

Environmental Aspects

1. Initially, the environmental aspects that are proposed to be reviewed are :

Upstream

- 1.1 Impacts of backwater buildup
- 1.2 Catchment area status and treatment
- 1.3 Compensatory afforestation
- 1.4 Impacts on fauna, flora and terrestrial ecosystems
- 1.5 Impacts on fisheries and aquatic ecosystems
- 1.6 Pollution of the surface and ground water
- 1.7 Impacts on human health
- 1.8 Impacts on archaeological monuments
- 1.9 Impacts of human rehabilitation of the environment
- 1.10 Rain stability

At the dam site

- 1.11 Impacts of seismic activity including Reservoir induced seismicity
- 1.12 Pollution and environmental degradation at the dam site

Down stream

- 1.13 Water logging and salinity
- 1.14 Impacts of reduced water flow on ecosystems and downstream human populations
- 1.15 Impacts on downstream fisheries and aquatic ecosystems

1.16 Impacts of the canal systems

1.17 Water use and conservation

1.18 Disaster management preparedness

2. As information and reports regarding these various aspects were not made available in faire, it has not been possible, during this meeting and yet to cover all or even most of these aspects. However, reports and information are now being collected and some observations on the remaining aspects could become possible by the next meeting.

3. Consequently, the focus of this report is mainly on two aspects : compensatory afforestation and catchment area treatment.

4. Catchment area treatment (CAT)

4.1 Basic statistics regarding the catchment are as follows :

Total Catchment	of which			
	Area	forest	non-forest	
	ha %	ha %	ha	%
Catchment needing treatment				
Indirectly draining				
Directly draining				
Very high				
High				

- 4.2 There is a decision of the NCA that only directly draining catchments will be treated at project cost while the remaining will be treated from other sources.
- Current reports on CAT identify subwatersheds that need to be treated, but not watersheds. It is not clear whether, when demarcated as subwatersheds by AISKUSO, New Delhi. The area to be treated would be the same as what is required by the NCA, i.e., watersheds. It is likely that when the area is measured in terms of watersheds it would be different. This issue needs to be resolved.
- 4.3 Also, currently treatment is being undertaken only of the very high and high priority subwatersheds, directly draining into the reservoir. However, it is not clear if, for the purpose of pari passu implementation, only these two categories need to be treated. This also needs to be clarified.
- 4.4 If we assume, for the moment, that only subwatersheds and not whole watersheds are required to be treated, and that only the very high and high priority areas need to be treated pari passu, then the progress reported is 52.6% on 12/95, as per the details below :
- 4.5 Two CAT sites (subwatersheds) were visited on 21st February, 1996. These were NK1c (very high priority) and NK1b (high priority). Both sites were on neon-forest land.

4.6 In the first site (nearly 85 ha), five different CAT activities were observed :

- i) field bunding (small cross-section bunds on the adjusted contour)
- ii) diversion draws
- iii) loose boulder checks
- iv) plantation of fruit (guava) trees
- v) cattle proof trenching

4.7 In the second site (about 135 ha) only first two of the four listed activities were undertaken.

4.8 Observations and recommendations

As no CAT sites on forest land were visited, these observations might not be totally relevant to forest land sites.

- a) The practice of planting fruit trees in farmers lands, as a part of CAT and the distribution of about Rs.13,000 per ha to them towards maintenance charges seems a totally inappropriate activity for CAT. It is not clear what benefits, if any, such plantations would have on CAT. Further, the sustainability of the plantation and the durability of converting agricultural land into horticultural plantations is also questionable. It is recommended that this activity be immediately discontinued as a part of CAT and only reintroduced after a proper assessment finds it viable for CAT.

- b) The efficacy of the package of other measures need to be established. For the purpose it is imperative that silt and water run-off be monitored from a sample of micro watersheds, starting prior to the initiation of the CAT activities.
- c) There is also a need to experiment and develop alternate methods of CAT, appropriate to varying agro-climatic and bio-geographic conditions, and to the diverse socio-economic conditions. For the purpose it is recommended that, as was initially envisaged, pilot plots be set up, to experiment with CAT methods. It is further recommended that a suitable existing institution in the region be asked to take up research and training activities for the NVDA. This institution should not only be involved in developing appropriate CAT methodology in the pilot projects and elsewhere, but also in training the NVDA staff for CAT work.
- d) In most of the non-forest CAT sites, there reportedly are patches of common or government lands, apart from privately owned fields. These does not appear to be a workable methodology for treating these lands. A critical factor for the success of efforts here would be the involvement of the local communities. This aspect needs to be focussed on and appropriate micro-level plans need to be developed in a participative manner. Fortunately, there good examples of this type

of work being done by certain institutions (specifically NCHSE, Bhopal) in Madhya Pradesh. There are also other examples, like the work of the Chakra Vikas Yojna in Palamau, Bihar, or the well known Sukhomajri in Punjab. Lessons from these must be incorporated into the NVDA CAT programme.

