International Environmental
Law Research Centre

ENVIRONMENTAL ASPECTS OF NARMADA SAGAR AND SARDAR SAROVAR MULTI-PURPOSE PROJECTS

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December 1986

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1. Both the projects are located in the Narmada basin whose waters are proposed to be harnessed through the construction of 30 major, 135 medium and about 3000 minor river valley projects in accordance with Narmada Water Disputes Tribunal Award, 1979. So far, only three irrigation schemes have been completed and another two are under construction in the basin.

The two multi-purpose projects i.e. Narmada Sagar Project, Madhya Pradesh and Sardar Sarovar Project, Gujarat are proposed to be taken up with World Bank assistance. Detailed investigations on NSP were recommended in 1948 by a special committee chaired by Dr. A.N. Khosla and investigations have been going on since then in the Narmada basin.

This note covers only the major environmental issues of Narmada Sagar and Sardar Sarovar Projects which include:

(i) rehabilitation of the largely tribal, affected population;

(ii) Catchment area treatment;

(iii) Command area development;

(iv) Compensatory afforestation; and

(v) Loss of flora and fauna.

The present status of each of these aspects in terms of availability of data, and plans and readiness to execute these plans is briefly described here.

The other components like the higher incidence of water borne diseases, loss of mineral reserves, submergence of Central Railway line are also important but are not dealt with in detail.

I. (a) Rehabilitation and Submergence

The creation of reservoirs for Narmada Sagar Project (NSP) and Sardar Sarovar Project (SSP) would result in the submergence of 91,348 ha. and 39,134 ha. of land respectively with the following break-up:

Narmada Sagar Project

Forest Land		*40,332 ha*
Reserve forest	*24,857 ha*	
Protected forest	*10,468 ha*	
Revenue forest	*5,007 ha*	
Culturable land		*44,363 ha*
Land designated for other uses		*6,653 ha*
		********
		91,348 ha

Sardar Sarovar Project

Forest land	*13,744 ha*
Culturable land	*11,318 ha*
Land designated for other uses	*14,072 ha*
	********
	39,134 ha

(b) Number of villages affected

Narmada Sagar Project	
No. of villages affected	*254*
Villages where no shifting is necessary	*105*
Villages partly affected	*60*
Villages coming under total submergence	*89*
Sardar Sarovar Project	
No. of villages affected	*237*
Villages partly affected	*234*
Totally submerged	*3*

(c) Population affected

Narmada Sagar Project	
Total Population	*1,29,396 (1981 census)*
	88,572 (excluding population whose land is submerged only for short period every year).
Sardar Sarovar Project	
Total population	*66,675*
SC/ST population	*48,250*

Rehabilitation in both these projects' is being proposed in phased manner.

(d) Rehabilitation Needs

The formulation and assessment of rehabilitation programme is on the basis of:

i. *Identification of all affected population including landless and carry out socio-economic surveys to project their needs;*

ii. *Identification of lands for rehabilitation on the basis of:*

- *Land capability surveys*

- *Water availability for drinking as well as irrigation.*

iii. *Identification of measures needed for making identified lands fit for agriculture and resettlement;*

iv. *Arranging occupational training programmes for the oustees;*

v. *Prepare phased programme of:*

- *Land reclamation & preparation with details of operations;*

- *Creation of facilities & amenities;*

- *Actual shifting of oustees.*

(e) Status of Readiness

Narmada Sagar Project *[omitted]*

Sardar Sarovar Project

The problem of rehabilitation is not so severe in the case of SSP as the number of fully submerged villages is only 3. But, the rehabilitation has to be taken up in all three States - Madhya Pradesh, Gujarat and Maharashtra. Preliminary data has been furnished on lands identified in Maharashtra and Gujarat whose suitability and acceptability to farmers is yet to be ascertained 'by the NSP authorities.

II. CATCHMENT AREA TREATMENT

The requirement of Catchment Area Treatment are:

(a) Demarcation of critically degraded areas on the basis of aerial photographs, satellite imagery and ground checks;

(b) Creation of a chain of nurseries of suitable species for biological treatment of Catchment Area;

(c) Preparation of phased action programme for biological and engineering treatment of the degraded catchment area.

Out of the total catchment area of 98,796 km² upto the confluence of the Narmada river with Arabian Sea, it was first proposed to treat about 17,750 km² of area between Narmada Sagar and Tawa and an area of 29,570 km² between Tawa and Bargi in ten years. This area was subsequently reduced to 11,300 km² and finally the area proposed to be treated is 7,919 km² at a cost of Rs.304 crores during the next ten years. The extent of area to be treated is on the basis of a thumb rule and not on any field survey.

