



International Environmental
Law Research Centre

WORLD BANK PROJECT COMPLETION REPORT (SARDAR SAROVAR)

**World Bank, Project Completion Report - India - Narmada River Development -
Gujarat Sardar Sarovar Dam and Power Project (Credit 1552-IN/Loan 2497-IN),
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EVALUATION SUMMARY

Background and objectives

1. The Sardar Sarovar Dam and Power Project and the Gujarat Water Delivery and Drainage Project form part of the Narmada River Development Plan, whose overall objective is to harness the Narmada River through a series of dams, for irrigation, water supply and energy. The arrangements for sharing and utilizing water by the four benefiting states (Madhya Pradesh, Gujarat, Maharashtra and Rajasthan) were defined by the Narmada Water Disputes Tribunal (NWDT) in December 1979. Under this award, Gujarat was allocated 11,000 Mm³ representing about one-third of the 75 percent dependable usable annual water flow, and was authorized to implement a project comprising: (i) the Sardar Sarovar Dam, (ii) a 1,200 megawatt (MW) riverbed powerhouse (RBPH), (iii) a 250 MW canal head powerhouse (CHPH), (iv) a canal system to irrigate 1.87 m. ha in Gujarat and 70,000 ha in Rajasthan, and (v) a water supply system for about 30 million people in the drought-prone areas of Saurashtra and Kachchh. On that basis, Gujarat prepared the Sardar Sarovar Project in 1980, which was to be implemented in various phases over a period of about 20 years. Phase I comprised: (i) the Sardar Sarovar Dam, (ii) the RBPH, (iii) the CHPH, (iv) the first 144 km of the main canal up to the Mahi River, and (v) a network of branch and distribution canals and drainage system to irrigate about 450,000 ha.

2. The original components of the Sardar Sarovar Dam and Power Project (Cr. 1552-IN/Ln. 2497-IN), to be financed within 110 months, included: (i) the Sardar Sarovar concrete gravity dam and its spillway gates, (ii) the underground riverbed powerhouse and selected electro-mechanical equipment, (iii) the irrigation bypass tunnel, (iv) the Narmada Basin hydro-meteorological network, (v) a management information system, (vi) training, and (vii) technical assistance. In the same period, the Borrower's own resources were to finance: (a) the canal head powerhouse and its five 50 MW turbine generating sets, (b) the Garudeshwar Weir, (c) the Vadgam saddle dam, (d) the headworks reservoir regulation system, (e) the resettlement and rehabilitation (R&R) of about 10,758 projects affected families (PAFs), and (f) a monitoring and evaluation system for the R&R activities. The six 200 MW reversible turbine generating sets were to be financed through a separate credit arrangement with the Government of Japan. The project did not finance any environmental components, nor did the Credit/Loan finance any of the R&R activities that became so critical during project implementation.

3. The Water Delivery and Drainage Project (Credit 1553-IN) was processed in parallel with this one and is the subject of a separate Project Completion Report. The two projects were presented to the Board concurrently on 7 March 1985. The Staff presentation highlighted the R&R program for the projects. The Directors queried the institutional arrangements for that program and the relatively undefined state of the environmental studies. Their other concerns related to the project size, future Narmada Basin development, and being kept informed (during implementation) about the projects' social and environmental effects. Taken together, these Board concerns revealed the early exposure of all parties in the Bank to the R&R and environmental issues, and the attention afforded to them by the EDs. Management agreed and complied to a specific Board request to keep it informed of the projects' progress on social and environmental issues through many written responses to questions and a number of briefings of EDs.

Project design and organization

4. Project preparation took four years from identification in 1979 to pre-appraisal in 1983. The project was prepared by the Narmada Planning Group (NPG) with assistance from the United Nations Development Program (UNDP) and the Bank. Project concept and design closely follows the NWDT award. NPG conducted supporting studies and analyzed the project's financial and economic benefits. The Narmada Development Department, in charge of project implementation, prepared detailed designs and cost estimates for the major project structures.