- e) It must be remembered that a huge area has to be dealt with, in the coming years, under the CAT programme. CAT is critical for both reducing silt flow and repulating water flows to the project. Therefore, the investment of time and resources for developing a workable strategy for CAT, and for training NVDA personnel to carry out such a strategy, is well worth the effort.

5. Compensatory Afforestation (CAF)

5.1 Basic statistics regarding CAF are as follows :

	Area ha	Degraded	
		forest ha	non-forest ha
Total CA required	80,945	70,802	10,143
Achievement upto 12/95	63,666 (%)	55,782 (%)	7,884 (%)
Balance	17,279 (%)	15,020 (%)	2,259 (%)

5.2 A close-by site of compensatory afforestation under S&P was visited. Nevertheless, as reported by the methodology being used for ISP CAF is the same as that being used for SSP observations on this site should also be valid for the ISP sites.

5.3 Observations and recommendations

As no non-forest land sites for CAF were visited, these observations might not be totally relevant for such sites.

- a) The height and survival rates of the trees seemed to be satisfactory. There was also good grass growth between the saplings, indicating good protection. The area was surrounded by a cattle proof trench.
- b) Given the fact that compensatory afforestation, as the name suggests, is aimed at compensating for the loss of forests due to the project, the CAF sites must be developed to be as like the natural forests of the region as possible. Unfortunately, current practices seem to focus only on trees and some grasses, and to introduce exotics (like su babul). Also, planting of trees was observed in species wise clusters, rather than mixed, as in the case in a natural forest.

It is recommended that prior to CAF being taken up, the species profile of natural forests in the region should be determined from past working plans or from existing patches of undisturbed natural forests. Action plans

should be developed to, as far as possible, re-create such forests through a stage by stage introduction of trees, creepers, shrubs, grasses and other plants. Where necessary, related animals, especially bird and insect species must also be re-introduced for the proper propagation and establishment of species.

c) To assist the NVDA in this work, especially in the research and training involved, it is recommended that, appropriate institutions like the Indian Institute of Forest Management, Bhopal, the Wildlife Institute of India, Dehradun, or the Indian Institute of Science, Bangalore, be associated.

d) It is further recommended that, plantations already established by the NVDA, as a part of CAF, must also be reviewed and remedial measures be taken.

e) A major concern about the CAF plantations is their prospects of survival once the NVDA hands them over after 7 years. Today it is well recognised that unless the factors which initially led to the degradation of a forest area are also tackled, mere planting of trees will not ensure that the area is not degraded again.

It is recommended that site specific, micro level, strategies for involving the local communities in the continued protection of these CAF sites be developed in a participatory manner, using well established

strategies like joint forest management and ecodevelopment. It is further recommended that, financial provisions for CAF include adequate provision for operationalising such strategies well in advance of the areas being handed over and, for new CAF sites, right from the initiation.

The earlier mentioned institutions can also be associated, alongwith local colleges and NGOs, in carrying out the socio-economic surveys and the participatory rural appraisals required to develop such strategies.

- f) The forest staff attached to the NVDA needs to be prepared for these various tasks. It is, therefore, recommended, that suitable training opportunities be identified or developed for them.

6. Miscellaneous issues

- 6.1 While visiting the dam site, it was noticed that over-burden from site-excavation had been dumped on slopes above the banks of the river. This must not be permitted, as much of this overburden would, during the rainy season, flow into the river thereby polluting the river and adding to the silt load of SSP downstream. Infact, overburden from the project must not be permitted to be dumped in the river catchment as, otherwise, it will ultimately add to the silt load of the river. It is recommended that a suitable site for dumping the overburden be identified and that the contractor

be made to deposit the overburden only on this site. Remedial measures must be taken to relocate or otherwise stabilise the overburden already dumped near the river.

6.2 On the basis of the information provided by NVDA, it appears that required assessment has not been carried out for the underlisted impacts and aspects. If this is correct, then the studies needed must immediately be commissioned. On the other hand, if these studies have already been done, then copies should be made available.

- a) Impacts of backwater buildup
- b) Impacts of reduced water flow downstream
- c) Impacts on upstream and downstream aquatic ecosystems (as opposed to commercial fisheries)
- d) Possibility, magnitude and effect of reservoir induced seismicity.
- e) Possibility, levels and impacts of upstream and downstream water pollution, both for surface and ground water
- f) Possible impact of rehabilitation on the environment
- g) Disaster management preparedness, including impact of excessive water releases in terms of down stream flooding.