

**BANK MANAGEMENT RESPONSE TO
REQUEST FOR INSPECTION PANEL REVIEW OF THE
PAKISTAN NATIONAL DRAINAGE PROGRAM PROJECT (Credit No. 2999)**

Management has reviewed the Request for Inspection of the Pakistan National Drainage Program Project (Credit No. 2999), received by the Inspection Panel on September 10, 2004 and registered on September 17, 2004 (RQ04/5). Management has prepared the following response.

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ABBREVIATIONS AND ACRONYMS

| | |
|---------|--|
| amsl | above mean sea level |
| ADB | Asian Development Bank |
| AWB | Area Water Board |
| BP | Bank Procedure |
| CBO | Community-Based Organization |
| CCA | Cultivable Command Area |
| CIDA | Canadian International Development Agency |
| DERA | Drought Emergency Recovery Assistance |
| DfID | Department for International Development (United Kingdom) |
| DMP | Drainage Master Plan |
| DPOD | Dhoro Puran Outfall Drain |
| DSEA | Drainage Sector Environmental Assessment |
| EA | Environmental Assessment |
| EIA | Environmental Impact Assessment |
| EMP | Environmental Management Plan |
| EMMP | Environmental Management and Monitoring Plan of the LBOD Stage 1 Project |
| EPA | Environmental Protection Agency |
| FESS | Fordwar Eastern Sadiqia South |
| FGW | Fresh Groundwater |
| FIDC | Federal Irrigation and Drainage Cell |
| FLAR | Framework for Land Acquisition and Resettlement |
| FO | Farmer Organizations |
| GoP | Government of Pakistan |
| GoS | Government of Sindh |
| IDA | International Development Association |
| IES | Initial Environmental Scoping |
| IPN | Inspection Panel |
| IsDB | Islamic Development Bank |
| IWASRI | International Waterlogging and Salinity Research Institute |
| JBIC | Japan Bank for International Cooperation |
| KPOD | Kadhan Pateji Outfall Drain |
| LBOD | Left Bank Outfall Drain |
| NDP | National Drainage Program |
| NGO | Non-Governmental Organization |
| NIO | National Institute of Oceanography |
| NSDS | National Surface Drainage System |
| NWFP | North West Frontier Province |
| OD | Operational Directive |
| ODA | Overseas Development Administration |
| OFWM-PB | On Farm Water Management - Punjab Agriculture Department |
| O&M | Operation and Maintenance |
| OP | Operational Policy |
| OPEC | Organization of Petroleum Exporting Countries |
| PAP | Project Affected Person |

| | |
|-------|--|
| P&D | Planning and Development Division, Government of Punjab |
| PDC | Pakistan Drainage Consultants |
| PIC | Public Information Center |
| PIDA | Provincial Irrigation and Drainage Authority |
| PID | Project Information Document |
| PIDs | Provincial Irrigation Departments |
| PoE | Panel of Experts |
| ppt | parts per thousand |
| PSR | Project Status Report |
| QACU | Quality Assurance and Compliance Unit |
| RAP | Resettlement Action Plan |
| RBOD | Right Bank Outfall Drain |
| RD | Reduced Distance measured, one RD=1000 feet |
| SAR | Staff Appraisal Report |
| SAR | South Asia Region |
| SASAR | South Asia Agriculture and Rural Development Unit (WB) |
| SCARP | Salinity Control and Reclamation Projects |
| SDC | Swiss Development Corporation |
| SGW | Saline Groundwater |
| SEPA | Sindh Environmental Protection Agency |
| SFD | Saudi Fund for Development |
| SIDA | Sindh Irrigation and Drainage Authority |
| SMO | SCARP Monitoring Organization of WAPDA |
| TOR | Terms of Reference |
| WAPDA | Water and Power Development Authority |
| WECS | WAPDA Environmental Cell (South) |
| WMED | Watercourse Monitoring and Evaluation Directorate of WAPDA |
| WMP | Wetland Management Plan |

| English Units | | UNITS | | |
|-------------------------|-------|---------------------|------------------------|-----------------------|
| | | Metric Units | | |
| 1 inch | (in) | 25.4 | millimeter | (mm) |
| 1 foot | (ft) | 30.5 | centimeter | (cm) |
| 1 mile | (mi) | 1.609 | kilometer | (km) |
| 1 acre | (ac) | 0.405 | hectare | (ha) |
| 1 million acre | (Ma) | 0.405 | million hectare | (Mha) |
| 1 acre foot | (af) | 1,233.5 | cubic meter | (m ³) |
| 1 million acre foot | (Maf) | 1,233.5 | million cubic meter | (Mm ³) |
| | | 1.234 | billion cubic meter | (BCM) |
| 1 cubic foot per second | (cfs) | 28.5 | litre per second | (l/s) |
| | | 0.0285 | cubic meter per second | (m ³ /sec) |
| 1 foot per second | (fps) | 0.305 | meter per second | (m/s) |

I. INTRODUCTION

1. On September 17, 2004, the Inspection Panel registered a Request for Inspection, IPN Request RQ04/5 (hereafter referred to as “the Request”), concerning the Pakistan National Drainage Program (NDP) Project partly financed (Credit No. 2999) by the International Development Association (IDA).

2. *Structure of the Text.* The document contains the following sections: Section II provides information on the Request. Section III presents the background of the project, including the history of the drainage crisis in Pakistan and earlier projects. The section also contains a description of project status and evolution. Section IV discusses issues of particular relevance to the Request, including the Left Bank Outfall Drain, the Tidal Link and Cholri Weir, and NDP project issues. Section V recommends actions, and Section VI concludes the main text. Annex 1 presents the Requestors’ claims, together with Management’s detailed responses, in table format. Eight other annexes provide background and other pertinent information.

II. THE REQUEST

3. The Request for Inspection was submitted by Khadim Talpur, Mohammad Ali Shah, Mustafa Talpur, Munawar Hassan Memon, Iqbal Hyder, Mir Mohammad Buledi, and Najma Junejo on their own behalf and on behalf of over 2,000 others who live in the area known as district Badin, Sindh, Pakistan (hereafter referred to as the “Requesters”).

4. Attached to the Request are:

- Attachment 1 – Pictures and media reporting of failure of Left Bank Outfall Drain (LBOD) during 2003 rains;
- Attachment 2 – Article circulated on email on failure of LBOD during 2003 monsoon rains;
- Attachment 3 – Reporting and media coverage of Affectees Rally in Badin Town;
- Attachment 4 – Media coverage of Karachi Rally;
- Attachment 5 – Letter sent by Save Coast Action Committee during Sept. 2003 to Dec. 2004;
- Attachment 6 – Media Reporting of Rally and Press conference by Save Coast Action Committee;
- Attachment 7 – Letter of District and Taluka Nazims sent to President of Pakistan;

- Attachment 8 – Email correspondence with the Asian Development Bank (ADB);
- Attachment 9 – Email correspondence with World Bank Country Director;
- Attachment 10 – Email correspondence with NDP Task Team Leader;
- Attachment 11 – Hunger strike demand letter for cancellation of NDP loan;
- Attachment 12 – Media Reporting of Hunger Strike;
- Attachment 13 – Pictures and media reporting of May 2004 rally in Badin, Sindh, Pakistan;
- Attachment 14 – Letter of Taluka Nazim Badin Sindh Pakistan to President of Pakistan;
- Map of LBOD Area;
- Map of proposed national drainage network in upper Indus Basin; and
- Map of proposed drainage network in lower Indus Basin.

No further materials were received by Management in support of the Request.

5. The Requesters claim that the Bank has failed to observe or has otherwise violated various provisions of its own operational Policies and Procedures, including:

- OD 4.01 Environmental Assessment (October 1991);
- OP 4.04 Natural Habitats (September 1995);
- OD 4.20 Indigenous People (September 1991);
- OD 4.30 Involuntary Resettlement (June 1990); and
- OPN 11.03 Management of Cultural Property (September 1986).

III. PROJECT BACKGROUND

6. Many of the issues raised in the Request relate to the prior LBOD Stage 1 Project, which closed in 1997. The Requesters claim that the LBOD system is faulty and they have incurred losses because of its poor design. They also voice concerns that the NDP project would extend the system to serve the entire Indus Basin, adding more effluents from the upper basin, through a National Surface Drainage System (NSDS). Management wishes to note that the LBOD Stage 1 Project was closed in 1997 and NDP will not extend the LBOD Spinal Drain further north. Although the NDP project as originally con-

ceived in the 1997 Staff Appraisal Report (SAR) was to have laid the groundwork for the NSDS, the concept was subsequently rejected as a result of extensive studies and reviews (see Annex 1, Items 6 and 7). Issues relating to the LBOD Stage 1 Project and the NDP project are further elaborated in Section IV and the chronology of the two projects is provided in Annex 2.

7. **The Project.** The NDP project originated as a result of the new strategy for water resources development formulated by the GoP and IDA in 1994 (Pakistan Irrigation and Drainage: Issues and Options, March 1994) and other recommendations, including the Borrower's Water Sector Investment Planning Study, the Eighth Five-Year Plan (1993-1998) and lessons of experience from projects in Pakistan and the reform experience in Mexico, Turkey, Chile and elsewhere. The GoP and IDA commissioned a Drainage Sector Environmental Assessment (DSEA), which was completed in 1993, in response to the deterioration of drainage and environmental status of the Indus Basin Irrigation System. The lack of an effective drainage system for the Indus Basin Irrigation System was considered a principal threat to the sustainability of agriculture in the Basin (see Annex 3 on the history of the drainage crisis in Pakistan). In 1992, IDA had stopped all new lending to the sector pending formulation and agreement with the GoP on a new strategy. As part of the new direction, IDA and the GoP closed eight projects between FY92 and FY94 and restructured a number of others. The Bank meeting on the Initial Executive Project Summary for the NDP project was held in January 1994 and the project was prepared over a period of almost four years. The project's complexity is dictated by its challenging context—the irrigation system of Pakistan is one of the largest integrated irrigation networks in the world. See Map 1.

8. The IDA Credit 2999-PAK for USD 285 million for the NDP project was approved by the Board of Executive Directors on November 4, 1997. Two legal agreements pertain to the project: the Development Credit Agreement between the Islamic Republic of Pakistan and IDA, and the Project Agreement among the Pakistan Water and Power Development Authority (WAPDA), the Provinces of Punjab, Sindh, North West Frontier and Balochistan and IDA, both signed on December 16, 1997. The project became effective on February 25, 1998. It is being implemented by WAPDA and the Provinces of Punjab, Sindh, North West Frontier, and Balochistan on behalf of the Government of Pakistan (GoP).

9. **Project Financing.** The NDP project's estimated cost was USD 785 million, of which USD 525 million was provided by several donors. IDA contributed USD 285 million; the ADB provided USD 140 million; and the Overseas Economic Cooperation Fund (OECF), later renamed to Japan Bank for International Cooperation (JBIC), provided USD 100 million. Farmers, through Farmer Organizations (FOs), were to contribute USD 32.1 million and GoP and the Provinces the balance of USD 227.9 million. Loan Agreements with ADB and OECF were signed on December 6, 1996 and March 31, 1997, respectively. Both these donors are participating in the project on the basis of parallel financing.

10. **Project Objectives.** The NDP project is supporting a six and one-half year time slice of GoP's 25-year national irrigation and drainage program. It spans all four Prov-

inces of Pakistan, with a total irrigated area of 18 million ha. The objective of the Project, as noted in the SAR, is to improve the efficiency of the irrigation and drainage system in Pakistan, and ensure its sustainability, by: (a) establishing an appropriate policy environment and institutional framework, and strengthening the capacity of sector institutions (to carry out the first phase of policy and institutional reforms in the water sector); (b) improving sector policies and planning; (c) strengthening the technical foundations of and knowledge base on irrigation and drainage; and (d) improving the irrigation and drainage infrastructure network. While the NDP project originally contemplated a solution such as the NSDS (see Map 2), the results of the pre-feasibility studies and reviews by two Panels of Experts (PoEs) have led to the preference for solutions other than the “drainage super-highway” concept in favor of local disposal options (see Annex 1, Items 6 and 7).

11. The NDP project, which marked a new concept in project design, was deliberately “frontloaded” with an institutional and policy reform agenda and “backloaded” with an investment program. Management sought to focus the dialogue on strengthening governance and transparency in the management of irrigation and drainage affairs—increasing community participation, strengthening environmental planning and management and improving water use efficiency. The institutional reforms were seen as critical to improving water management and therefore addressing problems of waterlogging and salinization. From the outset, it was seen as a complex intervention with a number of risks. The major risks emanated from the possible impact of the project on existing power relationships and alliances in rural Pakistan, as was evidenced by the strong opposition of feudal interests and parts of the irrigation bureaucracy; such opposition included thwarting civil works, damaging infrastructure and illegally removing water, and discouraging farmers from paying water charges.

12. **Project Components.** The NDP project has four components:

- *Sector Planning and Research* (USD 25.7 million) providing capacity building and technical assistance for: (a) policy-oriented studies in irrigation and drainage; (b) sector planning studies; and (c) research, including major research programs, and small grants programs ;
- *Institutional Reforms* (USD 57.7 million) calling for institutional reforms to WAPDA’s Water Wing, focusing on strategic reorientation, streamlining and restructuring, and capacity building and training. An institutional program is aimed at decentralizing Provincial Irrigation Departments (PIDs) and converting them to Provincial Irrigation and Drainage Authorities (PIDAs), and establishing pilot Area Water Boards (AWBs) and FOs;
- *Investment* (USD 683.1 million) designed to improve drainage and water management infrastructure and protect wetlands. Subprojects are focused on rehabilitation, construction and improvement of on- and off-farm drainage; rehabilitation and modernization of irrigation systems; and operation and maintenance through performance-based contracts awarded to the private sector, including completion of some carry over projects from LBOD Stage I; and

- *Program Coordination and Supervision* (USD 18.5 million) which supports overall program coordination and monitoring, comprising the Federal Project Steering Committee, which is chaired by the Secretary of the Ministry of Water and Power of the Borrower; the Federal Irrigation and Drainage Cell (FIDC) in the Ministry of Water and Power; and WAPDA and Provincial NDP Coordination Cells.

13. **Financing Arrangements.** According to the understanding among the NDP donors, IDA is financing institutional reforms, a part of the investment component in all Provinces, all sector planning and research, technical assistance, and coordination and supervision costs. ADB is providing parallel financing for the major part of the investments in Balochistan and NWFP, some in Sindh and environmental management monitoring and evaluation. JBIC is providing parallel financing for most of the investment projects in Punjab and training and capacity building.

14. **Project Supervision.** Since it became effective in February 1998, the NDP project has been intensively supervised by a combination of headquarters and field staff and consultants. Task management was based in the field from January 2000 to August 2003; the co-task team leader has always been located in Islamabad. In addition to regular interactions with the Borrower and implementing agencies, there have been ten full supervision missions (see Annex 4). Supervision required above average costs because of the range of expertise required and the intensity of the effort, given the complexity of the project. Except for FY02, NDP project supervision costs were a factor of 2-3 times the norm in the South Asia region (see Table 1 below):

Table 1. Comparative Supervision Costs NDP, SASAR, SAR (USD 000)

| | FY98 | FY99 | FY00 | FY01 | FY02 | FY03 | FY04 |
|------------|------------|------------|------------|------------|-----------|------------|------------|
| NDP | 237 | 285 | 389 | 269 | 96 | 372 | 177 |
| SASAR | 97 | 108 | 131 | 94 | 69 | 131 | 70 |
| SAR | 79 | 110 | 135 | 87 | 60 | 79 | 63 |

15. **Project Status.** As of September 28, 2004, USD 206.5 million (72 percent of the original Credit amount) were disbursed. Bank Management and GoP have agreed that NDP will be closed on December 31, 2004, the original closing date. All ongoing IDA supported subprojects are expected to be substantially completed by that time. JBIC has agreed to a two-year extension to allow completion of a large canal remodeling subproject it is supporting in Punjab. ADB is also considering extension up to December 2006, subject to improved performance on institutional reforms and satisfactory monitoring arrangements.

16. **Project Evolution.** Project implementation proceeded more slowly than expected due to various reasons, including project complexity, poor coordination and leadership; an absence of reform “champions” and, therefore, lack of commitment to, and slow launch of, institutional reforms; a lengthy subproject identification and preparation process; and lack of agreement on a drainage strategy. The Mid-Term Review (MTR) process was conducted jointly with the ADB and JBIC. The February-April 2000 MTR mission

(also the Bank’s fifth supervision mission) concluded that further review was needed. Hence, the MTR continued in March-April 2001 and resulted in recommendations for restructuring. By the second stage of the MTR, it was evident that the project as originally designed was overly ambitious and unlikely to meet its target and objectives. Figure 1 shows the relationship of the long-term vision of GoP to use of land and water resources.

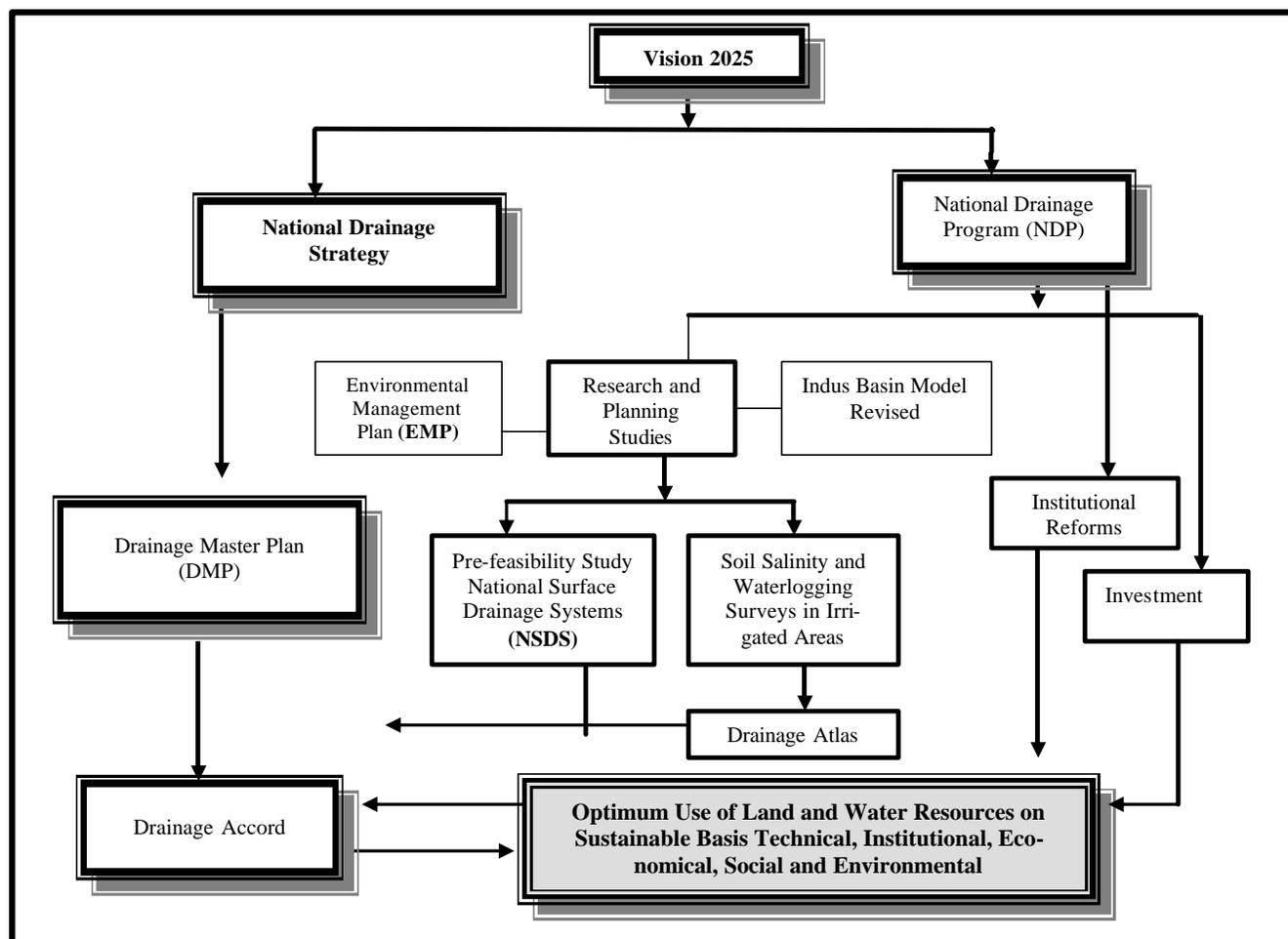


Figure 1. Relationship between the Vision of GoP and Use of Land and Water Resources
(Source: Mid Term Review Report NDP, 2001)

17. **Review by Special Committee Appointed by the President of Pakistan.** Following a change of government in October 1999, the GoP subjected all externally assisted projects, including the NDP, to a detailed review. Shortly after the second MTR mission, in June 2001, the President appointed a Special Committee (the Junejo Committee) headed by the Federal Minister for Food, Agriculture and Livestock to carry out an in-depth review of NDP. The project was put “on-hold” until completion of the review. The deliberations of this Committee culminated in a report entitled “Report of the Special Committee on the Review of the National Drainage Program,” (February 2002).

18. The key recommendations of the Report were that NDP implementation should be revived with full momentum according to the restructured program proposed by the Special Committee; a Drainage Master Plan (DMP) be prepared within nine months; a Drainage Accord reached amongst the Provinces at the earliest; institutional reforms implemented strictly in their entirety and spirit; consultancy costs reduced; coordination among water and agriculture improved; the scope and size of investment component made commensurate with implementation capacity and remaining time period in the life of the project. In summary, the project objectives were endorsed, but the project cost was reduced from PRs 31.4 billion (USD 785 million equivalent at appraisal) to PRs 25 billion (USD 428.2 million equivalent) due to the elapsed time. The Report's recommendations were approved by the President in August 2002.

19. The MTR completion mission (Joint Donor Review) was carried out in October–November 2002 to identify expected outcomes—given the review of the Special Committee—and identify a program that could be implemented in the remaining two years of the project.

20. **Reallocation of USD 100 million for Drought Emergency Recovery Assistance (DERA).** Beginning in 2000, Pakistan was faced with a major drought, including severe water shortages in the major rivers and reservoirs that had a significant impact on agriculture and the overall economy. In April 2001, the GoP approached the Bank for emergency recovery assistance to mitigate the drought impacts. In response, the Bank agreed to allow use of funds from two ongoing projects, one of which was NDP, in which utilization of funds had been very slow. An amendment to the NDP legal agreements was approved by the Board of Executive Directors in July 2001 to create new categories to support the DERA components, and an amount of USD 100 million was allocated to these categories.¹ ADB also reallocated (USD 77.25 million) from its NDP loan to its drought recovery projects and two other irrigation projects.

21. **National Surface Drainage System (NSDS).** As called for in the NDP SAR, a pre-feasibility study of an NSDS was carried out from January 2001 to November 2002. This study envisaged a major drain, 1,464 km long, to carry drainage effluent from Punjab to the sea at an estimated cost of USD 575 million. The Bank fielded an independent PoE to review the Report and advise the Government. The PoE recommended that the proposed NSDS be deferred and that it be considered only if alternative approaches and measures—such as institutional and policy reforms, more efficient irrigation management, local stakeholder participation and management, and local drainage effluent disposal solutions—were not found adequate by themselves. The PoE, in its Draft Final Report of April 2003 (see Annex 5) also advised that further studies be carried out and their results incorporated in a proposed DMP for Pakistan.

¹ The funds allocated to DERA have been fully utilized or committed. The drought is continuing and its severity has once again increased. Severe water shortages are expected during the 2004–2005 winter crop season. GoP requested, and the Bank has approved, a further allocation of USD 35 million to the DERA categories.

22. **Implications of NSDS PoE Recommendations.** The PoE recommendations were endorsed by the Bank and the GoP. One implication of this was that the NDP investments in drainage would continue to be confined to: (a) rehabilitation of the existing system (essentially deferred maintenance and repairs) without increasing the drainage area;² and (b) investments to reduce the drainable surplus through improved water management, improvement of watercourses, channel lining, and institutional reforms, including greater farmer participation. See Annex 6 and Map 3.

23. **Drainage Master Plan (DMP).** The objectives of the DMP being prepared under the NDP project are to: (a) encourage and sustain increased agricultural production and improve agricultural productivity; (b) alleviate poverty and improve quality of life; (c) ensure equitable sharing of benefits accruing from investments and as far as possible target these benefits towards the disadvantaged; (d) encourage beneficiary participation in project formulation and construction, as well as in Operation and Maintenance (O&M); (e) reduce O&M liability of government to a minimum level; (f) minimize and mitigate adverse environmental impacts; and (g) improve the knowledge base of the planners, designers, executors and operators of projects. A draft of the DMP was completed in August 2004. At the request of the GoP, the Bank convened a PoE in September 2004 to review the draft DMP. The DMP PoE confirmed the finding of the earlier PoE that had reviewed the NSDS and rejected the concept of extending the LBOD or constructing major trans-basin drains.

