# Chapter–5: Case Study of Sardar Sarovar Project

# CASE STUDY OF SARDAR SAROVAR PROJECT

In the present chapter, an attempt is made to validate the propositions made in the discourse so far and to test the applicability of proposed stakeholder model by a case study of Sardar Sarovar Project (SSP). For the stated intent, the option of SSP has been favoured over several other projects for three important reasons. Firstly, SSP purports a supply-side solution to the indisputable needs of vast population over a large stretch of water scarce areas, yet is criticised by many for its ambitious goals at the cost of another set of large population, thereby highlighting the existence of stakeholder conflicts which are often heightened under aggressively emotive and political overtones, judicial interventions, and extensive media coverage. Secondly, the genesis of the multi-state Sardar Sarovar Project lies in settlement of an interstate-river-sharing-dispute that was arrived through the restricted route of judicial tribunal, and accomplishment extents of this long-drawn settlement is still debatable. Thirdly and lastly, the SSP - conceived four decades back and poised for completion only in the approaching decade - is an omnibus project assimilating the past / present problems of project revisions, construction, and operation; thus, making SSP a unique project for a case study. Viewing the SSP from stakeholder perspective, the chapter is divided into four parts. Part one narrates the brief account of interstate conflict on Narmada river water, the mechanism of dispute resolution through a Judicial Tribunal, and the emerged features of Sardar Sarovar Project. Part two looks into the impediments that have come in way of project implementation, and the present status of project including its financial aspect. Under part three, the chapter moves on to understand, identify, and classify the numerous project stakeholders; and in part four, it presents the octagonal stakeholder model of the project.

# 1 AN OVERVIEW OF SARDAR SAROVAR PROJECT

The Sardar Sarovar Project (SSP) is an interstate, multipurpose joint venture of four states, viz., Gujarat, Madhya Pradesh, Maharashtra and Rajasthan, with a terminal[1] dam on river Narmada in the state of Gujarat. It is the largest water resources development project in India and possibly in the world (SSNNL, 2000).

## 1.1 Brief History of Interstate Conflict

The history of the Sardar Sarovar Project is marred with interstate disputes on the sharing of Narmada river water, and the height of the dam to be built in Gujarat. And, it is difficult to assert as to when exactly the controversies related to sharing of Narmada water and the height of Sardar Sarovar dam first arose.

Initially, in 1946, when the then governments of 'Central Provinces & Berar' and 'Bombay' requested the central agency 'Central Waterways Irrigation and Navigation Commission[2]' for investigation on the Narmada river system, the focus was on the overall Narmada-basin development with flood control, irrigation, power and navigation as general objectives. Till 1955, several studies were carried out focusing on the comprehensive development of the Narmada valley. In early 1956, when the central agency gave the first proposal for a weir at a site near Gora (now in Gujarat) with 160 feet (48.77m) pond level, possibly there was no dispute on this Narmada Project proposal. In 1959, the agency on technical grounds modified the proposal and finalised the site of dam at Navagam with the 160 feet pond level at first stage and with provision for raising it to 300 feet (91.44m) in the second stage. The agency had also generally agreed with the modification suggested by the erstwhile Bombay Government to raise the second stage pond level from 300 to 320 feet (97.54m). In April 1960, a panel of consultants

appointed by the 'Ministry of Irrigation and Power' suggested that the proposed two stages of the Navagam dam should be combined into one stage with a view to extend irrigation towards Rann of Kutch using a high level canal (NWDT, 1978a; and GID, 1980a).

In May 1960, the erstwhile state of Bombay was bifurcated into two states, namely the state of Maharashtra and the state of Gujarat, whereby the Navagam project site fell within the territories of Gujarat. In August 1960, the Planning Commission gave acceptance for implementation of the first stage of Narmada Project with the Navagam dam at Full Reservoir Level (FRL) of 162 feet (49.38m) and a low level canal for irrigation of 3.89 lacs hectares. The approved estimates however included obligatory works required for raising the dam to FRL 320 feet (97.54m) in second stage; which would have enabled generation of about 625 Mega Watt (MW) of power and an additional 3.64 lacs hectares of irrigation extending into North Gujarat - including the Little Rann of Kutch - by means of a high level canal. The then Prime Minister, Pandit Jawaharlal Nehru inaugurated first stage of this scheme in April 1961, and preliminary works commenced soon thereafter (NWDT, 1978a; and GID, 1980a). Till this point of time, there are no evidences suggesting any major altercation amongst Narmada-basin states on the issue of project construction with dam at Navagam.

In 1961, the Government of Gujarat undertook reservoir submergence area survey and surveys for high-level canal. With the fresh assessment of storage capability of Navagam reservoir and the potential of irrigation with a high level canal, the Government of Gujarat came to conclude that with the FRL of 460 feet (140.21m) it would be possible to utilise untapped flow below Punasa (in Madhya Pradesh) and extend irrigation to further

area of over 8 lacs hectares. Another site, about 610m upstream of earlier dam site, was finalised by the Government of Gujarat for building a high dam. However, this proposal meant raising of Navagam dam reservoir level to that of Harinphal project in Madhya Pradesh, which was planned immediately upstream of Navagam Dam (NWDT, 1978a). The first sign of serious disagreement between the Narmada-basin states on the issue of Narmada Project implementation probably arose at this stage.

In November 1963 an agreement was arrived between the Chief Ministers of Gujarat and Madhya Pradesh to built Navagam dam to FRL 425 feet (129.54m), which was later, ratified by the Gujarat. Madhya Pradesh however rejected the agreement and did not ratify it contending that Navagam dam should not be constructed to a height greater than FRL 162 feet (49.38m) because that was the riverbed level at the borders of two states. In September 1964, the Government of India constituted a high level committee headed by Dr. A.N.Khosla to break the stalemate arising out of Madhya Pradesh's stand on Navagam Dam height. While the deliberations of Khosla Committee were in progress, the states of Madhya Pradesh and Maharashtra entered into their own agreement for a hydropower project contemplating construction of another dam at Jalsindhi (in Maharashtra), a site situated between Harinphal and Navagam. In September 1965, the Khosla Committee in its master plan for Narmada water development, submitted to the Government of India, proposed the optimum FRL of Navagam dam as 500 feet (152.40m), with the canal off-taking at Full Supply Level (FSL) of 300 feet (91.44m). The plan envisaged an overall benefit of irrigation to the tune of 42.54 lacs hectares, with sharing arrangement among Madhya Pradesh (61.82%), Gujarat (37.14%), Maharashtra (0.09%), and Rajasthan (0.95%) (GID, 1980a). While the Government of Gujarat endorsed the recommendations of Khosla Committee, the governments of Maharashtra

and Madhya Pradesh rejected them. At this stage, the disagreements between basin states were focused on (i) allocation of Narmada water amongst co-basin states, (ii) height of Navagam dam in Gujarat, and (iii) necessity of high-level canal from Navagam site.

## 1.2 The 'Narmada Water Disputes Tribunal' and its Award

In July 1968, with no amicable settlement at sight, the state of Gujarat made a complaint to the Government of India under Inter-State Water Disputes Act, alleging that implementation of Maheshwar and Harinphal dams by Madhya Pradesh, and Jalsindhi jointly by Maharashtra and Madhya Pradesh, would prejudicially affect the rights and interests of Gujarat state by compelling it to restrict the height of Navagam dam to FRL 210 feet (64.00m) or less. In October 1969, the Government of India constituted the Narmada Water Disputes Tribunal (NWDT); and referred to it the matter of adjudication of Narmada water dispute emerging from Gujarat's complaint (GID, 1980a).

Within ten days of referring the complaint of Gujarat, the Government of India referred to NWDT another issue raised by Rajasthan relating to its right on Narmada water. Not happy with the direction of developments, Madhya Pradesh filed a demurrer before the Tribunal questioning the action of Government of India in constituting the Tribunal itself and referring to it the complaints of Gujarat and Rajasthan. After hearing the arguments of all the party states and Union of India for over two years, the NWDT in its judgement on preliminary issues justified the act of Government of India in constituting the Tribunal and referring to it the complaint of Gujarat, but disagreed to the referring of Rajasthan's complaint to it (NWDT, 1978a). Both Madhya Pradesh and Rajasthan, being unhappy with this judgement of Tribunal, appealed to the Supreme Court and obtained a stay on further proceedings before the Tribunal.

After a lull of over two years, Madhya Pradesh, Maharashtra, Rajasthan and Gujarat reached an agreement on a number of issues and got the Court's stay vacated. The agreement, keeping high the spirit of national interest over regional ones, resolved tricky issue of assessment of utilisable quantum of Narmada water and its allocation to the states of Rajasthan and Maharashtra. Thus, having consumed over five years on preliminaries and with the agreement among party states forming basis for further resolution, the Tribunal set forth to examine the more complex issue of equitable apportionment of remaining Narmada water to Madhya Pradesh and Gujarat.

After spending another five years listening to the arguments of party states and covering almost all aspects of dispute like topology and hydrology of Narmada, existing resources from other rivers, cultivable command and water requirement of Madhya Pradesh and Gujarat, existing laws on apportionment of water etc., the NWDT gave its final Award in December 1979. The Award, a landmark in many ways, not only adjudicated apportionment of water but also ruled about height of Navagam dam, full supply level of Navagam canal, distribution of costs and benefits of SSP, contribution to the cost of Indira Sagar Project (ISP) in Madhya Pradesh for downstream benefits derived from it, rehabilitation of displaced persons, and setting up of machineries for the implementation of Tribunal's decision.

The Tribunal accepted the agreement between party states that net available quantity of Narmada water at Sardar Sarovar Dam site at 75% dependability should be assessed as 28 Million Acre Feet (MAF), of this, the allocated share of Maharashtra should be 0.25 MAF and Rajasthan 0.5 MAF. In its decision regarding apportionment of remaining 27.25 MAF, the Tribunal ordered that Madhya Pradesh is entitled to share 18.25 MAF and

Gujarat for 9 MAF (NWDT, 1978a). The final allocation[3] of water decided by the NWDT is summarised in Table 5.1.

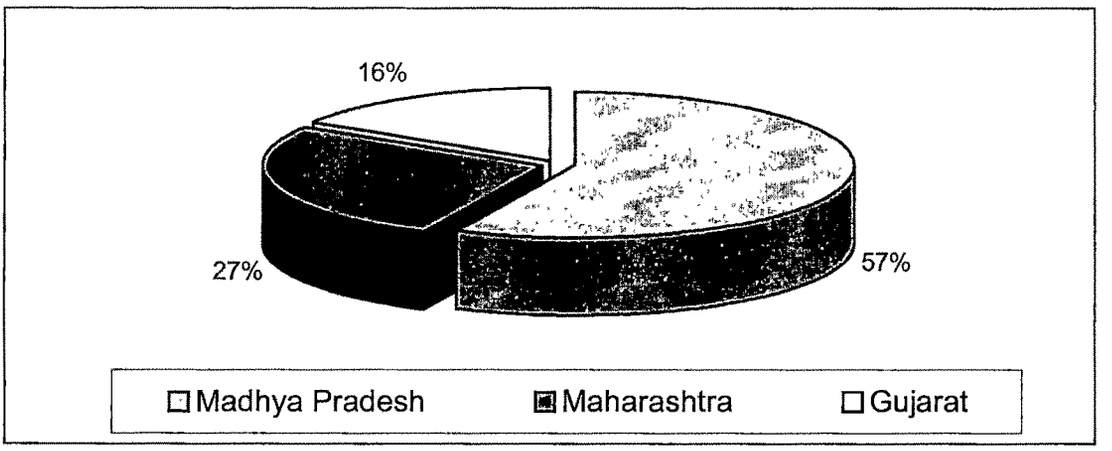
**Table 5.1: Apportionment of Narmada Water Amongst Party States**

| Party States | Million Acre Feet | Million Cubic meters |
|---|---|---|
| Madhya Pradesh | 18.25 | 22511.01 |
| Gujarat | 9.00 | 11101.32 |
| Rajasthan | 0.50 | 616.74 |
| Maharashtra | 0.25 | 308.37 |
| **Total** | **28.00** | **34537.44** |

*(Source: NWDT, 1978a)*

The NWDT in its Award also fixed the height of Sardar Sarovar dam with FRL at 138.68m and Maximum Water Level (MWL) at 140.21m. The Tribunal also ordered that out of the net power produced by the Sardar Sarovar Project at any day, the share of Madhya Pradesh will be 57%, and share of Maharashtra will be 27%, while Gujarat's share will be 16% (Figure 5.1). Regarding sharing of costs, the Tribunal gave clear formulations about the capital costs of power portion and irrigation portion, and the sharing of power and irrigation costs by different party states. Tribunal also ordered Gujarat to pay 17.63% of the cost of Indira Sagar Project to Madhya Pradesh for the benefit derived from its storage[4] (NWDT, 1978b).

**Figure 5.1: Share of Party States in the Power Generated from SSP**



Regarding submergence, land acquisition, and rehabilitation of displaced persons, the NWDT gave detailed directions on criteria for land to be compulsorily acquired; Madhya Pradesh and Maharashtra's role as agents for acquisitions; Gujarat's liability for payment of compensation for land acquisition and rehabilitation; and provisions for rehabilitation of displaced persons. In the liberal compensation package to displaced persons - considered to be much ahead of its time - the NWDT advocated a land for land policy. Gujarat was directed to accommodate all such people of Madhya Pradesh and Maharashtra who are willing to come to Gujarat in the command area of the project, so as to enable them to share benefits of the project (NWDT, 1978b).

The NWDT also ordered for setting up of Narmada Control Authority (NCA) to act as inter-state administrative machinery for compliance and implementation of the NWDT orders. Since the construction works of Sardar Sarovar Project are to be carried out by the state of Gujarat while other states have financial commitment to it, NWDT ordered for constitution of Sardar Sarovar Construction Advisory Committee (SSCAC) to carry out supervisory functions related to construction of project. Regarding the period of operation of Tribunal's Award, NWDT stated that it is subject to review at any time after a period of 45 years from date of publication of Award[5] in official Gazette (NWDT, 1978b).

## 1.3 Salient Features of the Project

Estimated to cost about Rs.6400 crore at the 1986-87 price level, the construction of SSP has been divided into four major work components as brought out in Table 5.2. A broad layout of the project components is given in Plate IV, and the key features of project are highlighted in following paragraphs.

**Table 5.2: Construction Components of the Sardar Sarovar Project**

| Sl. No. | Project Component | Description | Estimated Cost in Rs. Crore at 1986-87 price level |
|---|---|---|---|
| 1 | Unit-I | Dam & Appurtenant Works | 1019.45 |
| 2 | Unit-II | Main Canal | 1588.54 |
| 3 | Unit-III | Hydropower Complex | 979.95 |
| 4 | Group-IV | Branches and Distribution System. | 2818.10 |
| | | **Total** | **6406.04** |

*(Source: SSNNL, 2002)*

### 1.3.1 Narmada River

The river Narmada, referred as the holiest of holy rivers by Shri Adi Shankaracharya, rises near Amarkantak in the Shahdol district of Madhya Pradesh and traverses about 1,312 kms. before joining the Gulf of Cambay in the Arabian sea. The first 1,077 kms is in Madhya Pradesh and the last 161 kms. is in Gujarat. Of the remaining length, 35 kms forms a common boundary between Madhya Pradesh and Maharashtra, and another 39 kms between Gujarat and Maharashtra. The Sardar Sarovar Dam on river Narmada is located barely 12 kms from the Maharashtra-Gujarat border, and the length of river up to Sardar Sarovar Dam is 1163 kms (SSNNL, 2000).

Considered as the largest[6] west flowing river, Narmada has a catchment area of 97410 Sq. kms, of which about 88.14% lies in Madhya Pradesh, 1.7% in Maharashtra, and 10.16% in Gujarat. The total drainage area of the river up to the dam site is 88000 Sq. kms. The average annual rainfall in the basin is 112 cm (GID, 1980a). The maximum-recorded flood at the dam site is 70847 cubic-metre-per-second (cumecs), i.e., about 25 lacs cubic-feet-per-second (cusecs). (SSCAC, 2003a).

### 1.3.2 Main Dam

The NWDT has fixed the design parameters of Sardar Sarovar Dam with a view to derive optimum[7] irrigation and power benefits. The 1200 m long and 163 m high concrete dam

is designed to pass a maximum flood discharge of about 87,000 cubic-metre-per-second through its spillways, and the volume of concrete involved in construction is estimated to amount to 6.82 million cubic meters (SSNNL, 2000). The other salient features of this major dam[8] are summarised in table 5.3.

**Table 5.3: Salient Features of Sardar Sarovar Dam**

| Sl.No. | Design Parameter | Value of the parameter |
|---|---|---|
| 1. | Length of the dam | 1210.02 m |
| 2. | Maximum height above foundation level | 163.00 m |
| 3. | Top of dam Elevation Level (EL) | 146.50 m |
| 4. | Full Reservoir Level (FRL) | 138.68 m (455 feet) |
| 5. | Maximum Water Level (MWL) | 140.27 m (460 feet) |
| 6. | Minimum Draw Down Level (MDDL) | 110.64 m (363 feet) |
| 7. | Gross Storage Capacity of the Reservoir | 0.95 Million hectare metre (7.70 Million acre feet) |
| 8. | Dead Storage Capacity | 0.37 Million hectare metre (7.70 Million acre feet) |
| 9. | Live Storage Capacity | 0.58 Million hectare metre (7.70 Million acre feet) |

*(Source: GID, 1980a).*

The reservoir formed by dam will submerge about 37533 hectares of land out of which about 30% will be agricultural land, about 36% will be forestland, and balance 34% will be riverbed and wasteland. About 193 villages will be affected in Madhya Pradesh; however the extent of land submergence in 114 villages will be less than 25%. In Madhya Pradesh, only habitation areas will be affected in 21 villages while only government wasteland area will be submerged in 9 villages. About 33 villages will be coming under submergence in Maharashtra; and extent of private land submergence will be less than 25% in 12 villages. The state-wise different categories of land likely to be submerged are indicated in Table 5.4.