5. Appraisal took a lengthy 17 months (March 1983 to August 1984) and several Bank missions. Negotiations took place in November 1984 and Board Presentation in March 1985. R&R policies and related institutional, monitoring and evaluation arrangements were described in the SAR. The legal documents included three covenants on health, 16 dealing with R&R, and three with environment including the party states' obligation to implement an R&R plan satisfactory to the Bank, plus a work plan on the project's environmental effects (see Evaluation Summary, Attachment 1).

6. In May 1988, responsibility for project implementation was transferred from the Narmada Development Department, a government agency, to the Sardar Sarovar Narmada Nigam Ltd. (SSNNL), a parastatal corporation organised along functional lines,

Hydrology

7. Bank and Borrower reviews deemed the basic hydrological data used for project design to be satisfactory. The NWDT has set the annual 75 percent dependable water availability for the project at 28 million acre feet (MAF) (34,580 Mm³) with 65.2 percent allocated to MP, 32.1 percent to Gujarat. 1.8 percent to Rajasthan, and 0.9 percent to Maharashtra. With first priority given to water supply, second to irrigation and third to power generation. Water availability for firm power generation at the riverbed powerhouse will decline sharply – and could drop to practically nil when MP will use its full water allocation. However, the riverbed powerhouse will still be able to produce peaking power generation due to its reversible turbine generators. Revised estimates show that MP is likely to use only 70 percent of its allocation by 2024, when the NWDT award will be reviewed. The canalhead powerhouse will continue to produce 50 MW of power generation throughout the life of the project

Project implementation

8. General. The Credit became effective in January 1986, nine months after Board approval, but construction was delayed till July 1987, pending environmental clearance from India's Ministry of Environment and Forests (MoEF). The project implementation schedule was revised in December 1989 – with irrigation and power generation expected to start in July 1995, after dam construction had reached 112.5 m. The dam, with its spillway gates, was then expected to be fully completed by January 1998. However, the Credit/Loan closed on 29 March 1993, two years and three months ahead of time, at the Borrower's request

Civil engineering

9. The Sardar Sarovar Dam was to be completed in 110 months (by June 1996), but was initially slowed by difficulties in importing and commissioning key construction equipment, especially a 330 m³/hour concrete batching plant and two 1,600 m, 28 ton capacity cable ways. Procurement, installation and commissioning of this equipment took about 42 months, rather than 26 as stipulated in the contract. Thereafter, concrete placement increased considerably, reaching a peak of 1.0 Mm³ in FY 1990/91. High standards of construction and quality were maintained throughout due to the establishment by SSNNL of an Expert Committee on Cement and Concrete, the creation of a Quality Control-Quality Assurance organization, and an effective Management Information System.

10. The Riverbed Powerhouse (RBPH), the second largest civil works component financed under the project, was to be completed in 93 months, i.e., by April 1995. Though the construction of this exceptionally large underground powerhouse had a good start, it suffered delays due to unexpected physical problems. The first was unstable slopes in the collection pod, followed by the development of cracks in the machine hall walls. The latter problem required the assistance of international consultants provided by the Bank. The completion of the RBPH now depends on procurement of six 200 MW reversible turbine generating sets that were to be provided by a Japanese consortium under a credit agreement with Overseas Economic Cooperation Fund of Japan (OECF). Though three turbine generating sets were being manufactured in Japan, they could not be delivered because the Government of Japan withdrew its support for the project in 1991 – citing deficiencies in R&R. The Borrower has, since then, been actively negotiating an alternative financing arrangement with the supplier. However, the financing issue is still unresolved and the date of completion of the RBPH with its turbine generating sets remains uncertain.