24. **Project Outcomes.** While the NDP project did not bring about an increase in the area benefiting from new drainage capacity and facilities, it has had several positive outcomes. First, it helped to clear the backlog of deferred maintenance of the existing system (some parts of the irrigation and drainage system had had virtually no maintenance for several years). Second, although the institutional reforms component had a mixed performance, the need for the reforms was endorsed at the highest level of the GoP and the Provinces. Third, it was instrumental in the completion of key policy and sector studies that have paved the way for introduction of a National Water Policy and a drainage sector strategy for the country. Fourth, the project improved the knowledge base by providing funding for institutions and individual researchers and contributing international experience through study tours and use of international panels of experts. Fifth, the NDP project promoted farmer participation in the operation and maintenance of the irrigation system. Finally, the NDP project provided a forum for the discussion of long term options for the sustainable development of the Indus River Basin, and as a consequence, has raised awareness of the importance of sound environmental planning and management.

25. **Project Rating.** The project is currently rated as unsatisfactory overall, principally because of the *Institutional Reforms* component.

² The only exception is a battery of tubewells that would provide vertical drainage in the Mirpurkhaas area supported by ADB. These tubewells would be operated in situations where waterlogging reaches “disaster levels”— (0-150 cms from the surface).

- The *Sector Planning and Research* component is satisfactory: seven important policy studies have been completed and some seventeen sector studies are completed or about to be completed (see Annex 7). Similarly, the research component has performed satisfactorily;
- The *Institutional Reforms* component has had mixed performance. While Sindh has made substantial progress in mobilizing farmers in the pilot areas and in forming new institutions, progress in the other Provinces has remained slow. In Sindh, three AWBs were established, as were over 200 FOs, of which half have obtained operational autonomy (responsibility for O&M, authority to collect water charges). In Punjab, the proposed pilot AWB is not yet operational and while over 340 Nehri Panchayats (similar to FOs) have been established, only about 20 FOs are expected to be granted operational autonomy in the near future. In NWFP, one AWB and 20 FOs have been established. Balochistan withdrew from NDP after the MTR but rejoined in 2003;
- The *Investment* component was scaled down for various reasons, including lack of agreement within Provinces on a core portfolio of subprojects to be supported under NDP; inability to comply with the Framework for Land Acquisition and Resettlement (FLAR); and lack of an environmentally safe outfall for disposal of drainage effluent; and
- *Safeguard policy* compliance was first rated in December 1999 (Project Status Report – PSR, December 1999). Compliance with both the EA and Involuntary Resettlement policies was rated satisfactory. The rating for Involuntary Resettlement changed to unsatisfactory in 2001 due to continued disagreement with the GoP over the FLAR (PSR, December 2001). Based on subproject screening, the rating for compliance with the EA policy has remained satisfactory.

IV. SPECIAL ISSUES

26. The Request concerns three broad areas: losses the Requesters claim to have incurred due to poor design of the now-closed LBOD Stage 1 Project; impacts from the damage to the bunds of the Tidal Link and failure of the weir; and various issues with regard to NDP project implementation. Therefore, this section reviews issues related to LBOD as well as some broader issues of relevance to the NDP project. Another major concern of the Requesters, the extension of LBOD to the north, is no longer a part of the NDP project (see paras 21-23 and Annex 1, Item 7). Management's responses to specific claims are provided in Annex 1.

LEFT BANK OUTFALL DRAIN

27. In the early 1960s, the GoP started construction of a spinal drain system discharging to the Arabian Sea to dispose of the excess water of the lowland areas and reduce

flooding problems. A principal objective of the LBOD Stage 1 Project was to address the Indus Basin's drainage problems. The project was approved by the Board of Executive Directors in December 1984;³ it was implemented from September 1985 to December 1997, when it closed (after 4 years of extension).

28. Carrying the LBOD drainage, consisting of baseflow and stormwater, across the coastal zone to the Arabian Sea was considered important for several reasons. First, the drainage outflow from the system could not be emptied into the Shakoor Dhand and Rann of Kutch because these are international wetlands shared by India and Pakistan. Second, while the salinity of the drainage outflow is quite moderate compared to the Rann of Kutch, it was likely to contain a number of agricultural chemicals, nutrients, and industrial and domestic pollutants, and hence could not simply be disposed of in such a valuable wetland without possible risk to its important environmental values. Third, it was believed at the time that a sustainable direct outlet to the sea would need to be developed.

29. The adopted scheme for disposal of effluents included: (a) completion of the Spinal Drain (started in the 1960s and funded until then largely from GoP resources); (b) remodeling of the Kadhan Pateji Outfall Drain (KPOD) and the Dhoru Puran Outfall Drain (DPOD); and (c) a 26-mile Tidal Link canal, running from northeast to southwest across the Rann of Kutch and connecting KPOD to an active tidal creek, Shah Samando Creek. The canal physically separated the four major dhands⁴ (Sanhro, Mehro, Cholri, and Pateji) in the Sindh portion of the Rann of Kutch, from the rest of the Rann of Kutch. See Map 2.

30. As early as 1989, during preparation of the Environmental Impact Assessment (EIA) for LBOD Stage I, there were animated discussions among planners and civil society about the approach to effluent disposal. The 1989 EIA evaluated ecological impacts on the tidal creek, the coastal zone and the dhands. Exposing the dhands to the tidal fluctuations in the Tidal Link canal could have caused potentially serious ecological impacts. Therefore, the northern side of the Tidal Link canal was raised along the Pateji and Cholri Dhands and an overflow concrete-crested weir (Cholri Weir), 1,800 feet long, was constructed to protect the aquatic and marine ecology of the adjoining areas and to evacuate saline drainage water of the LBOD to the sea. The top of the weir was fixed at +4.5 feet above mean sea level (amsl) to prevent over-drainage of the dhands at low tide, and to allow the temporary flow of canal water into the dhands to attenuate water levels in the canal at high tide.

31. The LBOD was beneficial to Sindh agriculture and to the livelihoods of millions of people (see Annex 3). Among these benefits were increased agricultural productivity

³ The LBOD Stage I Project was financed by eight donors: for a total sum of USD 430 million (rounded) as follows: ADB (USD 169 million); IDA (USD 141 million); SFD (USD 43 million); ODA/DfID (USD 33 million); CIDA (USD 12 million); SDC (USD 10 million); OPEC Fund (USD 9 million); IsDB (USD 9 million); SDC/DfID/CIDA Trust Fund for M&E (USD 5 million). The Tidal Link component was funded by the SFD.

⁴ *Dhand* is the Sindhi word for the shallow lakes, depressions and wetlands commonly found in this region.

on more than half a million hectares (1.27 million acres); revival and expansion of agro-industries including rice milling, oil and flour mills, sugar factories and cotton ginning facilities; and greatly improved flood management in Sindh. All works under LBOD Stage I were completed except certain contracts pertaining to the remodeling of the Nara Canal, commissioning of the Jamrao Canal and some electrification works, which were carried over to the IDA-financed portion of the NDP project. None of these works pertain to the Requesters' claims.

32. **Status of the LBOD Environmental Management and Monitoring Plan (EMMP).** In 1997, the first series of baseline studies was carried out, covering avifauna, fisheries, water quality, and comparative land use. In 1998, an update of the 1995 EMMP was prepared for the LBOD Stage 1 Project, including the Tidal Link area, under ADB financing. The key mitigation measures identified in the 1989 EIA for the Tidal Link were incorporated in its design, but the lack of a complete baseline and continuing, systematic, scientific and well coordinated monitoring and study of the area remain critical issues. Apart from ongoing bathymetric and hydrographic surveys of the Tidal Link canal by the National Institute of Oceanography (NIO) and water table and salinity monitoring by WAPDA's SCARP Monitoring Organization (SMO), no further studies have been carried out, and no ecological monitoring, analysis or management of the situation in the area is taking place. More recently, based on its August 2004 mission, ADB has indicated that it is taking steps to ensure implementation of the LBOD EMMP, including a Stakeholder Consultation Workshop and implementation of monitoring activities.

33. An important consequence of the failure to implement the LBOD EMMP is the lack of public awareness of the need to sustainably manage both the fishery and the ecosystem of the dhands. Community mobilization and the creation of local mechanisms to sustainably manage the dhand ecosystem resources in collaboration with local authorities should be a central element of renewed efforts to implement a revised LBOD EMMP.

TIDAL LINK AND CHOLRI WEIR

34. **Damage to the Tidal Link and Cholri Weir.** Almost as soon as the Tidal Link began operating in June 1995 it experienced significant erosion and scour problems. In June 1998, undermining and erosion caused a 250 foot section of the weir to collapse. Many attempts were made to close the breached weir section, but all failed due to monsoon weather and the remoteness of the site. At the end of October 1998 the federal and provincial authorities and the consultants who visited the breach site jointly decided to stop further remedial works after the length of the breach in the weir had increased to 450 feet from the southern end. On May 21, 1999 a catastrophic tropical cyclone hit the Tidal Link area causing severe damage, which included the near total destruction of the Cholri Weir, and further breaches of both sides of the Tidal Link embankment in 56 places. Since the collapse of the weir and the cyclone breaches in the embankment, the water and salinity balance of the Tidal Link and the dhands have changed. The Tidal Link flow is no longer confined; instead, it is now intermingled with the flow to and from the dhands and the Rann of Kutch at every tide cycle. Details on the history of the Tidal Link are provided in Annex 8.

35. **Response of the Government and the Bank to the Damages.** In March 2001, the Bank fielded a Tidal Link Fact Finding Mission. The mission concurred with the view of the High-Level Technical Review Committee convened by the Government of Sindh (GoS) in May 2000 that, despite the damage, the Tidal Link was continuing to function (i.e., to discharge LBOD effluent to the sea with good gradient) and the ongoing channel evolution should stabilize sometime in the future, in a path that would generally follow the current alignment. It also agreed with the recommendations of the committee that no repair or remedial work should be undertaken for either the Tidal Link or the Cholri Weir until further monitoring provided a basis for formulating mitigation measures. The Bank Fact Finding Mission placed particular emphasis on the critical need to strengthen and expand the monitoring and study of the ongoing physical and morphological changes in the Tidal Link canal and the dhands, and of the environmental and socio-economic conditions in the dhands and their surrounding areas.

36. The PoE engaged to review the NSDS also considered the findings and recommendations of the Committee and the Fact Finding Mission. It agreed with the recommendations as given by the Bank Fact Finding Mission. The monitoring that is being done at present shows that after seven years without maintenance dredging, the discharge capacity has not been significantly reduced. However, from time to time maintenance dredging may be required to maintain the hydraulic performance of the drain outfall.

37. In a meeting chaired by the President of Pakistan on August 20, 2004 in Karachi, the Engineer in Chief of the Pakistan Army presented the findings of a review carried out on the July 2003 floods in Thatta and Badin Districts of Sindh. The review recognized the benefits that LBOD has provided to the Province as well as the need to address its limitations in order to enhance its performance. For example, it was recommended that the GoS, in consultation with and with technical support from WAPDA, analyze additional flood mitigation measures to prevent damage from future unusual storms.

38. The lower Badin area is characterized by severe poverty and harsh living conditions. Management acknowledges the disruption in livelihoods experienced during the extreme weather events in 1999 and 2003 (see Annex 1, Item 20). However, given the difficult circumstances of the lower Badin area, it cannot be presumed that these disruptions are attributable directly to the damage to the Tidal Link and failure of the Cholri Weir. The Fact Finding Mission acknowledged the environmental and social risks of these events and the Bank is supporting a diagnostic study to determine to what extent they have affected livelihoods (see para 45 and Annex 1, Item 17).

NDP PROJECT ISSUES

39. **NDP Implementation Delays.** Three aspects of NDP implementation were weak. First, the original intent to frontload implementation of major planning studies, such as the NSDS, was not realized. The DMP, while not specifically mentioned in the SAR, was seen as part of the NSDS study (Back-to-Office Report, July 10, 1995). Both the NSDS and DMP studies were initiated more than halfway through the project implementation period. If the studies had come earlier, they would have provided opportunities to focus on finding local drainage effluent disposal solutions, which was being emphasized in the

planning and implementation of subprojects. Second, the environmental management and planning studies that were upfront covenants in the ADB loan did not begin for four years and hence the ability of the project to benefit from the findings was reduced. Third, the institutional development component did not make much progress in Punjab, NWFP and Balochistan Provinces, although significant progress was made in Sindh.

40. **Project EA Categorization.** Environmental Data Sheets were prepared in April 1993, May 1995 and March 1997. In each case, the project was designated as Category B under OD 4.01. The rationale for assigning the NDP project to Category B was that a primary objective was to address environmental issues associated with irrigation. Significant, beneficial environmental effects were anticipated, i.e., the project would address problems such as waterlogging and salinity and mitigate the effects of sedimentation, soil erosion and water contamination. Capacity building to strengthen environmental assessment and monitoring was contemplated; investment subprojects would conform to environmental criteria and Resettlement Action Plans (RAPs) were to be prepared. The 1995 Data Sheet noted that ADB had prepared a detailed Environmental Report to update the DSEA and apply it to the more specific designs of NDP, but this document could not be located.

41. During the 1990s, the Asia environment department (combining what are now the East and South Asia environment units) of the Bank placed some relatively large projects in Category B (“the big Bs”). Such categorization appears to have reflected a premature (pre-EIA) balancing of possible adverse effects with positive effects, and a focus on individual infrastructure activities, without regard to their potential cumulative effects. Thus, a Category B for the NDP project was consistent with the Region’s practice at the time—it had potential environmental benefits and the investments were individually small- to medium-sized subprojects that had not yet been designed but would be subject to environmental and social screening. Management acknowledges that it would have been more appropriate to categorize this as an EA Category “A” project.

42. This practice of “big B” categorization has ceased. The creation of the Quality Assurance and Compliance Unit (QACU) in 2000 with its mandate to pursue quality and Bankwide consistency in the application of safeguard policies, examination of the portfolio by QACU and regular discussions among the anchor and Regions about safeguards have significantly improved the understanding of how projects should be categorized. In particular, there is now recognition of the need to consider potential regional and cumulative effects, the overall size of investment components and the use of the Category A designation as appropriate to projects with major risks.

43. **Compliance with Bank Safeguard Policies.** Management believes that the NDP project is in compliance with many of the requirements of OD 4.01 (Environmental Assessment), including preparation of a sectoral EA and requirements for screening of subprojects in a sector investment loan. Independent consultants to WAPDA, Pakistan Drainage Consultants (PDC), carried out environmental scoping and screening, social assessment and economic analysis for subprojects other than O&M. Subprojects were dropped or their design modified to ensure compliance with environmental and social requirements and guidelines. A Bank consultant further reviewed subproject appraisal re-

ports and conducted site supervision of ongoing works. Nevertheless, no report has yet been prepared on ex-post sampling, as required in the April 2000 MTR, to ensure compliance with the EA policy or the covenants concerning screening in the Project Agreement. Implementation of an Environmental Management Plan (EMP), required by the Project Agreement to cover the cumulative basin-wide environmental aspects and implications of the project as a whole, has not yet been achieved. Consultations on the DSEA appear to have been few, particularly with affected groups. With respect to disclosure of the EA (see Annex 1, Item 23), the NDP project was not in compliance with BP 17.50, Disclosure of Operational Information, since the DSEA was not disclosed prior to appraisal at the Infoshop and no records of disclosure in country could be located.

44. According to the PSR, OP 4.04 (Natural Habitats), OD 4.20 (Indigenous Peoples), and OPN 11.03 (Cultural Property) were not applicable. Natural habitats and cultural property issues were to have been taken into account in Initial Environment Scoping (IES) for investment subprojects as appropriate. As explained in Annex 1, Item 20, OD 4.20 on Indigenous Peoples does not apply to the Mallah community. With respect to OD 4.30 on Involuntary Resettlement (see Annex 1, Item 14), the FLAR was agreed to during negotiations but objections were subsequently raised by the GoP and agreement could not be reached. Therefore, no subprojects involving resettlement were financed by IDA.

V. RECOMMENDED ACTIONS

45. While a poverty-targeted intervention is certainly needed in the lower Badin area, Management believes that the NDP project is not the right instrument for this and further, that implementation of the NDP project has not worsened the plight of the people living near the dhands. The National Rural Support Program, with resources from the Pakistan Poverty Alleviation Fund (PPAF), has been active in Badin District for the last three years and has completed approximately 50 community infrastructure projects that have included watercourse linings, hand pumps and link roads, all aimed at improving livelihoods. The GoS High-Level Technical Committee (see Annex 2) reviewed the environmental and social effects of the cyclone damages to the Tidal Link and Cholri Weir and outlined a series of physical and other livelihood interventions targeting the population in areas prone to flooding in lower Badin. Taking into account the findings of the High-Level Technical Committee, the Bank will implement the following actions:

- Assemble a PoE to review the ecological, hydrological and water quality monitoring data in the LBOD outfall area and propose a course of action. This course of action would be developed within the next three to six months;
- Carry out a diagnostic study focused on livelihood improvements in the area, in consultation with GoP, GoS and the affected population, to determine the extent and severity of losses incurred and, in discussion with the district authorities in Badin, formulate a livelihood assistance program, taking into consideration the ongoing programs in the area. The diagnostic study will examine the relationships between economic, social and vulnerability concerns, and

natural resource management in the area, including the Mallah fishing community. This approach would be developed within the next three months; and

- Assist the GoP with a Country Water Resources Assistance Strategy (scheduled to be completed in June 2005) and Strategic Country Environmental Assessment, and work with the GoP, ADB and other partners in supporting environmental capacity building and management support for the water sector, building appropriate elements into the next Country Assistance Strategy, which is also scheduled for completion in June 2005.

46. Based on the findings and recommendations of the diagnostic study, the formulation of a livelihood program will take cognizance of other ongoing and proposed Bank-assisted activities, which also provide opportunities to address the three inter-linked concerns of poverty, environmental degradation and security from natural disasters. The Bank will urge the GoP and GoS to:

- Further target resources to the lower Badin area, from the PPAF, which is already supporting poverty alleviation activities in the district; and
- Improve the knowledge base and analytical capacity and consultation mechanism, through the proposed Water Sector Improvement Project (WSIP) currently under preparation, to support preparation of a water development and management plan for the Kotri sub-basin area, with stakeholder participation. This approach would also help implement recommendations of the Tidal Link Fact Finding Mission concerning a better knowledge base for assessing impacts and designing mitigation measures for the damage to the LBOD infrastructure.

VI. MANAGEMENT'S RESPONSE

47. The Requesters' claims, accompanied by Management's detailed responses, are provided in Annex 1.

48. Management believes that the Bank has made efforts to work with the GoP, ADB and JBIC to realize the objectives of an extremely large and complex Project. The Bank intends to pursue issues raised in the Request concerning Sindh Province with the Borrower so that the Requesters' concerns are addressed. Management believes that the Requesters' rights and interests are not, nor will be, directly and adversely affected by the manner in which the Bank has implemented its policies and procedures in the NDP project.

ANNEX 1 CLAIMS AND RESPONSES

| No. | Claim/Issue | Para no | Response |
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| Management wishes to clarify that many of the claims in the Request relate to the LBOD Stage 1 Project, which was closed in December 1997. However, as relevant, information on the issues and historical context is provided in the response. | | | |
| Environmental Assessment - OD 4.01 | | | |
| 1. | <p>Environmental Assessment. The Bank accepted the Drainage Sector Environmental Assessment (DSEA) prepared by the consultant on behalf of government of Pakistan. The DSEA focuses general environmental issues of the drainage sector in Pakistan. According to the assessment total saline effluents anticipated is 10.91 Maf (13.5 Bcm), of which, 60% is planned to be disposed directly into the sea through LBOD, but the assessment which was acceptable to Bank to fulfill the requirement of OD 4.01 is incomplete, vague and does not cover the issues like coastal ecology, safe disposal into Arabian Sea and environmental degradation of wetlands.</p> | 34 | <p>The DSEA (1993) was accepted by the Bank because it provides a strategic overview of the environmental issues of the drainage sector in line with the scope of the NDP project. It includes the following volumes:</p> <ul style="list-style-type: none"> • Volume I - Drainage Sector Environmental Assessment; • Volume II - Concept Framework for National Drainage Programme; • Volume III – Supplementary reports, including studies of issues specific to lower Sindh, comprised of: (a) Forestry; (b) Fisheries Sector; (c) Birds of the Wetlands of Pakistan; (d) Environmental Engineering Aspects (Assimilative Capacity of Drains); and (e) Role Framework for Institutions and Guidelines for Action (including Reference to Social Aspects); and • Volume IV – Water, Soil and Agriculture. <p>Further safeguards were built into the design of the NDP project. IESs were carried out for all subprojects except O&M. Full EIAs were to be prepared for subprojects whose IES indicated significant environmental impacts. Requirements for social assessments and the application of the FLAR were also agreed (SAR, paras 4.13, 4.15 and 4.16, Annex 1, Annex 7 and the SAR Implementation Volume). During the April 2000 MTR the subproject review and approval process was clarified such that IDA would need to review on a prior basis the first two subprojects in an investment category, regardless of cost, and thereafter, those that involved land acquisition/involuntary resettlement, cost over USD 5 million, or that were technically complex and worth review by a PoE, e.g., with major environmental issues.</p> <p>The 1989 LBOD EIA addressed the coastal zone issues referenced by the Requesters. Additional information on this is found in Items 5, 7 and 9.</p> <p>Analysis of alternatives during preparation of the draft DMP (currently under review by the Government and a PoE) concludes that there will be a substantial reduction in estimated drainage surplus (from 875 m³/sec to 33 m³/sec). See also Item 12.</p> |
| 2. | <p>EA Category. The project was classified into “B” category, but that was again in violation of the World Banks guideline provided in annex-E of OD 4.01. The para 5 of guideline mentions, that a full EA is required if a project is likely to have significant adverse impacts that may be sensitive, irreversible and diverse. The projects of irrigations, drainage and flood control, as well as those that have</p> | Box on 4.01 | <p>The principal objective of the NDP project was sector reform, It was designed as a program in which subprojects were identified and prepared on a three-year rolling plan, with environmental and social screening of individual subprojects, as indicated in Item 1, consistent with the requirements for sector investment loans. Nevertheless, Management acknowledges that it would have been more appropriate to categorize this as an EA Category “A” project.</p> |

| No. | Claim/Issue | Para no | Response |
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| | resettlement impacts, are listed in category A projects. (NDP is a large drainage projects and has sensitive, irreversible and diverse environmental impacts, and resettlement impacts.) | | |
| 3. | <p>Updating of EA. The DSEA was prepared in early 1990's and during that time LBOD was not operational so the technical problems of LBOD fall system was not obvious, however this study was not updated during the consideration of NDP loan in 1997; we believe that this is a violation of Bank policies. The DSEA also lacks public legitimacy because no civil society groups or affected people were consulted during the prepared of study.</p> | 35 | <p>In January 1996, the Borrower formally submitted, and IDA accepted, the 1993 DSEA as a sectoral EIA for the project. It was not updated as such, because the primary focus of the NDP project was sector reform and safeguards for each subproject were built into project design. These safeguards called for investment-specific environmental and social assessments to be prepared in a current timeframe. Substantial studies and research have supported updating of environmental information to complement the original DSEA.</p> <p>Environmental issues were addressed in the Second Preappraisal Mission, during which a limited IES was conducted jointly with the ADB to address key technical and institutional issues (Back to Office Report, July 6, 1995). The results were reviewed and recommendations developed by environmental specialists in WAPDA, major Pakistani environmental NGOs, ADB, and IDA.</p> <p>With respect to consultation, the IES was discussed at public meetings conducted by the NDP Program Manager and Provincial Cells in Punjab (Lahore), Sindh (Hyderabad), NWFP (Peshawar), and Balochistan (Quetta) in October 1995 (as described in the Environmental Management section of the SAR Implementation Volume). A widely attended Project Launch Workshop was also organized at the beginning of the project (January 1998).</p> <p>There were 38 subprojects identified in Sindh, of which 10 have been completed, 15 are under implementation and 13 were dropped or not implemented. Other than those for which screening was not applicable (e.g., surveys, and O&M contracts) and two subprojects that were carried over from the LBOD Stage 1 Project, IES was undertaken for the subprojects that were implemented in Sindh (see Annex 6).</p> <p>See Item 23 with regard to disclosure.</p> |
| 4. | <p>Alternatives. The feasibility and sustainability of entire NDP depends on the sound foundations of LBOD because it is a final disposal point of drainage effluents. The design of NDP has entirely ignored the current reality and the social and environmental problems of the existing disposal route, and never explored the alternatives. We have been suggesting an alternative since early 1980's when the LBOD was started... Implementing agencies, financiers including the World Bank, and the project consultants never listened to us. We believe and it is obvious after the</p> | 14-18 | <p>Management is of the view that preparation work for the NDP project, as well as the studies supported during its implementation, sought to consider all reasonable alternatives for disposal of Indus Basin drainage effluent.</p> <p>The DSEA (1993) considered the following alternatives (Chapter 5 of the DSEA Main Report):</p> <ol style="list-style-type: none"> Re-use of the tubewell drainage effluent from fresh groundwater (FGW) areas directly or after mixing with canal water. Recycling of the saline drainage effluent by disposal in nearby canals or rivers, keeping mixed water quality within permissible limits for re-use downstream. Disposal into lakes for temporary or permanent storage. Disposal in evaporation ponds. Disposal in the sea through a carrier drainage system (the LBOD). <p>See also DSEA Chapter 7, where surface, tile, tubewell and</p> |