While aerial photographs of the Narmada Basin as in 1984-85 and satellite imagery have been procured by the Government of Madhya Pradesh, its analysis and interpretation will take time by the All India Soil and Land Use Survey, Nagpur and the Indian Institute of Remote Sensing, Dehradun. Field surveys are also likely to be started soon. The survey work is likely to take two to three years as per the estimates of the Ministry of Water Resources. Pilot projects are proposed to be taken up and their details are under preparation.

State of Readiness

Considering that the Catchment Area Treatment on an intensive scale is imperative both to reduce silt load and to maintain ecological balance and keeping in view the fact that;

- the interpretation of the aerial photographs and satellite imagery will take at least one year for completion to be followed by ground truth checks;

- the detailed land and soil surveys would take another three years to be completed;

- the geo-morphological studies to suggest the engineering and biological treatment measures for the eroded areas are still be taken up; and

- the chain of nurseries needed to provide the necessary saplings in adequate quantity along with manpower and other infrastructure requirements are still to be mobilised.

It is reasonable to conclude that the catchment area treatment programme can be realistically formulated only after three years when these data become available.

Today we have an 'Intention Plan' which can be converted into an action plan only on the basis of field survey data which is not available.

Considering the accelerated deforestation during the last few years, the total area in catchment needing treatment is sure to be much larger.

III. COMMAND AREA DEVELOPMENT

Command Area Development is aimed at achieving the following:

- Prevention of waterlogging and salinity;

- Optimisation of water utilisation; and

- Maintenance of water quality.

All these objectives require development of the command area through levelling, grading and provision of sufficient drainage both surface and sub-surface as well as pollution control measures specially against the fertilisers and pesticides run-off. On farm development works would be detailed and implemented over a period of 30 years starting from 1990-91. A detailed survey of the command area is, therefore, required on priority to prepare a package of the nature and quantity of development and drainage and on farm works to fully utilise the irrigation potential. Action programme is yet to be detailed.

The Ministry of Water Resources is preparing an evaluation report covering;

(i) Extent of likely waterlogging and salinity problems;

(ii) Effectiveness of measures proposed or likely to be proposed to combat these problems as per the Action Programme to be formulated.

It is to be noted that NSP will submerge 91,348 ha of land and provide direct irrigation to only 1,23,000 ha.

IV. COMPENSATORY AFFORESTATION

The project authorities have not been able to identify non-forest land for compensatory afforestation and have, therefore, now proposed to undertake afforestation on double the extent for degraded forest land i.e. about 90,000 ha. The proposal submitted is fairly detailed and seems satisfactory.

V. LOSS OF FLORA AND FAUNA

The forest area specially affected by NSP represents areas harbouring rich heritage of genetic resources as well as wildlife. The preliminary study carried out by the Environmental Planning and Coordination Organisation, Bhopal (EPCO) as well as the observations made by the World Bank clearly underline the need for preparing a master plan showing not just the present status but also the likely scenario, after the project is implemented. The prime concern is to ascertain loss of biological diversity and whether the wildlife will be able to sustain itself after the destruction of its habitat specially on the Southern side which is surrounded by agriculture fields. The following studies are considered absolutely essential to determine the loss of flora and the adequacy or otherwise of the left-over habitat to sustain the wildlife;

- A wildlife census of the area (ZSI will take at least 2-3 years to complete the survey);
- Preparation of a master plan showing all protected areas i.e. national parks, wildlife reserves, reserve and protected forests, etc. on which should be superimposed the areas cannot be taken up for various reservoirs, roads, canal, settlement colonies, etc;
- Study of the carrying capacity of the surrounding areas where the wildlife from the submergence area will disperse.

These studies are considered specially important in the case of NSP. The work initiated by BSI and ZSI at the request of the project authorities will be completed only by 1989. The other studies have not yet been initiated. Under the circumstances, it is not possible to assess the impact of the loss of habitat on the wildlife and the overall loss of biological diversity and genetic reserves.

Even if one were to assume that the forests to be destroyed do not contain genetic resources, which in any case cannot be valued, the simple loss of these forests would have an environmental cost estimated at several thousand crores of Rupees as per norms developed by FRL. The environmental cost is thus colossal.

VI. HEALTH ASPECTS

The introduction of perennial irrigation is invariably accompanied by a substantially higher incidence of water-borne diseases. A base line health status has been prepared covering such diseases as Cholera, Gastroenteritis, Guinea worms and Malaria, etc. It is proposed to set up a separate cell for monitoring the health parameters and to screen the migrant labour.

