it is ready for a fresh hydrological investigation into the issue by CWC. One result of the dispute is lack of agreement by the two states on the proposed Parbati Kalisindh Chambal River link project under the ILR. (*Dainik Bhaskar* 180606, *Indian Express* 200606)

**Cauvery: Minor vs major irrigation** The Committee of Assessors appointed by the Cauvery Water Disputes Tribunal has said that Karnataka, TN and Kerala can go ahead with development of minor irrigation works planned by them in the Cauvery basin, but warned that any increase in the area under minor irrigation will be at the cost of reduction in areas permitted under major and medium projects. Tamil Nadu had indicated that it would further develop 53 600 acres with requirement of 69 TMC, taking the total area under minor irrigation to 344 500 acres. Karnataka intends to develop 90 100 acres with requirement of 71.3 TMC, to bring the total area under minor irrigation to 330 100 acres. The assessors had taken into consideration minor irrigation from surface water only. This view of the assessors thus negates the lop sided view expressed by the experts committee headed by CC Patel. Assessors held this view following the Centre's policy of encouraging extensive irrigation. (*Indian Express* 180506)

**HYDRO PROJECTS****Dandeli HEP: Forest clearance rejected**

The govt of India has rejected the Karnataka govt's request to divert 57.51 ha of moist deciduous forest land for the Murudeshwar Power Corp to set up a 18 MW run of the river Mavalangi HEP on Kali River near Dandeli town in the Uttar Kannada district. The Union Ministry of Environment and Forests' decision based on the recommendation of the Forest Advisory Committee was conveyed though a letter dated June 21, '06. The letter states that the request is not in consonance with the Ministry's and the state govt's own stand in 1987 when 1360 ha of virgin forests were diverted for the Kodisalli HEP, that no further projects involving diversion of forest land will be undertaken on the Kali River or its tributaries. The Rs 180 crore proposal involved construction of a 3 m high dam 5 km upstream of Maulingi to direct water through a 2 km long tunnel. The diversion would dry up the main river. The Union ministry has taken the stand that too much of ecologically sensitive virgin forest land in the western ghats (20513 ha for the generation of 1225 MW of power) has already been submerged. The project site just 2 km from the Supa dam and close to the Anashi National Park and the Dandeli Wildlife Sanctuary was unacceptable.

⇒ However, events took a strange turn after the meeting of June 21, '06. According to a Press Statement by the Environment Support Group, Bangalore, although the Union Ministry of Environment and Forests rejected the request of diversion of forests for Mavalangi dam on 21st June, 2006 "after careful examination," the Ministry once again convened the meeting of "stakeholders" to reconsider the decision as per its letter dated 11th July, 2006. The reconvened meeting is scheduled on 31st July 2006 in Delhi. This has created doubts in people's minds as to the actual motive of such a move. In the name of so-called stakeholders only government officials and company officials have been invited to present their views. Are these the only stakeholders in this case? Aren't the communities and NGOs stakeholders as well? It is not clear what was the result of the July 31 meeting. (Frontline 280706, see *Dams, Rivers & People*, April-May '06, p 13)

**Vishnu Prayag faces silt problem** The 400 MW Vishnu Prayag HEP in Uttaranchal, commissioned in June '06, is already facing high silt problems and was shut down for that reason at 1630 hours on July 24, '06. (*Rashtriya Sahara* 250706)

**REL pays premium to get Urthing Sobla HEP** The Reliance Energy Ltd has paid upfront cash premium of Rs 6.5 crores to get the 280 MW Urthing Sobla HEP in Uttaranchal. Govt companies like NHPC complain that they cannot do likewise. (The Economic Times 070606)

**Nagarjunsagar Pond Power Project** The Chief Minister of Andhra Pradesh on June 2, '06 laid the foundation stone for the 2 X 25 MW Nagarjuna Sagar tail Pond

Project at Adividevulapalli village of Damaracharla Mandal of Nalgonda district of Andhra Pradesh. The 2 X 25 MW project is to cost Rs 463.74 crores, likely to be one of the costliest such project to be taken up. Tail Pond Dam, located 21.06 km down stream of Nagarjunasagar Dam, near Shastrasala village, Guntur Dist, is designed to store 1.04 TMC of water and to facilitate pump mode operation of 7 Nos. 100.8 MW reversible units of Nagarjunasagar Powerhouse for 8 hours delivering a peaking capacity of 500 MW through out the year. The two units are to be commissioned in July and Nov '08. (www1.apgenco.com, Pioneer 020606)

**Hydro capacity addition** The 10<sup>th</sup> Plan Hydro capacity addition has been 6230 MW so far, and the Power Ministry hopes it would go up to 9500 MW. The hydro capacity addition in the 7<sup>th</sup>, 8<sup>th</sup> & 9<sup>th</sup> plan were 3938 MW, 2428 MW and 4538 MW respectively. (The Tribune 300706)

**NHPC projects lagging** NHPC projects have been lagging behind & NHPC couldn't achieve capacity addition targets. NHPC was expected to add 2480 MW in the 10<sup>th</sup> Plan, has so far added 1580 MW, including 1000 MW Indira Sagar Project (JV with MP govt), much delayed 280 MW Dhauliganga and 300 Chamara II HEP. The 390 MW Dul Hasti project is far behind schedule. The 120 MW Sewa II, scheduled for commissioning in Sept '07 is also behind schedule due to adverse geology and delay in getting approvals. Union Power Minister admitted in Parliament in reply to a question that NHPC projects are getting delayed. (The Tribune 300706)

**GMR eyes hydel units in Nepal, Uttaranchal** The GMR Group is eyeing opportunities in Nepal and Uttaranchal for constructing hydro electric power projects. The group plans to set up a 300-400 MW hydroelectric plant in Nepal. The group believes that the biggest advantage of setting up a project in Nepal is the enabling environment. Nepal has a close geographical proximity to Uttar Pradesh and this may help in the evacuation of power to the state to meet its power demands. GMR Group plans to set up run of the river projects and is eyeing 480 Mw Pali Maneri project in Uttaranchal through a joint venture with Uttaranchal Jal Vidyut Nigam Ltd. However, the Uttaranchal govt has received around 30 request for qualifications for forming the joint venture and the final selection of the developer is expected to be done by March 2007. The project may require an investment of around Rs 2,500 crore. While the state govt will have a majority stake of 51 %, the remaining share will be with the private developer who will manage the JV. The company is also exploring Arunachal Pradesh, Sikkim and Himachal Pradesh for HEPs. (Business Standard 210706)

**Uttaranchal SHP** The Uttaranchal minister for power has dedicated the 2.25 MW Pilangaad Small Hydro Project to the nation and laid foundation stone for the 3 MW Asiganga II SHP. Both the projects are under Uttaranchal Jal Vidyut Nigam Ltd. (*Rashtriya Sahara* 310706)

**Chinese Companies debarred from NHPC projects**

The govt has barred Chinese companies from supplying equipment to National Hydroelectric Power Corp for key projects coming up in border areas. The current business opportunity lost by Chinese companies is to the tune of Rs 500 crore and the move may also spell curtains for Chinese companies seeking to supply equipment for HEPs in future. The issue came up for discussion after bids by two Chinese companies were considered at the 'pre-qualification' stage for supply of equipment to the Teesta low dam project in W Bengal. Procurement of Chinese equipment is under consideration for the Parbati-III project in Himachal Pradesh too.