| No. | Claim/Issue | Para no | Response |
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| | <p>operation of LBOD that this is not a viable and sustainable solution for the effluents disposal. However time-to-time the World Bank officials are persistent on the studies on NSDS and its justification. They have not been talking the other alternative options... We think that the way NDP has been planned and several mission recommendations are leading towards extending current LBOD system to upstream, against our wishes.</p> | | <p>biological alternatives for drainage are discussed, along with the "no-disposal" option.</p> <p>To explore these options further, the NDP project included provision for feasibility studies of the NSDS and related studies (see Annex 7). Item 6 provides further details regarding the NSDS.</p> <p>Contrary to the Requesters' supposition, there are no plans under the NDP project to extend the LBOD (see Item 7). Management also notes that none of the NDP project investments result in additional surface drainage load on the existing LBOD system.</p> |
| 5. | <p>Mitigation and Monitoring. The World Bank operational directive is very clear and elaborative on mitigation measures and OD 4.01 suggests the preparation of Environmental Management Plan. But in case of NDP after the lapse of six years there is no such EMP. In addition to EMP the DSEA also proposed Wetland Management Plan and environment monitoring and Audit but nothing has materialized in this regard. This is a clear violation of World Bank's safe guard policies. We believe that the delay in formulation of EMP leads to the environmental degradation and eliminates our trust that any such kind of plan will be formulated in and implemented. The environmental disastrous effects of LBOD have not even been mitigated. Due to these delay in the implementation of EMP of LBOD and non-formulation of EMP of NDP we are bearing the cost of environmental degradation including reduced fish catch, loss of agriculture land and forest, loss of grazing land and degradation of Wetlands. Consequently the combined effect of all these factors is impoverishing us.</p> <p>The appraisal mission ensures that the mitigation plan is adequately budgeted, and determines if the EA's recommendations are properly addressed in project design and economic analysis. (In case of NDP there is no EMP and no budgeting).</p> | 37, Box on 4.01 | <p>The design of the NDP project foresaw preparation under the project of an EMP, as described in the SAR and Implementation Volume (Section 11, Environmental Management). The NDP project is supporting various elements of environmental management. A Water Sector EMP – Framework for Action was developed under the NDP project in February 2002. Detailed design of the Water Sector EMP is under preparation. The Water Sector Framework also outlined a basin-wide Wetland Conservation Strategy. Development of a comprehensive Wetland Management Plan is called for. Separately, a Wetlands Action Plan has been developed by WWF in August 2000.</p> <p>With respect to the Requesters' claim that effects of LBOD have not been mitigated, the LBOD Stage 1 Project incorporated into its design the mitigation measures identified in the 1989 EIA to protect the wetlands. These were configuration of a Tidal Link canal to convey the effluents past the wetlands to the sea and construction of a weir to regulate the tidal influence and maintain an appropriate water balance in the wetlands. The first series of baseline studies under the EMMP for the LBOD Stage 1 Project was prepared in 1997 (see Item 16), but full implementation of the LBOD EMMP was delayed as a result of difficulties in institutional coordination. More recently, ADB has indicated in its September 2004 Aide-Memoire steps to ensure implementation of the LBOD EMMP, including a Stakeholder Consultation Workshop and the implementation of monitoring activities.</p> <p>Regarding livelihood issues, see Item 17.</p> |

| No. | Claim/Issue | Para no | Response |
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| 6. | <p>NSDS. Several documents both from government of Pakistan and World Bank indicate the extension of existing LBOD system and construction of National Surface Drainage System....The mid term review admits two major constraints that dramatically affect scope and pace of NDP. First, the absence of a master drainage plans and second agreement on inter-provincial drainage flows that ensure environmentally safe and sustainable disposal.</p> | 17 | <p>Examining the feasibility of an NSDS was among the agreed actions of the SAR (Annex 7). The NSDS pre-feasibility study, which did not begin until late January 2001, examined a “drainage superhighway.”</p> <p>In mid-2002, the GoP requested that the Bank provide an independent PoE to review the NSDS. The Panel found (see Annex 5, Executive Summary of the PoE Report, April 2003) that the “drainage superhighway” concept was not feasible.</p> <p>During the same time period, and following the second NDP MTR (April 2001), the GoP recognized the importance of developing a DMP and National Drainage Accord. The International Waterlogging and Salinity Research Institute (IWASRI) began preparation of the DMP in March 2002.</p> <p>In September 2004, a PoE for the DMP carried out a review of the interim findings of the DMP studies, and made recommendations on the next steps for the DMP planning process. It also confirmed that the “drainage superhighway” concept was not feasible.</p> <p>Further studies of drainage and water management are being pursued through the DMP. For example, the PoE has developed terms of reference (TORs) for water management plans for Kotri Basin and trained local technicians in how to develop drainage plans. As part of the DMP, state of the art DRAINFRAME methodology will be used as a pilot to analyze two major basins – Kotri in Sindh and Chaj in Punjab.</p> |
| 7. | <p>Extension of LBOD. We have a serious threat due to the extension of LBOD without looking into the environmental issues at disposal point and sea intrusion. The same has been identified in Environmental Management Plan Frame Work Sindh Province. The plan identified two key mitigation measures that are needed to counter trend several obvious potential major negative impacts of an NDP on – a National Surface Drainage System (NSDS) guaranteeing environmentally-acceptable modes of disposal to the sea for all unwanted effluents and a Wetland Management Plan (WMP) to sustain the many ecologically important wetlands.</p> | 28 | <p>There are no plans under the NDP project to extend the LBOD. The NDP project has not financed any expansion of the area drained into LBOD. The incremental drainage resulting from the tubewells installed under the ADB-financed components of the NDP project is controlled so that the tubewells do not operate during storm events, and therefore do not increase the peak flood flows that must pass through LBOD. Moreover, as noted above, the “drainage superhighway” option has been rejected by two independent PoEs composed of local and international experts. The PoE recommendations were accepted by the government.</p> <p>The 1989 LBOD EIA addressed the environmental issues of the disposal point, as described in Item 9. Extensive field studies of avifauna in the Tidal Link and adjoining areas and a fisheries survey of the dhands in Badin, were completed in 1997 (see Item 16).</p> <p>In addition, many studies and competitive research grants (see Annex 7) have been financed under the NDP project to improve the knowledge base on environmental and drainage issues in the Indus Basin.</p> |
| 8. | <p>Land Loss and Salinity. This phenomenon of sea intrusion has already destroyed the agriculture land. The loss of topsoil due to flooding is a common and hundreds of acres of coastal land are gradually being converted into sea. Thousands of acres of our land have been encroached by</p> | 29 | <p>Lower Sindh is an extremely flat delta region, prone to intense monsoon storms that produce high rates of excess rainfall and extensive shallow flooding. Cyclones raise the sea level, further impeding drainage. Because of the low drainage capacity of this area, the naturally recurrent seasonal flooding tends to persist for long periods, adversely impacting health and livelihoods in the area. Limited isolated erosion is occasionally associated with this flooding.</p> |

| No. | Claim/Issue | Para no | Response |
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| | <p>sea and this process has accelerated after the collapse of Tidal Link and Cholri weir, we have shared these concerns during the process of participatory poverty assessment in Sindh. Hundreds of farmer families have been pushed to live under extreme poverty. In case of increasing the drainage flow; this problem of land loss will be scaled up. In addition to loss of topsoil the problem of secondary salinity will also rise. In case of overflowing, breaches in Tidal Link and KPOD the saline effluents will just spread around the agriculture land, thus add into soil salinity.</p> | | <p>The objective of the LBOD Stage 1 Project was not only to dispose of drainage effluent to the sea, but also to improve the disposal of excess rainfall and runoff, thereby reducing inundation and land loss. As noted in Item 7, investments under the NDP project have not increased excess rainfall, runoff, or peak flood flows, and therefore have not exacerbated flooding nor led to increased land loss due to erosion.</p> <p>In June 1998, a section of the Cholri Weir on the Tidal Link collapsed. Several attempts to repair it failed because of continuing erosion. In May 1999, a cyclone hit coastal areas of Sindh; the banks of the Tidal Link were damaged at numerous locations and the Cholri Weir was further damaged.</p> <p>The 2001 Bank Tidal Link Fact Finding Mission (see Annex 8) concurred with the judgment of the GoS's High-Level Technical Committee that the damages done by the 1999 cyclone to the Tidal Link and the Cholri Weir were beyond repair. The mission also indicated that the Tidal Link was continuing to discharge drainage effluent to the sea with good gradient, but observed as well that salinity had increased in the Tidal Link up to RD-35¹ (the dhands are at roughly RD-93) as a consequence of the comingling of the much more saline waters of the Rann of Kutch and the dhands with the Tidal Link flow. The mission strongly recommended that monitoring of water levels and bed levels in the Tidal Link, and environmental conditions including salinity, be continued to help determine trends.</p> <p>The salinity of the dhands has probably changed as a consequence of the damage, but that has not yet been ascertained empirically. Data collection now being carried out at five points along the Tidal Link will help to improve the understating of the changes that are occurring. However, drainage effluents alone would not be the cause of increased secondary salinity, if it has occurred.</p> <p>In July 2003, most parts of Sindh, particularly the southern districts, received very intense and heavy rains and the resulting flooding by surface runoff was far greater than the LBOD was designed to handle. After the 2003 floods and resulting damage, the GoP requested the Bank for assistance under the NDP project for emergency repairs to the LBOD system. The Bank approved the use of NDP funds for emergency repairs to KPOD (the drain connecting to the Tidal Link Canal at the end of the LBOD Spinal Drain), although many of these were ultimately undertaken directly by the GoP on an emergency basis.</p> <p>Regarding livelihood issues, see Item 17.</p> |

¹ Where a canal starts the point is usually marked as RD 00. Going downstream on a canal, the RDs increase. The point where a drain ends or its outfall point is marked as RD 00. Moving upstream on a drain, the RD values increase (opposite to that of canals). Negative RD values occur in measuring distance beyond the end point or outfall point of a drain. In the LBOD drainage complex, the Tidal Link starts where KPOD ends. Treating the Tidal Link as a continuation of the KPOD drain, its RDs start with a negative value, which keeps increasing until the point where it meets the sea.

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| 9. | <p>Ecological Effects. The proposed drainage network will badly affect the already degraded environment of Indus Delta. There is no fresh water available to add to the ecological value of delta, which is essential for coastal forests and marine life. In the absence of fresh water, disposing toxic drainage effluents will destroy the remaining resources of marine fisheries and mangrove forests. The drainage effluents comprise not only the saline sub-soil water but also it accumulates along the way the residuals of pesticides, fertilizer and industrial waste.</p> | 30 | <p>Management believes that the NDP project is being implemented in a manner that does not add to or exacerbate the environmental problems of the already degraded Indus River Delta or the coastal zone. Moreover, the LBOD will not be extended under the NDP project.</p> <p>The 1989 LBOD EIA examined the potential impact of the LBOD outfall on the coastal environment, and found that:</p> <ul style="list-style-type: none"> • The mangroves near Shah Samando Creek (the outlet of the Tidal Link Canal) were in poor condition, and the LBOD discharge would not be likely to have any effect on the them; • The discharge would mix rapidly with creek water, which is of higher salinity, and would not be likely to affect creek salinity significantly; but, • The discharge of pesticides and other effluents through LBOD appeared to be a potentially serious hazard. <p>In 2002, under the auspices of the NDP project, the Sindh Environmental Protection Agency (SEPA) monitored water quality in various water bodies in Sindh, including the Indus River, various lakes, drains and the Tidal Link. The principal pollution found was human waste in the canals and drains (Pilot Water Quality Monitoring Program in Sindh, November 2002, SEPA). In the Sindh On-Farm Water Management Project, a pest management plan incorporates both monitoring and measures to reduce pesticide use.</p> <p>The ADB is leading the development of a regulatory framework to better manage disposal of domestic and industrial effluents in selected pilot drains (Satokatia in Punjab, Pinyari Canal in Sindh, Budni Nullah in NWFP and Habib Drain in Balochistan). This includes the establishment of a database management and information system at federal and provincial levels, initiation of wetland management activities, and a training program for environmental staff.</p> <p>Quite independent of the NDP project, there are serious problems in the Indus River Delta. The ecological impacts of the drastic change in freshwater flow and reduced sediment load reaching the Delta brought about by the development of the Indus Basin irrigation system (especially since the 1960s) are the subject of intense interest and debate in Pakistan. The Delta is affected by the process of coastal erosion aggravated by the change in flow regime and the loss in sediment due to the development of Pakistan's irrigation system—the largest contiguous irrigation system in the world—built over a period of more than a century. Pakistan's National Oceanographic Institute has calculated that the original sediment deposit was in the order of 400 million tons a year but currently it is only about 35 million tons a year.</p> <p>The dispute among the Provinces is over the nature of the damage and costs caused by the changes in the hydrologic regime of the Indus River and the amount of minimum freshwater flow that should be "allocated" below Kotri, the last diversion structure on the Indus, to mitigate this damage. In an effort to resolve this dispute and mitigate the damage, the GoP is in the process of commissioning three studies. Two of these studies would examine the ecology and salinity of the Indus River Delta</p> |

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| | | | and the minimum environmental flow requirements below Kotri Barrage. The third study would look at the downstream environmental impact of the eastern tributaries of the Indus river, whose waters were allocated to India under the 1960 Indus Waters Treaty between India and Pakistan. The Bank has agreed to finance, from another ongoing project, a PoE to review the findings and recommendations of these studies once they have been completed – expected by April 2005. |
| 10. | <p>Water Quality. The tidal effect restricts the drainage flow for two times in twenty-four hours this fight between drainage effluents and sea tides continues for about 4-6 hours, thus entirely blocks the drainage effluents. The standing drainage effluents seep into both sides of KPOD up to RD 110, negatively effects ground water quality, which is a single drinking source, thus causing severe impact on human health.</p> | 32 | <p>The tidal effect and the Cholri Weir were essential hydraulic features of the Tidal Link design which, under the LBOD Stage 1 Project, had the specific aim of mitigating drainage and tidal environmental impacts on the dhands. The tidal effect does not prevent flow from KPOD to the sea.</p> <p>No specific information has been found regarding groundwater quality or drinking water sources in this specific location (either side of KPOD up to RD 110).</p> <p>In general, most groundwater in the region is saline. The primary source of drinking water is usually the freshwater from the canal system. Besides direct use of canal water for drinking, hand pumps are used along canal banks to tap water seeping from canals. In areas served by non-perennial canals, water is stored in ponds for later use.</p> <p>Under the ongoing DERA, for which funds from the NDP Credit were allocated in 2001, drinking water supply schemes have been supported in several areas of Sindh, including the district of Badin where KPOD is located.</p> |
| 11. | <p>Consultation. Local communities, and especially the affected people of coastal belt, have been kept entirely unaware about the plans of NDP and its environmental assessments. The project planning process remained the business of a few bureaucrats and donors while project implementation remained non-transparent and hence failed to obtain informed consent or meaningful participation since the inception. We were entirely unaware regarding NDP until the rains of 2003, when we were informed that more effluents would be added in existing LBOD system.</p> <p>Para 8 of annex-D of OD 4.01 mentions, "In addition, in view of the need for the borrower to take the views of affected groups and local NGOs into account, the Task Manager ascertains the nature of the consultations undertaken with such groups and assesses the extent to which their views have been considered." (In case of NDP no such consultation has been</p> | Box on 4.01 | <p>During preparation of the DSEA, government stakeholders participated in a scoping session that was held in October 1991. This was followed by a workshop on EA held at Lahore on April 8-9, 1992, at which 27 professional representatives took part. A second round of workshops was held in Lahore and Karachi in September/October 1992 (DSEA, Main Report, Volume I).</p> <p>Given that NDP was a national program, the project was a vehicle to bring together concerned government agencies and NGOs/CBOs in all Provinces for open and transparent discussions. Consultations were held during the project preparation phase with representative NGOs, FOs and CBOs to define the overall program and to outline the consultation and appraisal criteria and process for individual subprojects. Local consultations were carried out during preparation of subprojects. See Annex 9 for additional detail.</p> <p>During 1997-1998, the NDP project facilitated engagement with NGOs throughout the country, and helped to put in place a partnership framework. This was used as a basis to invite the Pakistan NGO Federation to nominate representatives to the Coordination Cells and the Provincial Steering Committees.</p> <p>In Sindh, the list of NGOs/intermediaries included Dharti Dost, Oxfam, Strengthening Participatory Organization (SPO); Sindh Agricultural and Forestry Workers Organization (SAFWCO); IIMI (now IWMI-International Water Management Institute; Worldwide Fund For Nature (WWF); Trust For Voluntary Organizations (TVO); Non-Government Organization Resource Center</p> |

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| | conducted for EA). | | <p>(NGORC); Sindh Ngo Forum (SINGOF); International Union for the Conservation of Nature (IUCN); Sindh Goth Sudhar Sangath (SGSS), Water Users Federations, Thar Rural Development Program and others.</p> <p>A briefing note with basic information on the NDP project was translated and shared with participants in advance of the meetings, which were open and included media representatives.</p> <p>The Bank team also visited local communities in Badin and other areas. The team met with local community groups and farmers and obtained feedback. The team also interacted with local intermediary organizations in the field and invited them to join on these visits.</p> <p>In March 2004, the Task Team Leader had a meeting with the Forum for Conflict Resolution and the Sindh Agricultural Forum. More recently, in September 2004, the PoE of the DMP held stakeholder consultations in Badin and Hyderabad, which representatives of ActionAid attended. They also participated in the final workshop in Islamabad with the GoP and representatives of the Provinces.</p> |
| Involuntary Resettlement | | | |
| 12. | <p>Flooding Potential. Though the NDP is being implemented in entire Indus Basin Irrigation System, which geographically covers whole country, but the specific location of drainage disposal has certain peculiarities. The southern part of Pakistan, where the proposed up country effluents will be disposed has a less gradient, more flat topography and bestowed with natural shallow water depressions and vegetation. There are several thousand people who entirely depend on local dhands/fishing, grazing and agriculture. Keeping in mind the experience of LBOD, we can easily predict that incoming saline water will cause huge flooding and having no other option we have to leave our ancestral villages. This type of displacement is even not considered in project documents even though it will occur due to the consequences of project outcome.</p> | 19 | <p>Areas of lower Sindh are always prone to flooding. Indeed, the extent and duration of flooding were greater prior to construction of works under the LBOD Stage 1 Project.</p> <p>Management believes that the implementation of the NDP project has not and will not exacerbate flooding. As explained in the response to Item 7, the IDA-financed subprojects have been limited to repair and rehabilitation of existing drains and there is no plan to finance any new drains.</p> <p>The PoE that convened to review the NSDS pre-feasibility study rejected the option of disposal of the entire Indus Basin drainage effluent through a "drainage superhighway" to the sea. Therefore, the type of flooding feared by the Requesters will not occur as a result of disposal of drainage effluents in the lowland areas of Sindh. The disposal strategy recommended by both PoEs (for the NSDS pre-feasibility study and the DMP) relies primarily on local disposal options, such as evaporation ponds, saline agriculture, improved irrigation practices and basin management.</p> <p>Livelihood issues are addressed in Item 17.</p> |
| 13. | <p>Land Acquisition. We have a fear that in the phase of expansion of KPOD, DPOD and spinal drain several thousand acres of land will be required. We have already sacrificed for existing system and left with meager resources for livelihood, in case of expansion, we might lose remain-</p> | 20 | <p>The Bank has no plans to support expansion of KPOD, DPOD or the Spinal Drain. Under NDP Bank supported activities, the only works proposed for KPOD are repairs.</p> <p>IDA funding has not supported any subprojects that require land acquisition or resettlement. Subprojects that would have needed land acquisition were excluded because of lack of agreement on the FLAR and the implementing agency's capacity to apply it. See also Item 14.</p> |

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| | ing land. | | |
| 14. | <p>Resettlement Framework. The government of Pakistan prepared and submitted to the World Bank A Framework for Land Acquisition and Resettlement (FLAR) in 1996, which is quite vague and does not mention the location and quantity of land required. The FLAR does not give time frame of compensation payment and credible economic rehabilitation of project affectees. The government has since disowned even that half-hearted FLAR. We think that our land will be acquired under land acquisition act of 1894 for expansion of KPOD, without proper compensation and resettlement and in violation of World Bank policies. There was no resettlement Action Plan (RAP), a fact that was recognized but not corrected at the time of the mid term review of NDP in year 2001 and mentioned by the Bank mission “during the March 2000 supervision mission, it was agreed that the Pakistan Drainage Consultants will prepare TORs for the preparation of RAPs”, to date no TORs have been prepared, and no consultants engaged to prepare RAPs.</p> | 22 | <p>The FLAR that was agreed by IDA and the GoP laid out the legal, institutional and implementation framework to guide compensation for assets lost, resettlement and rehabilitation involving project affected persons (PAPs) adversely affected by any subprojects under NDP. The FLAR required detailed field investigations including census, inventory of affected assets and preparation of appropriate RAPs or mitigation plans for subprojects that require land acquisition. Details on PAPs and entitlements were not included in the FLAR because these were to be included in subproject RAPs.</p> <p>The FLAR was originally prepared in January 1996 and after much discussion was officially approved by the GoP and agreed with IDA, as noted in the SAR. However, during the Project Launch Workshop, in January 1998, WAPDA project directors raised objections to a number of provisions of the framework. Following further discussions with project officials during the April 2001 MTR (see Annex 7 of the Aide-Memoire), revisions to the FLAR were proposed in May 2001. However, no agreement was reached; the position of the Provinces was that: "Law of the land is comprehensive and takes care of all the concerns involved in RAP/FLAR." In view of the decision to include only those subprojects that do not involve land acquisition and resettlement in the IDA financed investment component, further discussions with the GoP on the FLAR were not pursued.</p> <p>TORs for engagement of RAP consultants and RAPs were not prepared because the subprojects did not involve land acquisition. With regard to the Requesters' specific concerns, there is no land acquisition involved in the repairs and rehabilitation of the KPOD.</p> |
| 15. | <p>Losses Incurred. KPOD drain and Tidal Link has blocked all runoff water to move to Rann of Kutch and other grazing areas. This caused declining of vegetation to the south of KPOD, loss to forest species and decreased grazing areas. It impacted on the livelihood of local communities and finding no other alternative these people have migrated. Just two villages are settled now with less population in the southern side of KPOD in Rann of Kutch. While before there were about 10 villages. The area was green with several species of gross and forest trees, but when the water source has been blocked by KPOD this area desertified and could not support the life.</p> <p>Another shock witnessed by us during monsoon rains of 2003. We are</p> | 23-27 | <p>While this claim refers to the closed LBOD Stage 1 Project, Management is of the view that the ongoing work supported by ADB under the NDP project to support and strengthen implementation of the LBOD EMMP will help to mitigate residual environmental and social impacts of the LBOD system.</p> <p>Stormwater runoff occurs on both the left and right banks of LBOD (and south side of KPOD). Runoff on the left bank of LBOD spreads in the areas on the left bank (including grazing areas). The runoff also goes through the DPOD to the Shakoor Dhand and thence to the Rann of Kutch. Also, whenever the flow in LBOD exceeds 2,000 cubic feet per second, stormwater flows, including those generated on the right bank, go into the DPOD and onwards to Shakoor Dhand.</p> <p>Assessments carried out by the GoS and WAPDA after the 2003 monsoon storm concluded that this was an extremely rare event. The volume of rainfall associated with this storm, which caused extensive flooding, was larger than that of any other storm on record. The extremely heavy rainfall in both the upper and lower basins, accompanied by farmers breaching embankments to drain their fields and by a high tide, resulted in surface runoff that was four times the design capacity of the LBOD drain-</p> |

