

DRAFT FOR PETITION ON NARMADA PROJECT

SUMMARY OF ARGUMENTS

1. The Narmada Sagar (NSP) and Sardar Sarovar (SSP) Projects represent a huge expenditure of over 15,000 crores, at current estimates, from the public exchequer.
2. They collectively threaten to displace nearly 200,000 people (1981 census), most of whom are tribals or members of economically backward classes.
3. The two projects collectively would submerge nearly 60,000 hectares of forests under their reservoirs.
4. They would destroy untold number of wild plants and animals.
5. In addition, they would also submerge nearly 80,000 hectares of non-forest land, including agricultural land.
6. The projects may also threaten the seismic stability of the region.
7. The reservoirs of the project would further threaten settlements, land and forests on the side of the Narmada River's tributaries as the reservoir would result in the build-up of backwaters.
8. The command areas of these two projects would be threatened by water-logging and salinity.
9. The reservoir and the irrigation system would inevitably enhance the incidence of vector borne diseases such as malaria and filaria, among others. The pesticides proposed to be used for vector control will also inevitably cause severe health disorders.
10. The entrapment of silt and sediments by the dams, and the reduced downstream water flow would negatively effect the downstream

environment, including the aquatic (riverine) ecosystem. This reduced flow would also cause salt-water ingress at the mouth of the river.

11. There would be various other impacts of the dams, like changes in micro-climate, effect on neighbouring forests, and the growth of weeds along and in the reservoir and canals.

12. Despite these costs, the projects have been cleared presumably because, in the opinion of the Ministry of Forests and Environment and of other concerned ministries of the Government of India, the benefits of the projects are sufficiently greater than the costs.

13. It is our contention that many of the costs have not been taken into consideration, or adequately computed.

14. Similarly, it is our contention that many of the benefits have been grossly exaggerated.

15. It is further our contention that many of the steps prescribed by the Government of India itself as being pre-conditions to the clearance of such projects have not been taken at the time of clearance, nor since, and as such the clearance is improper. ???

16. Further, it is our contention that the question of whether these projects are in public interest, especially considering the high monetary & other costs, can not be determined till at least the steps prescribed by the Government of India are taken.

17. Also, that the projects cannot be judged to be in public interest till a comprehensive and realistic cost benefit analysis is done.

18. Further, the fact that a project might have more benefits than costs is not alone enough to qualify it to be in public interest. It must also be determined that this is the most beneficial possible way of achieving the required goals. However no study of alternatives to the

dam, or alternative designs of the dam, has been done.

19. Finally, in judging whether a project is in public interest it is not enough to show that the benefits are greater than the costs. Considering the Indian Constitution and the avowed policies of the Government of India, it is also important to determine which economic class benefits and at the cost of whom. However cost effective a project, if the costs are primarily to be paid by the poor & the benefits are primarily to go to the rich, then such a project increases disparities in the society, is against natural justice and therefore not in public interest.

20. It must also be borne in mind that NSP and SSP involve just two of the 30 large dams planned for the Narmada Valley. The Narmada Valley Development Project (NVDP) further involves 135 medium and 3000 minor dams. The combined impact of all these dams, e.g. on forests, or on the seismic stability of the Valley, or in terms of the colossal human displacement involved, has not been assessed at all. At the moment attention is focused on NSP and SSP, but the potential damage to the Narmada Valley and its inhabitants by the NVDP as a whole must be the context in which these two dams are assessed.

DETAILED ARGUMENTS

A: SOCIAL AND CULTURAL IMPACTS

A.1. Displacement and rehabilitation

1. NSP and SSP are together expected to displace over 2 lakh people, most of these in the state of Madhya Pradesh, some in the states of Gujarat and Maharashtra. This displacement will take place in the next 10 to 12 years if the dams go on schedule. SSP has already caused displacement of at least 8 villages which have been submerged under 'rock-filled' dykes or due to the construction of the staff colony at Kevadia.