The home ministry, the Intelligence Bureau and the ministry of external affairs were opposed to Chinese companies supplying equipment for these projects. The defence ministry and the RAW also backed the opposition to participation of Chinese companies in these projects. It was pointed out that there could be a pattern to Chinese firms bidding for projects which are located in 'sensitive' border states. The issue was discussed at a meeting chaired by cabinet secretary BK Chaturvedi earlier this month. Since most of the depts participating in the meeting were not in favour of Chinese operating at power plants located in sensitive areas, the power ministry's plea for enhanced competition was rejected. NHPC would benefit due to increased competition, the power ministry had argued. Dongfang Electric Corporation and IMPSA Asia are the two Chinese companies that are under consideration for the Teesta low dam project-IV. The project is located close to Sikkim which borders China. The Intelligence Bureau was apprehensive of Chinese participation in Parbati-III too since it was located in Himachal Pradesh which houses a large Tibetan settlement. Procurement of Chinese equipment would mean granting permission for Chinese citizens to work in these areas for long periods of time.

Chinese companies had also bid for the Chamera-III and Uri-II projects of NHPC but none of the passed the 'pre-qualification' stage in the case of these projects. The explanation that IMPSA Asia was actually the Hong Kong-based subsidiary of an Argentinean company did not pass muster. The firm could not be treated as a south American company, since it was the Chinese subsidiary which was bidding for the NHPC project, intelligence agencies argued.

Finally, the Cabinet Secretariat ruled that participation of IMPSA Asia and Dongfang Electric Corporation in the power projects should be avoided. The power ministry has also been asked to submit, in consultation with the external affairs ministry and the IB, a comprehensive paper on participation of foreign companies in sensitive projects. (The Economic Times 250706)

**Tehri Power: At what Cost? Whose cost?** The cost of the Tehri Project has gone up very substantially to 8198.34 crores for the 1000 MW installed capacity as per Nov '05 price level, which is yet to be approved. The latest approved cost (March '03 Price level) is Rs 6621.32 crores. THDC had applied to CERC for fixing the tariff for the project and has invited comments, objections on the application for a period of 30 days from July 27, '06. The water level in the reservoir reached 758 m on July 26, and the commercial production from the project has been started. The two part tariff details are:

|                                                                                                  | 2006-07 | 2007-08 | 2008-09 |
|--------------------------------------------------------------------------------------------------|---------|---------|---------|
| Annual Fixed charges (based on the capital expenditure of Rs 7257.87 crores by Dec '05) Rs Crore | 690.12  | 960.27  | 945.94  |
| Primary energy charges Rs per unit                                                               | 0.8241  | 1.6446  | 1.8046  |

The worst fears of the critics about the cost of the project is coming true, with cost per unit being over Rs 5 at bus bar and over Rs 8 at the consumer end.

⇒ **Unit 1 commissioned: PSP foundation laid** On July 30, '06, Union Power Minister inaugurated commercial generation from 250 MW unit 1 of the Tehri Project. The project when fully commissioned, is expected to generate 3568 MU in a full year. The minister also laid foundation stone for the Rs 1700 Crore 1000 MW Tehri Pump Storage Project that is expected to generate 1377 MU peaking power per annum.

⇒ **CM boycotts inauguration** The Uttaranchal Chief Minister boycotted the inauguration of the first unit of Tehri Dam, apparently because he was not taken into confidence about the ceremony timing and manner. A senior working officer of the Tehri Corporation said on condition of anonymity (which itself speaks volumes about the culture at the dam), "In this country gardens are created only on the graveyards".

⇒ Union Power minister claimed that best rehabilitation has been given to the affected people, but the fact is thousands are yet to get their due. Nor did anyone remember those scores of workers who were killed when the project was under construction. (The Tribune 270706, 300706, 310706, *Rashtriya Sahara* 310706 DRP 0706 p 17)

**Tayal Energy plans in Uttaranchal** Tayal Energy, a wholly-owned subsidiary of Mumbai-based KSL Realty & Infrastructure, wants to build two HEPs in Uttaranchal, costing Rs 550 crore. The company has bagged the rights for 63 MW HEP at Mori-Hanol of Uttarkashi & 7.7 MW at Jimbagad on a BOOT basis. TE would operate the projects for 45 years. The project development agreement will be signed soon. The Mori-Hanol HEP will be built on Tons River, a tributary of the Yamuna by '09. The company is in the process of preparing the DPR. The power price will be Rs 2.75 per unit for the first five years Of the total power generated, 50% can be used for the company's purpose. The state govt will buy the remaining power. According to the agreement, if the company is setting up any industrial facilities in Uttaranchal, it can consume the entire power production. (The Economic Times 210706)

## HYDRO PROJECT IN NORTH EAST INDIA

**Arunachal Pvt Projects** Arunachal Pradesh govt has, in a response to NHPC's criticism of the state govt giving projects to private companies in place of PSUs, claimed that some of the pvt companies are offering better terms, e.g. upto 19% free power rather than 12% offered by NHPC. It claimed that pvt developers also allocate 11% share to the state govt, for which the state govt does not have to contribute funds. However, the CPM has written to the Power Ministry that the projects thus awarded through MOU route is in violation of the govt policies and such projects should be awarded only through competitive bidding. CPM has demanded that the MOUs should be cancelled. (Business Standard 060606, others)

**Loktak Lake Protection Act is anti people** The Manipur Loktak Lake (Protection) Act, 2006 is anti-people." Salam Rajesh, environmentalist, speaking at the one day discussion on the Manipur Loktak Lake (Protection) Act, 2006 said, "In the name of protecting and saving Loktak, this act is a protective shield for NHPC to exercise its monopoly". The discussion was organized by Citizens' Concern for Dams and Development. The proposed reconstituted Loktak Development Authority one is structurally defective since there is no room for inclusion of experts in the same which consist of 39 members as the members will be state govt appointees. Referring to the data submitted by All Manipur Loumee Lup to the prime minister, speakers said that over 50,000 ha of cultivable lands are under water and an accountable Rs 10 crores are annually wasted while more unaccountable amount are wasted due to the Loktak HEP. It was observed that the Loktak Project has done more harm than good. Representative of Loktak Project Affected Areas Action Committee said that the Act seem to be constituted for NHPC's benefit and not for the people or the lake per se. In addition to land and crop compensation, the focus should be on the need for occupational rehabilitation of the affected people. (The Imphal Free Press 300706)

**Tipaimukh** Despite strong opposition from the people, the pre-bid qualification seal of the global tender announced by NEEPCO for the proposed Tipaimukh dam was opened at Guwahati on July 27, '06. 3 firms from Japan, one from Iran, 2 from China and 7 from India responded to the global tender. However, out of Rs 100 crores sought from the Union Power Ministry for the survey and investigation on the 1500 MW project estimated to cost Rs 5885 crores, only Rs 9 crores had been sanctioned. From the power to be generated 600 MW would be provided to Assam, 200 MW to Manipur and 250 MW to Tripura, and an agreement to this effect had been signed and signing of agreement with other States is under process. The State govt has given approval for conducting public hearing at Tamenglong.

⇒ **Protests, Strikes** Normal life at the Manipur long was affected on July 28 due to the 24 hrs general strike called by Action Committee Against Tipaimukh Project.