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| | <p>live witness of the episode that how the water of KPOD and Kotri barrage surface drains flooded about 75 villages. The study conducted by national NGO ActionAid observed that the failure of the drainage system portrays the entire coastal strip of Sindh as a drainage bowl, destroyed Tidal Link indicate that saline water of LBOD, instead going into the sea, is continuously destroying the Badin District lands. The newspapers reported that one hundred and sixty dehs (indicates a small revenue unit in Pakistan) are completely under inundation, where agriculture crops standing over 200,000 acres has been destroyed and more than 200,000 villagers have been rendered homeless for couple of months. In single union council, which was worst hit by KPOD flowing water in villages, 32 people died due to drowning in drainage water. There were 14 major breaches observed in KPOD from RD 20 to RD 180.</p> | | <p>age system. The existing drainage system, including LBOD and the drains improved under the NDP project, was overwhelmed by the unusual magnitude of the storm.</p> <p>Management acknowledges the effects of the monsoon rains of 2003 on the community. See also Item 17.</p> |
| Natural Habitats – OP 4.04 | | | |
| 16. | <p>Ramsar Sites. The Wetlands of Sindh especially mentioned below form an important component of a major migratory route for waterfowl known as the “Indus Flyway.” They are important wintering, nesting and staging grounds for a large number of locally and globally important bird species... Two species of marine turtles inhabit the area... The wetlands, channels and creeks are also a productive fishery source... The western margin of the Rann of Kutch, where the drains enter the coastal zone, consists of a number of small, interconnected lakes called dhands in Sindh... Two of these dhands have been internationally recognized as a Ramsar sites because of their significance for migratory birds and other significant biodiversity and ecosystem values... Under the obligation of Ramsar treaty the government and donors have to ensure the wise use and conservation</p> | 38, 40 | <p>The NDP project has not supported investments that directly affected the two dhands designated as Ramsar sites or any other sensitive wetland areas.</p> <p>Nurri (2,540 ha) and Jubho (700 ha) Lagoons were designated as Ramsar sites in October 2001, about four years after the NDP project was approved. According to their Ramsar listings, which confirm their importance for migratory waterbirds, neither site is explicitly protected under any environmental legislation, nor have management plans been prepared. More detailed assessment is required to determine if these sites are affected by the breaches in the Tidal Link Canal and the collapse of the Cholri Weir. The Rann of Kutch was also designated as a Ramsar site in November 2002.</p> <p>Long before these sites were given Ramsar status, and before the NDP project was initiated, the environmental importance of these sites was recognized, and the design chosen for the Tidal Link connecting KPOD to the sea incorporated measures for their protection and conservation. In addition, the LBOD EMMP proposed that extensive studies and monitoring be carried out to ensure their sustainable management.</p> <p>In 1997, the first series of baseline studies was carried out as part of implementation of the LBOD EMMP. These studies included avifauna (Zoological Survey Department, 1997), fisheries (University of Sindh, Jamshoro, 1997), and comparative land use (Mott MacDonald Limited, 1998). Because of a dispute between</p> |

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| | of wetlands defined, recognized and protected by the convention The World Bank is not supposed to provide support to projects that would contravene a government's requirements under international environmental treaties and agreements. | | <p>the GoS and WAPDA, work on implementation of the LBOD EMMP was stalled and is only now being re-initiated with ADB support under the NDP project.</p> <p>NDP project design recognized the importance of wetlands (SAR, Section 4.19) and included a process of environmental screening and assessment to take into consideration impacts on natural habitats (see Item 1). The NDP project also called for development of a Wetland Management Plan, intended to establish measures to improve wetlands protection.</p> |
| 17. | <p>Livelihoods. These dhands (wetlands) provide livelihood resources to the forty villages of fishermen having a 12000-15000 population and living around these water bodies. There is no other livelihood source.</p> | 39 | <p>The 2001 Tidal Link Fact Finding Mission summarized the physical and socio-economic conditions of the dhands area based in part on the available 1997 studies and concluded that socio-economic conditions in the area are very poor.</p> <p>While a poverty-targeted intervention is needed in this area, Management believes that the NDP project is not the right instrument for this and further, that implementation of the NDP project has not worsened the plight of the people living near the dhands. The National Rural Support Program, with resources from the PPAF, has been active in Badin District for the last three years and has completed approximately 50 community infrastructure projects that have included watercourse linings, hand pumps and link roads, all aimed at improving livelihoods. Recognizing the extraordinary circumstances of the 2003 floods, in consultation with the GoP and GoS, Management proposes to carry out a diagnostic study to determine the extent and severity of losses incurred and, in discussion with the district authorities in Badin, formulate a livelihood assistance program, taking into consideration the ongoing programs in the area.</p> |
| 18. | <p>Tidal Link Canal. The idea of linking the KPOD with Shah Samando creek through Tidal Link that was passing through these wetlands (dhands) was entirely unsound. Before the implementation of LBOD, these drains were receiving water from Kotri drains, rainfall and surface runoff in the monsoon season. The construction of Tidal Link prevented the water of Rann of Kutch during wet years to enter into dhands and the fall of Kotri barrage surface drains into KPOD also reduced flow towards dhands. The decreasing water flow to dhands reduced the areas of dhands. The 1989 EIA for the LBOD determined that the most important effect of the Tidal Link on the dhands would be excessive drainage due to the tidal fluctuations. However no measures were taken to preserve and prevent such kind of situation.</p> | 42 | <p>This claim refers to the closed LBOD Stage 1 Project.</p> <p>The 1989 LBOD EIA determined that the most important effect of the Tidal Link on the dhands would be excessive drainage due to tidal fluctuations, if no measures to mitigate this effect were taken.</p> <p>The design combination of the Tidal Link Canal and the Cholri Weir was intended to mitigate these adverse effects. However, a series of structural problems, compounded by the 1999 cyclone, damaged the Tidal Link Canal and rendered the Cholri Weir inoperable, severely limiting the efficacy of these mitigation measures. The Tidal Link Fact Finding Mission reviewed the current status of the Tidal Link canal and the weir as well as implementation of the physical and environmental monitoring programs. The mission stated that "the uncertainty about the future outcome of the active channel processes in the Tidal Link, the cost and viability of various rehabilitation options, and the environmental risks associated with the conditions developing in the dhands strongly indicates the need for an effective monitoring program that would help to understand the trends and help to define feasible and sustainable mitigation measures."</p> <p>The 1989 LBOD EIA also determined that additional, temporary inflow of drainage water from KPOD, which occurs at high tide when backwater raises the water level in KPOD, would not have an adverse effect. This inflow could also offset the loss of</p> |

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| | | | <p>water from the Rann of Kutch in wet years, further stabilizing the water balance in the dhands.</p> <p>With regard to recommended actions, see paras 45-46 of the main text.</p> |
| 19. | <p>Damage to the Ecosystem. The degradation of these important wetlands has caused severe damage to the ecosystem, habitat and fish catch. Although both the technical committee of the Government of Sindh and World Bank fact-finding mission recognized these issues after the 1999 cyclone, no measure was taken to prevent or mitigate the situation. Under the section of "risk" the fact finding mission mentions that "the first major risk is that the outcome anticipated by the Technical Committee, i.e. that the Tidal Link stabilizes and functions adequately but the uncontrolled connection between the canal and dhands remains, results in substantial and irreversible damage to the ecosystem, habitat and fishery in the dhands. The large diurnal fluctuations in dhand water level may change conditions in the dhands sufficiently to cause severe degradation to the ecosystem and loss of biodiversity and key qualities of the waterfowl habitat. The changes in biodiversity and habitat noted above could adversely affect the fishery reducing yields particularly of commercially important species."</p> | 46 | <p>The recommendations of the Tidal Link Fact Finding Mission (see Annex 8) were that no repairs be undertaken (as also recommended by the GoS's High-Level Technical Committee) because the damage was beyond the limits of possible repair, and the channel was continuing to actively evolve. The mission also recommended a renewed and strengthened monitoring program with increased emphasis on data analysis (see also Item 8).</p> <p>While data collection coordinated by WAPDA-South has continued (see Memorandum of Understanding between SMO-WAPDA and National Institute of Oceanography, March 1999), the strengthened program of monitoring and analysis has not been undertaken as recommended, and as a result, mitigation measures have not been identified and decided.</p> <p>Because the LBOD EMMP is in the early stages of implementation, it will take some time before solid data becomes available with which one could assess the specific changes taking place in the dhands. Anecdotal evidence, including the movement of the fishermen from the dhands to the Tidal Link channel, suggests there have been changes in the composition and yield of the fishery, but there is no systematic data on which to understand the changes and formulate mitigation measures.</p> |
| Indigenous Peoples – OD 4.20 | | | |
| 20. | <p>Mallah. The majority of coastal communities belong to Mallah, who from their forefathers are engaged in fishing. These groups of people are classified indigenous people, because they have close attachment to ancestral territories and natural resources in this area... There are more than 60 villages of this community with the population of 25,000 and engaged in fishing at both sea and contiguous wetlands... The operation of LBOD has brought significant changes in the lives of these people. The two-mega shocks mentioned earlier one cyclone in 1999 and other monsoon rains dur-</p> | 49-51 | <p>The Mallah in Sindh were originally involved with guiding people at sea; the word Mallah in Sindhi derives from this activity. They are longtime, Sindhi-speaking Muslim inhabitants of the Province. Their principal occupation is fishing although some have also moved into agriculture. The fishing community is considered to form part of the mainstream in Sindh by a majority of the Province's population. The GoP does not have a classification for Indigenous Peoples.</p> <p>The Mallah fishing community does not meet the criteria specified in the Bank's OD 4.20 for classification as Indigenous People because it: (a) does not have an indigenous language distinct from the mainstream language of the region; (b) lacks customary social and political institutions; and (c) is not identified by others as a distinct cultural group.</p> <p>The lives and livelihoods of the Mallah fishing community were not disrupted in 1999 and 2003 by the LBOD and Tidal Link.</p> |

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| | <p>ing 2003 have changed the economic base of these people. Both these shocks were interconnected with the operation of LBOD and aggravated by the overflowing and breaches in KPOD and Tidal Link. In both these two tragic events the Tidal Link Canal and KPOD inundated their villages, damaged houses and some families even lost their family members...Already poor, these communities were pushed into further absolute poverty.</p> | | <p>These facilities were overwhelmed by two storms of very great magnitude, and the flooding that occurred during these extreme events would likely have been worse had the LBOD and the Tidal Link not been in place. However, no studies have been undertaken to date to determine impacts on this community that might stem from the changed water regime of the dhands.</p> |
| 21. | <p>Poverty Impacts. The NDP has not taken into account the poverty and impoverishment of indigenous people and is also unable to anticipate the negative effect of proposed NDP interventions on the already miserable conditions of these poor fishermen. We believe that proposed NDP investment will pose serious threat to the lives, livelihood and rights to development and culture of indigenous groups guaranteed under several international covenants. The project will inequitably distribute the costs and benefits. The marginalized and vulnerable group of indigenous communities as usual will be looser in this game. Again the worst affected will be women due to gender inequality in society.</p> | 52 | <p>The NDP project has been implemented under diligent procedures for social and environmental assessment and screening for each subproject. There are no “proposed NDP investments” that extend the LBOD, materially change conditions in the KPOD or Tidal Link areas, or otherwise threaten people’s lives or livelihoods.</p> <p>The SAR (Section 4.13, Annex 1 and Annex 7) and subsequent implementation guidelines require social assessment and screening of each subproject under the NDP project. The vulnerable groups to be identified in social assessments for subprojects include low income groups (small farmers) women and the lowest one third in the income range (including landless and tenants). All social and economic groups that are disadvantaged are thus encompassed. The checklists and assessments at the subproject level aim to ensure that potential adverse impacts are mitigated and that proposed interventions maximize project benefits, including employment creation, for identified vulnerable groups.</p> <p>The process and procedures suggested for social and environmental screening were followed during preparation of the NDP subprojects. Since these subprojects mainly consisted of rehabilitation and improvement of existing infrastructure, detailed social assessment was not considered necessary. The NDP project has not supported interventions in the dhands or the Tidal Link. Further, environmental and social screening of NDP subprojects did not identify any adverse impacts on the Mallah community.</p> |
| Cultural Property – OPN 11.03 | | | |
| 22. | <p>Historic and Religious Sites. The southern part of Pakistan i.e. district Thatta and Badin have long been a rich cultural location due to the vicinity of sea as well as the Indus Delta. There were several ports used for local and international trade. The few and very important cultural sites in Badin which are being badly affected by KPOD and Tidal Link Canal includes the monuments of saint Shaikh Kirhiyo Bhandari, the historical site of Roopa Mari and Thari....</p> | 53-54 | <p>There are no plans to expand the KPOD under the NDP project.</p> <p>Roopa Mari is located about 2 to 3 km north of RD 10 of KPOD. The site includes the tomb of Dodo Soomro, the last ruler of the Soomra dynasty. The tomb is located on relatively higher ground. The building over the grave has been rebuilt at least three times, first in the 11th century, then in the 19th century and most recently in 1998. The construction and normal operation of KPOD does not appear to have affected the site, since the high water level in the KPOD design is about 1-2 m below the site. In the 2003 rains, however, the area was flooded (see Items 8 and 13).</p> <p>The monument of Saint Shaikh Kirhiyo Bhandari is located on the eastern edge of Pateji Dhandh near the tail of Mirwah Canal.</p> |

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| | <p>The KPOD is just passing through the identified 4 km area of Roopa Mari, where the Soomra rulers have their capital. The tomb of Dodo Soomro the last ruler of Soomra dynasty is also located there. All these cultural and historical sites are in the range of KPOD and Tidal Link flooding. The floods have hit these places twice in five years and there is eminent threat that we will lose our history and culture. In addition the current passage of KPOD has already occupied some of the area of cultural and historical importance and in case of expansion of KPOD, the remaining areas and monuments will be entirely vanished. In both the projects neither government nor donors have even bother to recognize the cultural and historical importance of this area and the threat to those places due to drainage projects.</p> | | <p>It lies on the outskirts of Roopa Mari about 3 km north of RD 5 of KPOD. This tomb was also rebuilt several times and the present building was built about 20 to 25 years ago. The Pateji Dhandh at this location has receded from the site.</p> <p>The Tharri site is located 10-15 Km north of KPOD near Sirani Drain.</p> <p>During a site visit by a Bank consultant in early October 2004, no recent damage was observed. According to available information, the Archaeology Department has not classified these sites to date and no excavations have been undertaken at any of them.</p> |
| | <p>Community Participation and Information Disclosure – 4.01, 4.20, 4.30</p> | | |
| 23. | <p>Community Participation and Information Disclosure. The failure to involve local people especially marginalized indigenous groups who are worst affected by LBOD in the planning and implementation in NDP, the refusal to share information with affected communities and interested NGOs, and the failure to ensure that the voices and concerns of affected people are heard and considered in the context of environmental assessment, disposal of drainage effluents, conservation of wetlands and long term involuntary displacement is a violation of bank policies regarding involuntary resettlement, environmental assessment and indigenous peoples. Few of the project related document produced in English, which we cannot read was made available in the offices of WAPDA and other department and was also hard to access by us.</p> | <p>Box after para 55</p> | <p><i>Participation.</i> Through the formation of FOs, the NDP project has provided opportunities to marginalized groups, such as sharecroppers and farmers at the tail end of the system, to participate in decision-making on water allocations among farmers. A review of several subproject feasibility reports indicates that stakeholder views were taken into account in subproject design.</p> <p>All on-farm investments (tertiary irrigation channel improvements and subprojects for improvement of distributary canals) were/are being implemented through farmer participation. Water distribution, particularly the rotation schedules during times of water shortage, is prepared in consultation with FO representatives. In Sindh, about 200 FOs have been established, of which about half have taken on legal responsibility for operation and management of the tertiary irrigation system and for collection of water charges. With the aim of participatory decision making, the Chairman of the AWB is elected by the members, who include small farmers and farmers from the tail end of the distributary canal. Furthermore, in Sindh, an apex body called the Farmers Organization Council was established in 2001, to represent FOs.</p> <p><i>Disclosure.</i> The status of disclosure on NDP project documents is as follows:</p> <p>(a) DSEA (June 1993) – was accepted by the Bank as the EIA for the NDP project in January 1996 and, according to the Infoshop (then Public Information Center or PIC) was submitted and disclosed in April 1996. This disclosure took place af-</p> |

| No. | Claim/Issue | Para no | Response |
|-----|--|---------|--|
| | | | <p>ter the October 1995 appraisal and was not in accordance with BP 17.50, para 13 for Category B IDA projects with a separate EA. No information could be located about in-country disclosure of the DSEA to affected stakeholders or about subproject EAs or Project Feasibility Studies.</p> <p>(b) FLAR (January 1996) – was disclosed in May 2001 at the Infoshop. There was no requirement for the resettlement document to be disclosed prior to appraisal under OD 4.30. No information on in-country disclosure to affected stakeholders could be located.</p> <p>(c) PID – was disclosed in October 1994 and subsequently updated. The January 1997 PID processed by the PIC in the week ending February 7, 1997, contained, as required, an annex describing the EA, in accordance with BP 17.50, as did an earlier PID disclosed in the Infoshop in October 1995, prior to appraisal.</p> <p>Prior to Board approval of the project, the only document located that was translated into local languages was a briefing document (see Item 11). From 2001, a periodic bulletin on the NDP project has been disseminated in Sindhi to farmers and other stakeholders.</p> <p>Consultations were carried out in meetings with local communities of the subproject areas during field visits for subproject preparation. The social and environmental screening reports were not disclosed. None of the subprojects warranted a full EIA; therefore disclosure was not undertaken.</p> |
| 24. | <p>Communication with the Bank and Other Authorities We have tried our best to engage with local authorities and World Bank officials to discuss our concerns with them. But we have not got any positive response from them. From time to time we have been engaged in peaceful protest in order to protect our historical rights and entitlements. But all our peaceful efforts of engagement and protest have yielded nothing</p> | 56-75 | <p>Management is unaware of the Requesters' communications with the "local authorities" (GoP or the NDP project implementing agencies) on the issues raised in the Request. Various communications between the Requesters and Bank staff are summarized below:</p> <ul style="list-style-type: none"> • <u>July 29, 2003</u>. The Requesters asked Bank staff by e-mail for certain documents and for a meeting. • <u>August 5, 2003</u>. Bank staff responded by e-mail and supplied electronic links to documents, and offered to supply hard copies. Electronic and hard copies of requested documents were also subsequently hand-delivered to Requesters. • <u>August 5, 2003</u>. The Requesters acknowledged by e-mail receipt of documents. • <u>September 9 and 11, 2003</u>. The Requesters sent emails to several organizations, including the Bank Islamabad office, reporting failure of the drainage system. • <u>September 17, 2003</u>. The affected communities organized a protest march in Badin. A detailed report was communicated to Bank officials in Islamabad and widely published in local and national media. It was not felt that a response was required. • <u>December 2003</u>. The Requesters telephoned the senior irrigation engineer in the Bank Islamabad office requesting a meeting to discuss their concerns. During the telephone conversation Bank staff suggested meeting the Requester jointly with concerned government and implementing agencies of the NDP project but this was not agreeable to him. The Requester also |

| No. | Claim/Issue | Para no | Response |
|-----|-------------|---------|--|
| | | | <p>asked for NDP related documents, including the EMP. The Requester was informed that ADB was assisting WAPDA to prepare a Water Sector Environmental Management Framework and that this was still under preparation.</p> <ul style="list-style-type: none"> • <u>February 9 and 12, 2004</u>. Four civil society groups wrote emails to the Country Director and to the Task Team Leader seeking appointments to discuss issues related to the NDP project. Another email was sent to the Task Team Leader with copies to the Country Director, Senior Irrigation Specialist - Islamabad office, Regional Vice President and Senior Advisor requesting them to consider community concerns on the NDP project. • <u>February 13, 2004</u>. Bank staff responded indicating that the Country Director was away and suggested meeting with sector staff. A specific date was proposed. • <u>February 16, 2004</u>. The Requesters indicated inability to meet on proposed date and suggested an alternative later date. The alternative date was not feasible for Bank staff. There was no further follow up. • <u>March 15, 2004</u>. A daylong sit-in demonstration by about 10 persons was made in front of the Bank's Islamabad Office, demanding reparations for communities affected by the July 2003 rains and suspension of all upstream drainage works under the NDP project. Four Bank staff met with the demonstrators and listened to their grievances. The demonstrators also delivered a letter dated March 15, 2004, addressed to the Country Director. • <u>March 15, 2004</u>. The Requesters sent an email to a large number of people, including Bank staff, informing them about the aforementioned demonstration. • <u>March 18, 2004</u>. Bank staff responded to the Requesters, indicating that Bank staff had agreed to meet in the past and remained willing to meet at an agreed time. • <u>March 22, 2004</u>. The Requesters responded to Bank staff and asked for a meeting between the Bank staff and a delegation of three to four persons in the first week of April 2004. The suggested date was not feasible as concerned staff were unavailable. There was no further follow up. • <u>March 30, 2004</u>. The Requesters asked for a meeting with a visiting mission. However, the meeting did not take place as the mission did not visit Islamabad. • <u>September/October 2004</u>. The PoE of the DMP had consultations and workshops with NGOs in Sindh, and will include concerns raised in the PoE final report. |

ANNEX 2 CHRONOLOGY OF KEY EVENTS

| LBOD | | NDP | |
|----------------|---|---------------------|--|
| December 1984 | Board Approved LBOD Stage 1 | | |
| February 1989 | EIA for LBOD Stage-1 (including Tidal Link) | | |
| September 1991 | Tidal Link and overflow weir (Cholri weir) implementation begun | | |
| | | June 1993 | DSEA |
| March 1993 | Environment, Supporting Report #10, Mid-Term Review, LBOD Stage-1 Project | | |
| | | January 1994 | Initial Executive Project Summary for the NDP Project |
| | | June 1994 | Preparation of NDP Project begins |
| November 1994 | Interim Environmental Report, LBOD Stage-1 | | |
| 1995 | Draft EMMP for the LBOD – Stage 1 Project | | |
| June 1995 | Tidal Link operational | | |
| | | July 1995 | Second Preappraisal Mission, during which a limited Initial Environmental Scoping (IES) was conducted jointly with the ADB |
| | | October 1995 | Appraisal of NDP Project |
| 1995-1996 | Erosion and scour of Tidal Link bed and both banks observed. Remedial works along embankment undertaken by WAPDA O&M (South), but bank sloughing, bed and bank erosion continued; differential settlement of upstream face of Cholri Weir detected beginning in 1995, remedial works undertaken and completed by end 1996 | | |
| | | April 1996 | Disclosure of DSEA at Bank Infoshop |
| | | January 1997 | PIDAs Ordinances and Acts |
| | | November 1997 | Board Approved NDP Project |
| December 1997 | LBOD Stage 1 project closed | | |
| | | February 1998 | NDP Project Effectiveness |
| April 1998 | Update of 1995 EMMP for the LBOD – Stage 1 Project including the Tidal Link area | | |
| June 1998 | 250 feet of Cholri Weir section length collapsed. Attempts to close the breached weir section failed | | |
| June 1998 | Implementation Completion Report for LBOD Stage 1 Project | | |
| October 1998 | Federal and provincial authorities stop further remedial works after breach in Cholri Weir increased to 450 feet length | | |
| May 1999 | Catastrophic tropical cyclone caused severe damage, including almost complete destruction of Cholri Weir, and breaches of both Tidal Link embankments in 56 places | | |
| | | February-April 2000 | Review/MTR Mission for NDP Project with Aide-Memoire in April 2000 |

| LBOD | | NDP | |
|---------------|---|-----------------------|--|
| May 2000 | GoS High-Level Technical Committee on Cyclone damages to Tidal Link/Cholri Weir with report made in October 2000 | | |
| December 2000 | GoS second High-Level Technical Committee to review environmental and social effects of damages to Tidal Link/Cholri Weir | | |
| | | January 2001 | Pre-feasibility study begins for NSDS |
| March 2001 | World Bank Tidal Link Fact Finding Mission on Cyclone damages to Tidal Link/Cholri Weir | | |
| | | March-April 2001 | Joint World Bank, ADB and JBIC MTR Mission for NDP Project |
| | | June 2001 | Special Committee appointed by the President of Pakistan to make recommendations to restructure NDP (Junejo Committee) - NDP project put "on-hold" during review |
| | | July 2001 | Funds allocated from NDP project for DERA |
| October 2001 | Report of second High-Level Technical Committee (received by the Bank in June 2002) | | |
| | | February 2002 | Water Sector EMP – Framework for NDP; Report of Junejo Committee |
| | | March 2002 | Preparation of DMP begins |
| | | Mid 2002 | GoP requests NSDS Panel of Experts |
| | | August 2002 | Report of Junejo Committee approved by President of Pakistan; NDP project taken "off-hold" shortly thereafter |
| | | October 2002 | Approval of Sindh Water Management Ordinance -- Sindh revised the SIDA Act of 1997 |
| | | October-November 2002 | MTR Completion Joint Donor Review |
| | | April 2003 | NSDS Panel of Experts Report |
| July 2003 | Very heavy flooding due to abnormally high rainfall during monsoon | | |
| August 2004 | Meeting to review Recommendations of the Chief Corps of Engineers on LBOD Performance after July 2003 floods – chaired by President of Pakistan | | |
| | | September 2004 | DMP Panel of Experts Mission to review August 2004 Draft DMP study |
| | | September 2004 | Request to Inspection Panel |

ANNEX 3 HISTORY OF THE DRAINAGE CRISIS IN PAKISTAN

1. The continuous and expanding use of Indus water for irrigation (from storage or direct river diversions) has significantly altered the hydrological balance of the Indus Basin. The lack of drainage solutions has reduced the productivity of land and the long term sustainability of the system. Seepage losses from irrigation canals, distributaries and minor water courses and deep percolation from irrigated lands have resulted in a gradual rising of the groundwater table, bringing with it critical problems of waterlogging and salinity over a vast area. Waterlogging is widespread throughout Punjab and Sindh provinces, where most of the country's food and fiber crops are produced. The twin problems of waterlogging and salinity are most severe in Sindh Province (Lower Indus Plain), where more than half of the waterlogged and salinity affected areas are located. In the early 1900s, the water table was more than 15 meters (m) below the surface throughout the Indus Plain. However, by 1978 (when the Indus Basin Salinity Survey was completed), the water table in 46 percent of the Basin was within 3 m and 22 percent within 1.5 m of the surface and the situation has deteriorated since then. According to GoP's definition, severely waterlogged (or "disaster areas") are defined as those areas that have water tables shallower than 1.5 m below the surface. Irrigated agriculture is only marginally viable at this level of water table, especially when combined with excessive salinity. A comprehensive survey conducted in 1961 estimated that about 40,000 ha of land were being lost annually to agricultural production due to waterlogging and/or salinity. Of late, waterlogging problems have been reduced because of: a four-year drought; vertical drainage from tubewells (see below); better operation and maintenance of drainage systems; better water distribution, because of farmer participation and closing of unauthorized direct outlets from main and branch canals that are intended as carrier channels and not for distribution of irrigation water. See Map 2.