2. The Centre for Social Studies, Surat, which is monitoring the resettlement and rehabilitation programme in Gujarat at the behest of the Gujarat Government, has reported that the resettlement of five of the above-mentioned villages that were studied has been far from satisfactory (Centre for Social Studies, 1986). The people who have been displaced are facing all sorts of difficulties at their resettlement sites, including severe shortages of fuelwood, fodder, and employment opportunities, fragmentation of families, conflicts with host populations, and in some cases inferior land and shortage of water.

3. While those most recently ousted from Gujarat by the SSP have got a much better deal than those displaced earlier, severe problems still exist with the plans for resettlement of oustees of SSP in Maharashtra and Madhya Pradesh, and with the oustees of NSP in Madhya Pradesh. It is instructive to note the Gujarat oustees have been recently able to get most of their demands met by the Gujarat Government, only after a 7-year long struggle to this end, which included a writ petition in the Supreme Court. A similar struggle is now being waged by the Maharashtra oustees of SSP, but there is little mobilisation among the oustees in Madhya Pradesh, which constitute the majority of the potential oustee population. In the light of the inability or unwillingness on part of the state governments to work out a just rehabilitation scheme, unless forced to do so as in the case of the Gujarat Government, this situation in Madhya Pradesh is alarming.

4. Another problem relates to the extent to which information regarding displacement and rehabilitation has been conveyed to potential oustees by the concerned project authorities or state governments. A series of field surveys by the Delhi-based Multiple Action Research Group (MARG), ('Sardar Sarovar Ousteas in MP - What Do They Know?' Vol. I, II, III; MARG, N. Delhi, May 1986, Feb. 1987, May 1987), shows that not only has there been a thoroughly inadequate surveying of the submerging villages of SSP in Madhya Pradesh (6 villages in Barwani Tehsil to be submerged

have not even been listed in official documents!), but also that the authorities have conveyed to the villagers very little information about the project and about displacement and rehabilitation. In some cases actual misinformation has been spread by surveyors or other officials who have been in touch with the villagers. The net result has been an atmosphere of severe confusion, uncertainty, and apprehension among the potential oustees.

5. Considering the experience of most of those already ousted from their lands by SSP, and considering the dismal record of every state government in India in the field of rehabilitation, and also considering the vastness of the displacement involved in SSP and NSP, resettlement is one of the most worrying aspects of the projects. Though the directives laid down by the Narmada Water Disputes Tribunal in 1979, and the various changes made in the rehabilitation policy of the Gujarat Government, mark a distinct improvement over past such policies in the country, there are still serious problems.

One such problem concerns the availability of land, especially as land is a scarce commodity, so much so that the government has been having serious difficulties in finding land for many important programmes like social forestry. It is, therefore, difficult to accept that land would suddenly become available in adequate quantity and of adequate quality just when these poor people are ousted from their homes. Perhaps it was for this reason, and keeping in mind the plight of oustees from many earlier projects, that the Government of India prescribed that identification of adequate suitable land must precede the clearance of the project. The fact that this has not been done shows the inability or unwillingness, or both, of the State Governments to make this land available. Indeed, in 1984, the Narmada Control Authority, Govt. of India, admitted that "The land required to be allotted as per the Award of the Narmada Water Disputes Tribunal may not be available either in Gujarat or in Madhya Pradesh..." Clearance of the

project, under such circumstances, is not only improper but can be seen as anti social and not in public interest.

Much of this has been admitted by the Department of Forests and Environment, Government of India, in a note on the project. An extract from this note, which also reveals some other shortcomings in the rehabilitation programme as regards NRP and SSP, is given below.

"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 and preparation with details of operations

-Creation of facilities and amenities;

-Actual shifting of oustees.

Status of Readiness: Narmada Nagar

1. Total land requirement of 40,000 ha. for rehabilitation has not yet been identified? let alone surveyed, for its capability etc.

2. Rehabilitation is proposed in 5 phases and phase-I will cover only 12 villages with a population of 8291. Identification of the affected families has been done along with a socio-economic survey.

3. These villages occupy 3418 ha. and are proposed to be about 100 km. away in Tawa Catchment.

4. Phase-I oustees are proposed to be resettled on land clear-felled in 1976 for Bangladesh refugees which was not fully utilised. About 13,000 ha. of this land is to be

utilised for rehabilitation and pasture development. A total of 2268 ha. of land is proposed to be reclaimed for agriculture by 1989.