11. Construction has not begun on the irrigation bypass tunnel, which is to supplement the discharge of the CHPH to provide water to the main canal. Its invert level was originally fixed at reservoir level 93.6 m, but Bank appraisal and supervision missions recommended lowering it to reservoir level 86.00 m to optimize Gujarat's diversions, particularly in drought years. The Government of Madhya Pradesh (GoMP) opposed lowering the invert level to preserve its own rights over power generation and to prevent Gujarat from using more than its share of water. Because the invert level has still not been decided, the designs for this key project component cannot be finalized. This structure will require a minimum of three years to complete, and any further delay will cause serious construction problems.

12. The Narmada Basin hydro-meteorological (hydromet) network for flood forecasting and reservoir operation is another important project component to be financed under the Credit/Loan, but which has not yet been implemented. In 1988, international experts recommended meteor-burst – a system not previously used in India – as a viable dedicated telecommunication system. This new technology was endorsed by the Telecom Commission, GoI, and a two-stage bidding procedure was initiated in 1991 to procure the required equipment. However, just as price bids were being sought, the National Informatics Center, GoI, operator of a nationwide satellite telecommunication

system, declared that its system would be cheaper and more reliable under Indian conditions. As a result, the bidding process was halted and the Bank agreed to change the specifications so that satellite telecommunications could compete with meteor-burst.

13. The SSNNL established an efficient Management Information System to monitor the progress of civil works, and prepared an Operation and Maintenance manual satisfactory to the Bank.

14. The Canal Head Powerhouse, though not financed under the Credit/Loan, made good progress and its first 50 MW conventional T/G set will be ready for commissioning by August 1995. However, the construction of the Garudeshwar Weir had not been initiated at the time of the PCR.

Environment and R&R – Background

15. Board approval was granted in 1985, in the absence of formal forest clearance from the MoEF. Forest clearance and an environmental conditional clearance were issued in 1987. As discussed in Annexes 1 and 2, the Bank's dialogue with GoI/States on environmental and R&R issues which started as early as 1985 and continuing through credit closure, including a major R&R mission in 1989, resulted in substantial strides being achieved on these two fronts. The project's R&R and environmental aspects had come under heavy criticism from national and international entities, including non-governmental agencies (NGOs). In response, in September 1991 the Bank commissioned an Independent Review. The resulting report (June 1992) questioned both the project's economic viability and the Bank's ability to follow its guidelines. It highlighted potential environmental problems relating to sedimentation, back water effects and downstream impacts, and drew attention to specific R&R inadequacies.

16. Independent Review. In June 1992, the Independent Review report criticized the Bank, the three party states, and the Central Government for poor implementation of the R&R program. The report offered three main criticisms of the Bank:

a. despite the existence of explicit operational guidelines with respect to involuntary resettlement and tribal people, the Bank failed to insist on proper preparation of R&R plans by the Borrower and, accordingly, failed to appraise adequately the resettlement components of SSP;

b. the appraisal team and the legal documents did not address adequately the special needs of tribal people affected by the project, because they were mostly encroachers on government land and therefore legally treated as landless; and

c. during the last few years of project implementation, Bank efforts to compensate for the lack of an adequate appraisal have helped to bring about some improvements, particularly in Gujarat; however this 'incremental approach' failed to achieve all the changes needed, particularly in Madhya Pradesh (MP).

17. On the Borrower's side, the principal criticisms related to:

a. the lack of sufficient baseline data gathered on the affected population, which made it impossible to prepare effective resettlement plans;

b. the lack of consultation with the affected population, and failure to inform them of their resettlement options and rehabilitation packages;

c. the lack of compliance with the provisions of the NWDT and the Bank's legal agreements; and

d. institutional weaknesses, poor implementation particularly in MP, and inadequate linkage between dam construction and R&R implementation.

18. The Independent Review report also gave a detailed description of R&R implementation in the three states and drew attention to specific issues. In its concluding remarks, the report indicated that R&R could not be implemented as planned and recommended that the Bank 'step back' from the project to re-evaluate the situation and institute improvements.