**Table 5.4: State-wise Details of Land (in Hectares) Submerged by SSP**

| Sl. No | Type of land | Gujarat | Maharashtra | Madhya Pradesh | Total |
|---|---|---|---|---|---|
| 1 | Private Cultivated land | 1877 | 1519 | 7883 | 11279 |
| 2 | Forest land | 4166 | 6488 | 2731 | 13385 |
| 3 | Other land including river bed | 1069 | 1592 | 10208 | 12869 |
| | **Total land** | **7112** | **9599** | **20822** | **37533** |

*(Source: SSCAC, 2003a. Table 4.1, P.27)*

As per the latest available estimates, 40963 families from 240 villages will be affected in Gujarat, Maharashtra, and Madhya Pradesh, due to submergence and backwater effects[9] (SSCAC, 2003a). The ratio of 'submergence area' to 'area irrigated' is only 1.65%; and is lowest in India compared to other major projects with corresponding average ratio of 4 to 5%. The ratio between the 'population affected' and 'population benefited' is only 0.3%, which is far lower than corresponding ratio of about 4% observed in other schemes (SSNNL, 2000).

### 1.3.3 Powerhouse Complex

The hydropower complex will have 1450 MW installed capacity. It will comprise of an underground River Bed Power House (RBPH)[10] with six units of 200 MW capacities; and a surface Canal Head Power House (CHPH)[11] with five units of 50 MW capacities. The 440 Kilo Volt (KV) double circuit transmission lines will evacuate the combined generated power to the three beneficiary states. The discharges from canal head powerhouse will be led to main canal for irrigation (and drinking) usage in Gujarat and Rajasthan. Four inter-linked ponds - with a combined storage of 63 million cubic meters - have been constructed between powerhouse and main canal head regulator with a view to control daily operational mismatch between power releases and irrigation demands (SSCAC, 2003b).

### 1.3.4 Canal System

The main canal in Gujarat is contour aligned, thereby restricting the supply only to areas falling on left side of the canal. Starting from dam site (Kevadia) it would cover a distance of 458 kms in Gujarat before entering the state of Rajasthan (in Tehsil Sanchore, district Jalore), wherein it would run for about 74 kms of which 54 kms is contour-canal

(irrigating left side) and the balance ridge-canal (irrigating both sides). The main canal is designed[12] to carry a maximum discharge of 1133 cubic-meter-per- second (40000 cubic-feet- per-second) at its starting point. The tail-end discharge capacity would taper down to 75 cubic-meter-per-second at Gujarat – Rajasthan border. Entire length of main canal is to be lined with concrete; and mechanised equipments are being deployed to achieve uniformity, quality control and speed of construction. Regulators at intermittent distances with automated gates are being provided to control water levels during normal and emergency operations, to store water during shut-down, and to isolate reaches and river crossings in case of a breach in main canal. Escapes at specific locations have also been provided to divert water in emergency situations (NCA, 2003b).

Apart from the main canal, the irrigation network in Gujarat would comprise of 42 branch canals[13] with gross length of 2524 kms, about 7500 kms long distributaries, and nearly 30000 kms of minors and sub-minors. The vast network of distribution system, including field channels, will stretch over an aggregate length of about 75000 kms. In Rajasthan, there would be 9 major distributaries with a total length of 282 kms; and the total length of minors and sub-minors would be 485 kms and 636 kms respectively.

In Gujarat, each unit of irrigation service area - called Village Service Area (VSA) – would be served through a single outlet from the distributory. This outlet would remain fully open for a fixed time period during irrigation water demand, or fully closed during periods of no demand. Water from distributories would be delivered at the head of VSA on volumetric basis to group of organised cultivators, and not to individual cultivators. The VSAs would generally constitute an area between 300-500 hectares of a village; and the cooperative body of farmers would manage water within the VSA (NCA, 2003b).

## 2 SARDAR SAROVAR PROJECT IMPLEMENTATION

As per NWDT Award, full implementation of different components of the project is to be carried out by the state of Gujarat, while the states of Madhya Pradesh and Maharashtra are to carry out related Resettlement and Rehabilitation (R&R) works in their respective areas. For the full implementation of project excluding R&R works, Government of Gujarat has formed a state-owned company, namely 'Sardar Sarovar Narmada Nigam Limited (SSNNL)'. To carry out works of R&R in Gujarat, Government of Gujarat has constituted an autonomous agency called 'Sardar Sarovar Punarvasahat Agency (SSPA)'. The related works of R&R in Madhya Pradesh are being carried out by 'Narmada Valley Development Authority (NVDA)' that was constituted for development of numerous projects of Narmada within Madhya Pradesh. In Maharashtra, the Irrigation Department is looking after R&R works of Sardar Sarovar Project.

Though envisioned by late Sardar Patel in 1946, the project in its present form emerged only in December 1979 after the final Award of the Narmada Water Disputes Tribunal. An agreement with World Bank for a loan of $ 450 million was finalised in 1985. Understanding was also reached with the 'Overseas Economic Co-operation Fund (OECF)' of Japan for credit of 27 billion Yen for the supply of Turbine Generator (TG) sets of riverbed powerhouse. However, the actual work on the project commenced in June 1987, after clearance from the Ministry of Environment, Government of India.

### 2.1 Impediments in Project Progress

Controversial issues surrounded the project right from its inception. Due to the June 1992 controversial report from Bradford Morse Committee[14] constituted by the World Bank, Government of India backed out from its loan given to Sardar Sarovar Project. The main

dam was originally scheduled for completion by June 1996, which was later revised to January 1998 to account for mobilisation delays. In May 1995, when more than 82% of concreting had already been completed, the work on the main spillway portion of the dam came to stop due to a writ petition[15] filed by 'Narmada Bachao Andolan (NBA)' in the Supreme Court of India; and the deadlock continued for over five years till Court's final judgement in October 2000 (SSCAC, 2003a).

The work of 250 MW canal head powerhouse started in March 1989 and erection of first unit was completed in August 1995, while the last unit was completed in January 1998. The works on 1200 MW riverbed powerhouse started in July 1987, with target of commissioning of first unit by September 1995. The order for supply of six units of 200 MW Pump Turbine Generator (TG) sets was awarded to Sumitomo Corporation of Japan, for which financial assistance was to come from OECF. The first tranche of 2.85 million Yen of assistance was utilised by 1987-88. Subsequently, with intensification of agitation by anti-dam groups in India and its ramification in Parliament of Japan, the OECF opted for abrupt withdrawal of financial assistance sighting environmental concerns. This resulted in stoppage of the supply of TG set parts, due to which civil works of RBPH had to be suspended. The stalemate continued till September 1998, when contract was amended and a fresh loan agreement signed with Sumitomo (SSCAC, 2003b).

The SSP has been confronted with many factors that have impeded its progress and hampered project implementation as envisaged in original plan. The four most-critical factors can be identified as: (i) prolonged litigation in Supreme Court, (ii) enduring agitation by anti-dam groups, (iii) shortcomings in execution of resettlement and rehabilitation programme, and (iv) conflicts amongst beneficiary states of the project.

Besides being responsible for substantial delays in progress, these factors at times have also raised serious doubts on the viability and fulfilment of the project. These factors are not mutually exclusive, and a closer examination may also reveal that the first three factors have taken critical dimensions largely on account of the fourth factor, i.e., conflicts amongst beneficiary states.

### 2.1.1 Litigation in the Supreme Court of India

Challenging the construction of SSP on the grounds of protecting the rights of life and livelihood of project affected people, the NBA's writ petition claimed that (i) project has been designed, planned and approved without adequate information and knowledge about costs, benefits and 'environmental and social impacts' of the project; (ii) project is violating the stipulations of NWDT Award; (iii) project affected persons have been treated with callousness by project authorities and their land will get submerged without their resettlement and rehabilitation; (iv) continuation of project would violate conditions of environmental clearance, 'Forest Conservation' Act and 'Environmental Protection' Act; (v) costs of the project would be much higher and benefits much lower than the original estimates, thus making it nonviable; (vi) lack of hearing to the persons going to be displaced constitutes negation of their fundamental rights and violation of principle of natural justice; (vii) project will destroy life support system of over ten lacs people mostly belonging to tribal, other backward class, and downtrodden section; (viii) land for resettlement of project affected persons is not adequately available; (ix) authorities have failed in monitoring and controlling the necessary studies, action plan, and their implementation pari-passu with the construction, as per the directives of tribunal; (x) authorities have failed in adhering to schedule set up by tribunal about land acquisition, rehabilitation master plan, and its implementation (NBA's Writ Petition, 1994).

NBA, through its petition, prayed to the Court to (i) restrain authorities from proceeding with dam construction; (ii) appoint independent expert body to re-examine project's costs and benefits; (iii) give opportunity to project affected persons to place their views before expert body; (iv) establish link and schedule of construction, submergence and rehabilitation of project affected persons; (v) appoint independent body with representation of oustees to monitor and control the project; (vi) appoint independent members and representatives of oustees on statutory bodies like NCA, SSCAC, etc (NBA's Writ Petition, 1994).

At an interim stage of Court proceedings (5th May 1995), the counsel for Union of India made a statement to maintain the effective height of the dam at a level of 80.30 m till further orders from Court. The status-co was maintained, and no works on spillway portion (block nos. 30 to 46) were taken up till 18th February 1999 when Court eventually permitted the raising of dam up to 85.0m level. In this hearing, Court was also informed about creation of independent Grievance Redressal Authorities (GRA)[16] for redressing R&R related grievances. Not happy with Court's interim order permitting increase in dam height, NBA resorted to street agitations and even targeted Court judges; both the actions were viewed seriously by the Supreme Court[17] (*Supreme Court Orders*, 1995-2000).

On 18th October 2000, the Supreme Court delivered its final judgement[18] in favour of continuing dam construction as per Award of NWDT. The dam height was initially cleared by Court up to 90.0m level and guidelines were given for further clearances by NCA (*Supreme Court Judgement*, 2000). Subsequently, when the first further-incremental clearance was given by NCA in May 2002, it was immediately challenged by NBA in the Supreme Court on grounds of breach of NWDT Award provisions. However,

Court turned down NBA's plea, and directed that any dissatisfaction on R&R measures must be first raised with concerned GRA, and if not satisfied, shall be raised before Court by the concerned project affected person only (*Supreme Court Orders*, 1995-2000). With this ruling of the Court, the capacity of NBA to affect impediment in project construction by legal avenues was considerably diluted.

### 2.1.2 Agitation by Anti-dam Groups

The agitation against Sardar Sarovar Dam started way back in 1988. Spearheaded essentially by the NBA, it gained momentum in subsequent years and also brought international pressures leading to the stoppage of OECF (Japan) credit and the World Bank loan. The NBA's prolonged litigation in the highest court of India (1994-2000) also practically halted the works of main dam for over five years (SSCAC, 2003a&b).

Though the number of people directly involved in agitation - lead by Medha Pathkar - has not been that large, yet the agitation frequently drew considerable media attention because of the involvement of Booker Prize winner Ms. Arundhati Roy and other renowned personalities (former Navy Chief Admiral Ramdas, retired Justice Rajinder Sachar etc.). After savouring success on many initial instances, the NBA's agitation also saw a few setbacks (e.g. final judgement of the Supreme Court), though the viewpoints of its leaders consistently continued to grow harsh[19] against the project. Originally oriented towards seeking relief to the displaced persons (NBA's Writ Petition, 1994), the total annulment of Sardar Sarovar Dam became sole objective of NBA's later part of agitation. The NBA on its own has sought Supreme Court's intervention on behalf of the project affected persons. For over five years NBA was given every possible opportunity to present its viewpoint before the Court, while the dam height was kept stagnated. The Court also

evidently accepted the concerns of NBA against R&R measures of the project, and hence sought to empower the project affected persons by setting up separate and independent Grievance Redressal Authorities in the three affected states. Thus, despite having given the sought-out relief to the project affected persons to a larger extent, the failure of the Court in permanently halting the project was seen by NBA as denial of justice.

Despite the final setback in Supreme Court, NBA's overall agitation against SSP can be argued as mostly successful. As to be discussed shortly, NBA's short-term (but radically significant) gains in the matter of litigation have also been due to the prevalence of conflict amongst beneficiary states. The other successes of NBA have come largely from its network with the other international anti-dam lobbies, and from the ability to project its acts as a reflection of global consciousness on social and environmental issues. Further, NBA's purposes also gained strength from the effective media campaigns focussing on its numerous events of *dharnas*, rallies and *jalsamadhis*; against which the central and state governments remained largely silent during critical period of litigation.

Another crucial factor of NBA's success against Sardar Sarovar Project can be attributed to its leadership, though the assertion is debatable; and it is so for two reasons. Firstly, the NBA is not a formal or structured organization. It is neither registered, nor its financial sources are disclosed or the accounts audited. In such circumstances the lines of formal authority and leadership are not distinctly ascertainable. For example, it may be difficult to point-out as to when Medha Patkar took over the mantle of NBA leadership from the original crusader Baba Amte. Secondly, the importance of leadership in running an organization is in itself an issue of controversy (Thomas, 2003). The leadership on one hand may be defined as a social influence process in which a person steers members of

the group towards a goal (Bryman, 1986); and on the other hand, it may be considered as exertion of managerial influence on organizationally relevant matters by any member of the organization (Katz and Khan, 1978; and Mintzberg, 1973). Evidently, in the case of NBA the former definition is applicable both from the point-of-view of unstructured organization and the revolutionary characteristic of the leadership. However, according to Tolstoy (1957), the real role of leaders is less one of determining the course of events than one of justifying the collective activity that leads to such outcomes as revolutions and war. Though the issue of leadership may remain debatable, its significance cannot be entirely ignored considering the fact that NBA's moment against SSP has been far more successful than the contemporary anti-dam moment against Tehri Project[20], which fizzled out under the person-centric leadership (Yadav, 2002).

### 2.1.3 Slow Pace of Resettlement and Rehabilitation Progress

The trial in Supreme Court was mostly focused on matters related to R&R (*Supreme Court Orders*, 1994-2000); and even after Court's final judgement the issue of R&R continues to remain the most critical factor in completion of full dam height. As per latest estimates, the total number of project-affected families (PAF) is about 40,963. State-wise break-up of affected villages and number of affected families are presented in Table 5.5.

**Table 5.5: Villages, Families and Population Affected by Project Submergence**

| Sl. No. | Beneficiary State | Villages affected | | Families to be rehabilitated | Population affected (1991 Census) |
|---|---|---|---|---|---|
| | | Fully | Partly | | |
| 1 | Madhya Pradesh | 01 | 191 | 33014 | 89796 |
| 2 | Maharashtra | 00 | 33 | 3221 | 19650 |
| 3 | Gujarat | 03 | 16 | 4728 | 18000 |
| | **Total** | **04** | **240** | **40963** | **127446** |

*(Source: SSCAC, 2003a. Table 4.2, P.27)*

As per the directions of NWDT, Gujarat has to resettle all the project-affected persons who are willing to resettle in Gujarat, including those from the state of Madhya Pradesh and Maharashtra. As per Tribunal's stipulations, each project affected person from whom more than 25% of land holding is acquired, has to be offered an equivalent area of land - subject to a minimum of 2 hectares - in the command area of project. The persons who are unwilling to resettle in Gujarat are to be resettled in their respective states based on similar land based policy (NWDT, 1978b). The rehabilitation policy was further liberalised to include joint-holders and major sons as co-sharer of acquired land; thereby making them eligible for land equal to their share subject to a minimum of 2 hectares each. Gujarat further liberalised the package by including encroachers and landless agricultural labourers, and making them entitled for 2 hectares of agricultural land. Each project-affected person, including major sons, is allotted 500 square meters of residential plot free of cost, and also given certain grants[21] (NCA, 2003a). Attempts are made to resettle project-affected person in groups so as to maintain their social life. The relocation sites are provided with living amenities like approach road, internal roads, drinking water facilities, electrification etc, apart from several civic amenities[22] prescribed by the Tribunal. Other services like registration in electoral rolls, issuance of ration card, accessibility to co-operative societies, and vocational training are also being given (SSNNL, 2000).

Despite mammoth proportions, some positive progress has already taken place with about 22,162 PAFs resettled, indicating a progress rate of about 54 %. Nevertheless, the pace of progress of R&R has been very slow. As per the action plan prepared by the NCA subsequent to Supreme Court's final judgement, the R&R corresponding to dam height of 100m, and 110m, were required to be completed by December 2001, and December 2002

respectively; but both target dates were missed (SSCAC, 2003a). The R&R works were completed corresponding to 100m height in May 2003, and the target set for 110m height was considered as achieved[23] in March 2004 only.