2. The need for drainage and salinity control in the Indus Basin became major issues beginning in the 1950s; by the early 1960s, the GoP had initiated a series of salinity control and reclamation projects (SCARP) with government tubewell installations for drainage and supplemental irrigation in usable fresh groundwater (FGW) areas. To date, about 12,000 such tubewells have been installed, covering about 35 percent of Pakistan's cultivable command area (CCA). Approximately 90 percent of these wells are located in Punjab, and most of the remaining wells are in Sindh. The tubewells have partly alleviated waterlogging and salinity in these areas, but a large portion of the CCA, especially in Sindh, continues to need drainage relief. While the SCARP experience demonstrated that tubewells do provide significant drainage relief, their operation and maintenance (O&M) has been deficient due to technical, financial, and managerial problems. Currently, the principal need is to address the drainage problem in saline groundwater (SGW) areas and to improve the efficiency of tubewells. With the support of several donors, Pakistan has made substantial efforts to reduce waterlogging problems through SCARP and the LBOD system. Farmers have installed 700,000 private tubewells in FGW areas where canal service is insufficient. This reduced waterlogging problems, particularly in Punjab Province, where most private tubewells are installed. In Sindh,

however, where most irrigated land is located in SGW areas, problems have increased. There, the need for surface drainage systems and better water distribution are fundamental to improving agricultural production.

3. **Impact of the Drainage Crisis on Sindh Province.** In Sindh, irrigation canals were extended and improved during the late 1800s and by 1910, the irrigated area had reached a peak of 1.4 million ha. Sukkur Barrage, completed in 1932, increased the annual cultivated area to 2.37 million ha. The completion of Ghulam Mohammed (now Kotri) Barrage (1955), and Gudu Barrage (1962) brought the rest of Sindh's irrigation system under barrage control. The total CCA under the three Sindh barrages now totals 5.5 million ha. The additional irrigation water supplied by these barrages has resulted in a rapid rise of groundwater levels.

4. Sindh Province is the repository for the plain's drainage waters. Approximately 3.2 million ha, more than 50 percent of Sindh's total irrigated area, has severe waterlogging and/or salinity problems. Sindh's drainage problems are aggravated by the nearly level terrain (the slope southwards towards the Rann of Kutch ranges from 1 in 15,000 to 1 in 20,000). The little natural surface drainage that exists is impeded by roads and irrigation bunds and canals. Effective drainage and improved water management are urgently needed in severely affected areas to arrest further land deterioration in the province, which comprises about 25 percent of Pakistan's total irrigated area.

5. There are a number of important environmental and social issues associated with the water sector in Pakistan, exacerbated by population growth, development needs and infrastructure development. The coastal Sindh area that is the spatial focus of the Request is subject to environmental risks, precarious livelihoods and vulnerability to natural disasters. The key environmental and social issues include access to freshwater for livelihoods, increased tidal fluctuations in affected wetlands, conservation of protected areas (including Ramsar sites), surface and groundwater quality, sustainable groundwater management, sustainable use of fisheries and integrated coastal zone management. These are regional development challenges and are beyond the scope of the NDP project.

6. **Recurrent Risks of Flooding in Lower Sindh.** Although average annual rainfall is low, southern parts of Sindh, particularly the coastal areas, are prone to intense rainfall and cyclone events, with rainfall amounts in excess of the average annual rainfall occurring in a span of a few days. As previously noted, the terrain is generally flat, with an average slope of 0.014 percent southeastwards, away from the course of Indus River, which flows on a ridge higher than the adjoining areas and thus does not act as a natural drain. Natural drainage is ill-defined and to a large extent, blocked by roads and irrigation bunds and channels. Since 1959, at least fourteen heavy rainfall events (with at least three of them accompanied by cyclones) have been recorded.¹ Due to the flat topography and lack of natural drainage, such events result in severe local flooding on average about once in three years, leading to loss of life and damage to property and crops.

¹ During the past 45 years unusually heavy rains were recorded in 1959, 1961, 1962, 1964, 1967, 1970, 1973, 1976, 1979, 1985, 1994, 1999, 2003 and 2004. In 1999, 2003 and 2004 the rains were accompanied by cyclones.

7. The low density of drainage channels (1 m/ha in comparison to an international average of 35-50 m/ha; in the Netherlands, 100 m/ha) and their generally inadequate capacity coupled with poor O&M of existing drains, poor management of the canal system and breaches or “escapes” from canals during storm events further exacerbate the flooding problem. Canal systems are very long—in some cases several hundred kilometers. During storm events, even though action is taken to stop further water diversions from the barrages, the water already present in the long channels has to be discharged in drains, since irrigation becomes unnecessary. This increases the flooding problem.

8. In addition to acts of nature and inadequate O&M, the diversion of Indus water for irrigation has drastically reduced the amount of sediment that used to reach the Delta and coastal areas, thus exposing these areas to sea intrusion. The DMP PoE summarized this issue as follows in its preliminary report:

“A special problem concerns the coastal erosion at various places along the coastal zone. There are several reasons for this erosion. First of all, due to the construction of the barrages in the Indus River the sediment supply to the coastal area reportedly has gone down from about 400 million tons per year to about 35 million tons per year. In addition there may be other reasons like: storm surges, currents induced by the tidal fluctuations, the rise of the mean sea level and the disappearance of mangroves... The impression exists that a new equilibrium is developing. However, additional coastal erosion will have to be expected, at least in the forthcoming decades. Measures can be considered to counteract such erosion.”

ANNEX 4 SUPERVISION CHRONOLOGY

| Date of Visits | Key Members of the Team |
|--|--|
| March 16 to 25, 1998 1 st Supervision mission | <ul style="list-style-type: none"> • Task Team Leader/Financial Management • Financial Analyst • Irrigation Engineer • Project Analyst • Procurement Specialist • Disbursement Officer • NGO Specialist |
| August 3 to 18, 1998 2 nd Supervision mission | <ul style="list-style-type: none"> • Task Team Leader/Financial Management • Irrigation Engineer • Resettlement Engineer • Procurement Specialist • Project Analyst |
| February 22 to March 4, 1999 3 rd Supervision mission | <ul style="list-style-type: none"> • Task Team Leader/Financial Management • Irrigation Engineer • M&E Economist • Operations Analyst • Procurement Specialist • Disbursement Officer • Social Development |
| May 17 to June 24, 1999 4 th Supervision mission | <ul style="list-style-type: none"> • Task Team Leader/Financial Management • Agriculture Economist • Project Analyst • Procurement Specialist |
| February 28 to April 7, 2000 5 th Supervision mission (Joint WB/ADB/JBIC MTR-I mission) | <ul style="list-style-type: none"> • Task Team Leader/Agriculture Economist • Irrigation Engineer • Disbursement Analyst • Procurement Specialist • Financial Management Specialist • Social Development • Project Implementation (ADB) • Program Officer (ADB) • Project Implementation (JBIC) |
| March 19 to April 6, 2001 (Joint WB/ADB/JBIC MTR-II mission) | <ul style="list-style-type: none"> • Task Team Leader/Agriculture Economist • Irrigation Engineer • Disbursement Analyst • Procurement Specialist • Financial Management Specialist • Social Development • Project Implementation (ADB) • Program Officer (ADB) • Project Implementation (JBIC) |
| June 18 to July 8, 2001 Follow up mission on Institutional Reforms | <ul style="list-style-type: none"> • Institutional Development Specialist |

| Date of Visits | Key Members of the Team |
|--|--|
| October 30 to November 15, 2002 (Joint WB/ADB/JBIC MTR-III mission) ¹ | <ul style="list-style-type: none"> • Task Team Leader/Agriculture Economist • Irrigation Engineer • Disbursement Analyst • Procurement Specialist • Financial Management Specialist • Social Development • Project Implementation (ADB) • Program Officer (ADB) • Project Implementation (JBIC) |
| May 11 to June 13, 2003 Implementation Review mission | <ul style="list-style-type: none"> • Task Team Leader/Agriculture Economist • Irrigation Engineer • Environmental Specialist • Financial Management Specialist • Drainage Advisor • Water Resources Advisor • Agriculturist • Administrative Client Support |
| November 29, 2003 to December 6, 2003 Implementation Review mission (Procurement) | <ul style="list-style-type: none"> • Task Team Leader • Irrigation Engineer • Procurement - Regional • Procurement Advisor - SAS • Financial Management Specialist • Lawyer (Consultant) |
| March 28 to April 7, 2004 Implementation Review mission | <ul style="list-style-type: none"> • Task Team Leader • Irrigation Engineer • Rural Development Specialist • Drainage Advisor • Water Resources Advisor |
| June 26, 2004 to July 4, 2004 Implementation Review mission | <ul style="list-style-type: none"> • Task Team Leader • Irrigation Engineer • Irrigation Advisor • Water Resources Specialist - FAO • Irrigation Consultant • Irrigation Consultant |

¹ On June 29, 2001, the President of Pakistan appointed a Special Committee headed by the Federal Minister for Food, Agriculture and Livestock to review the NDP Project in light of the MTR recommendations. This review culminated in a report entitled, "Report of the Special Committee on the Review of NDP" dated February 2002, which was ultimately approved by the President on August 27, 2002. While the review was in progress and until the Special Committee's recommendations were approved by the President, the NDP project was put "on-hold".

ANNEX 5
NSDS PRE-FEASIBILITY STUDY
PANEL OF EXPERTS
DRAFT FINAL EXECUTIVE SUMMARY
APRIL 2003

I General

I.1. The sector planning studies component of the World Bank assisted National Drainage Program (NDP), includes a study on the need of a National Surface Drainage System (NSDS). The objective of the system is to remove brackish and relatively saline, unacceptable drainage water, primarily originating in Punjab province, but from the other provinces as well. It envisages an interconnected system of outfall drains traversing the entire Indus Basin and passing through Sindh province to the Arabian Sea. A Pre-feasibility study of the NSDS has recently been completed in draft, covering technical, economic and environmental aspects.

I.2 The objective of the World Bank - Netherlands Water Partnership Program (BNWP) supported mission of a Panel of International and National Experts (PoE) in drainage, water and environmental management was to carry out a careful review of the Pre-feasibility study of the NSDS before proceeding to the next phase of preparing a feasibility report. Based on the TOR for the Panel the following was to be delivered: an initial discussion note, a draft executive summary on the findings and recommendations, as well as a first draft of the TOR for the Feasibility study on the NSDS and a final report on the outcome of the Panel's reviews and discussions, including recommendations for taking the NSDS Pre-feasibility study forward. This Task was implemented during October and November 2002. Based on the comments by the government services the draft review report has been revised and in February 2003 it was send as well to the government services. Additional comments have been received which have resulted in a draft final version that was submitted in April 2003 for approval to the World Bank.

I.3 The NSDS drains as proposed will have a total length of about 910 mi (1,464 km), their ultimate capacity will be 2,004 cusec ($57 \text{ m}^3/\text{s}$) and the area served by them 2.1 Ma (847,000 ha). The estimated construction costs are 33 billion Rs (575 million US\$) with lining of certain sections of the drains and 24 billion Rs (415 million US\$) without lining. Although the NSDS Pre-feasibility study includes a discussion of the drainage problems in the areas of the Left Bank Outfall Drain (LBOD), the Right Bank Outfall Drain (RBOD) and Kotri, the Panel has focussed on the proposed NSDS drains as it was concluded that the drainage plans for the other areas have already been prepared and that those plans have no relationship with the NSDS drains.

I.4 In this report the Panel presents in brief several examples (USA, Murray Darling, Nile, Yellow River, etc.) of large-scale river systems where drainage and salinity problems occur that show similarities with the problems in the Indus Basin. In most of the cases solutions have been found in a combination of measures, in some cases with an

outfall drain of moderate dimensions. These examples show that in almost none of these cases a large outfall drain as proposed in the draft Pre-feasibility report has been made and generally the drainage water is discharged into the river. Although no river system is identical it shows that the decision on the construction of an outfall drain needs a careful analysis.

II Findings

II.1 Drainage of agricultural land is intended to support the required increase in food production and sustainable rural development in Pakistan. Farmers, as well as the country benefit from improved productivity resulting from improved salinity and waterlogging control. It is important to view improved water management and adequate application of non-water inputs as a part of the solution to any waterlogging and salinity problem. In light of this the Pre-feasibility study of the NSDS will have to be positioned in relation to several policy papers, ongoing projects and accords, like: Water Sector Strategy, Medium Term Investment Plan, National Drainage Strategy (NDS), National Drainage Program (NDP), Master Drainage Plan (MDP), Water Apportionment Accord (WAA) and the envisaged Drainage Accord. In addition there are various related documents of multilateral donors. The Panel finds that especially the relation with other projects under the NDP and with the MDP has to be taken into account in formulating follow-up activities after the completion of the Pre-feasibility study of the NSDS.

II.2 The Panel would have expected that a study at pre-feasibility level would present a clear overview of the problems to be solved, the current institutional and policy arrangements and that the alternative options to solve these problems would have been presented in a balanced way with their respective advantages and disadvantages. The present study has a very strong focus on the NSDS, which is to a certain extent presented in more detail than would be expected in a pre-feasibility study, while alternative options have only been slightly touched upon.

II.3 Although an impressive amount of data has been compiled in the draft Pre-feasibility report, the Panel found it difficult to assess the hydrological conditions, which may be relevant for a decision on the NSDS. By comparing the draft Pre-feasibility report with information from other sources the Panel gets the strong impression that at least for the medium term future, local solutions can be found to cope with the saline drainage water. Even if it has impact on the aquifers, we speak about the development of a problem in a distant future. In fact no clear evidence has been provided about a widespread accumulation of salts in the root zone in Punjab. The Panel also believes that the widespread concern with salt accumulation in the Indus Basin due to the net import with about 24 Mt of salt per year exaggerates the threat of increasing salinity, as much more salt is already stored in the groundwater system. For example, an approximate calculation indicates that the current water supplies in the Punjab increase the salt storage in the upper 300 feet (100 m) of the sediment under the irrigated area by only 0.1% per year. In addition it is of importance that under the present practices a significant part of the annual salt load, about 28.2 Mt, is mobilised from the aquifer in the Basin. This amount could be reduced. Notwithstanding this, however, implementation of certain parts of the NSDS could be considered at an earlier stage when they offer a cost effective and environmentally acceptable solution.

II.4 Within the framework of the NDP several studies are being executed and several measures are being taken that may result in a significant reduction of waterlogging. Several of these measures will also result in a reduction of salinization in the basin, a reduction of the drainable surplus and increased water use efficiency. Some planned measures - such as increased water storage and additional drainage infrastructure - if not carefully dealt with may result in an increase in salinization and the drainable surplus. Measures that are being considered as part of the NDP include:

- institutional and policy reforms including water allocation and entitlement systems at Basin, Provincial Command Area and farmer levels, increased stakeholder participation, introduction of cost recovery systems and transferable water entitlements;
- ongoing projects for the lining of irrigation canals;
- introduction of modern water saving irrigation methods;
- groundwater recharge strategies using rainfall as a resource;
- rehabilitation/remodelling of existing drains and sub-drains;
- construction of new drains in all the provinces to consolidate the existing drainage systems;
- replacement/rehabilitation of saline ground water tubewells/tile drains;
- improved On-Farm Water Management (OFWM) practices.

In general these measures will have their effect on the application of more adequate amounts of irrigation water to the crops and as a result of this a reduction in the drainage surplus. This makes the short term need for an NSDS very questionable.

II.5 The study does not differentiate between the disposal of polluted water and of saline drainage water. In the Panel's opinion these problems would have to be treated quite differently. The pollution problem, which is basically caused by municipal and

industrial wastewater that is being disposed into the drains, or enters trans-boundary through certain rivers, is to a certain extent an acute problem. This problem would have to be solved locally and not by disposing the wastewater to the sea. The best final solution would be to treat this wastewater at the source. The Panel understands that such solutions may take a long time and that intermediate mitigation measures at local level will be needed.

II.6 A principal question is whether surplus saline drainage water is best accommodated locally, disposed through the Indus River, disposed through the NSDS, or some combination. In light of this it has to be realised that even when the NSDS will be constructed, a significant part of the surplus drainage water will still flow to the Indus River. This situation will occur primarily during the Kharif season when this surplus flow to the river has its lowest salinity. There are strong reservations from the downstream provinces to disposal in the Indus River because of the use of the Indus water for drinking water and irrigation. Meanwhile, Punjab has technical and economical reservations towards the construction of the NSDS at short term. This presumably demonstrates doubts about the immediate need for salt disposal, which will make adequate sharing of cost and responsibility to maintain and operate the NSDS difficult. In the opinion of the Panel, focus would therefore, for the time being, have to be on local solutions, maybe eventually in combination with the NSDS. It is understood by the Panel that there are certain problems with the present disposal in evaporation ponds. Such problems can be analysed and proper solutions for the short and medium term can be formulated. With respect to the development of local solutions it will also be of importance that agreement is reached on an acceptable water quality at the inlet points from the Indus River, especially at Guddu, Sukkur and Kotri.

II.7 The level of design detail for the NSDS is quite adequate for a pre-feasibility study. Although additional design can be left for the feasibility phase, recommendations made in the pre-feasibility phase may influence how future design proceeds. Therefore the following design issues need to be mentioned:

- *siphons* - instead of the multiple box culvert design concept, the use of pipes may be advisable;
- *cross-drainage* - the type of cross-drainage structure would have to be selected based on safety and environmental concerns, as well as intersection of hydraulic grade lines;
- *seepage into adjacent irrigation canals* - in some areas, the NSDS drain is higher than nearby irrigation canals. Seepage and possible spills from NSDS present a threat that would have to be addressed;
- *bottom width to depth ratio* - the proposed ratio of drain bottom width to depth is quite large for many sections of the NSDS. A deeper, narrower section may be preferable.

II.8 In order to restore the Tidal Link drain, embankments, which are heavily damaged, would need to be redesigned as dikes that can withstand severe waves and weather. This option is most probably not feasible. The Panel therefore shares the recommendations as given by the Fact Finding Mission that studied in 2001 the Tidal

Link problems. The monitoring that is being done at present shows that after seven years without maintenance dredging the cross section of the Tidal Link has not been significantly reduced and that its discharge capacity has been relatively well maintained. However, one may expect that from time to time maintenance dredging may be required to maintain the hydraulic performance of the drain outfall. This doesn't necessarily mean that the channel has to be exactly maintained, while development of some meandering may be expected. The maintenance dredging would have to focus on maintaining the discharge capacity. By depositing the dredged spoil at appropriate locations berms can be formed that could create desired barriers to cross flows. The cost of such an activity is significantly lower than the cost of reconstructing permanent dikes.

II.9 During the mission there have been quite some discussions on the estimation of the construction costs and resulting operation and maintenance (O&M) costs as presented in the draft Pre-feasibility report. It is understood that the NSDS Consultant has applied the present day unit prices. The range of costs included in the analysis is, however, not entirely clear. Costs related to protection of the environment and for resettlement of displaced families that are presently farming 37,800 acres in the proposed alignment of the NSDS appear to have not been included in the cost estimates. The cost for O&M is estimated at 1.5% of the construction costs, which is understood to be a standard practice in Pakistan. The Panel is convinced that for a drain that is subject to sediment disposal from upstream drains and runs for a long stretch - about 300 miles (485 km) through the desert this estimate is too low. Based on the work done the NSDS Consultant would have to be able to submit his professional judgement for a realistic level of O&M costs and to include these costs in the cost benefit analysis and the economic analysis. Other items with respect to O&M that will have to be taken into account are the institutional arrangements and the sharing of the costs. Although these items do not necessarily have to be sorted out during the pre-feasibility phase, they will be of significant importance during the feasibility and subsequent phases. This is especially true because the NSDS will be constructed in two provinces that will have quite different benefits from the NSDS.

II.10 The Environmental Assessment (EA) is of adequate detail for the pre-feasibility phase and provides a review of some of the environmental assets, values, needs and risks. It is important that these challenges and opportunities are adopted in subsequent developments of the study proposal. The NSDS Consultant appears to have considered issues such as the impact of some schemes on river salinity. It would be useful to see an overall summation of this and of opportunities for additional disposal via the river system. Further consideration and specification of farm chemicals (and other pollutant) loads and possible risk of eutrophication in drains, and receiving water bodies, including wetlands and the outfall in the Arabian Sea, is required in future phases of project development. Also other water quality issues need to be listed. The risk to health and hygiene of polluted surface water in open drains would have to be specified and its management addressed in future work.

III Recommendations

Recommendations on the finalisation of the Pre-feasibility study

III.1 The Panel recommends that the NSDS Consultant be requested to take the following issues into account in the finalisation of the draft Pre-feasibility report:

- presentation of the alternative options as already identified by the Consultant in such a level of detail, both from the point of view of effects and from the point of view of costs, that they can be compared with the NSDS;
- an assessment whether in view of the recent droughts the analysis of the waterlogging and salinity hazard and the estimates of the drainable surplus are realistic. Expected future developments would also have to be taken into account;
- compilation of recent data (quality and quantity) on the river pollution and identification of the main contaminating sources (municipal and industry);
- effects of disposal to the Indus River on the salinity content at Gudu, Sukkur and Kotri barrage;
- submission of professional judgment for a realistic level of O&M cost and include this cost in the cost benefit analysis and the economic analysis;
- to take into account the issues on engineering aspects as raised in item II.7;
- identification of knowledge gaps.

Recommendations on the future steps

III.2 In the opinion of the Panel, the MDP that is now under preparation is the obvious vehicle where alternative options for the future needs of agricultural drainage as an integrated component of water management in Pakistan would have to be presented and compared. Based on such a masterplan the government would have to formulate its future policy. The Panel strongly recommends broadening the scope of the MDP and to allocate sufficient time for the preparation of it. The MDP would also have to include a qualitative and quantitative analysis of the impact of the NDP on the waterlogging conditions in the Indus Basin. In the preparation of the masterplan effective use can be made of the results of ongoing work under the NDP. As far as the NSDS is concerned the Pre-feasibility study has generated sufficient information at masterplan level. For the alternative solutions existing reports have to be analysed and more in depth studies will have to be done in order to make a well-balanced masterplan. The broadened scope of the masterplan would not necessarily have to result in delays in preparation and implementation of measures that are required in the short term. The measures presented under item III.3 and III.4 can be developed in parallel to the development of the masterplan.