19. Management Response to the Independent Review. The Bank's Management, in its response of 23 June 1992, generally agreed with the description of R&R experience in the states, and also agreed that: (i) adequate R&R plans had not been prepared by the Borrower for appraisal by the Bank, (ii) while the development of the resettlement

policy in Gujarat was indeed an achievement, R&R policy in the other two states – Maharashtra and Madhya Pradesh – needed urgent improvement, and (iii) implementation needed to be further strengthened in all three states. The Management Response explained that the Bank's supervision strategy had focused on obtaining incremental progress through: (a) improvements in resettlement policy, planning and implementation in Gujarat, (b) efforts to replicate Gujarat's R&R policy and standards in the other two states, and (c) concentrating its supervision efforts on MP during the remaining years up to 1994, when R&R will commence in that state (see Evaluation Summary, Attachment 3 for a selected list of some of the key steps in the incremental approach followed). Nevertheless, Management concluded that the incremental approach did not yield the results expected and was too slow in the light of the time before submergence. It supported a new approach embodied in a monitorable action plan which became the benchmarks subsequently approved by the Board. Finally, the Bank believed that the establishment of these measurable benchmarks for addressing the situation was preferable to stepping back, as recommended by the Independent Review. In retrospect, the incremental approach proved to be a necessary process toward the Borrower's adoption of the changes in R&R policies and implementation that were so strongly advocated by the Independent Review and the Board but was not a sufficient step to achieve the desired result soon enough. Stronger actions to enforce the Bank guidelines would have been warranted in the earlier stages of project implementation.

20. At the time of setting of the benchmarks the Bank secured the Borrower's assurance that a comprehensive environmental action plan would be prepared, and that GoI would promptly correct the weaknesses in its R&R program. In October 1992 the Board agreed to continue support for the project, subject to Borrower's compliance by March 31 1993 with performance benchmarks related to environmental and R&R issues. On 29 March 1993, however, the Borrower requested cancellation of the outstanding loan amount of US \$181.5 million – while reiterating at the same time its commitment to meeting the benchmarks and agreed standards for R&R and environmental implementation,

Environment

21. After the Independent Review, the Borrower made concerted efforts on a number of environmental fronts. Compensatory afforestation has progressed well and is expected to be completed prior to submergence. Catchment area treatment is underway and, for selected priority areas, should be completed on time. Plans for preserving cultural sites and protecting wildlife are in various stages of implementation,

22. The Consultants recruited to assist the Borrower in meeting the benchmarks believe the remaining environmental matters cited by the Independent Review do not pose serious threats to either the environment or local residents, except in the estuary downstream of the dam where some fishing communities may need R&R and water may need to be released for environmental control at a later stage.

Resettlement and rehabilitation

23. The Borrower now estimates that the Sardar Sarovar Dam will affect about 41,014 families/131,245 persons in 245 villages (compared with SAR estimates of 10,758 families/67,340 persons). However, about 20,000 families (of which 45 percent major sons) will lose only houses and/or no land and would therefore be able to remain within or close to the village area beside the reservoir. The balance would be resettled mostly in Gujarat in the command area of SSP. The new figures count adult sons as separate families, and also reflect population growth and better surveys. About 82 percent of all project-affected families (PAFs) are in MP, 11 percent in Gujarat, and about 7 percent in Maharashtra. Of these PAFs, 97 percent are tribal people in Gujarat, 100 percent in Maharashtra, and 29 percent in MP mostly living at subsistence levels. The project's impact on tribals in all three states as well as the Nimad Plains of Madhya Pradesh are discussed in detail in Annex 2 Section V. About 23 percent PAFs in Gujarat and up to 47 percent in MP are estimated to be landless.

24. Because this was the first time that such high standards of R&R had been applied to a project in India, all concerned underestimated the complexity and time required to resettle and rehabilitate over 100,000 people. Ultimately, however, due to the efforts by the Bank and also the role played by State Governments, Government of India, project authorities, independent M&E agencies, NGOs and the Independent Review, this project has been the source of many improvements in R&R. With respect to R&R policies, the principle of land-for-land was applied on a large scale, adult sons (and daughters in Maharashtra) were recognised as separate families, tribal people on government forest lands were treated as landed families, and additional assistance was provided for subsistence and housing construction. On the implementation side, Gujarat developed a unique mechanism for

acquiring replacement agricultural land at market price through Land Purchase Committees. State R&R units were established, as well as a central project coordinating unit and monitoring mechanism. In MP, progress was made with the help of technical assistance and a computerized management system for R&R.