Many factors have been responsible for the slow pace of R&R works in the past, but four such important factors that may influence future pace of works as well are identified herewith. Firstly, the rehabilitation package given by NWDT was in itself much ahead of the time, and it got evolved further under the guidelines of World Bank, pressure mounted by the anti-dam agitation, and serious concerns expressed by the Supreme Court. Thus, SSP has been caught on an escalator of evolving R&R policies[24] (Verghese, 1994). And, having set very high norms, meeting the stipulations of balance R&R works – especially the land for land policy, and the policy of giving minimum 2 hectare of land to each major son of oustees – has become difficult. Secondly, with the setting up of Grievances Redressal Authorities by the Supreme Court, it has become possible to closely monitor the physical aspects of resettlement and rehabilitation works; but satisfying the largely qualitative criteria of resettlement and rehabilitation has become all the more difficult. Thirdly, with the incrementally evolving policy and the delay in land acquisition notifications, the estimate for the R&R works has increased to a mammoth proportion; and the requirement of balance R&R – estimated at Rs. 2000 crore - before the final target date of December 2004 may not be easily met. Fourthly, the continuance of anti-dam agitation, non-cooperation of some of the project-affected populace, and the political influence of NBA has caused hurdles in R&R progress and the dam height clearances, and may continue to have significant bearings on future clearances as well.

2.1.4 Conflict Among Beneficiary States of the Project

Till recently the views of Madhya Pradesh on the interpretation of certain aspects of NWDT Award, and on some other technical / financial issues, have been different from those of Gujarat. Except for certain issues on sharing of costs and timing of its payment, the states of Maharashtra and Rajasthan have been largely on the side of Gujarat on all contentious issues. It may not be inappropriate to deduce that Madhya Pradesh's long-time persistence with its divergent views on issues related to SSP has been due to its seemingly dissatisfaction with the final verdict of NWDT. The Table 5.6 highlights the extent of dissatisfaction of the state of Madhya Pradesh by listing out its main contentions before the NWDT, and the decisions of NWDT there upon.

**Table 5.6: Contentions of Madhya Pradesh and the Decisions of NWDT**

| Contentious issue | Contention of M.P. | Decision of NWDT | Extent of MP's dissatisfaction |
|---|---|---|---|
| Water requirement of M.P. | 24.08 MAF | 18.25 MAF | 5.83 MAF |
| Water requirement of Gujarat | 4.44 MAF | 9.00 MAF | 4.56 MAF |
| Full supply level of SSP main canal | 190 feet | 300 feet | 110 feet |
| Full reservoir level of SSP dam | 210 feet | 455 feet | 245 feet |

*(Source: NWDT, 1978a)*

Of the many issues in which the state of Madhya Pradesh took diverse stand, the prominent one was related to the issue of reduction in dam height. In April 1994, Madhya Pradesh requested the Narmada Control Authority to consider their proposal for reducing the height of Sardar Sarovar Dam from 455 feet to 436 feet. This proposal was objected by Gujarat on the ground that review of NWDT Award could be done only after 45 years, and that the proposal was beyond the jurisdiction of NCA. The state of Madhya Pradesh - taking a stand that NWDT Award has kept provision for alteration, amendment and modification of its clauses by agreement between all party states - persisted with the demand for dam height reduction. Even in Madhya Pradesh's petition (1995) filed in the

Supreme Court in response to NBA's case, the state reiterated the demand for reduction in dam height justifying it on following grounds:

- About 1,14,000 population of Madhya Pradesh was affected by the Sardar Sarovar Project. Out of these about 38,000 people would be saved from displacement, if the dam height were to be reduced by 19 feet (5.79 m).
- About 25,000 acres of land, including some good productive land could be saved from submergence.
- The latest (1994) estimate of Project Affected families was 33014 (in 193 villages) compared to the number of 6147 (in 158 villages) taken into account by NWDT. The trauma of displacement and problem associated with resettlement and rehabilitation had thus increased by manifolds, and were difficult to handle.
- Difficulties were being encountered by Gujarat in arranging sufficient irrigable land in command area of project for rehabilitating project affected persons. Villages coming under submergence in last stages of dam construction would be settled farther in the Saurashtra and Kuchh areas where project affected persons of Madhya Pradesh would be subjected to a totally different social and cultural milieu.
- Availability of utilisable Narmada water has become less by about 4.5 MAF when compared with the figure of 28 MAF agreed by NWDT, and hence a major parameter considered for dam height has changed.
- Irrigation needs of Gujarat (as per NWDT Award) could be fully met with a reduced dam height of 436 feet.
- Only power generation quantum would be affected by reduction in dam height, which could be justified on the grounds of reduction in hardships associated with rehabilitation of displaced persons. Only limited power would be available from

SSP and that too for a few years, and hence there would be no significant loss as such. The loss of power to Gujarat and Maharashtra on account of reduction in dam height could be compensated by the state of Madhya Pradesh from its share.

- Financial positions of party states have altered, and adequate funds would not available for this joint Project.

Gujarat's main concern in rejecting the proposal for reduction in dam height was its apprehension regarding getting sufficient water for meeting irrigation demands with a truncated dam. Even with a full height of 455 feet, the complete potential of SSP could be developed only when upstream reservoirs in Madhya Pradesh get completed so as to uniformly release 0.677 MAF of water per month below Madhya Pradesh's terminal Maheshwar Project. In case of delays in construction of Madhya Pradesh's main Indirasagar dam alone, apart from substantial loss of power from SSP, Gujarat could loose about 17.8% of its annual irrigation potential even with full height of Sardar Sarovar Dam (Pillai, 1999). Since the construction of Indirasagar dam at that point of time was lagging behind schedule, and was expected to have its own share of problems associated with displacement of people, Gujarat was not willing to any take risks on the issue of Sardar Sarovar dam height. Though Gujarat, on certain occasions, has gone to the extent of agreeing to keep the reservoir level at 436 feet by truncating regulatory gates, yet the demand of Madhya Pradesh to alter dam profile so as to restrict its height permanently was not found favourable. The state of Gujarat, apart from disagreeing with Madhya Pradesh on the stated benefits of dam-height reduction, also felt that issues related to assessment of utilisable quantum of water, the dam height, power sharing formula etc. were already settled by NWDT, and should not be reopened till December 2024 as ordered by the Tribunal. On the issue of height reduction, Maharashtra and

Rajasthan were fully aligned with Gujarat. The issue was however put to rest by Supreme Court's final decision, directing completion of full dam height as per NWDT Award provisions.

Another contentious issue between Madhya Pradesh and Gujarat has been on construction of twin Irrigation Bye Pass Tunnels (IBPT). The IBPT was proposed by Gujarat in 1989 to meet irrigation requirements under eventualities of shutdown in the canal head powerhouse. Madhya Pradesh has objected IBPT for the alleged reasons of alteration in NWDT stipulations, reduction in power generation from project, and withdrawal of extra water by Gujarat over and above its allocated share. Initially, disagreement was only on the capacity of tunnels and the level up to which they can draw water from reservoir. But later - while hardening its stand on dam height issue - Madhya Pradesh started questioning the necessity of IBPT. At the peak of conflict, Madhya Pradesh proposed to agree for the IBPT quid-pro-quo of an agreement by Gujarat for reduction in dam height. The issue of IBPT was repeatedly discussed in NCA meetings, and finally (in July 2000) it was decided to construct the tunnels considering them a technical necessity. This decision of the NCA was however challenged by Madhya Pradesh in the Review Committee of NCA (RCNCA). However, in August 2001, RCNCA opportunely resolved the complex issue by its decision that Gujarat will fully compensate the power loss (if any) caused by IBPT to the states of Madhya Pradesh and Maharashtra. Gujarat constructed the IBPT immediately thereafter; and even at partial stages of completion it drew water into the partially completed canal system without reaching the dam height of 110m. The IBPT thus immensely helped in mitigating the draught situation of Gujarat during 2002, and improved the drinking water situation in subsequent year.

Apart from above listed differences, the views of Madhya Pradesh and Gujarat also differ on financial matters such as: (i) sharing of the R&R costs, (ii) sharing of interest burden of market borrowings, (iii) sharing of cost of rockfill-dykes and link-channels, (iv) sharing of the cost of catchment area treatment[25], and (v) compensation to Madhya Pradesh for its government and forest land going in submergence. The more important ones of these financial issues are discussed in detail separately.

There have been also other indirect pitfalls of such prevailing conflicts amongst the beneficiary states. First of all, the NBA took advantage of this situation to highlight execution and implementation lapses, and project them as conceptual and planning fiasco of the project. Later, the R&R related arguments (in support of project) in Supreme Court hearings lost credibility under Madhya Pradesh's persistent demand for dam height reduction. The continuing situation of conflict also became a domineering reason for slow pace of progress in R&R works. Initially, not happy with the final judgement of Court, Madhya Pradesh has not been agreeable to a fast-track action plan for the R&R works. Later, its slow response in executing R&R in its territory also hampered meeting of the first milestone date[26] in NCA's action plan.

## 2.2 Present Status of Works

Despite a favourable judgement by the Supreme Court on the case filed by NBA, there has been very little progress in raising the height of dam because of the constrained R&R progress. As per the Court's decision, permission to raise dam height beyond 90m is to be given by Narmada Control Authority (NCA) from time to time, after obtaining clearances from its R&R and Environment Sub-groups. Also, these clearances are to be given only after consulting the three Grievances Redressal Authorities in the states of Madhya

Pradesh, Maharashtra, and Gujarat. Thus, the main spillway portion of dam – governing the effective dam height - is getting restricted because of the linkage with R&R progress. Fulfilling another direction of the Court, NCA in November 2000 finalized the Action Plan for completion of R&R measures and *pari passu* construction of dam (Table 5.7). Against such set targets of achieving 100m and 110m heights by June 2002 and June 2003 respectively, the dam could be raised[27] only up to 100m by June 2003 (SSCAC, 2003a). Although about 90% of the dam concreting has been completed, its present effective height (100 m) is about 40 m shorter than the intended final level, and about 10 m shorter than the level at which minimum power benefits can be derived.

**Table 5.7: NCA's Action Plan for R&R Works and Dam Construction**

| Dam Height (Elevation) | Time Frame | |
|---|---|---|
| | Completion of R&R | Completion of Dam |
| 100.0m | December 2001 | June 2002 |
| 110.0m | December 2002 | June 2003 |
| 121.0m | December 2003 | June 2004 |
| 138.68m | December 2004 | June 2005 |

*(Source: SSCAC, 2003a. Table 2.2, P.9)*

All five units of canal-head powerhouse are ready for commissioning; but because of slow pace of dam construction the minimum reservoir level of 110 m needed for power generation has not be achieved. With the settlement of the issue of TG set supply, the work in riverbed powerhouse has resumed and installation of first unit is now targeted for completion by September 2004; and with completion intervals of four months for each unit, the last unit is targeted for completion by May 2006 (SSCAC, 2003b). In normal course, Narmada water is envisaged to reach main canal after passing through canal-head powerhouse, thereby giving additional benefit of hydropower. However, the now constructed 'Irrigation Bye Pass Tunnels' have enabled direct flow of water from reservoir to main canal, bypassing CHPH. Thus, with the 88 m level of IBPT-inlet, it has

become possible to divert Narmada water to main canal even without reaching the earlier mandated 110 m level of dam (SSCAC, 2003a).

The main canal works in Gujarat up to 144 kms, coming under phase-I, have been completed in all respect. The works of main canal up to 263 kms (Phase-IIA) are also nearly completed. The works in canal reach, in Phase IIB, up to 388 kms have been taken up and are under progress, while works for final reach up to 458 kms (Phase-IIC) are yet to be initiated. In Rajasthan, main canal works are nearly complete in first 48.0 kms reach, and the entire works are scheduled for completion by year 2005-2006 (NCA, 2003b). The water started flowing in Gujarat's partially completed main canal reach through one of the IBPT during monsoon 2002, and through both tunnels in March 2003. Though main canal is designed for carrying a maximum discharge of 40,000 cusecs, the flow is presently restricted by IBPT's maximum capacity[28] of about 16,000 cusecs at dam height of 100m. Even this maximum flow becomes available during monsoon months of July to October only, while from January onwards flow declines – reaching minimum level of about 2000 cusecs in April / May - due to reduction in base flow of river itself.

In Gujarat, the works of branch canals under phase-I have been completed in all respect and those under Phase-II are at different stages of progress. The works of distribution network have started only under Phase-I, and its completion covering a command of 4.44 lacs hectares is expected only by year 2004-2005 (NCA, 2003b). At present, partial distribution network up to the level of minors has been completed in about 82,600 hectares of command area, while full preparation for irrigation (up to field channels) is to be carried out by 'village service area committees' that are under different stages of formation. The present limited flows of main canal is enabling irrigation in a restricted

command of about 20,000 hectares (necessary preparations for which are seemingly complete), besides improving the drinking water conditions in many parts (especially North-Gujarat and Saurashtra regions) of Gujarat. Thus, it can be safely said that partial benefits of irrigation and drinking water have already started accruing for Gujarat. However, no benefit would accrue to Rajasthan unless the last 70 kms reach of main canal in Gujarat is completed. Alas! This work is yet to be started by Government of Gujarat.

## 2.3 Financial Aspects of Project Implementation

Within stakeholders' framework, four critical issues concerning financial elements have been identified. The foremost financial aspect of the project relates to the issue of having an updated estimated cost of completion. The second aspect pertains to the dispute among party states on booking of certain expenditure component, and the manner of sharing them. The third aspect is related to the issue of delays in payment of share cost dues by the co-sharer states of the project. And, finally the fourth aspect pertains to the issue of excessive increase in project cost owing to the unwarranted construction delays.

### 2.3.1 Estimated Project Cost

The first and last project estimate approved by the Planning Commission is at least one-and-half decades old, and the actual expenditure has already exceeded the approved estimate by over two folds. Reasons for not having an approved updated estimate are many; the prime being the cumbersome procedure[29] involved in seeking approval of the Sardar Sarovar Construction Advisory Committee (SSCAC) before putting it up for Planning Commission's approval. The original project estimate approved by the Planning Commission pertained to 1986-87 price level amounting to Rs. 6,406.04 crore. The

revised project estimate corresponding to 1991-92 price level was approved by government of Gujarat for Rs. 13,180.62 crore, but could not be approved by the SSCAC. The latest available estimate corresponding to 1996-97 price level is tentatively placed at Rs. 22,775 crore, of which only dam (about Rs.4474 crore) and power (about Rs.2185 crore) components have been approved by the SSCAC[30]. Table 5.8 highlights the variation in estimates at three discussed price levels. None of the estimate has been capable of throwing light on the final cost of project, even ignoring future delays. Because of the inherent limitation of estimate in accommodating price escalations of construction period (discussed in chapter 3) and because of the failure of project in updating the estimates timely, the whole exercise of estimate preparation has been of mere academic interest, rarely serving the practical intent.

**Table 5.8: Estimated Costs of SSP at Different Price Levels**

| Project Component | Estimated cost (Rs. Crore) at different price levels | | |
|---|---|---|---|
| | 1986-87 | 1991-92 | 1996-97 |
| Main Dam | 1019.45 | 1886.09 | 4330.64 |
| Canal and Distribution System | 4406.64 | 9735.08 | 16260.00 |
| Hydropower Complex | 979.95 | 1559.45 | 2184.75 |
| **Total** | 6406.04 | 13180.62 | 22775.39 |

*(Source: SSNNL, 2002; and SSCAC, 2003a)*

2.3.2 Dispute on Booking and Sharing of Project Expenditure

Other than the already identified four construction components (Table 5.1), the state of Gujarat has created two more expense heads for booking expenditures; one, 'Sharable Common expenditure (Group-V)', and two, 'Non-sharable Common expenditure (Group-VI)'. While the Group-VI component is fully borne by Gujarat, the expenditure booked under Group-V gets reallocated to construction components (i.e. Units I, II, III and Group-IV) as per the SSCAC approved proportions indicated in Table 5.9.

**Table 5.9: Allocation of Sharable Common expenditure (Group-V)**

| S. No. | Type of Expenditure booked under Group-V | % Allocation to Units / Group | | | |
|---|---|---|---|---|---|
| | | Unit-I | Unit-II | Unit-III | Gr.-IV |
| 1 | Misc. Common Expenditure. | 25.00 | 25.00 | 25.00 | 25.00 |
| 2 | Establishment of Central Direction Office and stores. | 15.90 | 24.80 | 15.30 | 44.00 |
| 3 | Buildings at Gandhinagar. | 15.90 | 24.80 | 15.30 | 44 00 |
| 4 | Buildings and Common utilities at project site (Kevadia). | 49.14 | 2.89 | 47.25 | 0.72 |
| 5 | Narmada Bhavan, Vadodara. | 50.98 | - | 49.02 | - |
| 6 | Narmada Nahar Bhavan, Vaododara. | - | 60.99 | - | 39.01 |
| 7 | Other buildings at Vadodara. | 22.43 | 26.35 | 20.68 | 30.54 |
| 8 | Buildings at other places. | - | 50.00 | - | 50.00 |
| 9 | Rockfill-dyke and Link-channel. | - | 75.00 | 25.00 | - |
| 10 | Canal Investigation Division (Old). | - | 60.99 | - | 39.01 |

The interest accrued on account of market borrowing is also being booked by Gujarat under Group-V sharable expenditure. This expenditure is later on reallocated by Gujarat to Unit-I, Unit-II, Unit-III, and Group-IV at rates of 15.9%, 24.8%, 15.3% and 44.0% respectively. However, this sharing formula is not yet approved by the SSCAC.