5. The land identified have not yet been surveyed for:

- land capability

- Actual water availability

- Nature and quantum of reclamation works i.e. leveling, grading, terracing, gully plugging, retaining structures, etc.

6. The lands identified are reported to be:

- Severely eroded and gullied;

- infertile with low water holding capacity;

- Suffering from general scarcity of water.

7. Social desirability of tagging on the Adivasis to the Bangladesh refugee villages has not been examined and prima-facie is questionable.

8. The Rehabilitation Plan even for phase-I is not, therefore, really ready. The M.P. authorities have stated that basic surveys would be completed earliest in about a year to provide the needed data. No additional information on rehabilitation is likely to become available in the short run.

Sardar Sarovar

The problem of rehabilitation is not as severe in the case of Sardar Sarovar Project as the number of fully submerged villages is only 3 but, the rehabilitation has to be taken in three states. Preliminary data has been furnished on lands identified by Maharashtra and Gujarat where suitability and acceptability to farmers is yet to be ascertained by the Sardar Sarovar Project authorities." (DOEn, 1987)

6. The vast displacement to be caused by NSP and SSP represents one of the major costs of the project. The social cost of displacing persons has never been added to the costs. This is despite the fact that displacement of most of these people has meant, and will continue to mean, a destruction of their culture and way of life. It will also subject them to uncertainties, fears and severe hardship especially as most of them do not have any information as to what awaits them, only that they are to be displaced from their traditional homes.

A.2. Other Cultural Costs

1. Apart from the social and cultural impact of displacement, the dams will also cause socio-cultural disruption in other ways. A cultural phenomenon of great significance which will be affected is the 'Parikrama', an age-old practice in which residents of the Narmada Valley circumambulate the whole river on foot. With the creation of huge reservoirs the route of the parikrama will be severely disrupted, the impact of which has not been studied or evaluated. There will also be submergence of many temples and spots of religious or cultural significance. It will not be possible to relocate every single one of these, and thus there would be inevitable archaeological and cultural loss, the dimensions of which have not been assessed.

B. ENVIRONMENTAL IMPACTS

B.1. Loss of Forests and Wildlife

1. NSP and SSP will together submerge over 60,000 ha. of forests in Madhya Pradesh, Gujarat, and Maharashtra. This represents an enormous loss of natural forests in a country already facing a severe deforestation crisis. Some of the forests to be submerged under NSP are amongst the best teak forests left in central India.

2. The concept of compensatory afforestation, to the tune of area equivalent to the forest area being submerged, if the plantation is on revenue land, and area twice the size of that being submerged; if it is on forest land, has been propagated by the Government of India. The NSP and SSP authorities have therefore submitted plans for such afforestation.

It is sometimes felt that such "compensatory" afforestation actually compensates for the natural forests being lost. However, it is well established that plantations cannot perform an iota of the ecological functions performed by a natural forest. The forests to be

submerged by NSP have evolved over thousands, perhaps millions of years, and contain a finely integrated and immensely complex ecological community which would be impossible to recreate artificially. In any case, the ability and track record of the government in planting and looking after forest plantations does not fill one with great confidence about the chances of success of the "Compensatory" plantations. There is in fact a definite tendency for such plantations to be commercial in nature, i.e. involving species of trees which are commercially but not necessarily ecologically or socially useful. The NSP compensatory afforestation plan, for example, includes in its proposed list of species to be planted some exotic commercial species such as eucalyptus, which has become so controversial for its negative social and ecological effect ('Detailed Report and Development Plan on Forest and Wildlife in Narmada Valley'; Narmada Planning Agency; Undated).