25. The R&R component had to face a number of difficulties in part due to the Bank's failure to follow its own guidelines at appraisal such as the lack of early consultation with oustees and the preparation of detailed R&R plans by the states or to other reasons which became known only during project implementation. However, the lack of consultation is probably one of the major reasons for problems encountered in carrying out socio-economic surveys, preparing satisfactory R&R policies and plans and implementing them in a timely manner. Some other difficulties encountered were: (i) estimating the precise number of PAFs through house-to-house socio-economic surveys; (ii) applying the principle of land-for-land where land markets are limited, and without creating secondary displacement; (iii) linking dam construction with R&R without incurring huge costs through construction delays, and defining when R&R has been completed; (iv) predicting permanent and temporary submergence levels years in advance, in areas with highly variable rainfall; (v) deciding the size and location of resettlement centers; and (vi) integrating resettlement centers into host communities. Most of these issues were resolved satisfactorily except for the survey of oustees of some villages of the Akrani Taluka in Maharashtra whose resolution continues to be hampered by dam opponents. In particular, Land Purchase Committees were established in Gujarat, a Submergence Schedule for the 1 in a 100-year flood was prepared by the Narmada Control Authority (NCA) on the basis of the revised construction schedule, of December 1989, approved by the Sardar Sarovar Construction Advisory Committee a certification process was established to link dam construction with R&R implementation, resettlement site selection and development was improved, and steps were taken to integrate resettlement centers into host communities with assistance of NGOs.

26. A long learning process led to what can now be considered a reasonably well-structured program. Although implementation still exhibits weakness and further improvements will be required in the selection and construction of resettlement sites, the acquisition of replacement land, and overall program management, the SSP R&R program has set new policy and implementation standards which can be applied in future resettlement programs. There remain concerns about the extent of land options being offered for Madhya Pradesh oustees who wish to remain in Madhya Pradesh rather than take the Gujarat package.

27. The Board's performance benchmarks on R&R required the Borrower to: (i) assess the number of PAFs and analysis of tribal people affected, (ii) prepare comprehensive R&R plans in each state, (iii) strengthen institutional arrangements and the role of NGOs, and (iv) acquire land in Maharashtra and MP. The Board agreed to continue its support for the project subject to Borrower compliance with the benchmarks by 31 March 1993. Based on documentation submitted by GoI in August 1993, the Borrower appears to have met a substantial part of the benchmarks. The benchmarks still to fully met are: (i) the completion of socio-economic surveys in Maharashtra, (ii) the acquisition of 2,000 ha of land in MP (about 1,892 ha have been identified but not acquired), and (iii) an inter-state agreement on the sharing of R&R cost. In addition, the R&R plan for Maharashtra is still based on a provisional number of oustees, and that of MP requires improvements with regard to the total number of oustees and those willing to resettle in Gujarat

Project achievements

28. Physical Achievements. The Credit/Loan closed 27 months ahead of schedule, on 29 March 1993. By then, the Sardar Sarovar Dam was about 50 percent complete and the riverbed powerhouse about 55 percent complete, but construction had still not begun on the irrigation bypass tunnel. The Narmada Basin hydro-meteorological network was to be retendered so the national satellite communication system could compete with the meteor-burst system. Satisfactory operation and maintenance (O&M) manuals had been prepared and an efficient computerized management information system was in place. As for project components not eligible for Bank financing, good progress had been made on the canal head powerhouse and the main canal headworks. However, financing had not been secured for the turbine generating sets for the RBPH, and construction of the Garudeshwar Weir had not yet begun. According to the revised implementation schedule of December 1989, irrigation and power generation could start in monsoon of 1995. However, this date is likely to slip for the RBPH due to slow R&R implementation in Maharashtra and MP, and delays in financing the turbine generating sets.