As per NWDT Award, the cost of Dam (Unit-I) has been apportioned between Irrigation (43.9%) and Power (56.1%). Thereby, the capital cost of the power portion will include full cost of Power Complex (Unit-III) and 56.1% of Unit-I. Madhya Pradesh and Maharashtra are required to pay to Gujarat 57% and 27% of the thus worked out capital cost of the power portion, and Gujarat is to bear balance 16%. The states of Gujarat and Rajasthan will share the irrigation component of Unit I cost in the ratio of 18:1. The cost of Main Canal (Unit-II) carrying water to Gujarat and Rajasthan will be shared by the two states on cusec-mile basis. With this criterion, the shares of Gujarat and Rajasthan in Unit-II will be 88.977% and 11.023% respectively (NWDT, 1978b). A state-wise summary of the allocation of stated expenditures is given in Table 5.10.

**Table 5.10: Percentage Allocation of Expenditures to Party States**

| Project Components | Gujarat | | | Madhya Pradesh | Mahara - shtra | Rajas - than | Total |
|---|---|---|---|---|---|---|---|
| | Irrigation | Power | Total | | | | |
| Unit – I | 41 589 | 8.976 | 50.565 | 31 977 | 15.147 | 2.311 | 100.00 |
| Unit – II | 88.977 | - | 88.977 | - | - | 11.023 | 100.00 |
| Unit – III | - | 16.00 | 16.00 | 57.00 | 27 00 | - | 100.00 |
| Group–IV | 100 00 | - | 100.00 | - | - | - | 100.00 |

*(Source: NWDT, 1978b)*

There are three categories of expenditures with dispute on the manner of booking and sharing. These are: (i) expenditure on R&R, (ii) expenditure on interest burden of market borrowings, and (iii) expenditure on construction of Rockfill-dykes and Link-channels. These disputes have arisen essentially on two counts; one, differences in interpretation of NWDT Award provisions; two, novel nature of expenditure, unforeseen by the NWDT.

Dispute on Resettlement and Rehabilitation Cost

In the NWDT Award, numerous references have been made on the lines of payment to be made by Gujarat to other party states for R&R works. Some of such references are (i) "...the state of Gujarat shall pay to Madhya Pradesh and Maharashtra all costs including compensation, charges and expenses incurred by them for or in respect of the compulsory acquisition of lands acquired for Sardar Sarovar Project", (ii) "...Gujarat shall pay to Madhya Pradesh and Maharashtra and the Union of India compensation for the respective Government lands and structures on principles similar to those underlying the Land Acquisition Act, 1894", (iii) "...Gujarat shall pay to Madhya Pradesh and Maharashtra land revenue in accordance with the respective Land Revenue Codes of Madhya Pradesh and Maharashtra in respect of all lands in their respective territories acquired for Gujarat or conveyed to it", (iv) "...Gujarat shall pay to Madhya Pradesh and Maharashtra all costs, charges and expenses incurred by Madhya Pradesh and Maharashtra for the purpose of removal and reinstallation of any ancient or historical monuments, archaeological

remains, religious place of worship or idols likely to be affected by submergence under Sardar Sarovar", (v) "...Gujarat shall pay to Madhya Pradesh and Maharashtra all costs, charges and expenses required to be incurred by them for rehabilitation of oustees and oustee families in their respective territories", and (vi) "...Gujarat shall pay to Madhya Pradesh and Maharashtra costs on account of establishment charges for land acquisition and rehabilitation and other departmental staff which Madhya Pradesh and Maharashtra may consider necessary for the purpose of such acquisition and rehabilitation". However, NWDT Award also states that "..all costs incurred by Gujarat on acquisition of land and rehabilitation of outstees in respect of Sardar Sarovar shall be charged to Sardar Sarovar Project estimate Unit I – Dam and Appurtenant works" (NWDT, 1978b).

Madhya Pradesh, joined by Maharashtra, has taken a view that as per Award, Gujarat is only liable to pay for compensation of land acquisition and cost of rehabilitation. While Gujarat contends that these costs are to be booked as expenditure under Unit-I (dam & appurtenant works) and shared by party states as per the NWDT's cost sharing formula for Unit-I. Since the cost of R&R - expected to be more than Rs. 3000 crore at 2000-01 price level - forms a significant component of overall project cost, the party states are not easily yielding their stand on this contentious issue.

Dispute on Interest of Market Borrowings

Till end of June 2003, the Government of Gujarat has spent over Rs.3450 crore for payment of interest charges on funds raised through market borrowings (SSCAC, 2003a). The interest burden accounts for more than 23% of gross expenditure, forming a crucial constituent of project cost. Government of Gujarat is of the view that other party states should share this interest burden. The state of Madhya Pradesh continues to refuse to bear

the cost of interest burden on the grounds that no such provision exists in the NWDT Award, and that the state of Gujarat has borrowed from market without other party-states' consent. The states of Maharashtra and Rajasthan are also not in favour of sharing the huge burden of interest on account of market borrowings. Gujarat on the other hand views its stand as justified on the ground that it has resorted to market borrowings due to the failure of other party states in ensuring timely payment of their share of project cost.

Dispute on Cost of Rockfill-dykes and Link-channel

The Rockfill-dykes and Link-channel form an interface between the power and irrigation components of the project. The dispute in sharing of its cost is due to the non-agreement over formula for distribution of its cost amongst irrigation and power components. A formula given by 'Central Water Commission' – booking 75% of the cost under irrigation and 25% under power – though acceptable to Gujarat is not acceptable to other party states. Although, with a mere cost of Rs. 86 crore the issue is minor, yet party states so far have compromised little in reaching an amicable solution.

### 2.3.3 Delays and Non-payment of Share Costs by Party States

The party states, as per NWDT Award, were required to make available the annual instalments of their share of the funds at the commencement of each financial year as per approved construction programmes. This provision was later diluted by mutual agreement, and states were asked to make advance payment on quarterly basis. However, the party states have not been able to adhere to the original or the modified stipulation. All expenditures - including disputed ones - are being incurred by Gujarat and then booked under different heads as alluded to earlier.

Out of the total project expenditure booked by Gujarat at any point of time, a part of is shown as disputed, while the balance remains undisputed booked expenditure. Since other party states persistently refuse to pay for any portion of the disputed expenditure, full burden of disputed expenditure is falling on the state of Gujarat. Besides, the other party states have not been regular in payment of their share even on undisputed booked expenditure. Table 5.11 presents status of the disputed and undisputed expenditures on the project for the period ending June 2003. The disputed expenditure of Rs. 4177 crore accounts for 28% of the total expenditure (Rs. 14852 crore) booked by Gujarat, putting sever strain on the finances of the project.

**Table 5.11: Disputed and undisputed Project Expenditures till June 2003**

(Amount in Rs. Crore)

| Expenditure Component | Expenditure Amount |
|---|---|
| (A) DISPUTED | |
| Interest on Market borrowing | 3450.27 |
| Resettlement & Rehabilitation (R&R) | 639.84 |
| Rockfill Dykes & Link Channel | 86.45 |
| **Sub-Total of (A)** | **4176.56** |
| (B) UNDISPUTED (after allocation of Group-V sharable component) | |
| Unit-I Dam & Appt. works | 1726.90 |
| Unit-II Main Canal | 3886.72 |
| Unit-III Hydro-Power | 1454.31 |
| Group-IV Branches & Dist. | 3408.02 |
| Group-VI Non Sharable Exp. | 199.50 |
| **Sub-Total of (B)** | **10675.45** |
| **GRAND TOTAL (A+B)** | **14852.01** |

*(Source: SSCAC, 2003a. Table 3.2, P.22)*

Out of the booked undisputed expenditure component of Rs. 10675 crore, about Rs. 2504 crore is the share of other three party states. Out of this share payable to the Government of Gujarat, only about Rs.1554 crore has been paid till the end of June 2003, and balance Rs.950 crore remains unpaid as brought out in Table 5.12.

**Table 5.12: Share-cost Position on Undisputed Booked Expenditures till June 2003**

| Party States | Share Cost (Rs. Crore) | Share Paid (Rs. Crore) | Balance Share (Rs. Crore) |
|---|---|---|---|
| Madhya Pradesh | 1381 16 | 944 53 | 436.63 |
| Maharashtra | 654 24 | 478 44 | 175.80 |
| Rajasthan | 468.32 | 130.95 | 337.37 |
| **TOTAL** | **2503.72** | **1553.92** | **949.80** |

*(Source: SSCAC, 2003a. Table 3.3, P.23)*

2.3.4 Increase in Project Cost due to Construction Delays

The schedules of construction of dam and hydropower components are interlinked, and both have been subjected to delays. The two works practically commenced in 1987, and with a viable programme of 10 years should have been completed in all respect by 1997; instead, the two components are poised for completion by 2006 / 2007 only. On the other hand, though initiation of irrigation benefit depended on reaching a threshold level of dam, its planned expansion - spread over three decades - has been independent of dam construction. Besides, the ongoing construction of canal network has not been visibly impeded; and the increase in its estimate is on account of inevitable price escalation of planned construction period. Hence, only the dam and power components of the project are included in the below discussed financial analysis of the impact of construction delay.

The original estimates of dam (Rs. 1019.45 crore) and powerhouse (Rs. 979.95 crore) add up to about Rs. 2000 crore. Considering an average annual price escalation rate of 10%, a total escalation - before commissioning - in the original estimate of a 10-year project by 59.37% is inevitable given that project is on its scheduled course (refer Table 3.6). Thus, the total estimated cost of dam and power components would escalate to Rs. 3187 crore. As per recent rough estimates at 2000-01 price level, the cost of dam and powerhouse are tentatively placed at Rs. 5891.75 crore and 2748.59 crore respectively, totalling Rs. 8640

crore. Thus, presuming that the final cost of two components gets restricted to Rs. 8640 crore, the cost escalation attributed to the factor of delay works out to Rs. 5453 crore, which is about 273% of the original estimate. Earlier in Chapter 3, we have deduced that for the 10 years delay on a 10-year planned project, the cost escalation on account of delay will be of the order of 254% in case of delays at commencement, and about 127% in case of uniformly spread delays (refer Table 3.7). The delay in SSP falls somewhat between the two said cases, but is closer to the former category of delays. Even then, SSP's cost escalation attributed to delay is a bit higher than expected, calling for further explanation.

The evident disparity can be ascribed primarily to two reasons. Firstly, the price escalations in the 80s and 90s (of the order of 12% to 14%, and sometimes more) have been amply higher than the uniformly considered rate of 10%; besides, specific price changes need not be and are not generally of the same magnitude as that in general price level usually measured by the Wholesale Price Index (WPI). Thus, the uncontrollable escalation due to changing prices is itself higher than that considered, while escalation attributable to delay is rather lower than that projected. Secondly, the escalation in the estimates of SSP is not only on account of justifiable price escalation and factor of delay, but also owing to the significant appreciation in the scope of work, especially R&R work.

The enhanced scope of R&R is attributed to increased number of PAFs besides the enhanced provisions of R&R package. Estimated to cost about Rs. 317 crore at 1986-87 price level, the cost of R&R works has increased to about Rs. 2120 crore at 1996-97 price level (SSCAC, 2003a); and as per the recent rough estimates at 2000-01 price level, R&R cost is expected to be about Rs. 3033 crore. Being a significant part of dam estimate

(forming 51% component), the recent R&R estimate indicates nearly ten-fold jump over the original estimate while the total cost of dam works and hydropower works has appreciated by about four-folds only (Table 5.13). Thus, if financial implication of increase in scope of R&R is also accounted for, the actual cost escalation on account of construction delay will be closer to the anticipated level.

**Table 5.13: Increase in the Dam and Powerhouse Costs**

(Amount in Rs. Crore)

| Works Component | Cost at 1986-87 Price Level | Cost at 2000-01 Price Level | Ratio showing Increase |
|---|---|---|---|
| Dam Works | | | |
| R&R Component | 317.00 | 3033.21 | 9.56 |
| Other Components of Dam Work | 702.45 | 2858.54 | 4.06 |
| Total Dam Work | 1019.45 | 5891.75 | 5.78 |
| Hydropower Works | 979.95 | 2748.59 | 2.80 |
| Total of Dam and Power Works | 1999.40 | 8640.34 | 4.32 |

A major lacuna of SSP estimates (and also of the estimate-based analysis discussed above) is the concealment of the interest burden of market borrowings, which is zooming exponentially with project construction delays. The total cost of borrowing booked by the project has already exceeded Rs.3450 crore. The annual liability of the project for debt-services (i.e. interest plus redemption of due principal amount) alone in the year 2003-04 was about Rs.1600 crore. The debt-service liabilities for the 10$^{th}$ Plan period (2002-2007) are estimated to be over Rs. 5900 crore.

Besides increasing the project cost, the delay in project construction is also causing the loss of accruable benefits from the project. In absence of tangible return as of now, the notional value[31] of loss can be correlated with the opportunity cost of huge investment. Even considering a moderate rate of return of 10% on investment of Rs. 14852 crore (till June 2003), the annual loss is of the order of Rs. 1485 crore; which amounts to about Rs. 4 crore per day. The inordinate delay in raising of dam has other financial implications as

well, such as: (i) problems associated with prolonged idle-condition maintenance of turbine/generator units of the completed canal bed powerhouse, (ii) safety and maintenance of vast stretches of the completed canal network, (iii) recurring damages to stilling basin of the hydraulically unsuitable truncated dam, and (iv) contractual problems related to frequent and open-ended work extensions.

## 3 STAKEHOLDERS OF SARDAR SAROVAR PROJECT

Using the definition evolved in earlier chapter, the stakeholders of Sardar Sarovar Project can be described as individuals or group of entities that are affected during conceptualisation of the project or its present phase of construction, and those who may get affected during its operational phase; and who in turn bring influence on the construction, operation, and future direction of the project.

### 3.1 Stakeholders as Part of Project Environment

Evidently, the stakeholders of SSP are a part of the project environment. All constituents of the organization executing the project – namely, 'Sardar Sarovar Narmada Nigam Ltd. (SSNNL)' –are internal stakeholders. Similarly, organizations such as 'Sardar Sarovar Punarvasahat Agency (SSPA)', 'Narmada Valley Development Authority (NVDA)', and the Narmada Division of 'Maharashtra Irrigation Department' - associated with the works of R&R in Gujarat, Madhya Pradesh, and Maharashtra respectively - are also part of internal stakeholder group. The 'Narmada Planning Group (NPG)' of Gujarat and the central government organizations such as NCA and SSCAC - which have been constituted on account of SSP only - are also internal stakeholders. The Government of Gujarat, which is primarily funding the project, is an internal stakeholder entity. The other co-sharers of the project - namely governments of Madhya Pradesh, Maharashtra,


and Rajasthan, who are funding the project to the extent benefits are accruable to their states - are also internal stakeholders.

The external stakeholder group of SSP incorporates all elements of direct-action external environment and a part of indirect-action elements.

3.1.1 Direct-action Elements

The beneficiaries of Narmada water in Gujarat – namely farmers in command areas, urban and rural populace benefiting from drinking water supplies, small and large scale industries getting industrial water – are all external stakeholders of the project. The population in Jalore and Barmer districts of Rajasthan benefiting from Narmada water supplied from project are stakeholders. The people of Maharashtra in hilly banks of project reservoir likely to be supplied with pumped Narmada water would also constitute stakeholders. In addition, the domestic as well as industrial consumers of project's hydropower in three states of Madhya Pradesh, Maharashtra, and Gujarat are also stakeholders. The large number of people in Madhya Pradesh directly displaced by project submergence are stakeholders of the project. The relatively smaller segment of people displaced in Maharashtra and Gujarat are also stakeholders. The people along banks of river stretch below dam site at Kevadia - for whom the mighty holy river may soon get diminutive – are also stakeholders of the project.

The flora and fauna in the vast stretches of submerged land are also constituents of stakeholder group. The general riverine environment, topographical and tectonic features, monuments, and temples, getting submerged by project reservoir are also stakeholders. The aquatic life along river stretch downstream of dam, and the estuarine ecology near

river mouth at Bharuch - likely to be affected by long-term project operation - are also the stakeholders. On the other hand, flora, fauna and other factors of environment and ecology in the command area of project are also stakeholders. And, the aquatic and riverine lives in rivers traversing through the command – which are mostly dry and may benefit from a rise in water table of the command – are also stakeholders.

Several civil construction companies that have taken contracts for works of dam, powerhouse, canal-network, drinking water pipelines, etc. and their sub-contractors are external stakeholders. Many engineering companies associated with supply and erections of electro-mechanical equipments are also stakeholders. Industrial units supplying cement, steel, construction chemicals, construction machineries and other equipments, etc, and their intermediary agents, transporters, etc., are also external stakeholders of SSP.

Certain organizations and departments of Gujarat - such as: Gujarat Engineering Research Institute, Irrigation Department, Water Supply Department, Gujarat Electricity Board, Forest Department, Fisheries Department, etc. - that are associated with the SSP are also its external stakeholders. The other consultant organizations such as Central Water Commission (Delhi), Central Electricity Authority (Delhi), Central Water and Power Research Station (Pune), Central Soil and Material Research Station (Delhi), National Institute of Rock Mechanics (Kollar), and Gujarat Institute of Development Research (Ahemedabad), are also constituents of the external stakeholder group. The Members of Dam Safety Panel (DSP) and the Board of Consultants (BOC) - who as independent consultants provide valuable technical inputs - are also stakeholders. The academicians from certain universities in Gujarat and the 'Water and Land Management Institute (WALMI)' - who have been involved with numerous research works related to project

development - are also stakeholders of SSP. The Union Ministry of Water Resources is the nodal ministry concerned with progress and satisfactory completion of the project and hence is a stakeholder entity. Other ministries of Government of India – such as Ministry of Social Welfare and Empowerment, Ministry of Power, Ministry of Environment, etc. – are also closely associated with the project and are its stakeholders.