Recommendations on the Terms of Reference for further studies and programmes

III.3 In light of the above mentioned findings and recommendations the Panel recommends to postpone the formulation of a Feasibility study on the NSDS. Such a study can better be done at a later phase when the need for the NSDS has become clearer, if and when it is evident that alternative approaches - such as institutional and policy

reforms, more efficient irrigation, more effective drainage systems, local stakeholder participation and management - are not adequate by themselves. Instead the Panel proposes the following pre-feasibility studies:

- effects of lining of watercourses and minors and on-farm water saving measures, especially in Punjab province with special reference to the effect on water saving, reduction of pumping of saline groundwater and development of salinity in the aquifers;
- measures that can be taken to counteract the present problems with evaporation ponds;
- optimal measures to guarantee the drainage function of the LBOD and the protection of the environment of the coastal areas that may be influenced by the drainage water.

The Panel realises that parts of these studies have already been done, or are at present being studied. Therefore it will be of importance to investigate what is already available. The Panel proposes that the pre-feasibility studies to the extent that they still have to be done will be done under the umbrella of the MDP. Draft TORs for these pre-feasibility studies are presented in this report.

III.4 In order to acquire adequate data on the water and salt conditions and to enable the making of sound prognosis on the impact of proposed developments, the Panel recommends to initiate a Nationwide monitoring program in combination with the development of a river salinity model for the Indus Basin. This program would have to focus on the salinity in surface and groundwater, with special reference to the use of the water for various purposes and the long-term development of salinity in the aquifers. In addition it would have to:

- focus on the identification of irrigation and drainage needs for waterlogging and/or salinity control in the root zone within the command areas in relation to crop types, targeted yield levels and sustainable use of the resource base (land and soil);
- compare the salt balance of the Indus Basin with the balance as presented in the Drainage Sector Environmental Assessment (DSEA) study of 1993 and identify the breakdown of this basin per command/catchment area.

Under the NDP many activities are already being undertaken, or in preparation that as a whole can support a program. In addition there is a great need for an analysis and impact of discharging saline drainage water containing municipal and industrial waste and possibly residues of fertilizers and pesticides in receiving water bodies (including Indus River and the Arabian Sea).

Table I Summary of issues and recommended actions

| Issues | Recommended actions |
|--|---|
| 1. Drainage is required to support food production in Pakistan. | 1. It is important to take into account the objectives and development activities of the NDP and the MDP in formulating follow-up activities. |
| 2. The NSDS Report has a strong focus on a single project. | 2. Reformat the NSDS draft Pre-feasibility report to provide a more balanced review of alternatives to resolve the Indus Basin saline drainage problem. |
| 3. The National saline drainage and waterlogging problem can be largely dealt with through local solutions for the medium term. | 3. Utilize the MDP to focus on local solutions, as far as possible, and continue studies necessary to resolve the saline drainage problem. |
| 4. Other measures being taken through the NDP will influence the amount of drainage surplus. | 4. Encourage continuation of institutional and policy reforms and increased stakeholder participation in the O&M of irrigation and drainage systems. |
| 5. There is a need to more fully develop the assessment of municipal and industrial wastewater discharges. | 5. Continue the development of a comprehensive database showing the quantity, quality and location of municipal and industrial wastewater discharges into drains, streams and rivers carrying saline agricultural drainage water. |
| 6. There are strong reservations among stakeholders regarding the immediate implementation of the NSDS. | 6. Postpone development of a Feasibility study for the NSDS. Make a better assessment of the saline effluent to be disposed of with future outlook of expected changes. Assess the effect of local measures. Encourage dialogue for building consensus among provinces about strategic development. |
| 7. Some of the engineering design parameters for the NSDS have been questioned. | 7. Review the engineering design parameters described in the NSDS draft Pre-feasibility report. |
| 8. There is a need to rethink the concept of the Tidal Link | 8. Discuss more thoroughly the design and operation of the Tidal Link. Meanwhile, consider periodic maintenance by dredging. |
| 9. The factors used to estimate the cost of O&M in the draft Pre-feasibility report for the NSDS appear to under estimate the long-term O&M costs. The economic analysis does not include all project costs | 9. Re-evaluate the factors used to estimate cost of O&M for the NSDS. Include resettlement and environment management costs in the economic analysis. |
| 10. There is a need to do additional environmental evaluation prior to the construction of additional facilities to place saline drainage water from the Punjab province in the Indus River and/or the Arabian Sea | 10. Initiate, to the extent necessary, environmental studies and develop a comprehensive river salinity model to determine the impact of discharging saline drainage water, both with and without municipal and industrial waste and possibly residues of fertilizers and pesticides, into the Indus River and/or the Arabian Sea. |
| 11. There is a need to focus on irrigation and drainage needs for salinity control in the root zone for different soils and crops. | 11. Initiate a study to establish better and more reliable mathematical relationships between such parameters as the depth of irrigation application, its salt content, soil permeability, depth of leached soil, salt content of leached soil and that of leaching water at various depths besides salinity of drained water, in order to better understand the level of sustainability of irrigated agriculture in the Indus Valley on a long-term basis. |

ANNEX 6
NDP SUBPROJECTS APPRAISED, COMPLETED OR UNDER IMPLEMENTATION IN SINDH

STATUS OF PREPARATION OF APPRAISAL REPORTS IN SINDH PROVINCE¹

| No. | Province / Name of Sub-project | AR Cost PRs. Million | Screening Report ² Prepared | Appraisal Report (AR) Prepared | IES as Part of AR | Funding Agency | Remarks |
|-----|---|----------------------|--|--------------------------------|-------------------|----------------|------------------------------------|
| 1 | Fuleli Guni Outfall Drain System | 179 | Sep-98 | May-00 | Yes | WB | Under implementation |
| 2 | West Kadhan Patiji Outfall Drain System | 24 | Mar-99 | Nov-99 | Yes | WB | Completed |
| 3 | East Kadhan Patiji Outfall Drain System | 31 | Mar-99 | Nov-99 | Yes | WB | Completed |
| 4 | Ahmed Rajo Outfall Drain System | 10 | Mar-99 | Jun-99 | Yes | WB | Completed |
| 5 | Leghari Outfall Drain System | 30 | Mar-99 | Jul-99 | Yes | WB | Completed |
| 6 | Phalkara-Jajheja Surface Drainage Scheme in Matli | 1,015 | Feb-99 | Mar-99 | Yes | WB | Dropped due to unfavorable outfall |
| 7 | Pumping Stations and Drainage System-Ghotki Feeder in Ghotki Division | 34 | Aug-98 | Feb-99 | Yes | WB | Under implementation |
| 8 | Ghar/Khairpur Nathan Shah/Mehar and Sunhari Systems in North Dadu | 91 | | | | WB | Dropped |
| 9 | Larkana South/Larkana North/Nusrat/Naudero/Shahdadkot in Larkana Drainage Division | 65 | Nov-00 | Jun-01 | Yes | WB | Not Implemented |
| 10 | Lakhi/Shikarpur/Hyder Chandio and Zakaria Drainage Systems and Sindh Wah Pumping Station | 176 | Nov-00 | Jul-01 | Yes | WB | Not Implemented |
| 11 | Karo Naro Drain in Ghotki Division | 93 | May-99 | Jan-00 | Yes | WB | Under implementation |
| 12 | Drains of Lowari Drainage System | 37 | Aug-98 | Mar-99 | Yes | WB | Completed |
| 13 | Tando Bago Branch Surface Drainage System | 42 | Aug-98 | Jan-01 | Yes | WB | Under implementation |
| 14 | Drains of Ochito, Jamsakro and Ghorabari Outfall of Thatta Drainage Division | 161 | Nov-98 | Oct-00 | Yes | WB | Under implementation |
| 15 | Nagan Dhoru, Jati and Karo Gungro Outfall Drains of Sujawal Drainage Division, including Surface Drainage Systems | 292 | Jan-99 | Nov-00 | Yes | WB | Under implementation |
| 16 | Dewan System in Tando Md. Khan Area | 6 | Jan-99 | Jun-99 | Yes | WB | Completed |
| 17 | Kotri Barrage Surface Drainage Phase I, Part II, Stage III | 290 | | | | WB | Dropped |
| 18 | Thatta II sub-drains | 52 | Jul-00 | Apr-01 | Yes | WB | Under implementation |
| 19 | LBOD Branch Drainage System | 120 | Sep-00 | May-01 | Yes | WB | Not Implemented |

¹ This list of subprojects groups together various related contracts shown in Map 3 that are associated with particular subprojects. Equipment and materials related to electrification works are not listed here, as they did not require screening or appraisal reports. For subprojects involving O&M performance contracts, de-silting of canals, improvement of watercourses (very small tertiary farm level irrigation channels), monitoring studies, condition surveys, procurement of equipment, and contracts carried forward from LBOD, appraisal reports and IES were not required. For some subprojects that were dropped or have not yet been taken up for implementation, the columns are left blank.

² Screening Report = Initial subproject identification report.

| No. | Province / Name of Sub-project | AR Cost PRs. Million | Screening Report ² Prepared | Appraisal Report (AR) Prepared | IES as Part of AR | Funding Agency | Remarks |
|-----|---|----------------------|--|--------------------------------|-------------------|----------------|--------------------------------|
| 20 | Rehabilitation/ Replacement of Tubewells in Khairpur SCARP | 180 | Apr-01 | Sep-01 | | WB | Not Implemented |
| 21 | Condition Surveys of various parts of Sindh's Irrigation and Drainage System | 9 | | | | WB | Completed |
| | O&M for Sindh Irrigation & Drainage Authority | 0 | | | | | |
| 22 | O&M of Surface Drainage System in Sanghar | 37 | N.A. | N.A. | N.A. | WB | Under implementation |
| 23 | O&M of Sub-Surface Drainage Wells in Sanghar (SSD99-S) | 54 | N.A. | N.A. | N.A. | WB | Under implementation |
| 24 | O&M of Sanghar Scavenger Wells & Mir. Tile Drains (SSD99-M2) | 35 | N.A. | N.A. | N.A. | WB | Completed |
| 25 | O&M of Nawabshah Scavenger Wells and Interceptor (SSD99-N2) | 32 | N.A. | N.A. | N.A. | WB | Completed |
| 26 | O&M of Surface Drainage System in Nawabshah (SD99-N) | 45 | N.A. | N.A. | N.A. | WB | Under implementation |
| 27 | O&M of Surface Drainage System in Mirpurkhas (SD99-M) | 29 | N.A. | N.A. | N.A. | WB | Under implementation |
| 28 | O&M of Sub-Surface Drainage Wells in Nawabshah (SSD99-N) | 38 | N.A. | N.A. | N.A. | WB | Under implementation |
| 29 | O&M of Sub-Surface Drainage Wells in Mirpurkhas (SSD99-M) | 32 | N.A. | N.A. | N.A. | WB | Under implementation |
| | Modernization of Selected Canal Commands | | | | | | |
| 30 | Selected canals of Rorhi, Dadu and Lower Nara | 221 | Aug-01 | | | WB | Dropped |
| | Other Drainage Schemes | | | | | | |
| 31 | Small Surface Drainage Scheme between Phull and Daulatpur | 81 | Aug-98 | Feb-99 | Yes | WB | Not Implemented |
| 32 | Small Surface Drainage Scheme - Mirzapur and Dhoda | 37 | Jul-98 | Sep-98 | Yes | WB | Dropped due to social problems |
| | LBOD Remaining Works | | | | | | |
| 33 | Sanghar Interceptor Drains (S30.ND6) | Not | Feb-99 | | | ADB | Dropped due to absence of FOs |
| 34 | Mirpurkhas Tile Drains (T40.ND5) | 593 | Feb-03 | | | ADB | Dropped due to absence of FOs |
| 35 | Mirpurkhas Drainage Tubewells, including 444 disposal channels and one contract for 202 tubewells (ongoing), and one contract for 242 tubewells (completed) | 378 | | | | ADB | Under implementation |
| 36 | Nara Canal Remodelling, including Ranto Canal, West Branch Regulator, and Twin Jamrao Canal Commissioning | 1,645 | | | | WB | Completed |

| No. | Province / Name of Sub-project | AR Cost PRs. Million | Screening Report ² Prepared | Appraisal Report (AR) Prepared | IES as Part of AR | Funding Agency | Remarks |
|-----|-------------------------------------|----------------------|--|--------------------------------|-------------------|----------------|----------------------|
| | OFWM | | | | | | |
| 37 | Lining of Distributaries and Minors | 177 | Nov-02 | Apr-03 | No | WB | Under implementation |
| 38 | Bio drainage | 80 | Oct/02 | Jan-03 | No | WB | Not Implemented |
| | | 6,457 | 26 | 23 | | | |

SUMMARY

| Subproject | Completed | Under Implementation | Dropped | Not Implemented | Total |
|---------------------------------|-----------|----------------------|----------|-----------------|-----------|
| Drainage Rehabilitation | 7 | 7 | 3 | 4 | 21 |
| O&M Performance Contracts | 2 | 6 | | | 8 |
| Modernization of Canal Commands | | | 1 | | 1 |
| Other Drainage Works | | | 1 | 1 | 2 |
| LBOD Remaining Works | 1 | 1 | 2 | | 4 |
| OFWM Works | | 1 | | 1 | 2 |
| Total | 10 | 15 | 7 | 6 | 38 |

ANNEX 7 STUDIES COMPLETED UNDER NDP

POLICY STUDIES

| Name of Study | Executing Agency | Start Date dd/mo/yr | Remarks |
|---|--|-----------------------------|--|
| National Water Policy | Federal Coordination Cell ACE - Halcrow | <u>23/12/99</u> 22/03/04 | These studies are being under taken by Federal Coordination Cell, Islamabad. |
| Water Rights in Selected Canal Command | | | |
| Gypsum Pricing Marketing And Distribution | | | |
| Promoting Private Investment in Drainage | | | |
| Exploitation and Regulation of Fresh Ground Water | | | |
| Revenue Options and prospects of WAPDA Water Wing | | | |
| Efficacy of Past Drainage Investment | | | |

SECTOR PLANNING STUDIES

| Sr. No | Name of Study | Executing Agency | Start/ Completion dd/mo/yr | Remarks |
|--------|--|---------------------------|---|---|
| 1 | Physical Monitoring of Drainage- IV Project Faisalabad | SMO (WAPDA) | <u>8/2/99</u> 31/12/00 | Study completed in December 2002. |
| 2 | Land Leveling under PAPs of Fordwar Eastern Sadiqia South (FESS) Project | OFWM-PB. AGR. DEPT. | <u>30/9/00</u> 30/06/02 | Only 640 acres out of 7000 acres have been leveled. Study has been concluded on 30.6.2002, because of certain limitations. |
| 3 | Monitoring of Land & Water Conditions of FESS Project | SMO (WAPDA) | <u>30/09/00</u> 30/06/03 | Study completed in April, 2003. Final Data Report published. |
| 4 | Institutionalized Environmental Monitoring of Land and Water Conditions | SMO (WAPDA) | <u>21/11/98</u> 31/12/04 (Extended) | <ul style="list-style-type: none"> ▪ Depth to Watertable maps on GIS basis have been completed upto June 2003 and work on October 2003 in progress. ▪ One year extension has been granted to cover additional activities. |
| 5 | Soil Salinity Surveys of Irrigated Areas | SMO (WAPDA) | <u>01/03/01</u> 31/11/04 (Extended) | <ul style="list-style-type: none"> ▪ The survey of 41.3 million acres has been completed. ▪ Data analysis and Initial Report has been prepared 80%. ▪ Final Reports of 9 Canal Commands have been completed. ▪ Initial Draft Reports of 18 Canal Commands out of 40 are under completion. ▪ 39 Canal Command have been digitized & 20 maps of canal command areas completed |
| 6 | Reactivation of IBMR in context of NDP | P&D DIV. (WAPDA) | <u>05/01/01</u> 30/09/04 | <ul style="list-style-type: none"> • The progress is hindered due to non-hiring of Modeling Specialists. Possible modification/up-gradation of the IBMR is being carried out by the CAD itself. • The establishment of Water Resources Database Management System is being arranged by DG (IS). The general information about Indus basin Model & water resource data has been placed on WAPDA Water Wing web site www.pakistan.com under the sub head of Water Resource Planning. • Final Report is under preparation. The study will be ended in September 2004. |
| 7 | National Surface Drainage System | Federal Cell | <u>26/01/01</u> | These studies have been completed by Federal |

| Sr. No | Name of Study | Executing Agency | Start/ Completion dd/mo/yr | Remarks |
|--------|--|---------------------------------|---|--|
| 8 | Balochistan Effluent Disposal | Indus Ass. & Louis Berger | 26/11/02 | Coordination Cell, Islamabad. |
| 9 | Flood protection & Drainage of Peshawar Valley | | | |
| 10 | Preparation of Drainage Master Plan (DMP) | P&D (WAPDA) | <u>01/03/02</u> 31/12/04 | <ul style="list-style-type: none"> Comments on Draft Interim Report received from the Provinces and Bank and have been incorporated. After reviewing the DMP Report by the Local Panel of Expert, first draft has been issued to the Stake Holders and Bank. The International Panel of Experts will review first Draft in September 2004. |
| 11 | Physical Monitoring of LBOD Stage-I Project | SMO (WAPDA) | <u>14/01/99</u> 31/12/04 (Extnd/) | Draft Final Report under preparation. |
| 12 | Improving Drainage Execution & Evaluation of Canal Lining in FESS: a) Improving the Performance of Surface Drainage Through Monitoring and Evaluation at FESS Project. b) Prioritize Drainage Needs for FESS Project Phase-II by Groundwater Modeling. Performance Evaluation of Different Types of Canal Linings in FESS Project (Post Lining Monitoring and Evaluation). Watercourse Lining Plus | <u>(IWASRI</u> <u>WAPDA)</u> | <u>21/09/00</u> <u>30/06/03</u> <u>01/07/03</u> 31/12/03 | <p>Study concluded during July 2002 due to continuous dry spell. Final Report published.</p> <p>Final Report published.</p> <p>Study extended to incorporate additional study on water course lining plus as recommended by the Panel of Experts on NSDS. Draft Interim report has been submitted and Final Report is under process.</p> |
| 13 | Agro-Economic Monitoring of FESS Project a) Post-Construction Agro-Economic Monitoring and Evaluation (AEME) of FESS Irrigation and Drainage Project. b) Impact Monitoring of Economic Rehabilitation Measures for Project Affected Persons (PAPs) of FESS Project. | WMED (WAPDA) | <u>30/9/00</u> 30,12/03 | <p>Final Report is under finalization.</p> <p>Final Report published.</p> |
| 1 | Preparation of NDP Phase-II | | | Special Committee recommended to carryout in the end of Phase-I. |
| 2 | Environmental/Sea intrusion below Kotri | | | The study will be carried out under FIDC, Ministry of Water & Power. |
| 3 | Impact Monitoring Evaluation | WAPDA | | Special Committee has recommended to be continued in NDP Phase-II. |
| 4 | Tidal Link as Outfall Drain for NSDS | | | Six firms are requested to submit proposal. M/s Barqab, WAPDA only responded. Bank has been informed and requested to defer the study till the finalization of DMP. |

ANNEX 8
LEFT BANK OUTFALL DRAIN STAGE 1 PROJECT – TIDAL LINK
WORLD BANK FACT FINDING MISSION

TECHNICAL NOTE AND RECOMMENDATIONS

BACKGROUND

The Left Bank Outfall Drain Project and the Purpose of the Tidal Link

1. The Left Bank Outfall Drain (LBOD) is intended to drain saline ground and surface water, and storm runoff, from 1.27 million acres of irrigated land in the four districts of Sindh Province to alleviate water logging and salinity. LBOD collects excess irrigation water, saline seepage, pumped saline groundwater, rainfall runoff and industrial and municipal wastewater¹. At its terminus near the coastal zone, the LBOD empties into two existing and smaller drains, DPOD and KPOD.² These latter two drains empty into two natural, shallow lakes, *Shakoor Dhand* and *Pateji Dhand* respectively. These dhands are two of the numerous shallow lakes and depressions that form the larger wetland known as the *Rann of Kutch*. The Rann of Kutch lies in both India and Pakistan. At the completion of the LBOD Stage 1 project, disposal of the expected large volume of saline drainage water³ into this nationally and internationally important wetland became a major concern.

2. Three possible options were considered for the terminus of the LBOD drain: one option was to continue to empty most of the LBOD flow through KPOD into Pateji Dhand, which is connected to the Rann of Kutch in wet years or during high water; the second option was to empty the drain directly into the Rann of Kutch where it would find its way to the sea; and the third was to empty the drain directly into the sea through an independent canal linked directly with an active tidal creek. The first two options were dropped partly because the Rann of Kutch is an international wetland and partly because of the potential adverse impact on Pateji Dhand and the small dhands connected to it. The third option, which utilizes a direct, independent link canal to the sea, *The Tidal Link*, was finally chosen.

3. The adopted scheme included the construction of a 26 mile Tidal Link canal running from northeast to southwest across the Rann of Kutch connecting KPOD to an active tidal creek, *Shah Samando Creek*. The canal would physically separate the four major dhands in the Sindh portion of the Rann of Kutch, called *Sanhro*, *Mehro*, *Cholri*, and *Pateji*, from the Rann of Kutch. The upland drainage water of KPOD would be

¹ The drains are commonly used to dispose of untreated municipal and industrial wastewater even though is not consistent with Pakistan Environmental Law.

² *Kadhan Pateji* Outfall Drain (KPOD), originally one of the main drains for the area irrigated from the Kotri Barrage on the Indus. Its outfall was into Pateji Dhand. *Dhoro Puran* Outfall Drain (DPOD), a small stream emptying into the Shakoor Dhand, was excavated to carry stormwater from LBOD.

³ The design discharge from LBOD is 4440cfs. DPOD will carry 2000cfs of stormwater, and the balance of baseflow (1240cfs) and stormwater (2200cfs) will be carried by KPOD.

confined within the deep cut of the Tidal Link Canal bounded at both sides by high earthen embankments. The top of the embankment was fixed at 20 feet above mean sea level (amsl) to avoid overtopping from both sides since water levels in both the Pateji and Cholri Dhands and Rann of Kutch sometimes exceed +8.0 to +10.0 amsl.

4. The tidal influence (backwater) would extend from Shah Samando Creek all the way up the Tidal Link to KPOD, but sea water was not expected to extend farther than 12 miles upstream from the tidal creek (to RD -93), just below the Dhands. The northern side of the embankment running along Pateji and Cholri Dhands was provided with an overflow concrete-crested weir (Cholri Weir), 1800 feet long. The top of weir was fixed at +4.5 feet amsl to prevent over-drainage of the Dhands at low tide, and to allow temporary flow of canal water into the Dhands to attenuate water levels in the canal at high tide.

Cost and Financing of the Tidal Link

5. The implementation of the Tidal Link canal and the overflow weir was started in September 1991 using an ICB contract for construction, and an international consulting firm for the design and construction supervision. The construction of the Tidal Link and Cholri Weir was completed on time. The total cost of construction was about PRs 800 million, funded in part by the Saudi Fund for Development.

Objectives of the Bank Mission

6. The Bank fielded a fact finding mission during the period March 12-17, 2001. The objective of the mission was to understand the technical details and process of the failure and the damages to the Tidal Link, to understand the possible technical, environmental and social consequences, and to suggest to the Government of Sindh further steps to be taken. The GOS Additional Chief Secretary⁴ had constituted a high level Technical Review Committee of senior technical experts in May, 2000. The Committee made its report to GOS in October, 2000 [19]⁵. The mission visited the tidal link site, listened to the views of various Government and Non-Government Officials including members of the Committee (Attachment 1), and reviewed the various reports (Attachment 2) including the Technical Committee's report.

POST COMPLETION OPERATING EXPERIENCE OF THE TIDAL LINK

Initial Operating Experience

7. Almost as soon as the Tidal Link began operating on June 6, 1995 it experienced significant erosion and scour problems along both banks and the bed. In some sections, almost 50 percent of the total embankment body was lost with erosion still in progress. The remedial works along the embankment were undertaken by WAPDA O&M (South), but the bank sloughing, bed and bank erosion continued. Meanwhile, differential

⁴ Vide notification No. WR(W/W)5(P&D)79/69

⁵ The number in the brackets refers to the list of documents consulted by the mission given in Attachment 2

settlement of the upstream face of the Cholri Weir was detected beginning in 1995 and remedial works were undertaken and completed by the end of 1996.