VII. ENGINEERING ASPECTS AND THEIR ENVIRONMENTAL IMPLICATIONS:

The Narmada Sagar and Sardar Sarovar Projects are being designed as multipurpose projects to maximise irrigation and power benefits. The Narmada Sagar FRL has been fixed at 860 ft. to provide a live storage of 8.8 MAF. The following points are worth noting regarding the design criteria:

- Irrigation in Narmada Command will be provided only to 14,096 lakh ha by utilising just 1.4 MAF of the live capacity. There is reason to believe that even with variations in dam height down to FRL of 814 ft. the irrigation potential in Narmada Command will not be affected at all. The adverse impact would be on generation of firm power which would become 22 MW instead of 118 MW eventually.

- The positive impacts of fixing the FRL at 814 ft. are that the forest submergence gets dramatically reduced to 8,075 ha, total land submergence is reduced to 35,628 ha and the number of villages affected becomes 77 with a population of 20,200 only.

Reconsideration of fixing the dam height for the above reasons alone is justified. This becomes all the more important considering the fact that the 75 per cent dependable run off has been estimated to be only 23 MAF instead of 27.2 MAF assumed by the Narmada Tribunal. The Mean Draw Down Level (MDDL) of the Sardar Sarovar Project can be modified to provide an additional live capacity. A rough estimation is that the MDDL can be lowered by about 50 ft.

It is generally presumed that the levels indicated by the Narmada Tribunal Award are not negotiable. However, the Narmada Tribunal decisions in its sub-clause 17 provides:

> Nothing contained in this order shall prevent the alteration, amendments or modifications of all or any of the foregoing clauses by agreement between all States concerned.

In the overall interest of natural resources optimisation, reducing to the minimum impact on human beings and for minimising the ecological damage, objective review of the design parameters seems desirable.

VIII. NARMADA MANAGEMENT AUTHORITY

In view of the urgency expressed by the State authorities to approve the project, in principle, and the vehement opposition from the environmental groups, a series of meetings have been held to assess the situation in which the following position has emerged:

(i) Complete data is not yet available on important environmental issues. For NSP, the preliminary work has, in the last few months, made good headway. For SSP the state of preparedness is quite good except on the one issue

of rehabilitation plans of Maharashtra oustees and M.P. oustees to be resettled in Gujarat. But even here some advance work has been done.

(ii) A review of the design parameters may minimise the environmental damage and impact on human population which is predominantly adivasi and achieve natural resource optimisation.

(iii) If it is still decided that these long delayed projects are to be given approval in order to avoid cost escalation on the basis of the assurances extended by the State Governments and the Project authorities, the setting up of a Narmada Management Authority with powers inter-alia to stop work on engineering and other works, if the progress on environmental management measures is not satisfactory and *pari passu* with the engineering works, is absolutely necessary. The details of such an authority can be worked out separately; there is agreement in principle on the setting up of such an authority with Government of India and State Government representatives.

CONCLUSIONS

1. Taking note of the fact that the project formulation has been in progress for more than three decades and the active interaction of the project authorities with the Department of Environment has been going on for almost three years, the absence and inadequacy of data on some important environmental aspects still persists.

2. In an objective sense the NSP is not ready for clearance from environmental angle. Even though SSP is in a fairly advanced stage of preparedness, it is neither desirable nor recommended that the SSP should be given approval in isolation on technical and other grounds.

3. The state of readiness in the case of NSP is such that it gives just an outline of the intention plan. The fact that this intention plan will be converted to an action plan and there be effectively implemented has to be taken on trust. In case of Sardar Sarovar Project (SSP), readiness to execute is reasonably good except on the issue of rehabilitation of oustees specially from MP and Maharashtra.

4. Holding up of the projects even for the next few months is not likely to improve the level of preparedness on most of the environmental aspects, specially in the case of NSP. In the meanwhile, further studies will not perhaps pick up speed and thus at no time will the requisite information be fully available.

5. A large amount of money has already been invested on SSP which is critically linked – on technical and operational aspects to NSP. However, it may not be too late even now to modify some of the parameters of NSP and SSP to minimise environmental damage while at the same time ensuring optimal utilisation of water resources.

6. Under any circumstances, it is considered vital to have a Narmada Management Authority with adequate powers and teeth to ensure that the Environmental Management Plan does not remain only on paper but is implemented; and implemented *pari passu* with engineering and other works. Such an Authority should not be just a Monitoring Committee to be treated as a doormat but should possess the authority to stop the engineering and other works by all means including withholding of sanctions, approvals, tenders, contracts and funds to ensure that environmental management plan gets implemented as per the approved plans and time schedules. The powers to withhold funds should be applicable to the funds made available from the state, the centre and the foreign agencies.

If, despite the meagre availability of data and the state of readiness on NSP the Government should decide to go ahead with the project, it is submitted that it should do so only on the basis of providing a management authority as outlined above with the hope that the public opposition, not just by vested interests but by credible professional environmentalists, can be overcome. Effective implementation of the engineering and environmental measures implemented by harmonising environmental conservation needs with the development effort.

The choice is difficult but a choice has to be made.