Other than emergency & ceremonial services, no vehicles plied for the day and major business establishments & educational institutions remained shut. The bandh affected normal activities at Thoubal & Bishenpur districts. A large number of student and tribal groups had supported bandh. (The Sangai Express 290706)

**Arunachal, NHPC to tie up for 10,500 Mw project** The Arunachal Pradesh govt has, in-principle, agreed to ink an agreement with the National Hydroelectric Power Corp for setting up 10 500 MW of HEP capacity with an investment of around Rs 52 500 crore. The decision on the memorandum of understanding was reached at a meeting held by the power ministry in July '06. The MoU with the state govt is expected to be signed by the end of this financial year. Among the projects that will be developed by NHPC are Tawang I and II (total capacity of 1500 Mw), Dibang (3000 Mw), Subansiri upper and middle (total capacity of 2600 Mw) among others. The Dibang project will be developed through a joint venture with the state gov in which NHPC will have a majority stake. However, the Subansiri upper and lower projects are under Supreme Court restrictions and may be developed by NHPC, subject to clearance from the apex court. In another development, NTPC Ltd and North Eastern Electric Power Corp may also develop around 4,500 Mw and 1000 Mw projects respectively in the state. (Business Standard 310706)

**NEEPCO CMD in trouble** The Chairman-cum-Managing Director of North Eastern Electric Power Corporation seems to be heading for more trouble, with the Union Power Ministry asking him to review the sanctioned manpower and halt all further recruitment. The directions came after it came to the notice of the Ministry of Power that the NEEPCO recruited 356 personnel during the tenure of the CMD. Though it was within the sanctioned strength of 4305 of the Corporation, the Ministry wanted it to freeze all recruitment until completion of the review exercise. NEEPCO currently has a strength of 3,293. Union Power Minister Sushil Kumar Shinde revealed this in a reply to a question by Syeda Anowara Taimur, who wanted to know whether the CMD had violated any rules by mobilising interest-free loan advances to the tune of Rs 40 crore. During the year 2004-2005, the mobilized interest-free advances were released by NEEPCO against security of equal amount of bank guarantee to the contractors of major works of Kameng HEP according to their contract agreement, the Minister said. The Central Bureau of Investigation has held as proved the charges of submitting forged experience certificates of Bharat Bharti Udyog Nigam Limited and CKS Engineers Private Limited by the present CMD of NEEPCO at the time of his appointment as General Manager in the National Hydroelectric Power Corp, Shinde confirmed. The CMD is in the eye of the storm with the employees up in arms against his continuation. (North East Times 140806)

**HYDRO PROJECTS IN HIMACHAL PRADESH****Kol Dam Scandal: Forest dept forgot to include 120 ha forest land in the submergence zone:  
The area happens to be a protected area!**

This disclosure should have very far reaching implications and heads should role in many departments at state and centre. It seems the state forest dept and Union Ministry of Environment and Forest ministry *forgot* to include about 100-120 ha of forest land in while giving clearance to the Kol Dam. When the forest clearance was given for the dam, the sanction was for diversion of 954 ha of forest land, but now it transpires that the area which will be submerged is about 100-120 ha more, on which 40 000 to 45 000 trees are standing. More importantly, the left out forest areas formed part of the Magathal Wild Life Sanctuary. However, according to the Supreme Court orders, no diversion of such protected areas can be allowed without express clearance from the apex court. That has not been taken and the project work has been going on for years. At a high level meeting Principal Secretary (Forests) has asked the Principal Chief Conservator of forests to look into the matter and find out how this happened. However, since the work of the dam now ongoing is illegal without sanction for diversion of this area, the officials should have asked that the work be stopped till clear sanction is available. This has not been done, which indicates some involvement of the high officials in this illegal action even now. In all probability, to push the project ahead and by pass the legal requirements, concerned officials must have at the time of sanction *agreed* to forget about the concerned area. Now that the project is a fait accompli, the sanction can be obtained, by various means. The judiciary should also be concerned about this.

⇒ In another instance, the Central Empowered Committee set up by the Supreme Court has taken a serious view of violation of the conditions laid by the Union Ministry of Environment & Forests in 1992 while allowing diversion of 20 sq km of the then Darlaghat wildlife sanctuary for the Ambuja Cement Plant. The truncated 40 sq km sanctuary was renamed as Majathal WLS. A notification for adding 17.5 sq km area in the sanctuary area was issued in March 2002, but it was withdrawn in Dec '05 following alleged protests from the affected people. The condition of environment clearance remains unfulfilled. The Biodiversity Conservation Trust of India has pleaded before the CEC for action against the concerned officials for willful and deliberate violations of the conditions imposed under the FCA 1980 and Wildlife Act, 1972. It seems the cancellation of notification in Dec '05 was done to facilitate another cement plant in the same area.

⇒ **Catchment Area Treatment cheating** Discrepancies have also come to light in the implementation of the Catchment Area Treatment plan for the Kol dam project. In only the Shimla division, 1100 trees per ha have been planted in place of the required 1500 trees. Last year, 200 Ha CAT area thus lost at least 80 000 trees. (The Tribune 300706, 080806, 090806)

**Nathpa Jhakri: Silt Problem continues** All the six units of NJ HEP were shut down at 0600 hrs on July 24 after silt level in the reservoir went up to 12 000 ppm. The flow in the river came down to 1100 cumecs, down from 1365 cumecs on July 23. The Plant was earlier shut down on July 22 for flushing the silt and resumed operation on July 23 evening. The project remained shut down from July 24 to Aug 14. The project again shut down on Aug 23 early hours as silt level in Sutlej went up to 5700 ppm. (The Hindu 250706, 150806, 240806)

**Dehar Power Station break down** On Aug 28, the 990 MW Dehar Power house of the Beas Sutlej Link canal had to be shut down under emergency situation when bursting of a shaft seal lead to submergence of the three floors of the power house, including the turbines and generators. After three days of dewatering, the BBMB officials on Aug 31 said the damage was of about Rs 50 lakhs, besides the crores of loss due to loss of power generation of 14 million units of electricity per day. (The Tribune 010906)

**Police Atrocity On Chamera-3 Workers** The Himachal Pradesh state committee of the Communist Party of

India (Marxist) has strongly condemned the brutal attack on the workmen on the Chamera III HEP in Chamba district by the police on July 14, '06. At about 11.30 pm, a contingent of police reached the site of Adit tunnel 4-5 and mercilessly started beating the workmen who were asleep in their sheds. They were then stacked in the buses and thrown out of the district of Chamba. Some were dropped at Pathankot and others at Jassur bordering Punjab. The HCC management is known for its notoriety. It may be recalled how the three CITU workers were murdered recently at the worksite. A worker named Dev Dutt was shot dead during the execution of Nathpa Jhakri project where HCC was the company in charge. One leader of the Congress party named Zalam Singh was killed and his only fault was that he incessantly used to poke the HCC management for providing jobs to the local youth of the area in Chamera III. (People's Democracy 230706)

**Malana HEP: Govt cheated?** The Himachal Pradesh Chief Minister has alleged that the previous state govt agreed to reduce the share of state from 15% to 11% in power from the 86 MW Malana HEP in Kulu district. This is a serious allegation, coming from no less than the

Chief Minister. The least the CM can do is to set up an investigation as to how this was achieved, who were responsible from the state as this means a huge loss for the state govt.

⇒ The CM went on to say that due to the acts of the previous govt in not insisting on equity participation in the 800 MW Kol dam and the 1320 MW Parbati HEP, the state govt would lose Rs 80 000 crores over the next 40 years. He claimed that the current govt is trying to negotiate equity participation with even the private investors. (The Tribune 300706)

### POWER OPTIONS

**Wind Power Capacity** Total installed wind power capacity in India have gone up to 5340 MW as on March 31, '06, up from 3595 MW a year earlier.