3. The loss of wildlife under submergence is one of the most neglected aspects of NSP and SSP. At the time of the clearance of these projects, no comprehensive listing of the flora and fauna of the submergence zone was available; this is still the situation. Preliminary assessments made indicate that the forests to be submerged especially by NSP are extremely rich in wildlife, and contain threatened or endangered species like Indian Wolf, Tiger, and Python. Plans to relocate or otherwise compensate for the loss of wildlife are quite inadequate for NSP and SSP. The note by the Department of Environment is quite revealing in this regard:

"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 scenarios 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 both 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, canals, 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 FRI. The environmental cost is thus colossal." (DOEn, 1987)

B.2. Catchment Area Treatment

1. The cost effectivity of a river valley project is significantly dependent on the life of the reservoir. One of the major threats to dam life and safety is siltation of the reservoir. The rate of siltation, in turn, is primarily dependent on the condition of the catchment area of the project. Continued degradation of the catchment area in terms of decline in forest cover and consequently increased soil erosion would increase the rate of siltation in the river. It, therefore, becomes crucial to 'treat' the catchment area and ensure that the siltation rate does not go beyond what was projected.

2. It has been the Indian experience that many dams have had siltation rates significantly higher than the anticipated rates. Some of the figures given in the Report of the Irrigation Commission are:

RESERVOIR	ASSUMED RATE (in acre feet)	OBSERVED RATE (in acre feet)
Maithon	684	5980
Mavurakshi	538	2000
Nizamsagar	530	8725
Panchet	1928	9533
Ramganga	1089	4266
Tungabhadra	9796	41058
Ukai	7448	27758

Some of the reasons responsible for this enhanced rate of siltation are:

a) The submergence of a significant amount of forests by the reservoir leads to the remaining forests coming under greater pressure, as many of those who used the submerged forests for their needs would now transfer their activities to the remaining forests in the area and would add to the pressures already existing in these forests.

b) The enhanced population and activity that is the outcome of a river valley project contributes to the faster degradation of the surrounding forests. This process, in fact, starts even before the dam is constructed as the labour that is brought in uses the forests as a source of firewood.

c) Efforts at afforestation also do not often succeed as the increased pressure on the remaining forests also encompasses the new plantations and it becomes almost impossible to preserve them.

d) The displacement of large populations also significantly swells the numbers of the land-less or marginal farmers who have no alternative but to degrade the remaining forests for survival.

The degradation of the catchment area, therefore, not only results in increase siltation but also disrupts the water flow patterns so crucial for dams.

3. Due to the destruction of the catchment area environment, the water-flow in the river and tributaries is greater than anticipated during the rainy season and this, along with the reduced storage capacity of the reservoir due to silting, results in a situation where the reservoir gets over-full and poses a threat to the dam itself. This necessitates

in the excess release of water from the dam during the rainy season and resultant floods and destruction downstream.

4. Conversely, in the dry season the water-flow falls far below the anticipated level as most of the underwater reservoirs have not been fully recharged due to enhanced run-offs during the rainy season. Therefore, when water and electricity are most required, they are not available.

5. The importance, therefore, of catchment area management cannot be over-emphasised. Despite this, no systematic and comprehensive study of the Narmada catchment area has been undertaken. An inter-departmental committee was set up by the Government of India to look into this issue. Headed by Shri M.L. Dewan, this committee in its report in 1985 admitted that the study and planning work done on catchment treatment was quite inadequate. It said that its own report was based on "limited surveys and local knowledge" since "no specific surveys have been carried out to map areas of different treatments for checking soil erosion, water conservation, increased productivity of soil, land for agriculture, forest, grasses, horticulture, etc." (Ministry of Agriculture, Govt. of India, 1985).

6. The Dewan Committee report has been used by the M.P. and Gujarat state governments to evolve their own plans for catchment treatment. But these too are thoroughly inadequate in various ways. One of the many glaring faults in these is that there is no complete assessment of present and future demands on the catchment area forests and lands and therefore no plan on how to meet these demands without allowing further deterioration of the catchment.

7. Once again the 1987 Department of Environment note gives a clear indictment on this:

"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 sq.km. upto the confluence of the Narmada river with Arabian Sea, it was first proposed to treat about 17,750 sq.km. of area between Narmada Sagar and Tawa and an area of 29,570 sq.km. between Tawa and Bargi in ten years. This area was subsequently reduced to 11,300 sq.km. and finally the area proposed to be treated is 7,919 sq.km. 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 to be taken up; and

- the chain of nurseries needed to provide the necessary saplings in adequate quantity along with manpower and other infra-structure 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 the catchment needing treatment is sure to be much larger." (DOEn Document, 1987)

B.3. Impact on Human and Animal Health

1. The recent increase of malaria and other water related diseases in India is well known. Equally well known is the role that reservoirs play in the breeding of vectors and the spread of various diseases (6th plan document).

