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Law Research Centre

WORLD BANK OPERATIONS EVALUATION DEPARTMENT

MEMORANDUM TO EXECUTIVE DIRECTORS (SARDAR SAROVAR)

**World Bank, Operations Evaluation Department, Memorandum to Executive Directors
on the Sardar Sarovar Dam and Power Project, 1995**

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Subject: Project Completion Report on India – Narmada River Development (Gujarat) Sardar Sarovar Dam and Power Project (Credit 1552-IN/Loan 2497-IN)

1. Attached are Parts I and II of the Project Completion Report (PCR) on the Sardar Sarovar Dam and Power Project (SSDPP Credit 1552-In/Loan 2497-IN). Part I was prepared by the South Asia Regional Office. Part II was contributed by the Borrower who, supporting most of the analysis in Part I, disagreed with some of its interpretations and conclusions. Supporting annexes and Part III (228 additional pages) are not included but are available on request. The PCR should be read in conjunction with the PCR on the parallel Water Delivery and Drainage Project (Credit 1553-IN).

2. The SSDPP and the Water Delivery and Drainage Project were part (the first phase) of the Narmada River Development Plan, which aimed to harness the Narmada River through a series of dams and associated investments for irrigation, energy and domestic/municipality/industry (DMI) benefits in three states – Gujarat, Maharashtra and Madhya Pradesh. SSDPP was approved in March 1985 and was due to close in June 1995. From 1989, many national and international non-governmental organizations expressed serious concern regarding unsatisfactory arrangements for the resettlement and rehabilitation (R&R) of the project affected families (PAFs) displaced by the project as well as for the project's broad environmental implications. The President of the Bank commissioned an independent review (IR) of the project in September 1991. The ensuing report in June 1992 was critical of the Bank's and the Borrower's performance, especially with respect to R&R and environmental planning. The IR pointed out that the Bank had not followed its own guidelines, and recommended that the Bank 'step back' from the project rather than continue with financing of its planned implementation. Following a review mission by the Bank in July 1992, Management endorsed most of the IR findings, but considered that the most promising course of action would be to take advantage of Government of India (GoI) agreement to link progress of dam construction to associated R&R requirements. In October 1992, Management presented for the Board's approval a GoI action plan which would address the issues raised in the IR. The Board endorsed the plan which included a commitment by Management to suspend disbursements if the GoI failed to meet specific performance benchmarks by 31 March 1993. However, progress was uneven and on 29 March 1993, GoI requested the Bank to cancel the remaining Loan amount (US \$181.5 million of US \$200 million). The IDA Credit (US \$133.3 million) has been fully utilized by September 1992. At the same time, the Executive Director representing India reaffirmed GoI's continued commitment to complete the project and to meet agreed R&R and environmental standards. Performance under the action plan, as reported by GoI in August 1993 and in subsequent communications, indicates that significant progress has been made in meeting benchmarks but that important R&R requirements have not yet been met (mostly due to difficulties in Maharashtra and Madhya Pradesh). The project implementation schedule, revised in 1989, is unlikely to be met.

3. The basic rationale for the project is sound. The arrangements for basic development of the largest unexploited water resource in India, involving three riparian states, had evolved over a 10-year period through submissions to the Narmada Water Disputes Tribunal (NWDI) of GoI. The comprehensive basin development and management plan that resulted, with its binding inter-state agreements for water allocation and institutional and financial arrangements for program execution, was a substantial achievement. The scheme promises to make an important hydroelectric energy contribution to India's western grid and to provide water for irrigation and DMI consumption to about 30 million people in the severely drought-prone state of Gujarat, where a wide array of endemic diseases is traceable to malnutrition and unsafe domestic water supply.

4. Although delayed and incomplete, the project has made substantial progress in terms of civil works, not only in quantity of construction but also in the quality of work; achievements are described in detail in the PCR. A slow start-up associated with delayed GoI environmental and forestry clearances and the need to import and mobilize major construction equipment led to a revised construction schedule in 1989 with a completion date of 1998.