MW

| State                             | Installed capacity |
|-----------------------------------|--------------------|
| Tamil Nadu                        | 2893               |
| Maharashtra                       | 1001               |
| Karnataka                         | 585                |
| Rajasthan                         | 358                |
| Gujarat                           | 338                |
| Andhra Pradesh                    | 121                |
| Madhya Pradesh                    | 40                 |
| Others (Kerala, W Bengal, Orissa) | 4                  |
| <b>TOTAL</b>                      | <b>5340</b>        |

(The Hindustan Times 260706)

**Power From Rice Husk in Chhattisgarh** Power generation from rice husk in Chhattisgarh has started with current installed capacity of 73 MW, which may go upto 300 MW in two years. 31 companies are setting up their plants. The CM has inaugurated a 10 MW plant in Sarguja district, to be set up at a cost of Rs 37 crores. (Rashtriya Sahara, Deshbandhu 180606)

**Special Economic Zone for Renewables** The Govt of India plans to set up a special economic zone dedicated exclusively for manufacturing renewable energy equipment and devices and is looking for FDI flow for the same. (Financial Express 270606, 140706)

**Mathania Project unviable?** The 140 MW combined cycle solar project, a pioneering project of its kind and scale, has been declared unviable by the German aid agency KfW due to frequent changes in scope of the project. (Dainik Bhaskar 290606)

### IRRIGATION

**Costly Lift Irrigation Schemes in AP** The numerous lift irrigation schemes being taken up by the Andhra Pradesh govt is likely to put a very heavy burden on the farmers. If we take into account the existing schemes, the total power demand would go upto 980 MW. In addition, each LI scheme will require Rs 15-25 crore towards operation and maintenance of pump sets. These costs would be passed on to the farmers in one way or the other.

### Annual Power Required for LI schemes in AP

| Name                                     | Power Demand, MW | Annual Power cost, Rs crores |
|------------------------------------------|------------------|------------------------------|
| <b>TELENGANA</b>                         |                  |                              |
| Godavari LI I (Devadula)                 | 54               | 24.47                        |
| Godavari LI II                           | 304              | 137.75                       |
| Ali Sagar LI, Nizamabad                  | 28.4             | 12.87                        |
| Gutpa LI, Nizamabad                      | 19.14            | 8.67                         |
| Rajiv (Bhima) LI, Mahbubnagar            | 40               | 18.12                        |
| Bhima II                                 | 40               | 18.12                        |
| Sripadasagar (Yellampally) I, Karimnagar | 10.4             | 4.71                         |
| Sripadasagar II                          | 178.8            | 81.02                        |
| Kalwakurthy LIS, Mahbubnagar             | 450              | 203.9                        |
| Nettampadu LIS, Mahbubnagar              | 125              | 56.64                        |
| <b>RYALSEEMA</b>                         |                  |                              |
| Anantapur LIS                            | 450              | 203.9                        |
| <b>COASTAL AP</b>                        |                  |                              |
| Pushkara LIS (redundant after Polavaram) | 20               | 18.78                        |
| Tadipudi (redundant after Polavaram)     | 20               |                              |
| Jhanjhavati                              | 1.45             |                              |
| <b>TOTAL</b>                             | <b>1741.19</b>   | <b>788.95</b>                |

(Deccan Chronicle 180606)

**Handri Neva Sujala Sravanthi II in AP** The CM laid foundation stone for the second phase of the irrigation project at Basinikonda village near Madanapalli in Chittoor district. The first phase of the project covered 216 km. In the second phase, irrigation potential will be created in four districts: 1.4 lakh acres in Chittoor, 3.45 lakh acres in Anantapur, 37 500 acres in Kadapa and 8 000 acre in Kurnool. The second phase includes main canal from 216 km to 554 km, five reservoirs at Gollapalli, Marala, Chiralopalle (Anantapur district), Srinivasapuram and Adaipalle (Chittoor district). The Rs 46 000 crore project that will bring Krishna water from Srisaillam reservoir is also expected to provide drinking water to 23 lakh people. (Financial Express 070606)

### WATER OPTIONS

**Water Harvesting in Hamirpur** Over the last four years, farmers have built water harvesting structures at 90 places in five blocks in Hamirpur district in Himachal Pradesh. This has lead to increase in water levels in khads and nullahs, recharged groundwater and irrigation to additional 2177 ha. At 108 sites farmers have also set up pumps for irrigation. The state agriculture dept has acted as facilitator and NABARD has provided Rs 6.78 crores for the same. A number of baulis, nullahs and khads have been revived. At a number of places farmers have contributed resources. (Indian Express 210506)

## GROUNDWATER

**Punjab appeal for late paddy transplanted** The joint appeal by the Vice Chancellor of Punjab Agriculture University, the Chairman of Punjab Farmers Commission and Vice Chair of the Punjab State Planning Board to the farmers to not to go for early paddy transplanted to arrest groundwater depletion has worked, says PAU. (Business Line 200606)

**Contamination in Birgaon – Raipur – Chhattisgarh** The water from borewells in Birgaon, about 20 km from Raipur has become polluted due to the release of untreated effluents from the industries in the nearby areas over the recent years. Complaints from the people have brought no results. (Deshbandhu 110606)

## AGRICULTURE

**BT Cotton failure in China** Although Chinese cotton growers were among the first farmers worldwide to plant genetically modified cotton to resist bollworms, the profits they have reaped in the initial years by saving on pesticides have now been eroded. The reason, as reported by Cornell University researchers at the American Agricultural Economics Association Annual Meeting in Long Beach, Calif., July 25, is that other pests are now attacking the GM cotton. The GM crop is known as Bt cotton. After seven years, populations of other insects have increased so much that farmers now have to spray their crops up to 20 times a growing season to control them, according to the study of 481 Chinese farmers in five major cotton-producing provinces. The study -- the first to look at the longer-term economic impact of Bt cotton -- found that by 2004, farmers had to spray just as much as conventional farmers, which resulted in a net average income of 8 % less than conventional cotton farmers because Bt seed is triple the cost of conventional seed. ([www.newswise.com](http://www.newswise.com) 210706)

**Wheat Imports** According to Union Panchayati Raj Minister, the quantity of wheat import is the largest commercial purchase in the history of the country and that is larger than Kenya's wheat production. Many see the gov't's decision to import wheat in light of the US's lobbying for participating in the bidding for import of wheat for US companies like Cargil.

⇒ **SC notice** On August 7, in response to a petition by Vandana Shiva of Navdanya, challenging the gov't decision to import wheat, the Supreme Court has sent a notice to the Union Agriculture Ministry, asking why the petition not be entertained.

⇒ **No cereal shortage: Agri Minister in Parliament** The Union minister of state for Agriculture informed the Parliament in May '06 that there is no shortage of cereals in the country, the data given by the ministry is given in the table below. The demand is based on NSSO's 60<sup>th</sup> round (2004).

## Cereals availability in India

(MT)

|                    | 2003-04 | 2004-05 | 2005-06 |
|--------------------|---------|---------|---------|
| Production/Supply  | 198.28  | 185.23  | 196.09  |
| Consumption/demand | 168.48  | 171.07  | 173.64  |

The question that arises is that if this is the case than why has the Union gov't liberalized the import of wheat with a nominal Customs duty and withdrew the 10% duty on imported pulses?

⇒ **Why was the procurement low?** While the gov't was offering about Rs 7 per kg for procurement, the private companies were able to corner a lot of wheat by offering higher rates. The gov't could have easily increased the rates to say Rs 8 per kg to get the adequate procurement, and our farmers could have got better rates. But gov't chose not to do it and now is ready to pay Rs 10 per kg to import the wheat.