Damage to the Tidal Link and Cholri Weir in 1998 & 1999

8. Undermining and erosion caused 250 feet of the weir section length to collapse on June 24, 1998. Many attempts were made to close the breached weir section, but all failed due to monsoon weather and the remoteness of the site. By the end of October 1998 the federal and provincial authorities and the consultants who visited the breach site jointly decided to stop further remedial works after the breach in the Weir had increased to 450 feet length from the southern end [16]. On May 21, 1999 a catastrophic tropical cyclone hit the Tidal Link area causing severe damage, including the almost complete destruction of the Cholri Weir, and breaches of both Tidal Link embankments in 56 places.

Function and Impact of the Tidal Link

9. The primary objective of the Tidal Link was to evacuate the saline drainage water of LBOD to the sea. The objective had been achieved before the occurrence of the June 1998 weir collapse and May 1999 cyclone breaches. A substantial net outflow from the KPOD and Dhands to the sea was observed with an average rate of 1000 cubic feet per sec (cfs). The net outflow in the Tidal Link was accompanied by a sharp reduction in salinity in the Dhands (by about half[8]).

10. Since the collapse of weir and the cyclone breaches in the embankment, the whole water and salinity balance of the Tidal Link and the Dhands have changed. The tidal link flow is no longer confined, and is instead, now intermingled with the flow to and from the Dhands and the Rann of Kutch at every tide cycle through the breaches along the embankments. The salinity has been increased in the Tidal link up to RD -35. This has become especially pronounced in the last one and a half years because of the severe drought that has significantly decreased drainage flow from KPOD.

REPORT OF THE GOVERNMENT OF SINDH (GOS) TECHNICAL COMMITTEE TO REVIEW DAMAGES TO THE TIDAL LINK AND CHOLRI WEIR

The Recommendations of the Technical Committee

11. The high-level Technical Committee reviewed available project documents and monitoring data and made extensive field inspection. Among the Committee's key findings and observations are: 56 breaches in the southern and northern embankments of the Tidal Link, severe erosion of the canal banks; evidence of scour of the canal bed, and a considerable part of the berm on top of the embankments had been washed away; most of the northern embankment along with the entire berm has been eroded; the section of the channel has been widened considerably at a couple of places; the water level in the Dhands has been lowered and drained by the Link; the water was flowing within the Tidal Link during the low tide when the Committee visited the site. At high tide, the water apparently flows over the banks at some of the low points or through the breached sections.

12. The judgment of the Committee was that the Tidal Link is continuing to function and the ongoing channel evolution would stabilize sometime in the future with a section that would generally follow the current alignment. However, in light of the uncertainties concerning the factors governing the ongoing changes within the Tidal Link, and the uncertain viability of conventional options, the Committee made the following recommendations in their May, 2000 [19] report:

- No repair should be carried out in Tidal Link as damages done by cyclone are beyond the repair limit;
- Any remedial work for Cholri Weir is also not recommended;
- The Tidal Link is discharging its fluid into the Sea with good gradient;
- Continue monitoring of water levels in Tidal Link and KPOD for at least one year; and
- Carry out a survey of the bed levels in the Tidal Link.

13. As this Committee's report covered mainly the technical aspects of the failure, a second committee was constituted in December 2000, to assess the environmental and social consequences of the failure. This second Committee is still continuing its work.

General Comments on the Recommendations of the GOS Technical Committee

14. The mission held discussions with the Committee members and other Pakistani officials and NGOs (Attachment 1) after thorough examination of the situation, including a site visit and review of the existing documentation (Attachment 2). Considerable damage occurred to the berms and embankments of the Tidal Link. Direct connections between the Link and the Dhands have developed in several places after the northern embankment had been completely eroded. The downstream part of the Weir was breached completely and has turned into a wide opening to the Dhands where a similar drainage channel has also been formed. Water during high tide freely enters the Dhands through these openings. Wide and deep drainage channels have been created in the bed of the Dhands by the water freely drained from the Dhands at low tide.

15. The mission generally agrees with the conclusions and recommendations of the GOS Technical Committee regarding the Tidal Link and Cholri Weir. The no-action recommendation of the committee is justified not only because the damage is beyond repair by conventional methods, but also because the scour of the channel bed and erosion of the embankments are still active under the influence of the uncontrolled tidal flow through the tidal link and flow to and from Rann of Kutch and the Dhands. These conditions will render any attempt to repair the damages following conventional methods useless. Moreover, repair or replacement of the Cholri Weir is also meaningless because tidal and drainage water will continue to enter and leave the Dhands freely through the gaps in the breached embankments.

16. However, with respect to the Committee's recommendation concerning modification of the LBOD-DPOD weir to increase disposal of saline drainage water

through DPOD into Shakoor Dhand, the mission is of the opinion that such a decision should be deferred until a complete technical and environmental assessment is made on the basis of the proposed comprehensive monitoring program.

Comments on the Risks

17. LBOD drainage water is still flowing through the tidal link to Shah Samando creek with a noticeable velocity in the downstream direction during low tide. Thus there is no immediate or short-term danger of impeding the disposal of drainage water from the LBOD to the sea. However, it should be noted that drainage flows have been generally low because the Project is not yet fully developed and the drought conditions have prevailed over the past two years. Hence, the Tidal Link has not yet had to operate at full capacity in its present damaged condition.

18. The analysis of the longitudinal profile and cross sections taken along the Tidal Link at different periods covering before and after the cyclone damages indicates that in the long run the Tidal Link can evolve into a natural tidal creek. But it is very uncertain when and how that would happen. The superimposition of cross sections taken at different locations in 1997 and 2000 shows [15, 20] that there is a trend of localized scour and deposition of sediments at several sections of the tidal link. It is expected that the straight man-made Tidal Link may turn gradually into a more stable but meandering channel within a very wide and shallow section.

19. There could also be a more pronounced back up of the drainage flow as sedimentation progresses, resulting in a damping effect to the overall fall of the groundwater table in the LBOD area, particularly around its downstream reaches.

20. Due to the ongoing active channel processes, there is scouring and deposition of the sediments. Meanwhile, due to the active channel processes in the Tidal Link, the water is heavily laden with suspended sediments of brown color apparently a result from continuing bank erosion and bed scour.

21. The uncertainty about the future outcome of the active channel processes in the Tidal Link, the cost and viability of various rehabilitation options, and the environmental risks associated with the conditions developing in the Dhands strongly indicate the need for an effective monitoring program that would help to understand the trends and help to define feasible and sustainable mitigation measures.

Monitoring: Past, Present and Future

22. Shortly after commissioning the Tidal Link, physical monitoring was carried out by WAPDA during 1996 to assess the erosion situation in the berms and channel of the drain, and to identify necessary remedial measures. Longitudinal profiles and cross sections published in 1997 [9] provide a base line of the early erosion as well as analysis of the water balance, water salinity and morphology of the tidal link. A bed level survey of the tidal link and the KPOD downstream reach was carried out by the National Institute of Oceanography (NIO) in September 1998 [15] according to an agreed TOR with Directorate O&M, WAPDA (South).

23. The current monitoring and survey have been carried out by WAPDA's Scarp Monitoring Organization (SMO) for the water table and salinity while the National Institute of Oceanography has been carrying out bathymetric and hydrographic survey in the Tidal Link. A memorandum of understanding between SMO-WAPDA and NIO signed in March 1999 included a TOR for NIO to conduct comprehensive hydraulic monitoring of the Tidal Link under the NDP Drainage-I (IDA Credit 2999 Pak) for the period 1999-2003. The TOR initially covered the area including the Tidal Link Drain, the Dhands, the tidal mud flats, parts of Shah Samando Creek and adjacent areas. After the May 1999 tropical cyclone, which struck the entire area, the TOR was revised based on a proposal by NIO in September 1999 to account for the morphological changes caused by the storm. The revised TOR excluded the monitoring of any site downstream RD-125 including the Shah Samando Creek and the tidal mud flats. The first Annual report (1999-2000) of LBOD-I Physical monitoring was published in December 2000 by WAPDA [20].

24. The monitoring program as it is being implemented is not strictly complying with either TOR in terms of the specified sites or the frequency of measurements apparently due problems of site accessibility. Extensive discussions with the NIO Monitoring Team Leader and his associates confirmed the need to continue monitoring through the downstream reach of the Link, to comply with the TOR and to identify trends in physical and morphological changes within the monitored area. Future measurements must build on the base line information available from previous monitoring and surveys. It should also continue to track the sediment transport through the Shah Samando Creek that could be detrimental to the performance of the drainage function of the Tidal link if the huge sediment load is depositing somewhere near the mouth of the link to the creek. Year-round monitoring of surface water in the Dhands, particularly near the outlets of Karo and Fuleli drains, is equally important to ensure the effectiveness of the drainage from this part of Kotri system.

ENVIRONMENTAL SITUATION IN THE TIDAL LINK AREA

Environment setting of the Tidal Link

25. A broad and complex coastal zone lies between the terminus of LBOD and the Arabian Sea. Three distinct zones can be identified:

- the Rann of Kutch, a vast, highly saline wetland, that also includes large open bodies of saline water, salt pans in shallow depressions, land covered by a layer of crystalline salt, and numerous small, often interconnected saline lakes;
- a broad, extensive mud flat, that is temporarily covered by a thin layer of saline and silt laden water at high tide, particularly during the monsoon season; and
- a series of tidal creeks along the coast connecting the mud flats and wetlands with the sea.

26. The Rann of Kutch, which extends across the border between Pakistan and India includes a perennial, large and shallow body of water weakly connected by tidal creeks to the sea. Mangroves, which are generally limited in extent, specie diversity and productivity (because of the persistent high salinity), are found in places on the margins of the Rann of Kutch and among the tidal creeks. The land along the margins and extending some distance upland of this wetland is very saline, and the vegetation is very sparse to absent.

27. The wetlands of Sindh especially those east of the Indus River form an important component of a major migratory route for waterfowl known as the “Indus Flyway” [10]. They are important wintering, nesting and staging grounds for a large number of locally and globally⁶ important bird species (55-70% of all waterfowl found in Pakistan winter in Sindh), including some endangered species such as the Dalmatian Pelican. Two species of marine turtles inhabit the area, including the green turtle (frequently seen in KPOD and Tidal Link canal) and the loggerhead turtle. The wetlands, channels and creeks are also a productive fishery including several species of commercially valuable shrimp, prawns and crabs.

28. The western margin of the Rann of Kutch, where the drains enter the coastal zone, consists of a number of small, interconnected lakes called Dhands in Sindh, and a number of small lagoons some of which are dry during the late dry season or during drought periods. The surface area of the dhands varies seasonally and from year to year but averages about 700 sq. km. At low water levels, flow between the Dhands is limited and sometimes prevented by low ridges, but at high water particularly during the monsoon season or a wet year, they form a shallow, large and continuous wetland with the Rann of Kutch. The Dhands are generally oligotrophic⁷, with highly variable salinity (depending on stormwater and drain inflows), ranging from 15ppt to over 45ppt depending on the amount of mixing with drainage inflows whose salinity is generally less than 10ppt (principally from the Kotri drainage system). The Dhands and the surrounding lands, which are also saline, are nearly devoid of vegetation (except along the margins that are consistently fresh as, for example near a drain outfall). Biodiversity is nevertheless high with numerous specie of fish, crustaceans and mollusks that constitute a very productive fishery including several varieties of prawns, and high quality water fowl habitat.

29. Nearly all the villages near the Dhands depend on the fishery since the saline soils in the upland areas surrounding the Dhands support almost no agriculture except where water from the Kotri Barrage is available for irrigation. There are about 30 small fishing villages around the four Dhands and Sirani Drain (which enters directly into KPOD) [11]. Only one of the villages, *Karo Ghangro* located on Sanhro Dhand, is a permanent settlement of about 250-300 huts. The remaining villages are temporary, occupied seasonally when fishing in the immediate vicinity is good. In total there are about 5-6000 people, but the number varies year to year [11]. The socio-economic condition of these

⁶ The concentration of 22,500 Great White Pelican in Lake *Jabho* in Badin District in the winter of 1989 was the largest number ever recorded in Asia. In that same year 47,000 Greater Flamingo were observed in the Rann of Kutch, Pakistan. The breeding colony of Greater Flamingo in the Rann of Kutch is estimated to comprise over half the total world population and the largest assemblage anywhere in the world.

⁷ Except possibly in small areas where circulation is extremely limited

people is very poor: average incomes are about 6-800 PRs/month; there are no drinking water supply or health facilities; morbidity is high; education facilities are poor and participation rates are low [11].

30. Ramsar⁸ status has been officially requested by the Government of Pakistan for two areas near to where the drains enter the coastal zone. One is the *Narr-ri* Lagoon (2540 ha) near the outfall of the *Fuleli* drain in *Mehro Dhand*⁹, and the other is the *Jubho* Lagoon (700 ha) located on the western side of *Mehro Dhand*. If these sites are accepted (expected in 6-9 months), the surrounding Dhands will be designated as a Protected Area. Under the current regulations for Protected Areas in Pakistan, a management plan would then be prepared for this area by the GOS Department of Wildlife Conservation, and the use of this area regulated (not necessarily prevented).

Disposal of the Drainage Outflow

31. Carrying the LBOD baseflow and stormwater across the coastal zone to the Arabian Sea was considered important for several reasons:

- the drainage outflow from the system could not be emptied in the Rann of Kutch because it is an international wetland shared by India and Pakistan
- while the salinity of the drainage outflow is quite moderate compared to the Rann of Kutch it would likely contain a number of agricultural chemicals, nutrients, and industrial and domestic pollutants, and hence could not simply be disposed of in such a valuable wetland without possible risk to its important environmental values
- the left bank drainage system in Sindh is the first stage of an as yet undefined but necessary national drainage system for the left bank of the Indus river. Hence, an even greater volume of saline drainage and storm flow would have to be disposed of in the future, and a feasible and sustainable direct outlet to the sea developed

Specific Measures To Protect the Dhands

32. Before implementation of the LBOD project, the highly variable water balance in the four Dhands consisted of the relatively small Kotri drains that discharged directly into *Sanhro*, *Mehro* and *Pateji* Dhands, seepage, rainfall and surface runoff in the monsoon season, evaporation, and inflow to or outflow from the Rann of Kutch¹⁰. The drain inflow, evaporation and flow to or from the Rann of Kutch are thought to be predominant, but with the construction of the Tidal Link, flow from the Rann of Kutch in

⁸ The Ramsar Convention is an international treaty which came into force in Pakistan in November 1976. The main obligation of the government under the treaty is to ensure the wise use and conservation of wetlands defined in the convention as “an area of marsh, fen, peat land or water whether natural or artificial, permanent or temporary, with water that is static or flowing fresh, brackish, or salt including areas of marine water the depth of which at low tide does not exceed six meters”.

⁹ The *Karo* drain, which is much smaller than *Fuleli* in terms of flow (in an average year, 4.5 mcf/d versus 45.8 mcf/d from the latter in the monsoon season), discharges into the adjacent *Sanhro* Dhand.

¹⁰ Even at high water levels in the Rann of Kutch inflow to the Dhands is restricted by the generally northwest to southwest sloping topography

wet years would be prevented, and drain inflow reduced by directly connecting the largest drain, KPOD, to the Tidal Link canal. There appeared to be two key concerns that required mitigation:

- first, permanent separation from the Rann of Kutch, and elimination of the KPOD drain inflow, could lead to one of two scenarios, both with possibly adverse consequences: (i) if these two flows dominate the water balance, then such a change could cause a significant long term decrease in the normal surface area of the Dhands resulting in adverse impacts on both the fishery and waterfowl habitat; or (ii) if stormwater inflows and the remaining Kotri drains dominate the water balance, then such a change could result in the long-term increase in Dhand water levels increasing water logging and salinity intrusion in the surrounding lands and impairing the effectiveness of the drains;
- second, if the Dhands are left intentionally open to the canal (uncontrolled), the large tidal water level fluctuations in the canal would cause large diurnal water level fluctuations in the Dhands (the surface area of the Dhands would vary by an estimated 70% [12]). This effect would be enhanced if the head differences between the canal and the Dhands caused a network of drainage channels to develop within the Dhands. Water levels in the Dhands normally vary seasonally and from year to year but generally within a limited range of 1 to 2ft.

33. The 1989 EIA for the Left Bank Outfall Drain Project – Stage 1 determined that the most important effect of the Tidal Link on the Dhands would be excessive drainage due to the tidal fluctuations. Moreover, it was determined that additional, temporary inflow of drainage water from KPOD would not have an adverse effect and could offset the loss of water from the Rann of Kutch in wet years further stabilizing the water balance in the Dhands. It is important to note however, that at that point in time there was little or no data on the present and future kinds and levels of pollutants (pesticides, heavy metals, etc.) and nutrients that would be in the water flowing into the Dhands from the Tidal Link, nor what the biological and limnological fate of these substances would be (for example how much would be retained in the Dhands, would they be concentrated in the food chain, etc.).

Current Situation At the Cholri Weir

34. Since the complete destruction of the weir in 1998-99, water now flows freely in and out of the Dhands in response to tidal fluctuations in the canal through the opening left by the absent weir, and through a major breach in the canal bank. North of the weir opening, and the large breach in the embankment observed by the mission, a network of channels has quickly formed in the Dhands through which a significant portion of the Dhands are drained at low tide twice a day. The network of channels forming in the Dhands has the appearance of a typical tidal creek and appears to be progressing (deepening and extending) into the Dhands.

35. Anecdotal evidence suggests that local people are fearful of the changes taking place. They are reported to be concerned that because water is coming from all directions

waterlogging will increase, that the strong tidal influence is bringing sea water to the Dhands, and that the sea, once far away, is now very close.

Environment and Social Risks and Issues

36. GOS has appointed a second high level Committee to assess the environmental consequences of the Tidal Link damage, but it has not yet completed its review and made its report. The failure to implement the project EMP, which placed particular emphasis on monitoring and study of the area, makes it very difficult to evaluate impacts and assess risks. Nevertheless, it seems clear that there are several important long term risks that stem from the present situation and the course of action recommended to the Government of Sindh by the Technical Committee (paragraphs 11-13).

37. The first major risk is that the outcome anticipated by the Technical Committee, i.e. that the Tidal Link stabilizes and functions adequately but the uncontrolled connection between the canal and the Dhands remains, results in substantial and irreversible damage to the ecosystem, habitat and fishery in the Dhands. The large diurnal fluctuations in Dhand water level may change conditions in the Dhands sufficiently to cause severe degradation to the ecosystem and loss of biodiversity and key qualities of the waterfowl habitat. The great extent of the Rann of Kutch wetland may be sufficient to provide alternative habitat for breeding, feeding and resting by key waterfowl species, but it is not known if there is sufficient equivalent habitat elsewhere in the wetland, nor how the waterfowl will respond.

38. The changes in biodiversity and habitat noted above could adversely affect the fishery reducing yields particularly of commercially important species. Hence the second major risk is the loss of livelihood by the poor fishermen who depend on the Dhand fishery, and farmers whose lands could be adversely affected by high water levels in the Dhands (either temporary or persistent). Fishermen have been heavily fishing the canal since its completion, but there has not been any systematic monitoring of yields in the canal, and presently in the Dhands, in comparison to before project conditions.

39. Just as systematic and scientific monitoring is needed to observe and understand the evolution of the Tidal Link channel and its effectiveness and functioning, similar and perhaps more extensive monitoring and study is needed to understand, anticipate and respond to ecological changes occurring now and in the future in the Dhands.

Status of Implementation of the EMMP

40. In 1998, an update of the 1995 Environmental Management and Monitoring Plan (EMMP) was prepared for the LBOD – Stage 1 Project including the Tidal Link area [12]. The key mitigation measures identified in the 1989 EIA [2] for the Tidal Link were incorporated in its design – but the critical issue concerning future management of the Tidal Link and the surrounding impacted communities and wetlands was (and still is) the lack of a complete baseline and continuing, systematic, scientific and well coordinated monitoring and study of the area. As issues were identified in project planning and design, the lack of an adequate knowledge base to understand this dynamic system and its

response to various interventions and changes, and to support decision making in the future, became clear. In 1997 the first series of baseline studies were carried out covering, avifauna [10], fisheries [11], water quality [20], and comparative land use [13].

41. The 1998 EMMP update outlined a comprehensive program of baseline surveys and studies covering the social setting and economy of affected people, fisheries (biology, productivity, techniques), water quality and limnology, and ornithology. These studies were to continue for the foreseeable future at appropriate intervals to be determined as the knowledge base developed and needs and priorities were identified. The development of an institutional framework for this program with specific responsibilities assigned to different agencies who possessed the experience and qualifications to do the work, was rightly seen as critical to its success. A newly organized Environmental Cell (WECS) was established at WAPDA (South) to coordinate and lead the work.

42. However, from 1998 to the present a variety of disagreements between WAPDA and the Government of Sindh over who would lead and be responsible for the overall program including related elements of the National Drainage Program (NDP, financing of drainage activities in Sindh shifted to this project when LBOD-Stage 1 closed), has essentially prevented any further action on implementation of the EMMP program. No follow-up surveys and studies have been carried out since 1977 to complete the baseline, nor has an institutional framework to implement and coordinate the continuing environmental monitoring program been put in place.

FRAMEWORK FOR ACTION

Institutional Arrangements

43. The performance of the Tidal Link as the major outlet of drainage water from the Indus Left Bank to the open sea and its impact on the coastal wetlands is of strategic national and provincial interest.

44. The monitoring program should be continued as enormous amounts of past data and institutional memory have been invested in these organizations. However, the mission noticed that the analysis part of the monitoring task is weak. There is no permanent institution to constantly following up the analysis of the collected monitoring data of both organizations in an integrated manner, and to make the necessary interpretation of the ongoing phenomena. The mission therefore suggests that a core scientific group comprising multidisciplinary specialists should be formed solely for the purpose, and assigned the task. This core group will function as a counterpart body to any international and local panel of expert. Before thinking of engaging a Panel of Experts the core scientific team should accomplish the task of consolidating the existing data and information.

45. Two priority actions are urgently needed to address the environmental risks:

- (i) Those elements of the program of social and environmental monitoring, surveys and studies initially outlined in the 1998 EMMP that are most

relevant to the Tidal Link impact areas should be reviewed, updated and converted into a series of TORs and the revised program launched on an urgent basis;

(ii) Equally important, and perhaps more difficult, is for the Government of Sindh to establish a clear and stable institutional framework for the management and coordination of the program. As noted earlier it is not sufficient to arrange to contract for isolated data collection and surveys. The adopted approach should:

- provide an effective institutional mechanism to not only coordinate activities by different organizations and specialists, but also to ensure that data are compiled, analyzed, interpreted in an integrated manner, trends identified, and the program adjusted accordingly;
- ensure that all the concerned and capable organizations in Sindh are appropriately involved. It should be noted, for example, that the key agency responsible for management of these valuable wetland resources (the Department of Wildlife Conservation) is not a member of the GOS Committee to review the environmental situation in the Tidal Link area;
- provide an effective mechanism, and appropriate incentives, to share and disseminate data and information. Modern information management tools such as computers, GIS and other information technology hardware and software are now widely available in Pakistan. GOS should give this issues priority attention – timely sharing of data and coordination of activities is perhaps the least expensive way to expand knowledge.

46. Within Sindh, and certainly within Pakistan, there are a sufficient number of specialists with appropriate experience and advanced training to do the required work. Additional training to fill gaps can be mobilized quickly. Many experienced specialists can be found with in the specialist agencies, institutes and universities, and NGOs. What is needed is an institutional framework to mobilize and coordinate this capacity, and leadership.

47. The physically complex and environmentally sensitive coastal zone should be of special interest to the scientific community in Pakistan. Scientists from universities and research institutes should have the opportunity to develop more understanding of the area characteristics and the changes happening due to the construction of the Tidal Link. This approach would provide better vision and innovative solutions to mitigate adverse effects and sustain safe flow of drainage effluent to the sea. The research sub component of NDP provides appropriate window for engaging the scientific community in the future Tidal Link monitoring and studies.

48. An important consequence of the failure to implement the EMMP is the lack of public awareness of the need to sustainably manage both the fishery and the ecosystem of

the Dhands. Over-fishing, poaching, and disruption of habitat were highlighted in a number of studies done in 1997 [10, 11]. When these unsustainable practices are combined with the present threats caused by the damages to the Tidal Link, the risk of an irreversible loss is magnified. WWF indicated to the mission that there are good examples in Pakistan of successful efforts to mobilize stakeholders and communities and their adoption of new practices to sustainably manage their local natural resources and ecosystems. Community mobilization and the creation of local mechanisms to sustainably manage the Dhand ecosystem resources in collaboration with local authorities should be a central element of the implementation of the new EMMP. Enlisting local communities to participate in the monitoring program (both the physical and environmental monitoring programs) would significantly enhance such a program.