5. Positive aspects of physical implementation have been overshadowed by major deficiencies in planning and management of R&R and environmental impact analysis. In brief, the Bank did not follow its own R&R guidelines (OMS 2.33 of 1980 and OMS 2.34 of 1982) designed to ensure appropriate treatment of landed and landless PAFs. The NWDI agreement had obliged Gujarat to pay to Madhya Pradesh and Maharashtra all costs of R&R for oustees (persons cultivating, residing or working in the submerged area), with replacement agricultural land being provided for 'landed' oustee families. An R&R plan was prepared and approved at negotiations but it did not meet the requirements of existing Bank guidelines. Insufficient attention was afforded to R&R in 1989, and progress picked up arrangements. A Bank mission provided increased attention to R&R in 1989, and progress picked up after 1990, with further advances after the IR was issued in 1992. Approximately 41,000 oustee families were

identified against 10,700 in the SAR which did not have the benefit of adjusted surveys and had excluded certain categories of oustees (adult sons, landless and encroachers). However, substantial obstacles still remain. While Maharashtra has recently adopted satisfactory policies, implementation problems persist in that about half of the oustee villages refuse to cooperate to allow final definition of numbers and R&R arrangements. In Madhya Pradesh, the rehabilitation grant to landless families and adult sons is less attractive than in the other states and implementation capacity is weak. An earlier assumption that most PAF's from this state would move to Gujarat is now in question, possibly obliging considerable additional land procurement, a process which has been cumbersome in the past. NGOs have been usefully involved in the Gujarat R&R program, but in the other states confrontation continues between authorities and some local NGOs. The persistence of difficulties is likely to affect the pace at which the infrastructure program (and subsequent reservoir filling) can proceed.

6. The Bank did not follow its own environmental guidelines which came into existence before the final appraisal mission in August 1984 (OMS 2.36 of May 1984). This OMS required environmental impact studies to have been done and an evaluation made at appraisal of measures to be taken to avoid or mitigate serious environmental risks. The SAR included a brief description of the anticipated environmental consequences, and indicated that a work program for assessing and managing fisheries, forestry, wildlife, and public health effects would be undertaken and submitted to the Bank for its approval. Project costs did not appear to specifically include any environmental program except as a training component and as a watershed management study, and environmental measures were not financed under the loan/credit. The Board approved the project in March 1985 with legal documents requiring the Environmental Work Plan to be submitted for Bank approval by December 1985. The formal GoI forestry clearance had not been obtained at that time. The forestry clearance was obtained only in September 1987 and an environmental clearance (which became necessary by a GoI 1986 Conservation Act) was obtained in June 1987; both clearances were given subject to a number of important conditions in view of the unavailability of appropriate plans. Deadlines in 1985 and 1989 for completion of the Environmental Work Plan were allowed to lapse and ultimately the Plan was submitted in August 1993 following severe criticism in the IR of 1992 and subsequent studies by ODA-funded consultants.

7. Following the IR, the Borrower made significant efforts on a number of environmental fronts. The compensatory forestry program has progressed, catchment area treatment is underway, and plans for preserving cultural sites and protecting wildlife are in various stages of implementation. After a long delay, each of the states has carried out in-depth baseline health surveys in the project area and set up health care facilities for resettled and permanent populations; state programs for malaria control have been strengthened, although staffing and funding of these operations is not yet satisfactory. Prompted by the IR, consultants re-examined the projected sedimentation rate in the Sardar Sarovar Reservoir. This study confirmed that sedimentation would be greater than originally calculated, but that it would not be a major problem for the combined Sardar Sarovar and Narmada Sagar complex. Concerns about the impact on the estuary downstream of the dam were investigated by the ODA-funded consultants in 1993. This indicated that changed flow patterns are likely to affect the spawning of hilsa, but further work is needed to determine the significance of hilsa in marine catches by fishermen; a local institute continues to work on this matter. Continued implementation of the Environmental Work Plan, vigilance in monitoring and responding to fisheries and socioeconomic developments in estuarine areas, and increased support for the health program could yet help avoid significant detrimental effects.