⇒ **A testing year for wheat procurement?** Union Agriculture and Food Minister has said that due to the passage of agriculture produce marking act by most of the surplus wheat producing states, allowing direct wheat sale to private traders. The gov't could consider differential wheat price policy next year to ensure adequate stocks for PDS. (Financial Express 140606, 080806 Deshbandhu 270606, The Economic Times 300606, Business Line 050706)

**Sugarcane area up** The area under sugarcane crop in Kharif 2006 has gone up to 44.15 lakh ha, up from 41.26 lakh ha last year. The highest percentage increase has been in Tamil Nadu, followed by Punjab (30% increase), Karnataka (10%), AP (19%), Maharashtra (4%). The additional area would provide 21 MT additional cane, 60% of which generally land up at sugar factories. However, the new sugar factory capacity of 2.5 lakh tonnes now coming up would require 40 MT additional cane. (The Economic Times 210606)

**Mumbai HC: No license for new sugar mill** The Mumbai High Court has ordered that no fresh permission for starting sugar factories be granted by the sugar commissioner in Maharashtra till the authorities file answer in a PIL. (The Financial Express 140706)

**Vidarbha Crisis** Amravati farmers face excess of water 35 farmers from Wadhona village in Amravati district have written to President of India to allow them to die as an *errant* canal is damaging their farms. Their appeals to either divert it or build an embankment has fallen on deaf ears. The canal is inundating Wadhona and neighbouring villages like Khashikhed, Ghusli, Nagavandi & Asegaon. SDO said that the gov't is thinking of including the canal work under the special package of the Union or the state gov't. (The Hindustan Times 170706)

## POWER SECTOR

**Power Trading on Plateau** The power trading volumes seems to be on a plateau over the last three years – 12224 MU traded in 2003-4, 12445 MU in 2004-5 & 9046 MU till Dec 2005. Trading is around 2-3% of the 580 BU electricity generated. CERC is planning a power exchange for efficient trading. (The Economic Times 110706)

**11<sup>th</sup> plan target** The Planning Commission has set the target of adding 75000 MW additional power capacity during the 11<sup>th</sup> Five Year Plan (April '07 – March '12). This includes:

- ⇒ 42 000 MW thermal projects
- ⇒ 17 000 MW Hydro projects
- ⇒ 3 000 MW nuclear projects
- ⇒ 6 000 MW non conventional projects
- ⇒ 7 000 MW captive projects. (Planning Commission Approach Paper - 11<sup>th</sup> Plan, Financial Express 130606)

**Time of Day Tariff** The Central Electricity Regulatory Commission says that Time of Day tariff is applicable for high tension consumers in 16 states, it is not yet applicable at the retail level. CERC is aiming to impose ToD tariff at the retail level over the next two years on pilot level in two states to begin with. Each consumer will have to be given a new meter that will segregate the peak and no peak consumed units. (Financial Express 120706)

**Dabhol shut down again: No power demand** The controversial Dabhol power plant, restarted on April 30, '06 was shut down again on July 4, '06 as Maha Vitaran for the drawing of power at Rs 4.25 per unit came to a close on June 30. Maha Vitaran, which was the sole buyer of the Dabhol power, has stopped drawl of power from Dabhol as after the heavy rains, the power demand in the state has gone down. The plant was producing 350-700 MW from naphtha. The plant also had to close down several times in May and June for technical problems. (Financial Express 080706)

**Delhi Discoms' claim challenged by DERC in SC** The claim by the private distribution companies of Reliance & Tata in Delhi that they should be allowed depreciation rate of 6.69% in stead of 3.75% rate fixed by DERC has been challenged by the DERC in a petition in the Supreme Court of India. The discoms had gone to the appellate Tribunal, which had upheld the claim of the discoms. The SC has now sent notices to discoms and restrained DERC from implementing or announcing any power rate that it may fix.

⇒ Meanwhile Delhi govt has asked the power distributors in Delhi (BSES, NDPL, NDMC, MES (Delhi Cant)) to arrange for their power requirements themselves from April 1, 2007 after taking nod from DERC. This is likely to increase the cost of power for the consumers as when these bodies enter the market

separately, the sellers would get opportunity to ask for higher rates. (Tribune 140606, The Times of India 070706, 100706)

**Thermal PLFs** There is a big scope for improving generation from existing thermal plants through renovation and Modernisation so that the Plant Load Factor can be increased. While 36 plants are operating at PLF above 80%, 40 plants are operating below the national average of 75% and 26 plants are operating at below 60%. (Financial Express 140606)

**HP Power Tariff Cut** Power Tariffs for various consumer categories have been cut in HP tariffs for 2006-7, except for those from the below poverty line families, for whom the tariff has gone up by 0.1 Rs to Rs 1.65 per unit as subsidy beyond 50% of the cost of power (Rs 3.3 per unit) could not be allowed. The staff costs comes to Rs 1.05 per unit, much higher than the national average. The figure for Uttaranchal is Rs 0.33 per unit. (The Tribune 040706)

## RIVERS

**Illegal Sand mining from Sutlej** A probe into the illegal sand mining at five places along Sutlej has been started by the Pooh's ADM. Raids conducted recently revealed that such mining was going on at Tapri, Nathpa, Wangtoo and Del area in Sungra. (The Tribune 200606)

## LAKES

**Kanwar lake in Bihar dries up** The Kanwar lake in Begusarai district in Bihar has dried up as all the inlets have got plugged, so no water is coming in. The breaches caused during the 2004 floods have not been repaired, so the rainwater is also getting drained out. (PA Update June '06)

## FLOODS

**Swan River Flood Protection Plan** Under Phase I of this plan, embankments are to be constructed over 16.5 length of the river from Jhaled to Santoshgarh bridge, out of which 10 km embankments are completed. Rs 44 crores have been spent so far to construct embankments along 10 km length of the river. Further work will require Rs 30 crores. This phase is expected to help reclaim 2260 ha land, out of which 1200 ha has been reclaimed. In Phase II embankments are to be constructed along 26.5 km length of the river from Jhaleda bridge to Gangret at a cost of Rs 235.52 crores, to reclaim 5 000 ha land. This phase is under approval process. 73 small rivers meeting the Swan River in Una district of HP and there is a separate plan for embankments of some of the tributaries. Forest dept is spend Rs 154 crores for this. (Divya Himachal 090706)

**Haryana Drainage Plan** Haryana govt has planned a Rs 140 crore scheme to make five districts (Jhajjar, Rohtak, Bhiwani, Hisa and Jind) flood free by Bass-Bisar-Ghaggar multipurpose drain. (The Tribune 030706)

**Mithi River Clean Plan awaits centre's nod** After the Mumbai floods of July 26, '05, Mithi river was identified as the primary cause. The river is so choked with effluents and encroachments that it can no longer drain out excessive rain. A Rs 1300 crores plan for clean up of the river is lying with the Jawaharlal Nehru National Urban Renewal Mission directorate, which has not cleared it as it first asked the Union Ministry of Environment & Forest for techno financial appraisal, but MEF said it cannot do this. Now in June '06 it has asked NEERI to appraise the project. (Indian Express 080706)

**Rainfall in Barmer District** It is true that Barmer received unusually high rainfall during Aug 19-24 this year, leading to floods in desert and loss of life and property. What could have been done about it? One thing that surely could have been done, from watching the daily rainfall maps from NASA's TRMM website ([www.trmm.gsfc.nasa.gov](http://www.trmm.gsfc.nasa.gov)) and noting the heavy rainfall in the region starting from Aug 19 as reflected in the daily rainfall figures from IMD (see table below) is to understand that such heavy rainfall in such a region can only bring disaster. The next step would be to warn the local people, and that itself could have saved previous life and property. But that, clearly, has not been done.