29. Notwithstanding some shortfalls in SAR targets, the project set excellent engineering, construction, and management standards by introducing many innovative features. Highlights include the use of a modern concrete plant and two high capacity cable ways, the development and implementation of a comprehensive computerized

management information system (MIS), and SSNNL's establishment of a Dam Safety Panel and an Expert Committee on Cement and Concrete.

30. Financial Results. At appraisal, the cost of the entire Sardar Sarovar Project, including physical and price contingencies, was estimated at Rs 136,407.0 m. (US \$11,367.2 m.) at 1985 price levels, while the estimated cost approved by the Planning Commission, GoI in October 1988, was Rs, 64,060.4 M, at FY 1986-87 price levels. During project implementation, the total cost of SSP was re-estimated at Rs 145,985.1 million in 1992 prices, i.e., a 128 percent increase over the cost approved by the Planning Commission, but only 7 percent above the appraisal estimate. In US Dollar terms, the revised cost of SSP is estimated at US \$5,576.5 million in 1992 prices, compared to the appraisal cost of US \$11,367.2 million. The reduction in cost is due to the large devaluation of the Rupee against the US Dollar, which fell from Rs 12 at appraisal to about Rs 26 in 1992.

31. The IDA Credit of SDR 99.7 m. (US \$100 m.) and the IBRD Loan (2497-IN) of US \$200 m. (equivalent to a total Credit/Loan amount of US \$300 m.) were signed on 10 May 1985. Bank Group financing amounted to about 18 percent of total project costs, net of taxes and duties. No co-financing arrangements were made but it was expected that the six turbine generating sets of the RBPH would be financed through a separate credit arrangement with the Government of Japan.

32. Disbursements started two years late in 1987 after the project had obtained environmental clearance from GoI. Thereafter, disbursements continued to be slow for another two years but picked up momentum in 1990 when the concreting plant and cable ways became operational. The Credit was fully disbursed in September 1992. Only US \$18.49 m. (9 percent) of the Loan had been disbursed when the Borrower decided to terminate the Loan. Thus, only US \$151.79 m. (51 percent) had been disbursed against the total Credit/Loan amount of US \$300 m., by the date the Loan was cancelled.

Revised economic analysis

33. The economic analysis was revised in 1990 and updated again in 1993 for this PCR. Like the SAR, it covers the project's irrigation, power and D,M&I components. It reflects changes in quantities, prices and phasing since 1984 and pays particular attention to environmental costs and benefits (such as estuary changes, fisheries costs and benefits, fuelwood, and wildlife) which might have been underestimated or omitted in the original analysis. The revised analysis has an economic rate of return (ERR) of 12 percent – slightly lower than the 13 percent in the original SAR, but within the acceptable range for a project of this type. The scale of benefits is large, relative to any feasible alternatives, with substantial multiplier effects as well. Had the SSP project been conceived as a power project alone, the ERR would have been 14 percent. The command area, taken alone, exhibits a somewhat lower ERR. If expenditure to date is treated as a sunk cost, the ERR is 17 percent. The ERR estimate of 12 percent incorporates a five-year delay in the Narmada Sagar Dam's coming on stream.

Sustainability

34. The Dam and Power Project has adhered to high construction standards. If the Nigam can maintain present levels of quality control/quality assurance, the project should attain the 100-year-plus life expectancy for such projects. However, ultimate sustainability depends upon adequacy of O&M. Though India's track record in this area is not good, the exceptional nature of this project and the standard of excellence developed by SSNNL may be able to chart new directions for O&M.