8. The PCR reestimates the economic rate of return (ERR) on the projects' irrigation, power and DMI water investments to be 12 percent, compared with 13 percent in the SAR. The analysis includes the costs and benefits of Gujarat Water Delivery and Drainage Project as an integral part of the first phase in the basin development as in the SAR. It also includes environmental costs and benefits and R&R costs which were not adequately covered in the SAR, adjustments for actual construction costs and updated future costs, a share of the costs of upstream Narmada Sagar Dam which is required to enable regulation of water for irrigation and power generation up to the quantities projected (but with an assumed 5-year delay in construction and consequent reduced power generation), a higher (more realistic) value for DMI water delivery, and an assumption that some irrigation and (very minor) energy benefits would commence in 1995. However, despite the approximate adherence to the 1989 construction schedule so far, further delays of at least two years in both the irrigation and energy generation schedules are likely. The pace of construction must be adjusted to progress in the R&R program which has encountered persistent difficulties (para. 5). Floods in 1994 damaged the stilling basin which will need major reconstruction. There are uncertainties in financing arrangements for the overall development and for the foreign exchange purchase of turbine generators for the riverbed powerhouse (after the cancellation of an Overseas Economic Cooperation Fund (OECF) loan by the Government of Japan). Gujarat and Madhya Pradesh have not yet agreed on the invert

level for the irrigation bypass tunnel (lowering it would benefit Gujarat's diversions, particularly in drought years, but at the expense of Madhya Pradesh's rights), which has delayed initiation of tunnel construction. This has meant that the base case ERR scenario prepared for the PCR is already out of date. Sensitivity analysis shows that a delay of four years in the commissioning of the riverbed powerhouse would reduce the ERR by a further one percent, and some other delay scenarios continue to provide a return in excess of 10 percent (...). The stability of the ERR projections in the PCR scenarios is due to the multi-purpose nature of the investment and to benefit delays being associated with investment cost delays. Nevertheless, the robustness of the ERR calculations is clouded by many uncertainties.

9. The PCR is based on a hydrological model which a team of experts recently appointed by the GoI has not endorsed in full (see Memorandum on the Water Delivery and Drainage Project). PCR scenarios do not examine the economic implications of a failure to construct the complementary Narmada Sagar dam. This dam is an integral part of the basic development package agreed by the three states, and the construction contract has already been let (May 1992), but the fiscal implications of its development are substantial and its resettlement dimensions even larger than those of Sardar Sarovar. Delays in the completion of Narmada Sagar due to financing and/or R&R difficulties cannot be ruled out. To examine the implications of the omission of Narmada Sagar Dam, a new water modelling exercise would have to be undertaken in which the alternative of a series of upstream smaller dams to complement the Sardar Sarovar investment would have to be considered; major changes could be expected in the amount of water available for energy and for the command area in Gujarat which would, of course, influence the scale of the water distribution investment which could be made in that area. In the absence of such a model, the PCR uses a proxy to reflect the implications of extended delays in the completion of Narmada Sagar – 25 percent reduction in power and 20 percent reduction in irrigation benefits throughout the project life. Consequently, while the alternative scenarios appear to confirm the economic viability of the overall investment, uncertainty remains concerning the hydrological assumptions and the scale and sequencing of project benefits.

10. Institutional improvements were substantial in some areas of the project but weak in others. Overall, the institutional development impact is rated as modest. Certainly, advances in engineering design and construction quality control were significant, and an effective management information system to monitor the civil work component was established and is being expanded to financial and administrative aspects. Good progress has been made in operation and maintenance (O&M) plans, although these will need to be updated when the remote control and monitoring system for the operation of the main canal is available (the consultancy contract had not been signed at Loan cancellation, and bilateral technical assistance is being sought) and there is no evidence of institutional development in terms of formation of local irrigation groups or of providing such groups with financial autonomy. While the planning and implementation capacity of R&R has been improved, implementation still needs fundamental improvement in Maharashtra and Madhya Pradesh, and health services continue to be affected by inadequate funding and staffing.