In the case of NSP, it has been admitted that the incidence of malaria, filaria, cholera, gastroenteritis, viral encephalitis, goitre, and some other water-borne and water-based diseases will go up. In the light of this the following statement of the dam authorities, made in the 1984 Environmental Impact Assessment of NSP, seems to indicate a rather indifferent approach: "It may not be possible to take preventive action through spraying, etc. over such a large area (i.e. the command). It can only be hoped that medical facilities will be adequate to deal with cases of malaria." ('Narmada Sagar Project: Environmental Impact Study'; Environmental Planning and Coordination Organisation, Bhopal, 1984).

In the case of SSP, the project authorities have asserted that the potential rise in diseases will be controlled by strengthening existing health facilities and by vector-control through pesticide spraying on a large scale. Two problems with the use of pesticides have however not been dealt with at all in their plans: one, the fact that many mosquito species in India are now resistant to DDT and other commonly used pesticides, thus rendering pesticide-based vector control less effective and more costly; and second, that pesticide use in itself poses a serious health hazard to humans and livestock. The impact of large-scale

spraying on the environment and on human health has not been considered by the project authorities.

Since plans for disease control in the case of both NSP and SSP seem seriously deficient, it is more than likely that the incidence of several diseases will go up after the projects come up. The cost of the consequent human suffering, as well the cost of medical and other treatment that will be necessitated, has not figured anywhere in the cost-benefit analysis of these dams.

B.4. Water Logging and Salinity

1. The major benefits of the projects are from projected enhanced agricultural production due to the provision of irrigation.

It is well accepted today that many of our irrigation schemes have resulted in significant water logging and salinity in the command areas, resulting in the falling of agricultural production rather than in its enhancement. (Planning Commission Plan????? 6th)

To take the example of the Tawa dam in District Hoshangabad, M.P., The first of the dams under the Narmada Valley Project. The Comptroller & Auditor General of India has observed:

"It will be noted that the yields per acre after irrigation had actually declined." (CAG Report, Civil, 1979-80.)

2. A report on the drainage of the NSP command area, done by the Indian Institute of Science, Bangalore, and sponsored by the Narmada Planning Agency, Government of Madhya Pradesh, notes that a very large part (perhaps about 40%) of the command area will become water-logged given the surface/ground water use pattern proposed in the existing design of the project. This report has suggested a different surface-groundwater use ratio, viz. predominantly 70:30 instead of 80:20 as now proposed, to avoid waterlogging. This would necessitate the sinking in of a tube well

every 6.3 ha with a 3 bhp motor to prevent water logging. The cost of these measures is computed by the project authorities at Rs. 54 crores ('Narmada Sagar Complex Projects in M.P.: Position Paper on Watershed Management Plan'; Narmada Valley Development Authority, Bhopal, Jan. 1986), but it is not clear whether this cost has now been included in the cost-benefit analysis; it had clearly not been included in the original cost-benefit ratio presented in the Detailed Project Report of 1983.

3. Even the IISc study, critical as it is, does not take into consideration the reservoir of the SSP which will intrude into or border the NSP command area. If the reservoir is taken into consideration, the problem of water logging could become much more severe and the sinking of additional wells would not totally solve the problem as the wells, in effect, would be attempting to drain the reservoir. This scenario, which is the actual scenario, has not been studied.

4. For SSP, which has a huge command area of over 18 lakh ha, only 4.7 lakh hectares - the Mahi Doab - have been studied for drainage and potential waterlogging. The remaining over 13 lakh hectares has not yet been studied despite the fact that most of it is semi-arid land which is known to be particularly prone to salinisation problems (eg. Indira Gandhi Canal??). This is because the hot climate causes rapid evaporation of irrigation water from the surface of fields, leaving an encrustation of salts behind. Besides, it is also known that the sub-surface water in this region is saline and, therefore, salinisation could be aggravated even further.