#### Rainfall At some IMD stations in Barmer District

cm

| Station       | 19 Aug | 20 Aug | 21 Aug | 22 Aug | 23 Aug | 24 Aug | Total of available figures |
|---------------|--------|--------|--------|--------|--------|--------|----------------------------|
| Barmer        | 4      | 8      | 12     | 16     | 2      | 1      | 43                         |
| Ramsar        | NA     | 5      | 5      | 21     | 7      | 2      | 40                         |
| Betu          | 16     | 13     | 6      | NA     | NA     | NA     | 35                         |
| Pachpadra     | 15     | 8      | 2      | NA     | NA     | NA     | 25                         |
| Guda          | 13     | NA     | NA     | 1      | NA     | NA     | 14                         |
| Siwana        | 9      | NA     | 1      | 1      | NA     | NA     | 11                         |
| Sib           | 5      | NA     | NA     | NA     | NA     | NA     | 5                          |
| Barmet Tehsil | NA     | 13     | NA     | NA     | NA     | NA     | 13                         |
| Chohton       | 3      | 5      | 10     | 7      | 3      | 9      | 39                         |
| Sindari       | NA     | NA     | 3      | 3      | 2      | 1      | 9                          |

(Source: [www.imd.gov.in](http://www.imd.gov.in))

#### WATER SUPPLY

**ADB to fund JNNURM** The Asian Development Bank is supporting an initiative through \$200,000 technical assistant for improving infrastructure in cities under the Jawaharlal Nehru National Urban Renewal Mission. This is likely to be intended to open the floodgates of water privatisation in JNNURM as ADB has a clear policy promote water privatisation. (IANS 290706)

#### INTER LINKING OF RIVERS

**State ILR plans** The Karnataka govt has set up an expert panel for interlinking of rivers of Dakshin Kannada & Udupi districts. The Panel has held two meetings in the two districts. According to Union Water Resources Minister, NWDA has requested all the States to inform the details of intra-State links. Proposals have been received from Govt of Maharashtra, Gujarat, Orissa and Bihar. (Business Line 240806)

#### QUOTES

**Shunglu Committee** The Shunglu report is thoroughly indefensible.

**Ramaswamy Iyer**, former secretary, Ministry of Water Resources

How much sacrifice of people's rights may ever be justified at the alter of constitutionally unprincipled and insincere development policy making? Prime minister's endorsement of the Shunglu report raises the concern whether he applied reasonable care and due diligence in endorsing the OSG report. One hopes that the Supreme Court will find the NBA's critique of the Shunglu report helpful to do complete justice. The tyranny of statistics in the Shunglu report suggests that only 1393 accepted cash compensation out of the 4041 families. The report says that this is because 17.9% simply had no intimation concerning allotment of land; 94% were not satisfied with the land bank offerings, 21.9% opted for unexplained other reasons. The report prefers merely to highlight those who accepted SRP at a clear and cruel cost of others who did not do so.

**Uprendra Baxi**, former vice chancellor, Delhi University  
(The Hindu 300706)

**Unacceptable RTI Amendments** The Proposed amendment to the Right to Information Act would cripple the Act. File notings must be shown to the public. The exclusion has been opposed by the Union Govt's Administrative Reforms Commission. The amendments are against the decisions of the National Advisory Council then headed by Smt Sonia Gandhi. It is in the notes that you find the rationale for govt action or lack of it. Why was a certain policy changed, why a certain contract was given, why a sanction was withheld to prosecute a particular officials, why allocation of resources is biased in favor of the rich and the powerful, or why inefficiency and corruption is being rewarded and good officers are being victimized. Clearly, this govt does not want to give up its privilege to continue functioning arbitrarily and secretly.

**Aruna Roy** (The Tribune 300706)

**Right to ignorance** The secrecy of file notings is not only a small time game to do a citizen down, but more to mislead a PM, a Minister, a captain of Industry and to oblige anyone with power or purse.

**L C Jain** (The Deccan Herald 090806)

**Anti People Growth** Economic Development in India is disruptive. While India ranks 8<sup>th</sup> in the millionaire index, it lags pathetically in human development index at 127 globally. The reason why most governments face anti incumbency factor during elections is the widening gap between urban and rural economies. Though the rural economy contributes 50% to India's GDP, the condition of the rural poor is in shambles. Companies like HLL, ITC etc needs to cautioned that they should not exploit the rural potential for their marketing purpose alone.

**Union Minister for Panchayati Raj Mani Shankar Iyer** (The Financial Express 290706)

**THE PAKISTAN PAGE****Can the Indus be saved from the Big Dam Lobby?**

The Indus is drying up, the irrigation system is a mess and water management is pathetic. Should the focus be on building new dams? The mighty river that is the lifeline of Pakistan's agrarian economy is dying a slow death due to the thinning of Tibetan glaciers and the construction of mega dams upstream.

The glaciers of the Tibetan plateau are vanishing so fast that they will be reduced by 50 % every decade. The glaciers have been receding over the past 4 decades, as the world has gradually warmed up, but the process has now accelerated alarmingly. Average temperatures in Tibet have risen by 2 degrees F over the past 20 years, causing the glaciers to shrink by 7% a year. The melting threatens to disrupt water supplies over much of Asia.

The frenzy to build mega dams instead of going for proper water management & alternative energy sources will make the situation worse. The Punjab irrigation system was established in the 1890s. In 1932, the Sukkur Barrage was built. In 1958, the Ghulam Mohammad Barrage became operative and in the early 1960s the world's largest earthen dam Tarbela Dam was built, to be followed by Mangala. These have transformed the Indus delta, rendering lakhs of farmers, fisherfolk & shepherds jobless.

"Before dams & barrages were built in the Indus Valley the delta area was crisscrossed by the distributaries of the Indus. Due to this enormous quantity of fresh water and the silt, the delta lands were the richest in the area. The delta supported extensive forests & grasses which were feed for animals. Agriculture was seasonal and yields were high. It was carried out when the rivers receded. Rice was the main crop and most of it was exported to the coastal regions of India & the Gulf by boat," writes Arif Hasan in *The Unplanned Revolution*.

According to Tahir Qureshi, director coastal ecosystem, the World Conservation Union-Pakistan, River Indus flowed with 13 by-rivers into the Arabian Sea before the construction of Sukkur Barrage. This was the time when tiger and ibexes were reported in the Indus delta and people cultivated paddy. Today only one by-river, Khober is functional for 2-3 months; it becomes creek carrying seawater for the rest of the year. "Out of 8 mangrove species which were reported in Pakistan, only one is surviving in the delta & that too will not be able to sustain itself for long," says Qureshi.

The average annual discharge downstream of Kotri barrage, was 150 million acre feet in 1880-82. It dropped to 84.7 MAF in 1940-54 (10% decrease); 79.9 MAF in 1955-65 (12.9% reduction); 46 MAF in 1966-76 (45.7% cut); and 35 MAF in 1977-92, (58.4% reduction) From 1992 the discharge was only 10 MAF and today the delta does not receive any fresh water to nurture its mangrove forests, fisheries, paddy & orchards.

The lack of fresh water has not only badly affected the lives and livelihood of the inhabitants of Indus delta, but has also led to sea intrusion that has devastated the otherwise fertile land. According to IUCNP, the sea has intruded 54 km upstream along the main river course.

The silt load brought by the Indus has also reduced considerably, turning rich pastures into wasteland. According to the Irrigation and Power Dept of Sindh govt, the silt load was 400 MT in 1880-92. After the Sukkur Barrage was constructed in 1932, the silt load dropped to 225 MT in 1940-54. It was reduced to 100 MT in 1977-92 after the construction of Tarbela Dam. After 1992, the silt load has been reduced to 30 MT.

Since the livelihoods of the coastal population are mostly dependent on fisheries, agriculture & forestry, there has been a persistent decline in the socioeconomic conditions of the communities with the degradation of the natural resource base, causing a rise in poverty levels, malnutrition, & the deterioration of people's health. The scarcity of potable water contributes to the increasing incidence of diseases.

But the govt of Pakistan is adamant to build new dams instead of going for water management, when over 40 % of the irrigation water is lost in seepage & evaporation. However, keeping in view huge kickbacks involved in mega projects, one need not be surprised that the bureaucracy has always opted for mega projects just as the World Bank conceives that 'big is beautiful'.

"Building infrastructure projects in the developing world is a \$200 B business that provides a plethora of opportunities for corruption. According to Transparency International, infrastructure is perceived to be the most corrupt sector globally. About half of the WB anti-corruption unit's investigations that have led to specific corrective actions were linked to infrastructure projects. Bribes are paid to secure concessions & in exchange for contracts. Compensation for displaced communities ends up in the pockets of bribe-seeking officials," says Patrick McCully, International Rivers Network.