Part of project financing is being mobilized from the market. The financiers - including common people participating in SSNNL's public bonds, industrial houses investing in private placement of bonds, financial institutions and banks – are also stakeholders of the project. Since overall economy of the Gujarat is to benefit from project, the well-informed people of the state and their social, cultural, economic and political groupings influencing the course of the project are also stakeholders. Since national economy is also going to gain from project, the Planning Commission, numerous social and economic institutions, central federations of industries and commerce etc. are also external stakeholder entities.

There are also individuals and organised entities associated to the cause of project affected people, flora, fauna and ecology. These entities - active in both submergence areas and project's command - also constitute SSP's stakeholder group. While the NBA and key personalities associated with it are easily identifiable examples of such stakeholders, there are also other social and environment oriented entities at national and international level opposed to SSP because of its adverse social and ecological impact.

3.1.2 Indirect-action Elements

The Indira Sagar Project (ISP) in Madhya Pradesh is another important water resource project on Narmada upstream of SSP. As per NWDT Award, about 85% of the utilizable quantum of water at SSP has to come by way of regulated releases from the multi-purpose ISP. Thus timely construction of ISP in the envisaged manner, as well as its future operation, will have significant bearing on the functioning of SSP. Evidently, the stakeholders of ISP - forming indirect-action environment of SSP - have sufficient potential to bring direct actions so as to influence SSP; and hence are stakeholders of SSP as well. Further, because of NWDT Award provisions binding SSP to partly finance ISP, the stated stakeholder relationship between the two projects is two-way, and is also formally established. The influence of ISP in SSP is affected through Government of Madhya Pradesh's representations in NCA, SSCAC, and SSNNL Board.

There are two more Narmada river projects upstream of SSP and downstream of ISP. These are Omakareshwar and Maheshwar hydroelectric projects, both situated in Madhya Pradesh. But, since these projects are essentially run-of-river schemes with no consequential storages, their operations may not affect SSP. Also, since SSP is the terminal project on river Narmada, there are no downstream projects to impart influence on SSP's functioning.

## 3.2 Distinct Features of Sardar Sarovar Project Stakeholders

As discussed earlier, there are several distinctions between stakeholders of water resources projects and that of normal business organisations. However, even within the water resource sector there are sharp differences in stakeholders of different projects.

Following paragraphs highlight some such distinct features and characteristics of SSP stakeholders.

### 3.2.1 Distinction Because of Large-size of Stakeholder Group

It is evident that the scale of SSP is very large in both physical and financial dimensions. The physical dimension of the project is large not only in terms of the volume of construction, but also in its geographical spread. The extensive geographical spread of project in command and submergence areas has entailed default incorporation of a large number of human and non-human entities as stakeholders. But there are also entities (human only) that have become stakeholders by choice, and the financial dimension and prestige of project has influenced the extent of their numbers. Apparently, the size of stakeholder group of SSP is larger than that of any other water resource project in India.

The extraordinary size of stakeholder-group itself attaches a distinct characteristic to the stakeholders of SSP. This is so, because the large-size lends stakeholders a more credible voice and ability to influence the project in significant ways. The influence of size of beneficiaries is visible in priority allocation given to the project in Gujarat's annual budgets for past so many years. The large stakeholder-group also attracts political clouts that drastically influences project outcomes. Unsurprisingly thus in Gujarat, the SSP gets mentioned in every political oration irrespective of political affiliations. The political reactions, manner, and extent of jubilation marking intermittent milestones in raising of dam are also indicative of the political values attached to the project.

On the other hand, the significantly large adversely affected group has attracted strong political support as well. The largest segment of project oustees (about 90,000, as per

1991 census) is in the state of Madhya Pradesh. Though the Government of Madhya Pradesh is a co-sharer of the project, yet for a long time it has supported the cause of oustees by asking significant reduction in dam height. Even with a much less strength (about 20,000, as per 1991 census) the project oustees in Maharashtra have strong political backing; and in recent times, the Maharashtra Government has started looking afresh at its overall interest in SSP.

The large size of the stakeholders-group also attracts social-welfare groups, environmentalists, religious / philanthropic groups, and several other non- governmental organisations (NGO) who often strengthen the stakeholders movement, both from within and from outside. In case of SSP many such groups have come up in support of project, especially when it was passing through the phase of uncertainty pending final judgement by Supreme Court on the future course of project. Several groups are also working for the welfare of the project affected families by extending help to project authorities in R&R related works. Evidently, groups like NBA - also working for the welfare of project affected families, though focussed on opposing the project – are also attracted because of the large stakeholder size only. Finally, the presence of innumerable groups who voice their concern for side effects of the project - on the lines of its ecological, seismological, cultural, archaeological, and health impacts - is also owing to the scale of project. Some of these groups are with international background, while most of the national level groups so opposed to SSP are seemingly aligned with NBA.

### 3.2.2 Distinction Because of Geographic and Climatic Conditions of Gujarat

The beneficiary stakeholders of SSP show distinct traits in terms of attachment and activism for the project. This is largely because of the adverse geographic and climatic

conditions of Gujarat. Gujarat is situated on the West Coast of India between 20.60° and 24.42° North latitude and 68.10° and 74.28° East longitude. It is bordered by Pakistan and Rajasthan in North, by Madhya Pradesh in East, by Maharashtra in Southeast, by Indian Ocean and Arabian Sea in South and West. The state is traversed by 17 major and about 168 minor rivers. The total available water resources of the state have been estimated at 42666 Million Cubic Meter (MCM), which includes 11100 MCM that would be available from Narmada. Utilisable surface water in the state is 31500 MCM, including 11100 MCM (i.e. 35%) from Narmada. The lack of suitable reservoir sites due to predominantly flat terrain further restricts the scope of utilising entire available surface water resources. The state covers an area of 19.60 Million hectares and has a population of about 41.74 million (as per 1991 census), which is growing at an annual rate of 2.08%. Though Gujarat has a large manufacturing sector, the agriculture accounts for more than one third of state's income. Moreover, agriculture based industries contribute more than 50% of all factory employment. The state's water resources are just 2.28% of India's total water resources, while the state constitutes 4.88% of national population, indicating the low availability of per-capita water (GID, 1980; and Vyas, 2000).

The state has very limited groundwater resource, as large areas are incapable of yielding groundwater economically. In Saurashtra, the groundwater is confined to the cracks, fissures and inter-bedded sedimentary layers between successive layers of volcanic rocks, thereby making its extraction difficult. The ultimate utilisable groundwater resource is estimated at 19169 MCM, and the ultimate groundwater irrigation potential is 2.9 Million hectares. There are almost 900000 open wells and tube-wells in Gujarat, of which 28400 tube-wells are privately owned and 32600 tube-wells owned by Government bodies.

Maximum groundwater extraction is about 10416 MCM, which irrigates about 1.7 Million hectares of area. With additional 420000 wells and 5800 tube-wells, it will be possible to meet the ultimate groundwater irrigation potential (Vyas, 2000). However, it needs to be noted that groundwater sources are less dependable over longer times, unless their extractions are limited to the recharge of aquifers by precipitation or regeneration.

Gujarat has a tropical monsoon climate, but characterised by a low, uneven and unreliable rainfall with high coefficient of variance. On an average, three years in a cycle of ten years are drought years. In Saurashtra, due to over exploitation of groundwater the natural balance between seawater and groundwater has been disturbed and salinity ingress has become a major problem. North Gujarat is facing alarming groundwater-mining situation; and water available at an average depth of 700 to 1000 feet is contaminated with fluoride that causes almost incurable fluorosis. In some parts, including Ahmedabad, water tables are dropping at the rate of over seven feet every year. In Kutch, the non-availability of water is leading to advancement of desert and environmental degradation (SSNNL, 2000). Non-availability of replenishment into reservoirs due to failure of monsoons has resulted in severe drinking water crisis in many urban centres. During the last decade, every year the state had to incur extra expenditure on drought mitigation efforts aggregating to Rs. 164 crore. The private water supply business has been burgeoning with phenomenally high charges for water supplied through tankers. The industrial sector is also bearing heavy cost with the prices of water for various industries in Saurashtra being reported as the highest industrial-water prices[32] in India (Vyas, 2000). Evidently the water availability pattern within Gujarat is highly critical, but for the fact that surface water available through SSP will be of substantial quantity. Since the water affects all spheres

of societal development - including agricultural and industrial growth - the stakeholders' activism for Sardar Sarovar Project in Gujarat is understandably not overwrought.

3.2.3 Distinction Because of Multi-state Nature of the Project

Because of their spread over four states, the stakeholders of SSP have varied characteristics and constitute diverse interest groups. Besides, the multi-state nature of SSP has come because of imposed provisions of NWDT Award and not owing to economic or political acumen; and this also makes SSP's stakeholder-behaviour different from expected stakeholder-behaviour of a joint venture project.

The key distinction of SSP is regarding submergence aspect of its reservoir. Though nearly full benefit of consumptive usage of water is to accrue to Gujarat, the burden of reservoir storage in terms of submergence of area and displacement of population is chiefly to be born by Madhya Pradesh and to some extent by Maharashtra. With nearly 92% of consumptive benefits, Gujarat's burden of submergence in terms of area and population-displaced are about 19% and 14 % respectively. On the other hand, even without any share in consumptive usage of the storage created, Madhya Pradesh has to bear major burden of submergence with nearly 55% of submerged-land and 70% of project-oustees belonging to it. Maharashtra has to bear the burden of about 26% and 16% in terms of submerged area and people displaced, while gaining mere 2.5% share in consumptive usage of water - that too under pumped schemes only.

Though Madhya Pradesh is to get the lion's share (57%) in SSP's total power generation, yet looking at its overall stakeholder attitude, the burden of submergence is seemingly too

large to be offset by power benefits. Maharashtra has also started changing its views about project impacts and accruable benefits. Understandably, the people affected by submergence are bound to oppose project; however, opposition at times by beneficiary stakeholders – including governments of Madhya Pradesh and Maharashtra, who are also co-sharer of project cost - is indicative of a complex stakeholder characteristic.

# 4 STAKEHOLDER MODEL FOR SARDAR SAROVAR PROJECT

## 4.1 Three-tier Classification of Stakeholders

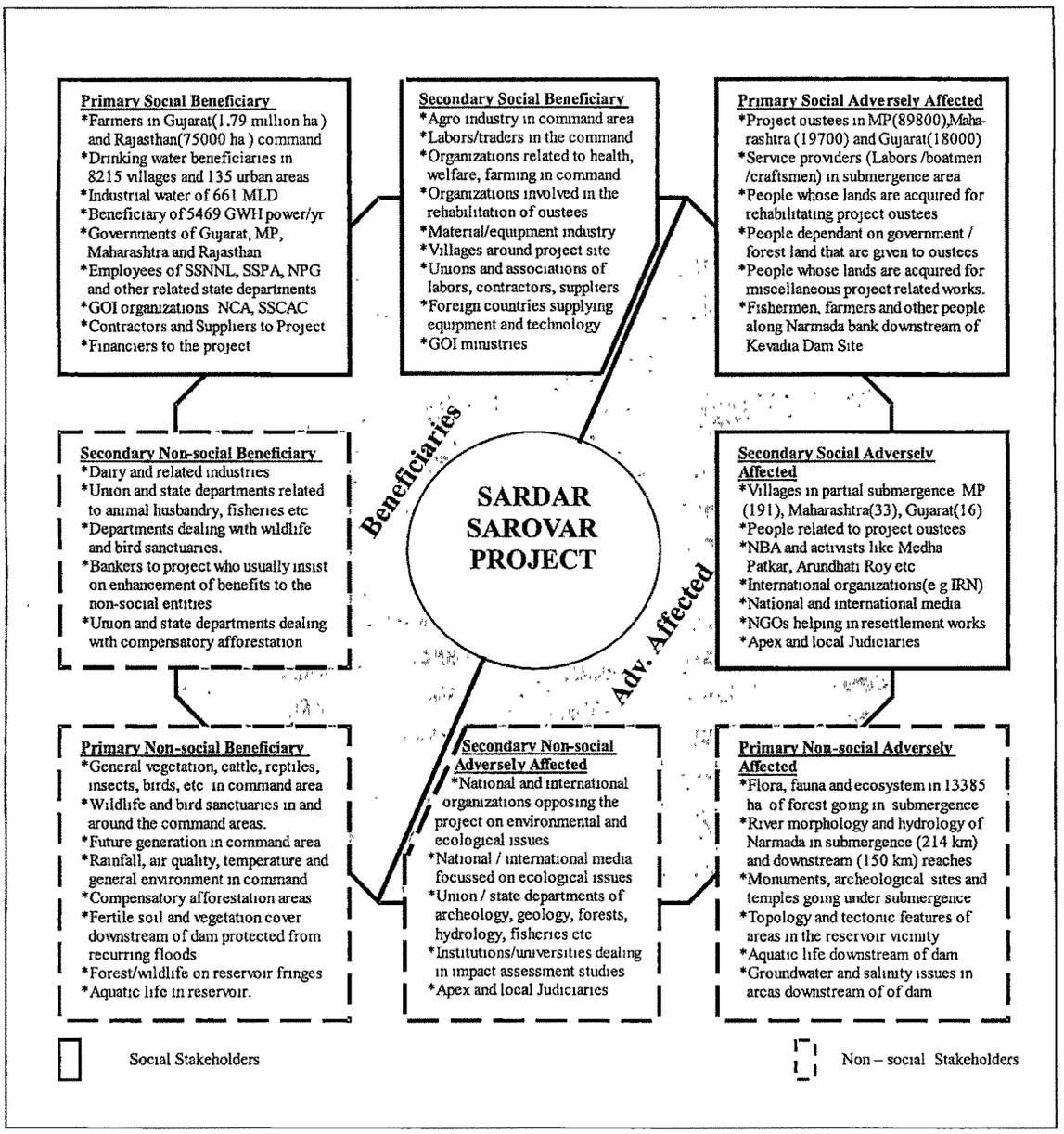
The earlier discussed three-tier stakeholder classification approach can be applied in case of SSP. To begin with, stakeholders are classified as beneficiary and adversely affected groups. These two groups of first tier are then further sub-classified into social and non-social groups, creating four classes in the second tier. In the final tier of classification process each of the four classes is again sub-classified as primary and secondary groups, thus creating the below listed eight-fold classification of SSP stakeholders:

- Primary Social Beneficiary (PSB) Stakeholders
- Secondary Social Beneficiary (SSB) Stakeholders
- Primary Non-social Beneficiary (PNB) Stakeholders
- Secondary Non-social Beneficiary (SNB) Stakeholders
- Primary Social Adversely-affected (PSA) Stakeholders
- Secondary Social Adversely-affected (SSA) Stakeholders
- Primary Non-social Adversely-affected (PNA) Stakeholders
- Secondary Non-social Adversely-affected (SNA) Stakeholders.

## 4.2 The Octagonal Stakeholders Congregate

The Figure 5.2 presents the octagonal stakeholders congregate of Sardar Sarovar Project.

**Figure 5.2: Stakeholder Model for the Sardar Sarovar Project**




Abbreviations:
MLD: million litres per day;
SSNNL: Sardar Sarovar Narmada Nigam Ltd.;
NPG. Narmada Planning Group,
NCA: Narmada Control Authority;
NBA· Narmada Bachao Andolan;
GWH. giga watt-hour;
SSPA: Sardar Sarovar Punarvasahat Agency;
GOI: Government of India,
SSCAC. Sardar Sarovar Construction Advisory Committee;
IRN International Rivers Network.

The model brings out three characteristic features of SSP: (i) the form of project's affect on stakeholders (beneficial or adverse), (ii) the nature of the stakeholders (social or non-social), and (iii) the impact of affect on stakeholders (primary or secondary). The beneficiary and the adversely affected stakeholders groups of the SSP divide the octagonal stakeholders congregate in two halves. Besides the people of project's command (in Gujarat and Rajasthan) and contradictory to general impression[33], the common people, farm and industrial sectors, and governments of Madhya Pradesh and Maharashtra are also beneficiaries of SSP. On the other hand, besides the people in submergence areas of Madhya Pradesh and Maharashtra, the Gujarat's submergence-affected people, canal-affected people, and people along 150 kms Narmada stretch downstream of dam, are also adversely affected stakeholders. Similarly, the spread of beneficially or adversely affected flora / fauna entities is not governed by the strict division of command and submergence areas of the project.

Evidently, the beneficial and adversely affected groups bring influence on the project in opposing ways and the net result of their activism dictates the pace of project progress at any given point of time. Thus, the present status of project (as well as the likely shape of completed project) is an outcome of long-term net influence of the two opposing forces. Looking back, it can be safely concluded that in case of SSP the influence of adversely affected stakeholder group had been often surpassing the influence of beneficiary stakeholder group; and the net impact of stakeholders' influence impeded the project progress. However, the influence brought about by adversely affected group had not been strong enough to alter the scope of project, though at times they looked close enough. Presently with the commencement of limited supply of water from the project, the beneficiaries of drinking and irrigation water in Gujarat have been activated; and are

likely to dominate over the adversely affected stakeholder groups. Similarly, with the present situation of acute power crisis (and with power component of SSP being closer to completion) the major beneficiaries of power in the states of Madhya Pradesh and Maharashtra have also been activated; and are likely to counter the influence of adversely affected groups in their respective states.