B.5. Seismicity

It is well known that large storage of water, like in reservoirs, can be a cause for triggering off earthquakes. Considering that the various

dams of the Narmada Project are coming up in the same valley, it would be essential to study the seismic potential of the total project, and not of each reservoir separately. Whereas any one reservoir might not trigger off an earth quake, the combined weight of two or more reservoirs might. This, however, has not been studied. Also, the National Geophysical Research Laboratory, Hyderabad, has reportedly alleged that the proposed dams in the Narmada basin pose a serious threat to the seismic stability of the region ('Narmada Dams May Cause Quakes', The Statesman, April 30, 1987).

The effect of an earthquake in a valley with thousands of dams cannot be exaggerated. The loss of life and property would perhaps be more than ever imagined.

B.6. Effects on Downstream Ecosystem

1. Dams inevitably cause a reduction in the flow of water, sediments, and silt downstream. This has a major impact on downstream ecosystems, both riverine as well marine (where the river meets the sea). Thus for instance the dam may impede the migration of fish or aquatic mammals, and upset the delicate balance that exists between the myriad life forms in the river. Reduced silt and sediment flow may affect the fertility of the downstream ecosystem, as also deplete food availability to aquatic animals.
2. The only aspect of downstream impact which has been studied to some extent is the effect on commercial fisheries. It has been stated that there will be no overall negative impact since the loss of some species of commercially valuable fish will be more than made up by the increase of other species in the reservoir. This may be a valid argument in purely short-run economic terms, but it cannot be said to be ecologically sound. The overall changes in the ecosystem of the river will sooner or later affect the viability of commercial fisheries, and

must thus be studied before a conclusive statement can be made.

2. The reduced water flow at the mouth of the river could also lead to ingress of salt-water, with potential disastrous effects not only on natural ecosystems but also on fisherfolk and other people whose livelihood is dependent on these ecosystems. While various official documents have mentioned some of these potential impacts, there seems to be no proper assessment of their nature, extent, and cost implications.

B.7. Impact of Backwaters

It is well recognised that artificial blockages to the free flow of water, like in dams, can aggravate the build-up of backwaters in the river and its tributaries. During heavy rainfall such backwater build up can be many metres high and can destroy everything in its wake. The Narmada Valley Development Authority was to have started studies on this in 1986. But the expected date of completion of these studies is "one year prior to filling up" (of the reservoir) ('Environment Work Plan for the Impact Area of Sardar Sarovar : Submergence Within M.P.' NVDA, Bhopal, March 1986), which means that the impact of backwaters and the cost of mitigatory measures are nowhere as yet included in the environmental assessment or the cost-benefit analysis of the projects.

C. TECHNICAL AND ECONOMIC ASPECTS

C.1. Water Availability

The viability of a river valley project finally depends on the availability of water. The Narmada Project was designed with the assumption that the assured 75% flow would be 27.2 MAF. This number was got on the basis of generated series as the actual data for 35 yrs was not available when this calculation was made.

However, since then the actual data has become available and the

actual series show a 75% assured flow of only 23 MAF, a shortfall of 4.2 MAF from the earlier anticipated flow (DOEn, 1987).

Needless to say, this change in the water-flow figures would significantly effect the project and would make many of the parameters infructuous. However, despite this new figure, no effort has been made to modify the design of the project or to re-calculate the costs and benefits.

C.2. Design Modification

The question of changes in the design of the dams has been brought up not just in relation to the changed water availability, but also as an effort to find a design which is much less socially and ecologically disruptive. The Department of Environment, Government of India, also seems to agree with such a possibility:

"Engineering Aspects and their Environmental Implications

The Narmada Sagar and Sardar Sarovar projects are being designed as multi-purpose 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 1.4096 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 8075 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% 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.

There is thus a strong case for an objective review of the storage planning of Narmada Sagar and Sardar Sarovar so that the water resources are optimally utilised while minimising environmental damage.