11. Bank appraisal and supervision performance has been unsatisfactory. Adherence to the Bank's guidelines could have avoided many of the negative consequences of the project - social unrest, diversion of resources (by GoI and the Bank) to address the consequences of inadequate early attention to environmental and R&R requirements (especially in PAF consultation), delayed benefits, and funding difficulties including the cancellation of the Bank and OECF loans. As a development investment, however, the project outcome is rated as marginally satisfactory based on PCR assumptions. This rating is affected by more than the usual uncertainties. It assumes that the hydrological parameters of the project will be fully funded and the complementary Narmada Sagar dam constructed. On this basis, the ERR is likely to be in excess of 10 percent. The substantial benefits to be obtained from this major investment of over US \$1.5 billion through energy generation and DMI distribution, as well likely irrigation benefits in the command area (see Memorandum on the Water Delivery and Drainage project), should be sufficient to outweigh the significant negative aspects of the projects and to compensate for all resettlement costs based on Bank guidelines. It is emphasized, however, that the likely outcome is less favorable than anticipated at appraisal, and has been affected by many avoidable social costs and deficiencies, especially in the areas of resettlement and of environmental planning, on both of which decisive action is still pending.

12. The sustainability of the project achievements is rated as uncertain. The project has adhered to high construction standards and the institutional capability in this regard is now well established. But much will depend on effective O&M for which India does not have a good track record. Action is needed to staff, equip and train an appropriate O&M unit in advance of the dam and power complex operation. The hydrometeorological monitoring network which is needed for dam safety, flood control and efficient reservoir operation had not been tendered at the time of the PCR. Realization of the Environmental Management Plan will be crucial for sustainability, especially with

respect to monitoring, and responding to, the effects of the scheme on downstream fisheries and communities. These effects, *inter alia*, will need to be addressed in the revision of the NWDT award in 2024. The Borrower is adamant that it will continue with the Narmada River Basin Development Plan, but, as previously noted, the rate of progress will depend on the Borrower's ability to deal with the social dimensions of the plan and to allocate to it the necessary managerial, financial and technical resources.

13. The PCR provides a detailed assessment of project implementation and shortcomings. With few exceptions (noted below), it is comprehensive, and it acknowledges major performance shortfalls. Concerns of the Executive Directors (EDs) at the 1985 Board presentation are noted, as is the commitment by Management to keep the Board informed on the social and environmental aspects of the project through written reports and briefings. The PCR deals with the major issues raised by the IR. The extent of compliance by GoI with the action plan agreed in late 1992 (as a basis for continued Bank support) is elaborated. As indicated earlier, significant uncertainty about the rate at which investments will be completed, and possible variations in hydrological parameters and water use scenarios, limit the robustness of PCR estimates of the ERR. The PCR fails to assess the scope or usefulness of M&E data and socioeconomic surveys as baseline information for impact analysis. In the discussion on 'Bank Performance', the PCR does not address the missed opportunities in potential use of selected, reputable NGO's to assist it in meeting the Bank's guidelines in this aspect of the project. While the PCR indicates that the Bank should have taken 'stronger action' to correct the R&R and environmental deficiencies during implementation, it does not make a forthright judgment that the Bank's enforcement of covenants was delinquent.

14. In its part of the PCR the Borrower is more confident that the Bank in predicting some aspects of future performance and scheduling, and highlights the high socioeconomic benefits which will be obtained by the intended provision of both irrigation and DMI water in the drought-prone areas of Gujarat.

15. Considering the extraordinary amount of investigation and lesson learning which has taken place with respect to environmental and resettlement dimensions of the project, there would be little value in carrying out further evaluation of these aspects at this stage. A performance audit is planned, however, in order to assess the realism and the sensitivity to risks of the reestimation of project costs and benefits. In due course, OED will undertake impact evaluations of socioeconomic effects (including health aspects) on PAF's and the impact of basin development on command area populations.

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