The social and non-social stakeholders groups of the SSP are identified in the model by continuous and dashed outlines respectively. The classification of social and non-social stakeholders is essentially along the presence or absence of a social relationship between project and stakeholders. Thus all the human beings affected beneficially or adversely by SSP are its social stakeholders. Though there is a large segment of affected tribal population, especially in submergence areas of SSP, yet none of them is too aloof from mainstream society to be considered as non-social entity. Only the non-human entities and yet-to-be-born human entities are covered under the classification of non-social stakeholders group.

As evident from the discussion in earlier chapter, the nature of influence brought about by social and non-social groups differs considerably; and this is where the identification of stakeholders as primary (directly affected) and secondary (indirectly affected) groups should become important. But in case of SSP, secondary stakeholders strongly represent the cause of social stakeholders too; and this is apparent from the composition of secondary social adversely-affected group incorporating motivated organizations like NBA, the judiciary, many international anti-dam organizations, and the national and international media. Thus, influence by the social stakeholders has deeper penetration because of the activism of both primary and secondary groups. Understandably, non-

social stakeholders' case is represented by secondary stakeholders only; and the influence brought about by them is less affective[34].

## 4.3 The Key Stakeholder Entities

While most of the stakeholders of SSP have been recognized and classified (Figure 5.2), some of them have been identified for closer examination because of their potential to impart significant influence on the course of project. Such obtained insight into these key stakeholders is discussed in brief below:

### 4.3.1 Farmers in Gujarat

Out of 9.00 MAF of Gujarat's share in Narmada water, 7.94 MAF of will be used for irrigation purposes. The command in Gujarat is allowed to spread wide on the well-founded notion[35] that for the greatest benefit, extensive approach is desirable. Thus, in the present formulation of project the farmers of Gujarat spread widely over 62 talukas in 14 districts (Table 5.14) are the main beneficiaries.

**Table 5.14: District-wise Detail of Cultivable Command Area**

| Sl. No. | District | Command in hectares | Number of Villages under Command |
|---|---|---|---|
| 1 | Narmada | 18873 | 125 |
| 2 | Bharuch | 166134 | 301 |
| 3 | Panchmahal | 3769 | 16 |
| 4 | Vadodara | 255518 | 932 |
| 5 | Kheda | 38463 | 137 |
| 6 | Gandhinagar | 14464 | 48 |
| 7 | Ahmedabad | 341894 | 433 |
| 8 | Mehsana | 61643 | 130 |
| 9 | Surendranagar | 347951 | 108 |
| 10 | Bhavnagar | 63800 | 99 |
| 11 | Rajkot | 44503 | 53 |
| 12 | Patan | 205243 | 277 |
| 13 | Banaskantha | 167685 | 232 |
| 14 | Kachchh | 112778 | 182 |
| | **Total** | **1842718** | **3073** |

*(Source: SSNNL, 2001)*

Geographically the command can be divided into three categories: (i) main land Gujarat, (ii) Saurashtra and (iii) Kachch. The soil and the climatic conditions of these three regions distinctly vary and hence influence the cropping pattern. In Saurashtra and Kachchh regions, crop yields are poor and cattle rearing are practised to supplement the income of family. The pastures here have coarse grasses with poor yield, resulting in uncontrolled grazing leading to increased desertification. A common feature of the entire command is that the precipitation (in total quantity and distribution) varies greatly from year to year, and the entire crops suffer as a result of moisture stress.

The average size of the farm in Gujarat is 4.1 hectares, but there are large differences from region to region. The mainland Gujarat with higher rainfall and relatively fertile soil are densely populated with small farm size (average size: 3.1 hectares) and a large portion of landless households. On the other hand, Kuchchh and Saurashtra with low rainfall and unfertile soil have not supported large population, and hence the farm sizes are large here (average size: 6.8 hectares in Saurashtra, and 6.5 hectares in Kachchh). In the overall command area, the marginal farmers with holdings of less than 1 hectares are about 28%, while small farmers with holdings of 1 to 2 hectares are 24.4% and the rest (about 47.6%) are medium and large scale farmers with holdings larger than 2 hectares. The total rural population of the command is estimated at about 4.5 million (in 1981). About 78% of the rural population are engaged in agricultural activities. Of these, about 0.60 million are cultivators and about 0.59 million are agriculture labourers. In terms of annual average per capita expenditure (1982 survey), about 28% of cultivators and about 64% of agricultural-labourers fall below poverty line. The component of scheduled caste and scheduled tribe farmers is about 17.8% (scheduled Tribe farmers: 8.7%, scheduled caste farmers: 9.1%) (SSNNL, 2001; and Vyas, 2002).

The farmers in the command are industrious, progressive, enterprising and commercially oriented, although the agricultural economy without SSP was mostly dependent upon vagaries of monsoon. Compared to other states, farmers here are advanced in use of fertilisers, pesticides, and adoption of high yield varieties. The command area has well-developed co-operative sector and also has financing institutions such as Land Development Bank, Nationalised Banks, Agricultural Financing Co-operations etc. The area also has very good network of transport and communication services, and also possibilities for growth of marketing and storage facilities needed for deriving optimum benefit of agricultural production under irrigated system of SSP.

As nearly 75% of the area under command of project is drought prone, the extent of irrigation benefits to farmers is immense. This is also evident from the fact that in three consecutive drought years (1985-86, 1986-87 and 1987-88), the farmers' loss in agriculture was estimated to be of the order of Rs. 50 billion. The extent of irrigation command in the severely water scarce regions of Saurashtra and Kuchchh are 5.43 lacs hectares and 1.13 lacs hectares respectively. With the completion of the canals of Saurashtra and Kutch regions, it is anticipated that irrigation would increase five times in Saurashtra region, while in Kutch region it would be more than three times the present level of irrigation. The overall cropping intensity is expected to rise from 105% at present to 135 to 140% with water from SSP and the recycling of induced ground water recharge. The yield of the crop is also expected to rise substantially. In the command of the project, it is estimated that the value of agriculture output (at 1984 price level) would increase by about 370% over a period of 20 to 25 years, while in absence of SSP the corresponding increase would have been below 30%. For Gujarat as a whole, this would translate into

about 40% higher agricultural production, than it would be without Sardar Sarovar Project (SSNNL, 2001; Vyas, 2002).

### 4.3.2 Beneficiaries of Drinking-water in Gujarat

Undoubtedly the economic benefits of SSP to agro sector are significant, but the greatest benefit will be the mitigation of droughts frequently faced over a greater part of Gujarat. About 0.86 MAF of SSP water will be used for the domestic[36] and municipal use, benefiting about 135 urban centres and 8215 villages (about 45% of the total 18144 villages) within Gujarat (Table 5.15). This will cover an estimated population of 20.63 million (1991 census) and prospective population over 35 million by the year 2021. About 11.7 million (in 1991) population benefiting from SSP's drinking water supply scheme will be from rural background. All the villages and urban centres of Saurashtra and Katchchh regions, and all 'no source' villages and the 'salinity and fluoride affected' villages in North Gujarat will be benefited. The conditions of the 7491 'no source' villages – of which 2218 villages have excessive fluorides, 551 have excessive nitrates, and 641 are under the grip of salinity – will improve tremendously.

**Table 5.15: Urban and Rural Areas Covered Under Drinking Water Schemes**

| Area | Urban Centres | Villages | Beneficiary Population in Lacs (1991 census) | | |
|---|---|---|---|---|---|
| | | | Urban | Rural | Total |
| Saurashtra | 90 | 4877 | 39.24 | 72.52 | 111.76 |
| Kachchh | 10 | 948 | 3.86 | 8.74 | 12.60 |
| Banaskantha | 3 | 490 | 1.32 | 6.55 | 7.87 |
| Mahesana | 13 | 542 | 6.27 | 10.26 | 16.53 |
| Sabarkantha | 4 | 568 | 1.28 | 7.47 | 8.75 |
| Ahmedabad | 12 | 377 | 35.68 | 5.43 | 41.11 |
| Panchmahal | 3 | 413 | 1.52 | 6.19 | 7.71 |
| **Total** | **135** | **8215** | **89.17** | **117.16** | **206.33** |

*Source: NCA, 2003b)*

### 4.3.3 Beneficiaries of Hydropower

In the present system of grid supplies, the specific identification of individuals getting SSP's power may not be possible. It may hence be appropriate to consider all people in

the three states of Madhya Pradesh, Maharashtra, and Gujarat as beneficiaries of power. The largest impact will be felt in the state of Madhya Pradesh, which will have a share of 57% in the power produced at any day. This power, with a potential of about 825 MW, will be dearer to Madhya Pradesh now because of its acute power shortage situation due to the creation of new state of Chattisgarh. After the Enron fiasco, the power availability situation in Maharashtra is also critical; and with a share of 27% power from SSP – equivalent to about 390 MW – the overall power situation of Maharashtra will improve substantially. Even with a mere share of 16% - equivalent to 230 MW – Gujarat will also gain significantly from the power generation at SSP; in addition it plans to generate power through several mini hydelpower stations proposed on steep gradients of canal system.

Presently the gap between demand and supply of power in the western regional power grid is about 15%, which will improve with the SSP. All the three beneficiary states coming under western region will get additional advantage from the fact that the SSP will provide peaking benefits in the power starved western region. The ideal mix for meeting the peaking demand between hydro and thermal power is 40:60; and in comparison, the present hydro-thermal mix in the western region is 12.5% : 87.5% only (Vyas, 2000). Thus, the SSP - which is also equipped to act as a pumped storage scheme - will improve this imbalance. Besides, in comparison to the available alternate source of power generation, the power produced at SSP is totally free from air pollution[37] and is environment friendly.

Estimated to cost about Rs. 6050 crore (at 2000-01 price level) as per Table 5.16, the power component of the project is likely to get fully commissioned by the year 2006-07.

In financial terms, the capital cost of power complex – at about Rs. 4.175 crore per Mega Watt[38] - is significantly less than the available alternatives of thermal or nuclear power plants.

**Table 5.16: Estimated Cost of Power Project at 2000-2001 Price Level**

(Amount in Rs. Crore)

| Unit | Total Estimated Cost | Proportionate share in power component | Remarks |
|---|---|---|---|
| **Unit-I(Dam & Appurtenants)** | | | |
| Main dam component | 2858.53 | 1603.64 | 56.1% share in Power |
| R&R Component | 3033.21 | 1701.63 | Component. |
| **Sub-Total (A)** | **5891.75** | **3305.27** | |
| | | | |
| **Unit-III(Hydropower Complex)** | | | |
| Civil Works | 793.51 | 793.51 | 100% share in Power |
| Electrical Works | 1955.08 | 1955.08 | Component. |
| **Sub-Total (B)** | **2748.59** | **2748.59** | |
| | | | |
| **Grand Total(A+B)** | | **6053.86** | |
| | | | |
| **Per Mega Watt Cost of the Project** | | **4.175** | For 1450 Mega Watt. |

Also, it can be seen that the variable component of the cost of power production will be very less, and there will be hardly any escalation in the cost of generation as compared to the normal 10% annual escalation in thermal projects. Assuming a power tariff of Rs. 2 per unit of power produced, other financial indicators of the power project have been worked out and summarized in Table 5.17.

**Table 5.17: Financial Indicators of the Power Project**

| Financial Indicator | Value |
|---|---|
| Internal Rate of Return (IRR) | 23.35% |
| Net Present Value (NPV) @ discount rate of 10% | Rs. 3721.73 crore |
| Pay Back Period | 4.11 years |

*(Detailed computations are given in Annexure – IV).*

4.3.4 Industrial-water Beneficiaries

Out of 9.00 MAF of Gujarat's share in Narmada water, about 0.20 MAF of water will be used for the industrial purpose. This share is expected to benefit industries in petroleum sector, chemical and fertiliser sector, and thermal power stations. About 671 million litre per day is planned to be supplied to industries that are coming up in Jamnagar, Bhavnagar, Kachchh, Sabarkantha, Panchmahal, and Ahemedabad districts, and to the ports located on Saurashtra and Kachchh coastlines. The water to the industries is likely to be made available at such rates that may help the government to implement cross subsidization of the domestic sector by the industrial sector (Vyas, 2000).

4.3.5 Beneficiaries of Flood Protection

The rivers Tapi and Narmada are the only two perennial rivers of Gujarat, while all others bring water during monsoon only. Even in case of Narmada and Tapi, seasonal variation in discharge is very high with almost 90% of annual flow occurring during monsoon months.

The discharge in Narmada is known to fluctuate between as high as 69400 cumecs (24.5 lacs cusecs) in monsoon to as low as 28 cumecs (1000 cusecs) in the month of May. Peculiar to Gujarat, the floods of high magnitude occur at somewhat long intervals, frequently intervened by long spells of droughts. Another feature of these rivers is that they bring flash floods without sufficient warning. They also bring huge amount of silt, which gets deposited at river mouths causing additional rise in water levels (GID, 1980).

Flood history of Narmada shows that about 210 villages that lie on or close to the riverbanks, and the populous city of Bharuch, suffer periodically from floods. The total

population affected is over 4.0 lacs spread over about 30,000 hectares of land. Almost every fifth year, Narmada runs in spate[39] causing immense damage to lives and properties. Though SSP is not specifically designed for inducing flood benefits, yet it is expected to provide sufficient flood cushion to mitigate Narmada's flood intensity to a large extent (GID, 1980; and SSNNL, 2000).

### 4.3.6 Beneficiaries of Irrigation and Drinking-water in Rajasthan

The entire command of SSP in Rajasthan is drought prone. The share of Narmada water will benefit the farmers of Rajasthan with accumulated holding of 73,157 hectares of land in the districts of Jalore and Barmer. With a gross command area of 1,42,020 hectares, the irrigation benefit will be spread over 89 villages (74 in Jalore district, and 15 in Barmer district). The SSP will also provide drinking water to a population of about 3.0 lacs living in 124 villages around the irrigation canal (NCA, 2003b).

### 4.3.7 Cattle and Other Livestock in Project's Command

Gujarat has a very large segment of population dependent upon cattle for livelihood. On account of periodic scarcity and drought conditions in Gujarat, the position of fodder and drinking water becomes acute for the large number of cattle and livestock. It may be pointed out that before partitioning of the country and creation of Pakistan, people with their cattle used to migrate to adjoining territory of Sind (now in Pakistan) during periods of drought (GID, 1980). But, in the past may decades the drought situation has caused people to abandon their cattle and livestock to die of hunger and thirst. The Narmada water, which is expected to reach far-off corners of Gujarat, will resolve the problem of fodder and water for the cattle and other livestock of the region.

4.3.8 People Displaced by Project

At the time of finalisation of the NWDT Award, the estimated number of the families going under reservoir submergence was 7366 in Madhya Pradesh (in 173 villages) and 467 in Maharashtra (in 27 villages) (NWDT, 1978b); and these numbers have gone up by 5 to 7 folds respectively. Out of the 244 villages now affected in the states of Madhya Pradesh, Maharashtra and Gujarat, only 4 villages are fully affected; and they are Rohana village in Madhya Pradesh, and Gadher, Vadgam and Mokhadi villages in Gujarat. Out of 192 villages affected in Madhya Pradesh, 100% of agricultural land will be submerged in only 1 village; while submergence of agricultural land will be to the extent of 76 to 90% in 4 villages, 51 to 75% in 14 villages, 26 to 50% in 30 villages, 11 to 25% in 32 villages, and less than 10% in 82 villages. In case of Maharashtra, out of 33 villages, about 19 villages are affected only marginally (NCA, 2003a).

Out of the 40,963 oustees families affected in the three states, only 12,104 are actual land owners displaced by the project, and about 850 are co-sharer of the land; about 18,316 have derived separate family status by virtue of being major sons of the actual land owners; and the balance are either landless agricultural labours, or encroachers of government land (Table 5.18). A large percentage of the population affected in submergence areas is tribal and backward; though not totally aloof from the mainstream society. In case of Maharashtra, 100% of the population affected is tribal; while in Gujarat 97.4% of the project affected population is tribal. In case of Madhya Pradesh, only 29% of the population affected is tribal; while the extent of affect is more on the mainstream population most of whom are wealthy farmers. In Maharashtra, the tribal population mainly belong to 'Tadvi' and 'Vasava' groups; in Gujarat they belong to 'Tadvai',

'Rathwa', 'Dungribhil', 'Vasava', and 'Nayaka' groups; and in Madhya Pradesh majority of them are from 'Bhilalas' and 'Bhils' groups (NCA, 2003a). The caste-wise categorization of the project affected population in the three states is given in Table 5.19.