35. The preparation and implementation of the Narmada Basin Environmental Management Plan are crucial for the long-term sustainability of the project. As part of this plan, the impact of the dam on the downstream communities, fisheries and Bay of Khambat are to be further investigated. Though the Borrower has so far rejected the option of releasing a minimum flow of water in the lower Narmada, the PCR feels strongly that this option should be thoroughly studied and possibly considered prior to the revision of the NWDT award in 2024. Unless this is done, the environmental sustainability in the Gulf of Khambat, immediately downstream of the dam, can not be guaranteed.

The Bank's and the Borrower's performance

36. Overall, both Bank and Borrower performance were excellent in the field of engineering, but mixed or poor in the R&R, environmental and health fields at the preparation and in the early stages of implementation. The Bank responded to emerging problems by appointing an Independent Review. Though its findings and recommendations were not fully accepted by either the Bank or the Borrower, the Independent Review Report had beneficial effects

on their respective efforts, and they each acknowledged and addressed a number of shortcomings cited in the Report. The Bank improved its policy on disclosure of information while the Borrower improved to a large extent its policies and performance on R&R and environment. However, there remains some inadequacies in R&R planning and implementation particularly in MP. The Bank could have taken a stronger stand in the earlier stages of project implementation to enforce conditionalities in these two fields.

LESSONS LEARNED

A. General lessons

37. The first lesson is the need to ensure that all Government clearances have been obtained before negotiations are finalized, particularly in a sensitive area such as environment. The project had not been cleared by the Planning Commission nor by the Ministry of Environment and Forests at the time of Board approval (see Evaluation Summary, Attachment 2). As a result, the lack of clearance led to at least a two-year delay in project implementation.

38. The second lesson is the need for the Bank to apply more rigorously its guidelines on environment and R&R during the preparation, appraisal and supervision stages. One of the major criticisms that emerged from the Independent Review was that the project had been approved without a proper environmental impact assessment of the dam and power complex, and also without adequate policies and plans for the R&R of project-affected persons. Bank policies on the environment and R&R were still relatively new at the time of project formulation and appraisal and much less stringent than current requirements with respect to operational requirements. Clearly, the Bank's performance was wanting in terms of quality at appraisal of the R&R and environmental plans. The Bank should have taken a stronger stand in the application of its guidelines during the early stages of project implementation. Legal covenants on R&R and environment should be strong and specific and the Bank must also be willing to enforce rigorously its conditionalities, which it failed to do early enough under the project.

39. The third lesson concerns the need to be cautious when financing a large multi-purpose project with a development period exceeding 10 to 15 years. In view of the difficulties in predicting performance of such projects, it would be wise for the appraisal mission to select smaller, self-contained portions of the overall program, such as the dam and power complex, or at least to recommend, as is the Bank's current practice, a thorough mid-term review at an appropriate point to enable updating of data on the basis of actual performance and to enable required adjustments to be made. It is difficult to predict the final outcome of a project so far in advance. In the case of SSP, the Bank was over-confident throughout project design and implementation that this project would be implemented as planned. However, this outcome was—and remains—uncertain: (i) there are always unforeseen delays due to technical and financial constraints, (ii) R&R and environmental issues have and will continue to hamper project implementation, (iii) there is still uncertainty about adequate funding for the Narmada Sagar Dam in MP and its pace of implementation, the final size of the command and the important role that the domestic, municipal and industrial component is likely to play in the future.

B. Lessons on resettlement and rehabilitation

40. The first lesson concerns the need to ensure the quality of the R&R process at project outset. The R&R component could have been improved early on through prior consultations with PAFs to gain a better understanding of land acquisition issues, transaction costs and the special needs of tribal people. The R&R training program should have been developed with more input from NGOs which had local knowledge of the PAFs. Additionally, a detailed review of the R&R process itself in the project's early stages would have improved performance.

41. The second lesson relates the need to empower the Borrower and executing agencies to take greater ownership for implementation of the R&R process. The Bank should have confirmed that the Borrower and executing states would assume greater ownership of the R&R implementation process. In the case of the SSP, this would have required GoI to supervise the execution of R&R policies while the Bank played an 'arms-length' role, simply holding the Borrower to the terms of legal agreements. The SSP operated in a particularly difficult context, however,

because GoI entered into financial agreements with the Bank, while the states actually executed the R&R policies. The alternative of establishing a common authority which in turn would have taken charge of all operational issues as regards R&R was not considered under the NWDT award and was not possible under the Indian Constitution.