It is generally presumed that the levels indicated by the Narmada Tribunal Award are not negotiable. However, the Narmada Tribunal Award's 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, an objective review of the design parameters seems desirable." (DOEn, 1987)

C.3. Cost-benefit Analysis

1. Of the anticipated benefits, the major share (approx 75%) is from agriculture, and next from power (25%).
2. The NSP is expected to generate 118 MW of firm power by 2023 AD and the SSP 300 MW.
3. However, considering the water availability, as mentioned above, it is not possible to get the projected amount of electricity unless irrigation is significantly curtailed. In either case, the total benefits will be much less.
4. Also, the power that would be required for mitigating or preventing water-logging in the commands of NSP and SSP has not been considered or computed. Taking this into consideration, the net power available would be much less.
5. The benefits from agriculture are mostly in the form of anticipated increase in yields of specific crops. The projected yields are, in most cases, much too exaggerated. Most of the anticipated yields are much higher than those ever reached in the region and mostly higher even than the highest in the country. No basis has been given for these projected quantum jumps in production.

6. The benefits have been calculated at 100% efficiency of the project, both for power and for agricultural production. No project ever works at cent percent efficiency. For industrial projects evaluation is done at 85% efficiency. Considering the past experience with dams, perhaps even a lower efficiency should be applied to them.

D. CONCLUSION

To sum up, it is obvious that the two projects are not ready for clearance and that much still remains to be done and even what has been studied has not always been adequately studied. This view also seems to be very similar to the view of the Department of Forests and Environment, as can be seen from the extract given below:

" 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 then 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 M.P. 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 door-mat 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 meager 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 simultaneously would go a long way to prove that even such a project can be implemented by harmonising environmental conservation needs with the development effort.

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

E. PRAYERS

1. That all work on NSP and SSP be halted till the issues raised above are adequately considered, i.e. till a proper environmental and techno-economic assessments can conclusively establish the desirability, or otherwise, of the projects. Also, till the land and other resources required for the rehabilitation are identified and the remaining shortcomings with the rehabilitation schemes rectified.

1.1. That, specifically, work on clearfelling of forests in the proposed submergence zones of NSP and SSP, which has reportedly started, be halted immediately pending reappraisal of the viability of these projects. If it is eventually found that the projects are unviable or

undesirable, this clearfelling of forests will be an enormous, tragic, and wasteful loss. It must be noted here that in the case of SSP, quite a bit of forest in the submergence zone had already been clearfelled by 1984-85, and more clearfelling is continuing. The situation is therefore urgent.

1.2. That, specifically, all acquisition procedures for land in the submergence and canal zones be stayed immediately pending the above-mentioned reappraisal. By no means should any human displacement take place in this period.

1.3. That, specifically, the use of public funds for these projects, except those to be used for completing the necessary studies, be immediately stayed till the above-mentioned reappraisal is made. This is vital because if the projects are found to be unviable or undesirable, but if a lot of money has already been spent on them then the country will have wasted valuable and scarce resources, and then the project authorities will plead that the projects be allowed to proceed since so much investment has already been made.

2. That the Govt of India and the Governments of M.P., Gujarat and Maharashtra immediately expedite the process of completing comprehensive environmental impact assessments (EIA) and benefit-cost analyses for NBP and SSP, and in this involve representatives of voluntary or non-governmental bodies who express an interest and show the necessary competence to be involved. Simultaneously the Court appoint suitable experts to look into the existing and forthcoming EIAs and B-C analyses to judge their credibility.

3. That the Governments of M.P., Gujarat, and Maharashtra along with the Govt of India quickly evolve a truly comprehensive scheme for resettlement and rehabilitation which would be used if the dams are

found viable and desirable. This would of course follow from a complete evaluation, itself needed urgently, of the economic, socio-cultural, and psychological impact of displacement, as a part of the EIA. In both the evaluation as well as in evolving a resettlement and rehabilitation scheme, social action groups who are working on the issue, as well as organisations and representatives of the potential oustees, should be involved.

4. That the concerned agencies immediately start work on assessing various alternative designs of the project and alternatives to the Projects.

5. That the concerned Government agencies publicise and make open to the public all the documents, reports, and information available on the Marmada projects. This is essential for meaningful involvement of the people in decision-making, which is what a democratic society is supposed to ensure. The people's right to information about matters concerning their life and livelihood must be recognised.