**Table 5.18: Categories of Project Affected Families**

| State | Number of project affected families under different categories | | | | | | |
|---|---|---|---|---|---|---|---|
| | Land owners | Co-sharer | Major sons | Landless agricultural labours | Encroachers | Other landless labours | Total |
| Gujarat | 647 | 850 | 2297 | 392 | 487 | 20 | 4728 |
| Maharashtra | 1472 | -- | 1001 | 748 | -- | -- | 3221 |
| Madhya Pradesh | 9985 | -- | 15018 | 5776 | -- | 2235 | 33014 |
| **Total** | **12104** | **850** | **18316** | **6916** | **487** | **2255** | **40963** |

*(Source: NCA, 2003a)*

**Table 5.19: Caste-wise Categories of Project Affected Population**

| State | Population as per 1991 census | | | |
|---|---|---|---|---|
| | Scheduled Tribes | Scheduled Castes | Other Castes | Total |
| Madhya Pradesh | 26,041 | 10,775 | 52,980 | 89,796 |
| Maharashtra | 19,650 | -- | -- | 19,650 |
| Gujarat | 17,532 | -- | 00,468 | 18,000 |
| **Total** | **63,223** | **10,775** | **53,448** | **127,446** |

*(Source: NCA, 2003a)*

The social implications of project delays are not restricted to the drought-prone command areas alone, but also extended to submergence areas. While on one hand uncertainty is getting associated with the issue of resettlement of remaining oustees, on the other hand oustees already shifted are not finding the promised irrigation network in relocated settlements that lie within project's command.

In addition to the land going in reservoir submergence, about 67,667 hectares of land will be used up for development of the canal network. Since about 62,580 hectares of land to be used up by canal network will be private land (balance 4,896 hectares will be government land, and 191 hectare will be forest land), it is expected that a vast section of population depending directly on the land for their livelihood will also be adversely

affected by the construction of the canals; though a reliable estimate of the people displaced by canal network is not available.

4.3.9 Narmada Bachao Andolan- the Organization Opposing SSP Construction

Initially started as a small assemblage of socially active people defending the rights of people likely to be displaced by SSP reservoir, the NBA soon grew in strength and prominence; and is now regarded as an organization devoted against construction of all big dams on river Narmada. The organization - not very structured or known to be registered under any form of association[40] - has no authorised composition. However going by its own claim, the NBA is a people's movement; and association of tribals, mainly from the Narmada valley.

The known leaders of the NBA are (i) Ms. Medha Patkar, (ii) Mr. Sripad Dharmadhikari, (iii) Ms. Nandini Ozha, (iv) Ms. Chittaroopa Palit, (v) Mr. Alok Aggarwal, and (vi) Mr. Shashank Kela. Of these, Ms. Patkar[41] is an internationally acclaimed personality who often represents the anti-dam lobbies of India in varied international forums. Another celebrity Ms. Arundanti Roy has also been actively associated with the agitations and *dharnas* of NBA, but is not known to be affiliated to NBA directly. Ms. Roy has also donated about Rs.15 lacs to NBA for the cause of its struggle against dam construction in Narmada valley. Another well-known person associated with NBA in his professional capacity is Advocate Shanti Bhusah, who represented NBA in the Supreme Court and also in other legal matters.

The NBA is largely a well-run organization with capacities to organize large-scale events (protests, *dharnas*, rallies, *jal samarpan* programs etc.) in submergence areas and cities

like Indore, Bhopal, Mumbai, Delhi etc. It has been able to draw considerable attention of national and international media, and is also well equipped to record and supply media clippings of different events. It has been able to sustain the long drawn and expensive litigation in Apex Court of India. Its leaders have been regularly meeting top political leaders and bureaucrats of party states and the centre. They also interact with international delegations and participate in international conferences world over.

Though, the funding requirements of NBA are apparently considerable, it has so far not disclosed the proper funding mechanism of the organization, apart from its claim that activities of the organization are mainly through contributions from friends, people's association, and other organizations against big dams. Allegations have been levelled against NBA in the past that they have been receiving foreign funds from various organizations, the International Rivers Network (IRN) being one such organization.

### 4.3.10 Submergence Affected Topology, Ecology, and Tectonics

The water spread at full reservoir level of dam is about 370 square kms. It has a maximum length along the river of about 214 kms and maximum width of about 16 kms. Parts of Broach, Baroda and Narmada districts in Gujarat, West Khandesh district in Maharashtra, and Jhabua, Dhar and West Nimar districts in Madhya Pradesh are affected by submergence. The gorge is narrow and water spread is confined mainly to the river portion for a fairly long reach, about 113 kms immediately upstream of the dam and about 32 kms in the tail portion of the reservoir (GID, 1980).

The submergence caused by SSP is expected to affect about 13,385 hectares of forest cover, maximum (about 48.5%) being in Maharashtra, followed by Gujarat (about 31%)

and Madhya Pradesh (about 20.5%) (SSCAC, 2003a). A good proportion of the forest going in submergence is degraded, and no part of it can be considered virgin. Though a substantial proportion of flora will also be lost and a great variety of fauna will be drowned or displaced, no known endangered species of theirs is affected. No deposits of known important minerals are undergoing submergence. Other than few temples of prominence, no important archaeological monuments are getting submerged (GID, 1980).

Though the main dam is situated close to a major fracture zone (namely the Tapi-Narmada-Sone lineament extending roughly East-Northeast to West-Southeast), no adverse impact of project reservoir is perceived by the geologists on the plate tectonics of the region. The Project falls in the seismic zone III (as per the IS-1893-1984, *Criteria for Earthquake Resistant Design of Structure*) and has been accordingly designed for peak ground acceleration of the order of "0.25g". Calculations have established that the Sardar Sarovar Dam can withstand an earthquake of the magnitude of 7.5 (on Richter scale) occurring at 12 kms radius and at a depth of 10 kms (SSCAC, 2002). For a comparative understanding, it may be worth noting that the Bhuj Earthquake (of 26$^{th}$ January 2001) measured 6.9 on Richer scale and occurred about 400 kms from the dam site with a focal depth of 25 kms. Based on the recommendations of the Dam Design Review Panel, expert advises of University of Roorkee and India Meteorological Department, a network of nine seismograph stations in the vicinity and around the reservoir periphery have also been established for monitoring the seismicity of project area.

4.3.11 Catchment Areas and Compensatory Afforestation Areas

In case of SSP - which is the first major project in India subjected to exacting environmental conditions subsequent to 1980 enactment of Forest Conservation Act -

even the general environment, the forest cover, and the wild life of areas upstream of project are affected in a beneficial way. The stated benefits of substantial proportion have come by way of the soil conservation treatment given to catchment areas, and the compensatory afforestation programmes taken up at project costs.

As part of project execution, soil conservation measures are being carried out in catchment areas to conserve the storage capacity of reservoir and to improve the post monsoon flow of river by increasing monsoon infiltration. The soil conservation measures would also cause benefits of soil erosion control and increasing of soil fertility; and will also augment the supply of timber and fuel from forests in the catchment area. The soil conservation measures involving afforestation, pasture development, terracing and *bunding* of cultivated lands, gully control, stream bank protection and provision of check dams are already being undertaken in the three states. As the largest part of catchment area is in Madhya Pradesh, most of the conservation benefits will accrue to it.

In parts of Gujarat where catchment area plantations were completed long back, the area has already established into multi-layered ecosystem, with sustained improvements in the floral and faunal diversities. Rare endangered trees like Arborea, Coclospermum Relgiosum, Oroxylum Indicum, Ougenia Oobeinensis, Casea Tomentosa, Boswellia Serrata have flourished, and better grasses like Themeda, Appluda and Dicanthium have replaced the poor species. With the increased faunal diversities, Panther, Hyena, Jackal, Porcupine and few four horned antelope can be easily seen. With the increased tree cover, birds like Golden Oriole, Treepic, Drongo, White Breasted Kingfisher, Muniyasand lora can also be seen now. Part of Shoolpaneshwar wildlife sanctuary forms the catchment area of SSP, and has been immensely benefited. With the improved habitat conditions of

the sanctuary and reduction in biotic pressures, there has been increase in the rare wildlife viz. Barking Deer, Four Horned Antelope, Slothbear, Giant Squirrel, Grey Hornbill, Grey Jungle Fowl etc. A comparative review of the Catchment Area Treatment using Remote Sensing Data of 1985-86 and 1994 has indicated that closed forest and open forest areas have increased by 3,273 hectares, and 3,001 hectares respectively; while degraded forest area has decreased from 12,746 hectares to 7,019 hectares (SSNNL, 2000).

As a neutralizing measure aimed at fully offsetting the negative impact of dam on forest cover, large scale compensatory afforestation program, regeneration of degraded forest land, along with wildlife conservation[42] programme, has been taken up in all the three states. Compensatory afforestation is being done in an area equivalent to area going in submergence, and restoration of degraded forest is also being done in double this area. Against every tree submerged by the project, 78 new trees are being planted. In Gujarat, as against the submergence of 4166 hectares of forestland, compensatory afforestation over 4650 hectares of non-forest land (now notified as forest land) has been done. In addition, about 9300 hectares of degraded forest has been rejuvenated in nearby districts, and a green cover has been created over 551 hectares of area in the vicinity of the dam. Against the forest area of about 6488 hectares getting submerged in Maharashtra, the total afforestation target is for an area of 19468 hectares. In addition, Maharashtra has also diverted some stretch of forestland for R&R purpose, in lieu of which another 4200 hectares of compensatory afforestation is planned for. Almost 99% of the targeted compensatory afforestation has been completed in Maharashtra. In Madhya Pradesh, against the extent of 2,731 hectares of forestland going in submergence, the target for afforestation is about 8737 hectares, all of which has been completed (NCA, 2003[c]).

4.3.12 Other Rivers and Groundwater Regime of Command Area

A part of irrigation water percolates to groundwater table and a part drains out of the field as surface flow. Both of these reappear[43] in the river as regenerated inflow and return flow respectively. When irrigation is done in the basin of the river on which project is situated, the regenerated water returns to the same river. However, when irrigation is done in the areas located outside the river basin, the regenerated water appears in the rivers in whose basin these areas are located.

Out of the 154.88 lacs acres of gross command of SSP, 143.75 lacs acres (92.81%) is outside the Narmada basin (GID, 1980). Thus, many rivers in the command area of the project will be benefited by the regenerated inflow, which in essence will be Narmada water. Also, the areas of SSP command have comparatively flat slopes, and with the commencement of irrigation the regenerated water will be stored in the sub-soil reservoir. This will raise sub-soil water level to varying depths below the surface. When sub-soil reservoirs are built up, use of groundwater can be resorted for irrigation as well, thereby reducing the intensity of canal irrigation and enabling further enlargement of command.

4.3.13 Ecology of Command Area and Wildlife Sanctuaries Benefiting from SSP

Spread over a mammoth area of 34.286 lacs hectares in Gujarat, and 1.42 lacs hectares in Rajasthan, the gross command of SSP will be immensely benefited in terms of improved ecological conditions. As about 75% of the area covered under command is drought prone, the all time supply of water will ensure growth of a new flora and fauna diversity, apart from checking the advancement of Little Rann of Kachchh, and Rajasthan desert. With increase in green cover and foliage produced by irrigation, the $CO_2$ fixation in

command area is expected to be 70 times that being affected in the submergence areas (SSNNL, 2001).

Apart from the spontaneous growth of vegetation cover and increased faunal diversity, various wildlife and bird sanctuaries in Gujarat will also benefit from the Narmada water. The project will help to develop the belt of Wild Ass Sanctuary in the Rann of Kachchh. Water to this area - proposed to be supplied through pipeline - will help fodder development, which in turn will help the habitat conservation programme by restricting wild ass inside the sanctuary area. Though the Nal Sarovar area was not falling in project's command, planning has been made to link Saurashtra Branch Canal with the Nal Lake so that water can be supplied to lake during years of drought, and winter bird migration can continue unhindered. The measure will also improve aquatic vegetation of this wetland eco-system and the fish life supported by it. The Velavadar National Park[44] of Black Bucks - though again not a part of project's command - will also benefit from water taken to it through some of the branch canals and distributories of the project (SSNNL, 2000).

4.3.14 Organizations Involved in Construction and Supervision Activities

The main agency entrusted with the task of construction and operation of SSP is 'Sardar Sarovar Narmada Nigam Limited (SSNNL)'. Formulated under the 1956 Companies Act, the SSNNL is a state public sector enterprise of Government of Gujarat and holds 100% assets of project. Apart from the Chairman (usually a political appointee) and Vice-Chairman, the Board of Directors of SSNNL has four full time Directors (including the Managing Director and Directors representing Dam-site construction, Canal construction, and Finance); three Directors representing Government of Gujarat; and three Directors

representing other party states of Madhya Pradesh, Maharashtra, and Rajasthan. The majority employees of SSNNL are technical and are deputed from other departments of Government of Gujarat; bulk of them coming from water resource department and some from Gujarat Electricity Board. As pointed out earlier, a separate organization - called Sardar Sarovar Punarvasahat Agency(SSPA) - has been entrusted with the task of R&R of the project affected people in Gujarat and those of Madhya Pradesh and Maharashtra who opt for resettlement in Gujarat. Headed by the Commissioner (who is also the CEO), the SSPA has been conceived for a limited span and its employees are also drawn from various departments of Government of Gujarat, majority of them being from the revenue department.

The Sardar Sarovar Construction Advisory Committee is supervising the construction of main dam and power complex works on behalf of all party states. The main body of SSCAC is in the form of a committee chaired by the Secretary, Union Ministry of Water Resources, and consists of several other secretary level officials[45] of the centre and four concerned state governments. The SSCAC is essentially a technical body that looks into such aspects of project construction as: specification, scheduling, contracts, project economics, financing, and appropriation of funds. It has a Permanent Standing Committee that examines technical issues in detail, and also acts as a claims committee to settle contractor's claims exceeding the powers of project authorities. Headed by a Chief Engineer level officer, its secretariat is situated in Vadodara for closer monitoring of the project. The SSCAC has a limited tenure lasting till three years after completion of dam and powerhouse works; and hence has no permanent cadre. Its officials are drawn from the Central Water Engineering Service Cadre, while the staff is taken on deputation from central / state governments.

The organizations of SSNNL and SSPA associated with project execution, and SSCAC associated with project monitoring, do not have permanent cadres. This organizational feature frees the project from liabilities of excess manpower after project completion. Besides, the temporarily placed employees are free from the syndrome of resolutely delaying the project, fearing joblessness[46].

The Narmada Control Authority (NCA) - entrusted with the task of implementation of NWDT Award provisions - is also an important stakeholder of SSP. Similar to SSCAC, the main body of NCA is also in the form of a committee chaired by the Secretary, Union Ministry of Water Resources. It also consists of Secretaries of other related Union Ministries (Ministries of Power, 'Environment and Forests', 'Social Justice and Empowerment', 'Tribal Affairs'), Chief Secretaries of the four party states, and a permanent Executive Member and three full-time Members appointed by the Central Government. The NCA through its regular meetings attempts to resolve numerous interstate disputes related to SSP, and in the past has held long deliberations on the issue of reduction of dam height, construction of irrigation bye pass tunnel, and sharing of disputed costs. It also gives intermittent clearance for dam construction with *paripasu* completion of R&R measures. The NCA has two main sub-groups, namely the Resettlement and Rehabilitation Sub-Group headed by the Secretary, Union Ministry of 'Social Justice and Empowerment', and the Environmental Sub-Group headed by Secretary, Union Ministry of 'Environment and Forests'. The other sub-groups of NCA are the Power Sub-Group, Hydromet Sub-Group, and Main Canal Sub-Group. Besides the headquarter at Indore, the administrative machinery of NCA has three regional offices at Indore, Bhopal, and Vadodara.

While constituting the committee form of SSCAC and NCA, they were perhaps viewed by NWDT as appropriate platforms for the four party state governments to resolve common interest issues, and conceivably the central officials were incorporated to give voice to the interests of other stakeholders such as project oustees and beneficiaries, ecological and environmental elements, suppliers and contractors, financers and scores of other institutions concerned with SSP. Contradictory to this objective, the committees sometimes presented a stage for state governments to highlight their individual interests overshadowing the common ones; and where unending problems were put forth and discussed unendingly. In the intense one-upmanship games played in these meetings, the central representatives often turned into mere spectators rather than becoming active participants or referees of the game. Many a times resolutions that were achieved did not happen because of achieving a meeting point on diverse views of party states or because of acceptance to a fair view of central party, but because of the tacit political agreements reached between the state governments outside the committees. In such circumstances, the interests of other stakeholders evidently did not find sufficient voice; and this organizational failure - in respect of project displaced stakeholders - was even castigated by the Supreme Court (*Supreme Court Orders,* 1995-2000).

**Notes:**

1. As per the basin planning recommended by the Narmada Water Disputes Tribunal, 30 major dams, 135 medium dams and 3000 minor dams are to be constructed on river Narmada and its tributaries. The Sardar Sarovar Dam is the terminal dam on the river Narmada, and the only major dam to be constructed in Gujarat.

2. In 1955, the 'Central Waterways Irrigation and Navigation Commission' was merged with 'Central Electricity Commission' and renamed as 'Central Water and Power

Commission'. Again re-christened in 1974 as 'Central Water Commission', it became an attached office of the Government of India, Ministry of Water Resources (CWC, 2001).

3. The apportionment of Narmada water relates to actual withdrawals; and within their share of water, each party state is free to make changes in pattern of water use and in areas to be benefited within or outside The sharing of distress or excess water in any year is to be made in the ratio of 73 for Madhya Pradesh, 36 for Gujarat, 1 for Maharashtra, and 2 for Rajasthan (NWDT, 1978a).

4. Out of 9.5 MAF of water required for use by Gujarat and Rajasthan from Sardar Sarovar dam, 8.12 MAF is to be met from regulated releases by Madhya Pradesh through storage created in its Indira Sagar Project (NWDT, 1978b).