42. The third lesson is with regard to the need for the Bank to develop better communication and decision-making policies for R&R. There were major political difficulties to be faced in achieving R&R objectives across three states. Facilitating communications among the states should have been set as an early priority; decision-making should have been made more explicit and timely. In addition, alternative views should have been both recognised and encouraged. A qualified sociologist/anthropologist should have been hired to handle R&R issues for the Bank. The SSP lacked this needed expertise and authority at the early stages of appraisal and supervision.

43. The fourth lesson concerns the importance of maintaining strong ties with NGOs. Through the development of the R&R policy for the SSP, the Bank recognised the important contribution that NGOs could make towards devising a more acceptable policy. During the early years of project implementation in Gujarat, NGOs played an increasingly useful role. NGO complaints should have been responded to by the Borrower rather than the Bank.

44. The fifth lesson concerns the need to go through a lengthy and sometime complex learning period. In the case of SSP, neither the Bank nor the Borrower had anticipated the complexity and magnitude of issues that emerged during implementation. Even if the R&R component had been prepared to the standards prevailing at the time of appraisal, it is likely that further adjustments would have been required during implementation. NGOs played an important role in drawing the attention of the Borrower and the Bank to the inadequacies of implementation, and particularly to the importance of assuring equitable treatment for all categories of oustees, whether they be landed, landless or tribal. The legal covenants must therefore be flexible enough to accommodate any improvements to the policies and plans.

45. Finally, the sixth and last lesson relates to the means and procedures required for satisfactory R&R implementation. This project has been the source of many improvements in R&R policies and implementation, which are now being put into practice in other projects. With respect to R&R policies, the principle of land-for-land was implemented on a large scale, adult sons were recognised as separate families, tribal people living in government forest lands were considered as landed families, and the need for additional assistance for subsistence and house construction was recognised. On the implementation side, Gujarat developed a unique mechanism for acquiring replacement agricultural land, at market prices through Land Purchase Committees. Well developed R&R units with central monitoring cells were established. Specific lessons on means and procedures required for satisfactory R&R implementation are given in Part I, paras. 16.11 to 16.16.

46. In summary, all future projects with major R&R aspects should conform to the upgraded standards that ensure: (i) baseline studies are adequately completed, (ii) specific project policies are agreed upon, (iii) institutional arrangements have been made for project implementation, and (iv) proper monitoring and evaluation arrangements through independent agencies have been made. Such projects should have a separate R&R component financed under the Credit/Loan. Precise legal covenants should be agreed and enforced. The Bank should use highly qualified R&R specialists to supervise implementation and provide recommendation to implementing agencies. Bank guidelines require such rigor.

C. Lessons on environment

47. While there is increasing evidence that many of the possible negative environmental impacts have been exaggerated by critics and a number of secondary environmental benefits ignored, there are still several important lessons.

48. The first lesson is that the Bank should not approve a project, particularly one that involves a large darn, without a proper environmental impact assessment and management plan. Strict adherence to the Bank's Operational Directive No. 4.01 on environmental assessment should now ensure that environmental issues are addressed more thoroughly and at a much earlier stage.

49. The second lesson is that no project should be approved until a formal environmental clearance is obtained from the Borrower.

50. The third lesson is that, in the case of a project with a large environmental impact, a mitigatory environmental component should be made an integral part of the project supported by strong legal covenants.

51. The fourth lesson relates to the need for the Bank to use highly qualified environmental specialists to supervise the environmental component and, as needed, to provide guidance to the Borrower in the resolution of special environmental issues.

52. The fifth lesson is that ample use should be made of remote sensing and computer modeling technologies for satisfying environmental impacts of large projects such as SSP.

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