"Brick & mortar investments in centrally managed dams & canals are not the only way to address Pakistan's water & energy needs. Because the existing infrastructure is not being properly maintained & so much water is being wasted, the efficiency of the irrigation system could be greatly increased. It is also more economical. A WB evaluation found that water conservation saved more water than the largest new dam in Pakistan's investment program could have stored, and at 20% cost. The Asian Development Bank estimates that an additional 4.7 MAF of water could be provided either by conservation measures at a cost of \$1.7 B, or by a new dam with a price tag of \$4.5 B," writes Peter Bosshard also of IRN. (The News-Pak 230706)

**THE NEPAL PAGE**

**The Tunneling Risks in HEP** Over 70 km of tunneling has been carried out for the HEP development since 1968. The increased activity in tunneling has proved that the Himalayan rocks are complicated. The experience from recently implemented hydropower projects suggests that the discrepancies between predicted and actual rock conditions along the tunnel alignment have been very high, resulting in considerable increase in the project costs and delay in construction. For example, the tunneling cost at Kaligandaki "A" project increased by 70 % and at Khimti, the cost of tunneling was doubled. This was mainly due to increased requirement for rock support and tunneling equipment needed to cope with actual geology which was different from what was predicted during pre-construction phase. Similar is the case for all HEPs. (The Kathmandu Post 090706)

**Small Hydro** "In the long-term, micro-hydro projects are the only solution of the growing energy need," say Nepalese energy experts. The energy crunch in the country, which has more than 6,000 rivers with huge potential of hydropower generation, can be overcome with clearer vision and investment. At present, only about 40 % of the total population has some form of access to electricity. Large hydropower plants have mainly been catering to the electricity needs of the urban or semi-urban areas, says Ram Chandra Pandey, director at the Community Rural Electrification Department of Nepal Electricity Authority. It's been a century of development of hydropower - started in early 1900 with Pharping power plant with a 500 KW installed capacity. Post-1990, the govt opened the sector to local and foreign independent power producers and NEA also initiated some projects with different financing modes. As a result, 292 MW capacity was added within 10 years to bring the current capacity to 600 MW. The current peak hour demand of NEA system is 556.3 MW and is likely to increase in an average rate of 7 % every year, according to NEA. To meet the increasing demand, more mini-and micro-hydel projects should be encouraged, says project manager of the Chilime HEP, developed by the NEA and private sector. (The Himalayan Times 020706)

**Farmers needs get priority over hydropower**

The 1.088 MW Fewa Hydro Power Project at Pokhara-17, Pardi stops power generation for three months in a year when farmers have the exclusive use of the water for irrigation if paddy. FHPP uses the water of lake Fewa for hydropower generation. The project authorities have to discuss with the Biruwaphant Farmers' Consumer Committee to get water to the project for electricity generation. Local farmers lock the canal to the powerhouse to use its water for irrigation for three months every year. The canal is taken to the powerhouse through the paddy fields of local farmers. FHPP is being operated under Nepal Electricity Authority. (The Himalayan Times 010706)

**The Hydro-dollar Myth**

The cost of Nepali electricity is unaffordable for Indians. The average tariff in Nepal is IRs 4.15 per unit. The Nepal Electricity Authority has suffered huge losses for the last 3 years. Calculating from NEA's balance sheet (Annual Report 2005), the per unit production cost is IRs 4.97. Since India has huge hydropower potential, its first priority will be to harness that potential. Second, the cost of generation in Nepal is much higher than in India, making Nepali power cost exorbitant. If India can purchase power from Bhutan, why not from Nepal? However, the issue is sensitive as Nepali people have the feeling that we have been cheated by India in all the deals made in the past including the Tanakpur treaty. It may be argued that if India can purchase power from Bhutan, why not from Nepal? Moreover, the political relationship between Bhutan and India is not comparable with that of Nepal. In addition, Bhutan's electricity generation cost is cheaper than that of Nepal. It is time Nepalis should stop dreaming of becoming rich by exporting power to India. The only project being developed solely for export is West Seti HEP. The license for this project has been issued to Australia's Snowy Mountain Engineering Company. It has been almost a decade since SMEC acquired license but no significant progress has been made. Every year SMEC issues press communiqué to show some progress. Last year, it said construction will begin in Dec '05. However, the tenders for the construction are yet to be floated. The delay is also due to India's reluctance to buy the power or SMEC's failure to mobilize resources. May be SMEC is not able to get the guarantee from Indian Govt for tariff payment as most SEBs are incurring losses. If Nepal has to industrialize in next 50 years, 43,000 MW is not a huge potential. Switzerland, a developed country with less than a third of Nepal's population, has installed capacity of 12,000 MW. At this rate, Nepal needs 40,000 MW. In 50 years when Nepal's population will be over 55 m, this potential will not be enough. Therefore, any power export treaty with India should not be long-term like the Kosi agreement, argues Sunil Thapa.

**The Other Side** However, Krish Krishnan & Dr Charles K. Ebinger argue otherwise: Why electricity tariffs to consumers in Nepal are among the highest in the world? This is because of the high interest rate (10.25%) at which Govt of Nepal lends to NEA, construction of ancillary infrastructure like access roads and transmission lines and the high cost of purchasing power from IPPs. Nepal has an option to do nothing now or it can do what countries such as the Peoples Democratic Republic of Lao and the Kingdom of Bhutan have done and the central Asian nations are commencing to do, which is to develop their HEP resources for export to generate revenue. From the 750 MW West Seti HEP alone, Nepal is likely to get a 10% net generation value (approximately NR 0.35/kWh). Nepal cannot afford NOT to export hydropower. (The Kathmandu Post 160606, 250606)

## WORLD DAMS

**Australian Dam project threatens living fossil** We are about to lose a key piece of our evolutionary history, warn biologists. They are campaigning to save the Australian lungfish, which they fear could be sent extinct by an enormous dam planned for SE Queensland. The hefty, muddy-brown fish is thought to have survived virtually unchanged for at least 100 million years, making it one of the oldest known vertebrate species around. It is also one of the closest living relatives of the ancestral fish that crawled on to land and eventually gave rise to all land vertebrates, including humans. Being able to study the species is important for understanding how that transition took place. The lungfish is now largely confined to two river systems in Queensland — among the only places that provide the shallow, running and weedy water in which the fish likes to spawn. A dam in one of these, the Burnett River, was completed last year.

On July 5, Queensland PM announced a decision to dam the second river, the Mary. Lungfish supporters say this could be enough to drive the species to extinction. The decision prompted lungfish expert Jean Joss at Macquarie University in Sydney to step up a campaign to block the dam and persuade the federal govt to intervene — so far over 100 scientists have responded. “It would be a calamitous and irreplaceable loss if this animal went extinct,” says Per Ahlberg of Uppsala University, Sweden, who collaborates with Joss.

There are five other species of lungfish living in S America & Africa. But the Australian lungfish, which can live for a century and grow 1.5 m long, is thought to most closely resemble the last common ancestor of land vertebrates. Biologists say that living fish can be used for genetic and embryology studies that probe how vertebrates moved from water to land — analyses that would be impossible with preserved specimens. Joss and Ahlberg, for example, are studying the lungfish’s patterns of gene activity, to try to work out how fins became limbs. “These things are amazingly important organisms in the history of the Earth,” says William Bemis who studies vertebrate evolution at the University of Massachusetts. The Queensland govt has guaranteed that the dam will include a ‘fish elevator’ to carry lungfish across the dam and says that it will do whatever it takes to meet federal environmental requirements, as it did with the last dam. But Joss says that this is not enough, because the lungfish’s old spawning grounds will still be destroyed. Lungfish lay very few eggs, and return to the same spawning sites year after year. (Nature 200706)

**Uganda Hydro: World Bank, Norway criticised** A report by the Nordic Consulting Group has criticised the World Bank and the Norwegian Water Resources & Energy Directorate (NVE). The World Bank has been held responsible for pushing inappropriate private hydro policy that led to corruption allegations & inability of the company in raising finances.