5. The report in five volumes was submitted by NWDT to the Government of India in August 1978. Subsequently, the further and final report was submitted in December 1979, and the decisions contained therein (Final Award) were published in the official gazette dated 12$^{th}$ December 1979.

6. Narmada, the largest west flowing river, is also the fifth largest river of India. The mean annual flow of the Narmada river is more than the combined flow of Ravi, Beas and sutlaj rivers, which had put the states of Punjab and Haryana on the path of green revolution. In terms of flow of water, the Narmada basin is the 8$^{th}$ largest, but in terms of utilisable flow it occupies 5$^{th}$ position after Ganga, Indus, Godavari, Krishna and Mahanadi (Vyas, 2000). Narmada is joined by 22 tributaries on its left bank from *Satpuda* range and 19 on the right bank from *Vindhya* range. (Verghese, 1994).

7. Optimisation of Sardar Sarovar Dam by NWDT may be considered as somewhat constrained due to the finalized conditions of river water allocation ahead of optimisation.

8. With a height of 163.0m, Sardar Sarovar Dam is India's 3$^{rd}$ highest dam after Bhakhra dam (226m) in Punjab and Lakhwar dam (192m) in Uttar Pradesh. In terms of spillway discharge capacity, the Sardar Sarovar Dam with a discharging capacity of 87,000 cumecs (cubic-metre-per-second) will be 3$^{rd}$ in the world after Gazenba dam (1.13 lacs cumecs) in China and Tucurri dam (1.0 lacs cumecs) in Brazil. And, in terms of volume of concrete, Sardar Sarovar dam with an aggregate volume of 6.82 million cubic-metre of concrete will be the 2$^{nd}$ ranking dam in the world after Grand Coule dam (8.0 million cubic-metre) in USA (SSNNL, 2000).

9. The large estimated submergence by SSP is due to the pondage created by reservoir, and also because of the backwater effects considered for very high magnitude floods with a return period of 1 in 100 years.

10. The underground riverbed powerhouse structure is located 157.5 m downstream of dam's right abutment. This large size cavern (212 m long, 23 m wide, and 58 m high) will accommodate six generating units of reversible type Francis turbines, each of 200 MW capacity, designed to operate under head varying from 80.6 m to 112.8 m. The six steel-lined penstocks from dam will supply reservoir water to generating units, and the tailrace discharge from each unit will be lead back to river channel after passing through a

common collection pool. For the operation of reversible units of riverbed powerhouse, a separate weir will be constructed about 12 kms downstream of the main dam.

11. The canal head powerhouse is a surface power station, located at the toe of another saddle dam on the right rim of reservoir about 800m upstream of the main dam axis. This powerhouse comprises of five units of conventional type Kaplan turbines of 50 MW capacities each, operating under a head varying from 15.5 m to 45.1m.

12. The bed of main canal slops at a rate of 1m for every 12.5 kms in the initial reach up to 144.5 kms, and thereafter the rate of slope is 1m for every 15.5 kms. The designed full supply level at head of main canal is 91.45 m (i.e. 300 feet), which is reduced to 44.96 m (i.e. 147.5 feet) at tail end. The section of the main canal at its head is 73.1 m wide and 7.6 m deep, while at tail end it is 10.3 m wide and 4.4 m deep. The canal is aligned to balance cutting and embankment portions at most of the places, though at places embankments have height up to 20m while cuttings have maximum depth of 23m. In all, there would be about 590 structures on the main canal for river crossings and other cross drainage works. (NCA, 2003b).

13. The major branches of the system are Miyagam branch (86 kms long), Vadodara branch (115 kms long), Saurashtra branch (104 kms long), and the Kachchh branch (329 kms long), each having a capacity of more than 75 cubic-meter-per-second. The largest branch in capacity is the Saurashtra branch, which negotiates a series of falls and lifts; and the electricity generated at falls would satisfy a part of power needed for subsequent lifts. The Kachchh branch crosses a depression connecting Little Rann of Kachchh, and this depression will also be negotiated through falls and lifts (NCA, 2003b).

14. A Committee of Bradfor Morse and Thomas Berger was constituted by the World Bank in September 1991 for independent review of Sardar Sarovar Project. In its report submitted in June 1992, the Committee stated "*... the Sardar Sarovar Project as it stands is flawed, the resettlement and rehabilitation of all those displaced by the project is not possible under prevailing circumstances, and that the environmental impacts of project has not been properly considered or adequately addressed. Moreover, we believe that the Bank shares responsibility with the borrower for the situation that has developed...*" The Committee suggested that the wisest course for the World Bank would be to step back from the project and consider it afresh (Morse and Berger, 1992). Following the report, the World Bank imposed new conditions and sought time bound compliance from the Government of India, which prompted Government of India to withdraw from the loan agreement.

15. The Civil Writ Petition (No. 319) of 'Narmada Bachao Andolan (NBA)' versus 'Union of India and Others' was filed in the Supreme Court of India in April 1994. During the course of litigation lasting more than six years - till final judgement in October 2000 - several hearings were held (about 30 hearings were held in the last year, 1999-2000, itself) and several interim orders were also passed by the Court.

16. The first Grievance Redressal Authority (GRA) was constituted for Gujarat and was headed by Mr. P.D.Desai, retired Chief Justice. Subsequently GRAs were also created for the states of Madhya Pradesh (headed by Mr. Justice G.G.Sohani) and Maharashtra (headed by Mr. Justice S.P.Kurdukar). The GRAs were asked by the Court to survey

rehabilitation sites to find out whether R&R measures - as mandated by NWDT Award - have been substantially complied with so as to accommodate oustees corresponding to a dam height of 90.0m, and to ascertain the availability of land and their suitability for resettlement and rehabilitation purpose (*Supreme Court Orders*, 1995-2000).

17. Expressing unhappiness over the way NBA reacted to its interim order, the Supreme Court - on 15th October 1999 - stated "*The action of the petitioner (NBA) and its leader Ms. Medha Patkar as well as writings of Ms. Arundhati Roy have caused us much anguish and when we express our displeasure of the action of Ms.Arundhati Roy in making distorted writings or the manner in which the leaders of the petitioner Ms. Medha Patkar and Mr. Dharmadhikari have, after giving assurances to this Court, acted in breach of the injuctions, we do so out of anguish and not out of anger.*" (*Supreme Court Orders*, 1995-2000).

18. The final judgement given by the Supreme Court favouring continuation of SSP construction was 'two against one' majority judgement by a bench of three judges. The judge opposing further construction did so on the grounds of dubious environmental clearance of the project by Government of India, and he sought a cease on further construction until environmental clearance by a Committee of Experts (*Supreme Court judgement*, 2000).

19. The harsh view of NBA leadership against dams is reflected in Arundhati Roy's critique: "*...Big Dams are obsolete, They're uncool. They're undemocratic. They're a government's way of accumulating authority (deciding who will get how much water and who will grow what where). They're a guaranteed way of taking a farmer's wisdom away from him. They're a brazen means of taking water, land and irrigation away from the poor and gifting it to the rich. Their reservoirs displace huge populations of people leaving them homeless and destitute. Ecologically, they're in the doghouse. They lay earth to waste. They cause floods, water-logging, salinity, they spread disease. There is mounting evidence that links Big Dams to earthquakes...*" (Roy, 1999). Such harsh attitude is also reflected in NBA's web site (www.narmada.org) content: "*...Large number of poor and underprivileged communities (mostly tribal and dalits) are being dispossessed of their livelihood and even their ways of living to make way for dams being built on the basis of incredibly dubious claims of common benefit and national interest. For us, this is simply immoral and therefore unacceptable...*"

20. The Tehri Project - on river Bhagirathi - sealed the fate of 185-year-old Tehri Town on 5th December 2001 with the shutting down of its two diversion tunnels and termination of the river flow. The 10,000-odd residents of Tehri Town felt the immediate impact, though in the long run the reservoir would drown several thousand hectares of fertile land and displace close to a lacs people in the fledgling Uttranchal state. The anti-dam movement that had sustained for close to two decades (since 1978, when actual construction activity got underway) finally failed, largely on account of person-centric leadership of Sunderlal Bahuguna with people's participation becoming symbolic (Yadav, 2002).

21. Each project-affected person is given resettlement grant at a rate of Rs. 750/-, escalated at 8% per annuam with base year 1980. Apart from grant in-aid up to Rs.500/- as per Award, each person is given Rs. 5,000/- to purchase productive assets and Rs.10,000/- to construct *pucca* house plinth. Free transport is provided for transportation of oustees'

salvageable material from submergence area; and each family is paid subsistence allowance at Rs. 15/- per day, for 25 days in a month, for a period of one year after resettlement (NCA, 2003a).

22. The NWDT Award provides for one primary school for every 100 families, one *panchaya-ghar* for every 500 families, one dispensary for every 500 families, one seed store for every 500 families, one children's park for every 500 families, one village pond for every 500 families, drinking water well for every 50 families, one tree platform for every 50 families, and one place of worship for every 500 families (NWDT, 1978b).

23. In March 2004, NCA cleared the 110m level of dam height, though resettlement of a small group of persons - numbering 173 - was yet to be completed in Maharashtra. However, a commitment to complete the balance task by May 2004 was given by the Government of Maharashtra ahead of clearance.

24. Despite World Bank's influence, governments of three concerned states (Madhya Pradesh, Gujarat, and Maharashtra) could not evolve a uniform policy for SSP, mainly fearing its adverse impact on other projects within their territories (Verghese, 1994). Even then, the common minimum of the three policies presents the best R&R package in India, which has been instrumental in improving the living standards of several thousand oustees of SSP resettled at early stages of project construction.

25. The treatment for directly draining catchment area was made mandatory by the Government of India in July 1992. Since the Tribunal did not deliberate upon this issue, problem arose in arriving at a formula for sharing of its cost by the states. Though the cost amounts to only Rs. 170 crore, the matter has been discussed in several NCA meetings; but no single cost-sharing formula has seen the light of the day till date.

26. In recent times, Madhya Pradesh has speeded up the pace of R&R progress in its territories. The change became visible after the carving-out of new state of Chattisgarh from Madhya Pradesh, which led to a sudden decline in power generation capacity of Madhya Pradesh; eventually prompting the government of Madhya Pradesh to look at power component of SSP more favourably. With this change, numerous issues of conflicts between Madhya Pradesh and Gujarat have also become dormant for the time being.

27. Though raising of dam to 90m level (approved by Supreme Court) was completed by December 2000, NCA's clearance for further raising by 5 meter came only in May 2002. Though work for 95m level was completed by June 2002, further clearance of 5m height was given by NCA in May 2003, and work got completed in June 2003 (SSCAC, 2003a). Presently NCA has cleared the dam height up to 110m level (in March 2004), and corresponding work is likely to be completed by June 2004.

28. The IBPT's maximum discharge capacity would improve to about 23000 cusecs when dam reaches a height of 110m level.

29. Approval of revised estimates begins with the preparation of updated estimates by the Government of Gujarat, for which inputs for the costs of R&R and Environment components are required to be given by the Governments of Madhya Pradesh and

Maharashtra as well. Thus, compiled estimate comes up before the Permanent Standing Committee of SSCAC, which tries to develop consensus among all party states and other members of the Committee on different estimated components. Often amendments are sought which calls for modifications and re-circulation of the estimate documents. The estimate components that are recommended by the Permanent Standing Committee are then put up before the SSCAC for final approval.

30. Out of the Rs.4474 crore estimate for the dam component at 1996-97 price level, only Rs.2354 crore portion has been approved by the SSCAC, while the R&R part of the estimate - amounting to Rs.2120 crore – remains unapproved.

31. The direct financial returns of project would be somewhat less than the indicated notional loss because of the prevailing subsidy in power and water. If completed in time the full height of dam and two powerhouses would have enabled annual generation of 5287 Million units of power, and at a rate of Rs.2.50 per unit this would fetch a maximum of about Rs.1320 crore per year. But the combined returns from irrigation and drinking water would barely meet the operational and maintenance charges (Navalawala, 2001), thus giving a 'negative' or 'nil' net financial returns.

32. The Reliance Petroleum Ltd at Jamnagar is forced to use saline water after converting it into industrially usable water by the process of reverse osmosis, at a cost of about Rs.90 per 1000 litres (Vyas, 2000).

33. A common, but faulty, impression about SSP is that the beneficiary and adversely affected groups relate with the command and submergence areas respectively. This impression is mostly owing to the high level of stakeholders' activism that has connotations of division along state boundaries because of the peculiar situation of project's command extending to Gujarat and Rajasthan, while its submergence extends to Maharashtra and Madhya Pradesh.

34. The weakness of non-social stakeholders in imparting any influence on SSP is evident from the manner in which project was pushed through environment clearance despite non-compliance of the mandatory impact assessment studies and identification of remedial paths. Thus, the initial defiance of the Union Ministry of Environment and Forest (SNA stakeholder) could not insure non-social stakeholders' cause. The World Bank and the Morse Committee (both SNA stakeholders) also failed to ensure any change in project's attitude towards non-social stakeholders despite applying breaks to the project financing. Finally, though the Supreme Court (also SNA stakeholder) deliberated in length the issue of SSP's non-compliance in environment related matter, the three judge bench could not form a consensus on enforcing project's acquiescence in the matter (*Supreme Court*, 2000; and Morse, 1992).

35. The notion 'extensive approach of irrigation gives greatest benefit' presupposes: (i) total yield of crops does not get reduced in the same proportion as the reduction in quantity of water applied, (ii) un-irrigated land is available in plenty, and (iii) agricultural labour (including farmer) is under employed and will be benefited immensely.

36. The domestic supply norms considered for SSP's planning: 140 liters-per-capita-per-day (lpcd) in urban centres with sewerage facility, 100 lpcd for urban centres without sewerage facility, and 70 lpcd for other regions (SSNNL, 2001).

37. The importance pollution free power from SSP can be realised from the fact that an equivalent 1450 MW coal-based thermal plant will throw out in the air approximately 10780 tonnes of suspended particles and 25700 tonnes of sulphur dioxide every year, even after observing the full environment control regulations (Vyas, 2000).

38. In case the dispute on sharing of R&R cost gets resolved in favour of Madhya Pradesh and Maharashtra, the capital cost of the project for these two states will get reduced to mere Rs. 3.0 crore per Mega Watt, thus making the project highly attractive.

39. In a study on Narmada involving analysis over 1930-68 period (Hydrological study of the heavy floods in Narmada and Tapi by P.S.Pant, S.D.S.Abbi and D.K.Gupta) the Indian Meteorological Department has indicated that the storms usually rise in the Bay of Bengal, take an east-west course and then proceed in a north-west to north direction. As the direction of the storm coincides - more or less – with the general course of the river, synchronisation of flows takes place resulting in abnormally high floods (GID, 1980).

40. The details about NBA's association or form of composition were not even made available to the Supreme Court during the course of NBA's famous litigation, despite being expressively desired by the Court (*Supreme Court Orders,* 1995-2000).

41. Other than her opposition to dam construction, Ms. Medha Patkar is also known to have opposed the multinational Enron's thermal power project. In recent times she is also getting associated with the cause of people affected by other developmental projects, including roads and railways.

42. In the already completed one such afforestation programmes in the highly arid areas of Kachchh, the plantations have established as excellent woodlots with good undergrowth and grass, in an area where nothing existed earlier. In this area, against one Chilka sighted in 1982, there is a group of more than 40 Chilkas now. In another case of compensatory afforestation programme at Nalia, presence of Great Indian Bustard, Black Patridges, and other avi-faunal diversity is a testimony of improved ecology (SSNNL, 2001).

43. The proportion of regenerated water depends upon factors of efficiency of irrigation, delta used for irrigation, type and depth of soil and climatic conditions. Return flow also takes place in case of domestic and industrial usage. In case of Narmada, the NWDT has made an assumption that 10% of irrigation use in the upstream major, medium or minor projects in the Narmada basin - in any month - would regenerate in the downstream river with a lag-period of one month. In case of domestic and industrial water, the NWDT has assumed that 60% of the water used will be available as return flow uniformly throughout the year (NWDT, 1978a).

44. The improvement measures that have already been carried out for the Velavadar National Park have resulted in: (i) Velvada now holding the highest population of Black Bucks in the world; (ii) population of Lesser Florican has increased from one in 1987 to over forty in last ten years; (iii) world's largest communal roost of wintering Harriers now migrate

to Velavada park every year; and (iv) numbers of Wolf – a natural predator for keeping ecological balance for Black Buck – has also increased (SSNNL, 2001).

45. Besides Secretary level representations from Union Ministries of Water Resources, Power, Social Justice and Empowerment, and various related central government departments, the SSCAC also consists of: Secretaries of Finance from the states of Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan; Secretaries of Irrigation from the states of Gujarat and Rajasthan; Secretaries of Power from the states of Gujarat, Madhya Pradesh and Maharashtra; Secretaries of Revenue from the states of Gujarat, Madhya Pradesh and Maharashtra; Chairman of State Electricity Boards of Madhya Pradesh, Maharashtra, and Gujarat; and Chief Engineers dealing with SSP from Gujarat, Madhya Pradesh, Maharashtra, and Rajasthan (SSCAC, 2003[c]).

46. One of the major problems about expediting work on the Thein Dam (in Punjab) has been anxiety on part of the personnel engaged about future employment once the project is completed (Verghese, 1994).

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