⇒ **Wrong project aided by Norway** The NVE has been criticised for taking up the wrong and costly choice of extending the capacity of the Owen Falls Dam by 40 MW at a cost of Norwegian Kroner 64 million at the Kira Power Station on Lake Victoria on which 30 million people of Uganda, Kenya and Tanzania depend for their crucial needs. This was a wrong option. Better option could have been to reduce the losses in existing systems, for which potential saving of 50 MW existed. Another preferable option would have been to add two cascade power stations in place of parallel ones and the former would have used the water twice, rather the parallel ones that now uses twice the amount of water. Both options would have helped reduce depletion of lake Victoria, where water level today is down to the lowest in 40 years, affecting millions of poor people living on the lake shore. This would not have been the situation if either of the other options had been used. The report also notes that the recommendation during the appraisal of proper assessment of water availability was never implemented and in stead the most optimistic figures were used. (Development Today 170706)

**Cambodia: Downstream impacts not assessed** Sweden’s aid agency SIDA and Norway’s aid agency NORAD funded part of the plan of Electricity of Vietnam (EVN) to plan dams along the Sre Pok river in Vietnam. SWECO & Statkraft, Swedish agencies did some of the studies. Incredibly, Sweco advised EVN that downstream events of Se San dams would be negligible and that only a few Cambodians in the downstream region would be affected. This is shocking as this happened recently, over the last seven years. The dams built by Vietnam on Se San and Sre Pok in Vietnam has already impacted the downstream areas in Cambodia seriously. But no consultations were held with the downstream communities while decisions were taken to take up these projects. A later study commissioned by the Asian Development Bank estimated that some 2500 households were entitled to seek immediate compensation for the loss of lives and property damages caused by Yali Falls, the first and the largest dam on the Se San about 70 km from the Cambodian border. A series of deadly floods suddenly released from the dam caused extensive damages in downstream Cambodia, including deaths of people and cattle, sweeping away people’s boats, crops, fish traps and other property. EVN neither investigated the damages, nor compensated the losses. Sweco failed to warn EVN of the potential safety hazards associated with its planned operations. Recently, in response to NGO Forum on Cambodia’s request, Sida announced that Sida & Norad would support a public consultation on downstream impacts. However, it would be necessary to investigate as to how Sweco did not look at the impacts in the first place and needs to be held accountable for such serious lapses. Without that, consultants won’t feel any accountability for the work they do. (Development Today 300606)

**Publications available with SANDRP**

1. *Large Dams for Hydropower in NorthEast India* SANDRP & Kalpavriksh, June '05, p 228, Rs 150 (individuals), Rs 300 (institutions)
2. *Tragedy of Commons: The Kerala Experience in River Linking*, River Research Centre & SANDRP, 2004, p 146, Rs 120
3. *Power Finance: Financial Institutions in India's Hydropower Sector*, P Bosshard, SANDRP, '02, p 132, Rs 100/
4. *Unravelling Bhakra*, Shripad Dharmadhikary, Manthan, 2005, pp 372, Rs 150/- (individuals); Rs 300 (institutions)
5. *THE GREATER COMMON GOOD* by Arundhati Roy, Published by India Book Distributors, 1999, pp 76, Rs 80/-
6. *Tehri Environment and Rehabilitation: Towards Failure and Devastation*, Published by MATU, pp44, Rs 25/-
7. *Citizens' Guide to the World Commission on Dams*, By A Imhof, S Wong & P Bosshard, IRN, pp 59, Rs 30/-.
8. *Know Your Power: A Citizen's Primer on the Electricity Sector*, Prayas, Pune, 2004, p 138, Rs 150/-
9. *Dam Vs Drinking Water: Exploring the Narmada Judgement*, LC Jain, Parisar (Pune), 2001, p 134, Rs 75/-
10. *Insidious Financial Intrusions in India's North East*, IR & FIPA, April '06, pp 100, Rs 50/-
11. *Conserving Raindrops a Much Better Option than Linking Rivers* by Bharat Dogra, pp 8, Rs 4/-.
12. *The Forest of the Buddha*, By Bulu Imam & Phillip Carter, Sanskrit Publishers, Jharkhand, 2005, pp 121, Rs 650/-
12. *Nadi Jod Yozana Ke Mayne, Vastvikta Ke Aaine Mein* (HINDI), SANDRP, 2004, pp 58, Rs 20/-.
13. *Ken-Betwa Nadi Jod : Pyasi Ken Ka Paani Betwa Mein Kyon?* (HINDI), SANDRP, 2004, pp 46, Rs 20/-.
14. *Nadi Nahin Jodnaa, Bund Bund sanjonaa* by Bharat Dogra, pp. 16, Rs 8/-
15. *Bade Bandh, Bharat ka Anubhav*: Hindi, SANDRP, 2001, pp 268, Rs. 100/-.
16. *Vishwa Bandh Ayog per Nagarik Margadarshika* (HINDI), SANDRP, 2002, pp 63, Rs 30/-.
17. *Bharat mein Bade Bandh ka Lekha jokha* (Hindi) summary of WCD India Country Study, Manthan, pp18, Rs 5/-.
18. *Rahiman Paani Bik Raha Saudagar Ke Haath* (Hindi) By S Dharmadhikari, Manthan, pp 55, Rs 10/-.
19. *Bina Jaankari Kaisy Jan Sunvai?*, MATU (Delhi), 2004, p 32, Rs 15/-
20. *Kasbe Ka Paani* By Rehmat/ Mukesh Jat, Published by Manthan, pp 40, Rs 20/-
21. *Sudhar Ya Bazaar: Commodification of Water in MP by IFIs*, Manthan, pp 20, Rs 5/-
22. *Log Banam Faisla: A Reflection on Narmada Judgement* (HIN DI), NBA, 2000, pp 72, Rs 10/-

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**YOUR RESPONSES**

I have had a bird's eye view of the July 2006 issue of *Dams, Rivers and People*, which has been forwarded to me today by one of my colleagues, Mustafa Talpur. Its well-researched stories and people-centered analyses are really impressive. One thing that I have noticed is that the *Dams, Rivers and People* is un-proportionately focused on India. My only suggestion is that as the *Dams, Rivers and People* is from South Asia Network on Rivers Dam and People, it should reflect a regional picture vis-à-vis politics of water in South Asia. I hope you will take my feedback positively.

**Azhar Lashari, Programme Officer (Water Rights) ActionAid, Pakistan**

Thanks for the informative and insightful critique on the 11<sup>th</sup> Plan Approach Paper in the July 2006 issue of DRP. I am hoping that some students here will take up the approach paper for further study.

**Dr Shambu Prasad, Xavier Institute of Management, Bhubaneswar**

Thanks for the excellent analysis of ADB's Uttaranchal Power Project in April-May '06 issue of *Dams, Rivers & People*, rather I would say, it is an unraveling the project. We should ponder over the linkage of climate change mitigation and hydro projects. Off late MDBs (the World Bank and ADB are prominent) are emerging as the new trustees of climate change mitigation. Both the WB and ADB now manage close to US\$5 billion carbon trusts. Going by insider versions, hydro power is being pushed from carbon-reduction angle. This needs wider awareness and thoughtful response.

**Richard Mahapatra, Bank Informaton Centre, Delhi**

The Article *GOL's fundamentalist push for large storage projects* in July 2006 issue of DRP is an eye opening article and deserves wide dissemination.

**Himanshu Upadhyay, Intercultural Resources, Delhi**

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