49. The record in Pakistan and in Sindh in regard to sharing data and information, and coordination of activities among different agencies even when they are working on the same general problem is not encouraging. Neither is the awareness or capacity of government organizations to work with local communities and stakeholders to achieve sustainable development objectives. The economic, social and environmental issues and risks in the Tidal Link area are of strategic importance to Sindh. A major effort should therefore be undertaken to overcome these past problems, simply because the risks are so high.

Panel of Experts (PoE)

50. Once such a comprehensive technical, environmental and social report is ready (one based not only on compilation of data but on analysis and interpretation), a high level Panel of Experts (PoE) could be engaged in the future phase of monitoring and studies on annual basis. The PoE formed from local and international experts could start by reviewing the state of developments up to the moment and recommending necessary adjustments to the program and the various TOR for monitoring including those for environmental monitoring, if necessary. The PoE would continue its annual reviews each time an annual monitoring report(s) is/are prepared. The Panel of expert will be in a position to see the appropriate course of actions leading to definite conclusions and recommendations appropriate to deal with the findings of this program.

PERSONS WITH WHOM THE MISSION HELD DISCUSSIONS

Meeting at the Secretariat, GOS, Karachi (03/12/2001)

| | | |
|-----|-----------------------------|---|
| 1. | Mr. Khadim Ali Memon | Additional Secretary, IPD, Government of Sindh |
| 2. | Mr. Tariq Masood | General Manager, National Drainage Program, WAPDA |
| 3. | Dr. Izhar Ul Haq | General Manager, Tarbela Dam, WAPDA |
| 4. | Mr. Riasat Ali | Chief Engineer Central Design Office (W) WAPDA |
| 5. | Mr. Mahboob A. Ansari | Conservator, Wildlife Department, GOS |
| 6. | Mr. Syed Rajhib Abbass Shah | Chief Engineer (W) South, WAPDA |
| 7. | Mr. Mohamad Izhar Khan | Chief Engineer, Kotri Barrage, WAPDA |
| 8. | Dr. Salam Memon | Provincial Coordinator, NDP, P&D |
| 9. | Mr. P.S. Rajani | Chief (W&P), P&D |
| 10. | Mr. Faizullah Khatri, | Senior Engineer, P&D |
| 11. | Mr. Rehan Hyder | Assistant Director, NDP P&D |
| 12. | Mr. H. Ali Din Mohammad | ACC, P&D |

Meeting at Hyderabad Field Visit (03/14/2001)

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|-----|-----------------------------|--|
| 1. | Mr. Syed Nasim Hender | Director General, EPA, GOS |
| 2. | Mr. Tariq Masood | General Manager, National Drainage Program, WAPDA |
| 3. | Dr. Izhar Ul Haq | General Manager, Tarbela Dam, WAPDA |
| 4. | Mr. Riasat Ali | Chief Engineer CDO (W) WAPDA |
| 5. | Mr. Mahboob A. Ansari | Conservator, Wildlife Department, GOS |
| 6. | Mr. Syed Rajhib Abbass Shah | Chief Engineer (W) South, WAPDA |
| 7. | Muhammad Yasin Shaikh | Director, SCARP Monitoring (South) WAPDA |
| 8. | Mr. Nazi Hussain Moghul | Superintending Engineer, LSDC, Kotri Barrage Region, |
| 9. | Dr. Ahmad Hadi Shaikh | Planning Engineer, PDC, GOS |
| 10. | Mr. Rehan Hyder | Assistant Director, NDP P&D |
| 11. | Mr. Saeed Akhtar Baloch | ASSH Conservator, Wildlife, GOS |
| 12. | Mr. Akbar Ali Khatain | Environmental Officer, LBOD, WAPDA |
| 13. | Mr. Abdul Khalifer Memon | Member Cholri Weir Community, Badin |

Meeting at NIO, Karachi (03/15/2001)

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|-----|---------------------|--|
| 14. | Mr. S.H. Niaz Rizvi | Team Leader, Tidal Link Monitoring Team, NIO |
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Meeting at Department of Wildlife Conservation, GOS, Karachi, 3/16/2001

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|-----|----------------------------|-----------------------------------|
| 15. | Mr. Mahboob Alam Ansari, | Conservator of Wildlife |
| 16. | Mr. Abdul Munaf Kaimkhani, | Assistant Conservator of Wildlife |
| 17. | Mr. Saeed Akhtar Baloch | Assistant Conservator of Wildlife |

Meeting at IUCN, Karachi, 3/17/2001

| | | |
|-----|-----------------------|---|
| 17. | Mrs. Nargis Alavi, | Head, Karachi Office, IUCN |
| 18. | Mr. M.Tahir Qureshi, | Director, Coastal Ecosystems Unit, IUCN |
| 19. | Mr. Ahmad Saeed, | Deputy Programme Director, IUCN |
| 20. | Mr. Syed Ali Hasnain, | Project Manager, WWF |
| 21. | Mrs. Rahat Jabeen, | Wetland Conservation Officer, WWF |

Attachment 2

Documents Consulted

1. Left Bank Outfall Drain Stage I Project Preparation, annex 12, Outfall System and Tidal Link, Sir M MacDonald and Partners Limited and Associates, January 1984.
2. LBOD Stage I Project, Environmental Impact Assessment of the Outfall Drains, Mott MacDonald Limited, February 1989
3. Tidal Link Mathematical Model, Modelling Effects of Dhand-Tidal Link Weir, Summary of Results of 1990 Modelling
4. Environment, Supporting Report 10, Mid Term Review, Left Bank Outfall Drain Stage 1 Project, Sir M MacDonald & Partners Ltd, March 1993
5. Drainage Sector Environment Assessment, National Drainage Program, Main Report Vol 2 – Conceptual Framework. Mott MacDonald, June 1993
6. The Performance of The Drainage systems of the Left Bank of the River Indus During the 1994 Monsoon, Album of Photographs, Sir M MacDonald and Partners Limited and Associates, October 1994.
7. Interim Environmental Report, Left Bank Outfall Drain Stage 1 Project, Mott MacDonald, November 1994
8. Presentation to the Minister for Water and Power, Left Bank Outfall Drain Stage 1 Project, WAPDA Integrated Management Organization, Hyderabad, January 1997
9. Morphology of the Tidal Link Post 1996 Monsoon, Left Bank Outfall Drain Stage-I Project, Sir M MacDonald and Partners Limited and Associates, May 1997
10. Survey of the Avifauna of Tidal Link and Adjoining Areas, Zoological Survey Department, May-December 1997
11. Fisheries Survey of Chotiari Reservoir (Sanghar) and Tidal Link Lakes (Badin). University of Sindh, Jamshoro. December 1997
12. Environmental Management and Monitoring Plan, Left Bank Outfall Drain Stage 1 Project, Sir M MacDonald and Partners *et al.* April 1998
13. Comparative Land Use Assessment Pre and Post Construction, Left Bank Outfall Drain Stage 1 Project (Study ENV/1), Mott MacDonald Limited, April 1998
14. Implementation Completion Report, Left Bank Outfall Drain Stage 1 Project, World Bank Credit 1532-PAK, June, 1998
15. Bed level Survey of LBOD Tidal Link & KPOD Up to RD+26 by Echosounding, Final Report, National Institute of Oceanography, October 1998.
16. A review of Erosion Problems in Tidal Link/Breach in Cholri Weir Structure and proposals for rehabilitation, by specialist Group, MM Pakistan (Pvt) Ltd., February 1999.

17. Memorandum of Understanding between SCARPs Monitoring Organization WAPDA and National Institute of Oceanography for Hydraulic Monitoring of Tidal Link, LBOD Under National Drainage Programme-I, March 1999.
18. Report on aspects of Environment & Social Issues after damages to Cholri Weir in June 1998 & Tidal Link during May 1999 Cyclone – Source Unknown
19. Committee Report on Damages to Cholri Weir in June 1998 and Tidal Link During May 1999 Cyclone to the Additional Chief Secretary, Government of Sindh, Chief Engineer and Project Director (South) WAPDA, October, 2000
20. Physical Monitoring Left Bank Out Fall Drain Stage I Project Under National Drainage Programme, (Two Volumes), SCARPs Monitoring (South) WAPDA, Hyderabad, December 2000.
21. Project Completion Report, Left Bank Outfall Drain Project (ADB Loan No. 700-PAK), January 2001

ANNEX 9 CONSULTATIONS

| No. | Place & Date of Consultation / Discussion | Name(s) of NGOs, CBOs, Civil Society Group | Reference |
|-----|---|---|--|
| 1. | July 5-28, 1994 On-farm Drainage Pilot Project in D G Khan | <ul style="list-style-type: none"> Discussions with Drainage Beneficiary Groups | Aide-Memoire, Third Preparation Mission (July 5-28, 1994) |
| 2. | Nov. 13-Dec. 22, 1994 | <ul style="list-style-type: none"> Discussions with NGOs, farmers and private sector held Field visits to project sites in Punjab, Sindh and NWFP | Aide-Memoire, Pre- Appraisal Mission (November 13-December 22, 1994) |
| 3. | June 28, 1995 Islamabad | <ul style="list-style-type: none"> Representative 8 NGOs including National Rural Support Program (NRSP) and Balochistan Rural Support Program (BRSP), Sindh Rural Support Corporation (SRSC), International Union for the Conservation of Nature (IUCN) and NGO Resource Center, supporting rural and community development efforts that cover Pakistan's four provinces. Discussion on IES with various stakeholders including representative NGOs Field discussion with farmers and meeting with local consultants and social organizers working in farming communities. | Aide-Memoire, Second Pre-Appraisal / Joint Mission WB, ADB & OECF (June 22-July 28, 1995), and BTO report dated July 6, 1995 with a list of 8 participating NGOs |
| 4. | Nov. 13-25, 1995 Lahore, Islamabad & Karachi | <ul style="list-style-type: none"> In Lahore about 20 NGOs were represented and agreed to plan and develop their association with the project in consultation with PIDA. In Sindh meeting was held with several NGOs concerned with environmental issues and having a local presence in and around the LBOD area including Pakistan Institute for Environmental Development Action Research (PIEDAR), Leadership for Environment and Development (LEAD), Sindh Agricultural and Forestry Workers Organization (SAFWCO), IIMI (now IWMI-International Water Management Institute), Sustainable Development Policy Institute (SDPI). Discussions were also held with other organizations including Sungi Development Foundation (SUNGf), Strengthening Participatory Organization (SPO) and Green Press to discuss possible partnership with the project. Meeting with IUCN in Islamabad. | Mission Note by NGO Specialist, SDV to the Task Team Leader |
| 5. | June 26, August 15, 1997 Islamabad | <ul style="list-style-type: none"> Consultation meetings by the NGO Specialist during July 2-August 10, 1997 with NGOs, CBOs, Media representatives, local communities and farmers in all the provinces and Islamabad. NGO network meetings were held in all provinces and in Islamabad. The meetings were arranged by the Regional / Provincial Networks and the NDP team was invited for a discussion. 20-30 NGO and CBO representatives attended the meeting in each province and 12 in Islamabad. A briefing note giving basic information on the project was prepared by the Mission and shared with the media and NGOs. This was also translated by NGO networks into the national and local languages and | AM Pre-Board Review Mission and supervision for the Nara Canal AWB Pilot Project BTOR by the NGO Specialist, SDV, dated September 22, 1997. |

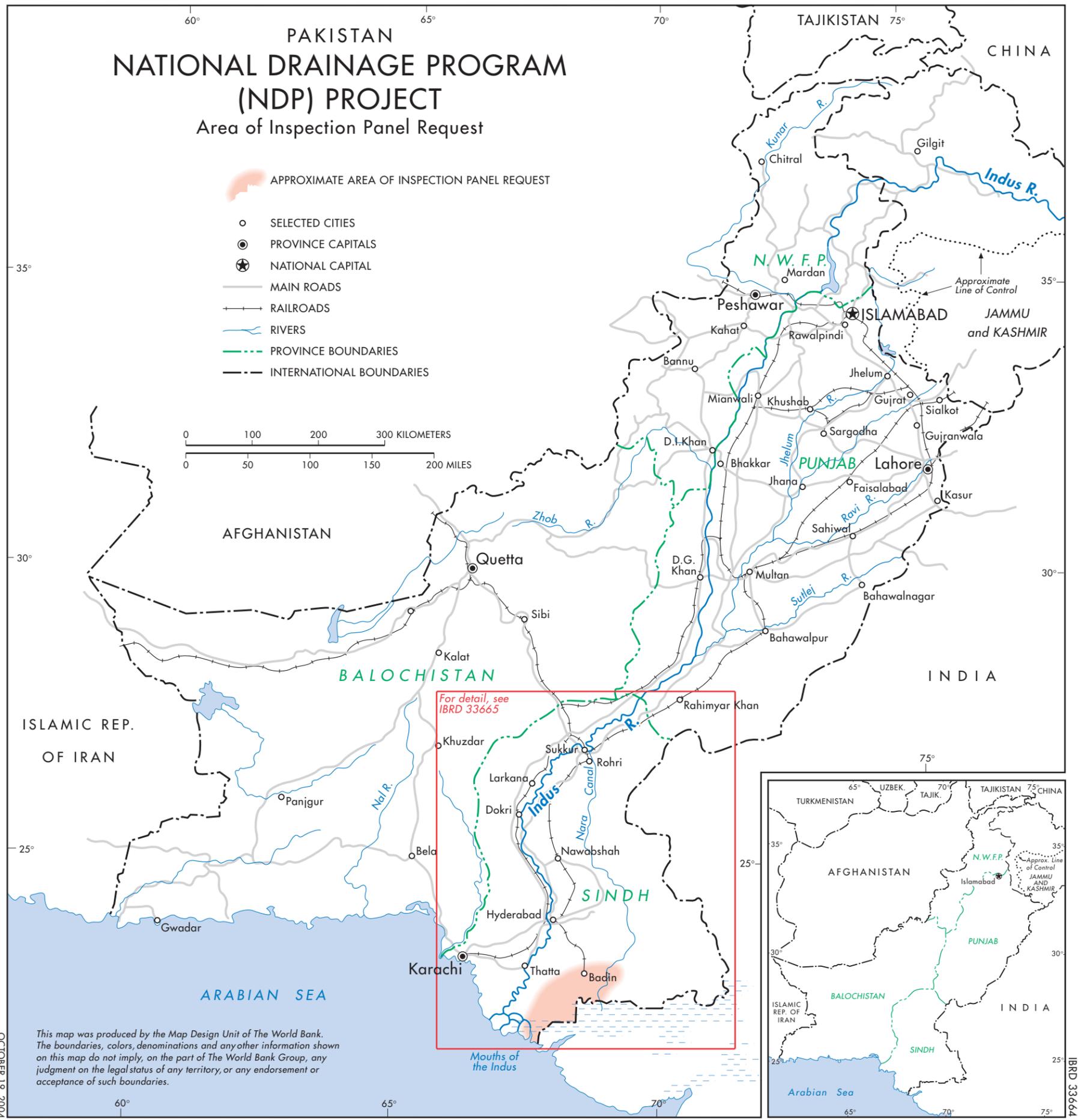
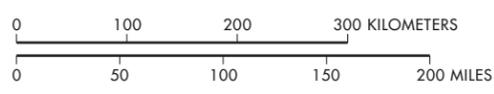
| No. | Place & Date of Consultation / Discussion | Name(s) of NGOs, CBOs, Civil Society Group | Reference |
|-----|---|---|--|
| | | distributed widely among the members. This note formed the basis of discussion at NGO network meetings. The roles and responsibilities of different partner agencies, including NGOs, were discussed in detail. | |
| 6. | January 7-8, 1998 Lahore | <ul style="list-style-type: none"> • Participation by Punjab NGO Coordination Council (PNCC); Aurat Foundation Balochistan NGO Federation (BNGOF); Sindh NGO Federation (SNGOF); Sarhad NGO Ittehad (SNI) Aurat Foundation; and Coalition of Rawalpindi and Islamabad NGOs (CORIN) | Aide-Memoire, Project Launch Mission, January 6-8, 1998. |
| 7. | March 23-April 10, 1998 | <ul style="list-style-type: none"> • Meeting with NGO network representatives (March 23-24) in Lahore. Subjects for discussion included IEC, social and environmental assessment, social mobilization and partnership with NGOs. • In Hyderabad, Mirpurkhas, and Sanghar: Meeting with Water Users Associations and Federations, and a meeting with Sindh NGOs Federation. • Meetings with NGOs focused on the role and expectations from NGOs in NDP Project, concerns in terms of NDP's effects on environment degradation in Sindh province, RBOD, and drainage of water from other provinces. The session also discussed the need and worked out a structure within the NGO network for coordination with NDP. | BTOR dated May 11, 1998 from NGO Specialist |
| 8. | Nov. 24-26-1998 Islamabad, Peshawar, Lahore, Hyderabad, Mirpurkhas, Sanghar, Nawab Shah and Karachi | <ul style="list-style-type: none"> • Meeting with representatives of Punjab, Sindh, and Pakistan NGO Forum, and the Sindh NDP NGO Forum, and their local partners. • NGO network representatives to the Provincial Steering Committees participated in a special session. The representatives from PNF, Punjab; and Sindh felt that they had a very critical role to play and offered serious policy input and social mobilization support. • NDP NGO Forum Sindh organized a meeting with the mission in Hyderabad and, as a next step, agreed to clearly define its own role, help guide the participation of Sindh NGO network representatives on the Steering Committee, offered support for social assessment and social mobilization; and offered to share the database on NGOs. • At this time, nomination of NGOs for membership of NDP Provincial Steering Committees had been received from NGO federations in all provinces. | Aide Memoire, Thematic Supervision Mission, Nov. 23-Dec. 10, 1998 |
| 9. | Feb, 22-March 5, 1999 Lahore | <ul style="list-style-type: none"> • Presentation by PDC. • Presentation by NGOs: Nominee of Pakistan NGO Forum focused on the role of NGOs; • General Manager NRSP presented NRSP's proposal for participation in NDP; • Social Coordinator FESS described the experience of FESS; and • Director OFWM presented their experience. | Note on Operationalizing Social Mobilization and other related aspects of NDP February 28, 1999 |
| 10. | May 17-June 24, 1999 Sindh, Punjab and NWFP | <ul style="list-style-type: none"> • Ruhuki Farmers' organization in Sindh, • Field visits and meetings with prospective FO farmers in Kohat, Hangu, Swat (NWFP) and found strong demand from farmers to manage water in their communities. • Visited potential project sites and farmers in | Aide-Memoire, Fourth IDA Supervision Mission, May 17-June 24, 1999 |

| No. | Place & Date of Consultation / Discussion | Name(s) of NGOs, CBOs, Civil Society Group | Reference |
|-----|--|---|-------------------------------------|
| | | Muzzafagarh, Kot Adu, and D.G.Khan (Punjab) | |
| 11. | March 19-April 6, 2001 NWFP | <ul style="list-style-type: none"> • ADB Mission Note dated March 31, 2001): NWFP agreed to carry out information campaign and for social mobilization | AM Joint WB, ADB & JBIC MTR Mission |
| 12. | September 2004 Badin, Hyderabad & Islamabad | <ul style="list-style-type: none"> • Representatives of various NGOs including ActionAid. ActionAid was the only NGO participating during the discussions with the Bank and the GOP agencies in Islamabad. | Panel of Experts meeting on MDP |

PAKISTAN NATIONAL DRAINAGE PROGRAM (NDP) PROJECT

Area of Inspection Panel Request

-  APPROXIMATE AREA OF INSPECTION PANEL REQUEST
-  SELECTED CITIES
-  PROVINCE CAPITALS
-  NATIONAL CAPITAL
- MAIN ROADS
- RAILROADS
- RIVERS
- PROVINCE BOUNDARIES
- INTERNATIONAL BOUNDARIES



For detail, see
IBRD 33665



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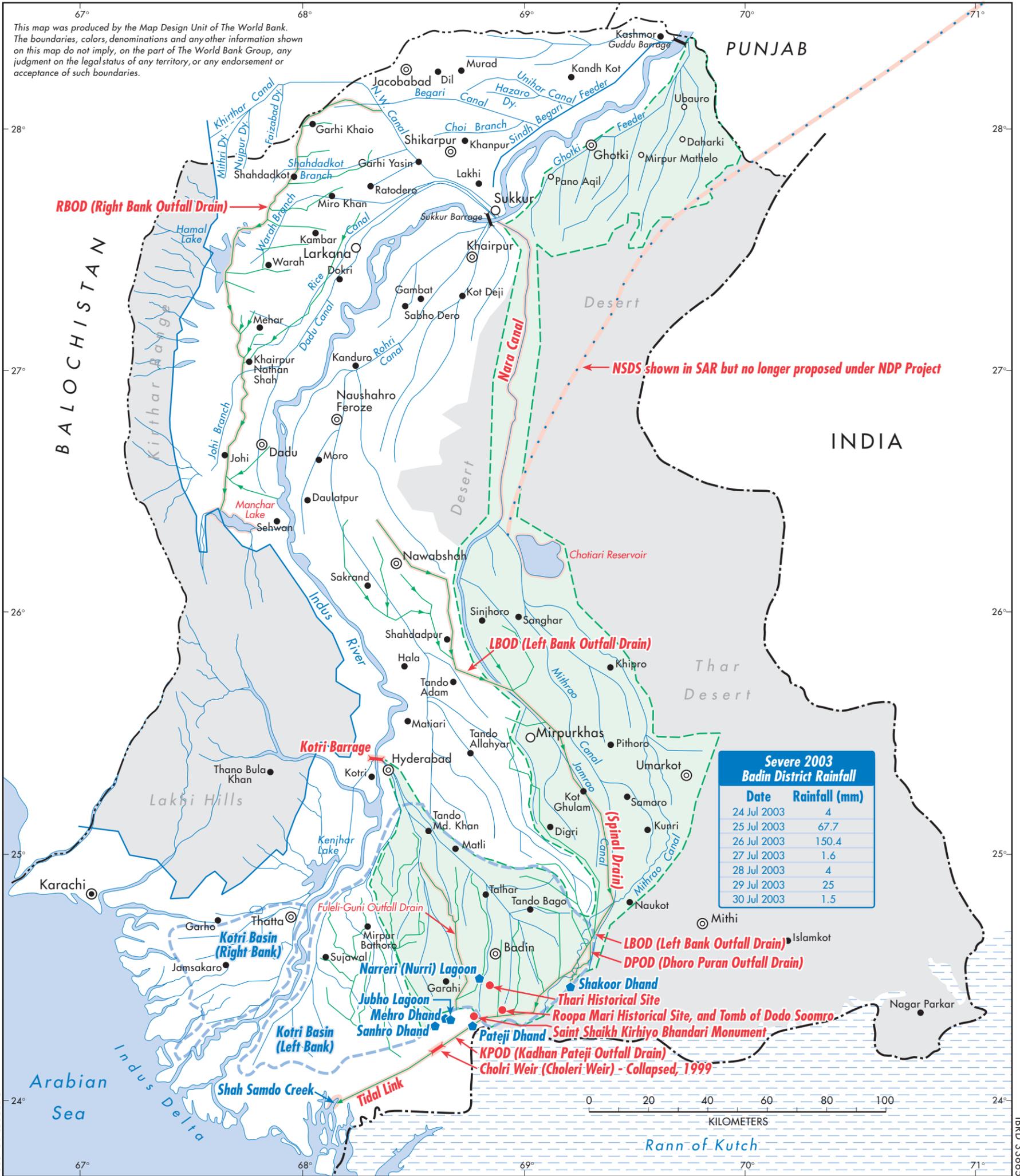
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PAKISTAN NATIONAL DRAINAGE PROGRAM (NDP) PROJECT Sindh Province

- CULTURAL SITES MENTIONED IN REQUEST
- ◆ DHANDS AND LAGOONS MENTIONED IN REQUEST
- ▬ WEIRS/BARRAGES MENTIONED IN REQUEST
- ▬ CANALS MENTIONED IN REQUEST
- ▬ DRAINS MENTIONED IN REQUEST
- ▬ NSDS (shown in SAR but no longer proposed under NDP Project)
- ▬ RIVERS OR STREAMS
- ▬ CANALS
- ▬ DRAINS
- ▬ BRANCH/DISTRIBUTARY CANALS
- AREA WATER BOARDS
- ▬ BARRAGES

- ▬ SELECTED BASIN BOUNDARIES
- DESERTS/HILLS
- SELECTED TOWNS
- MAJOR CITIES
- TEHSIL HEADQUARTERS
- ◎ DISTRICT HEADQUARTERS
- ◎ PROVINCE HEADQUARTERS
- ▬ PROVINCE BOUNDARIES
- ▬ INTERNATIONAL BOUNDARIES



PAKISTAN

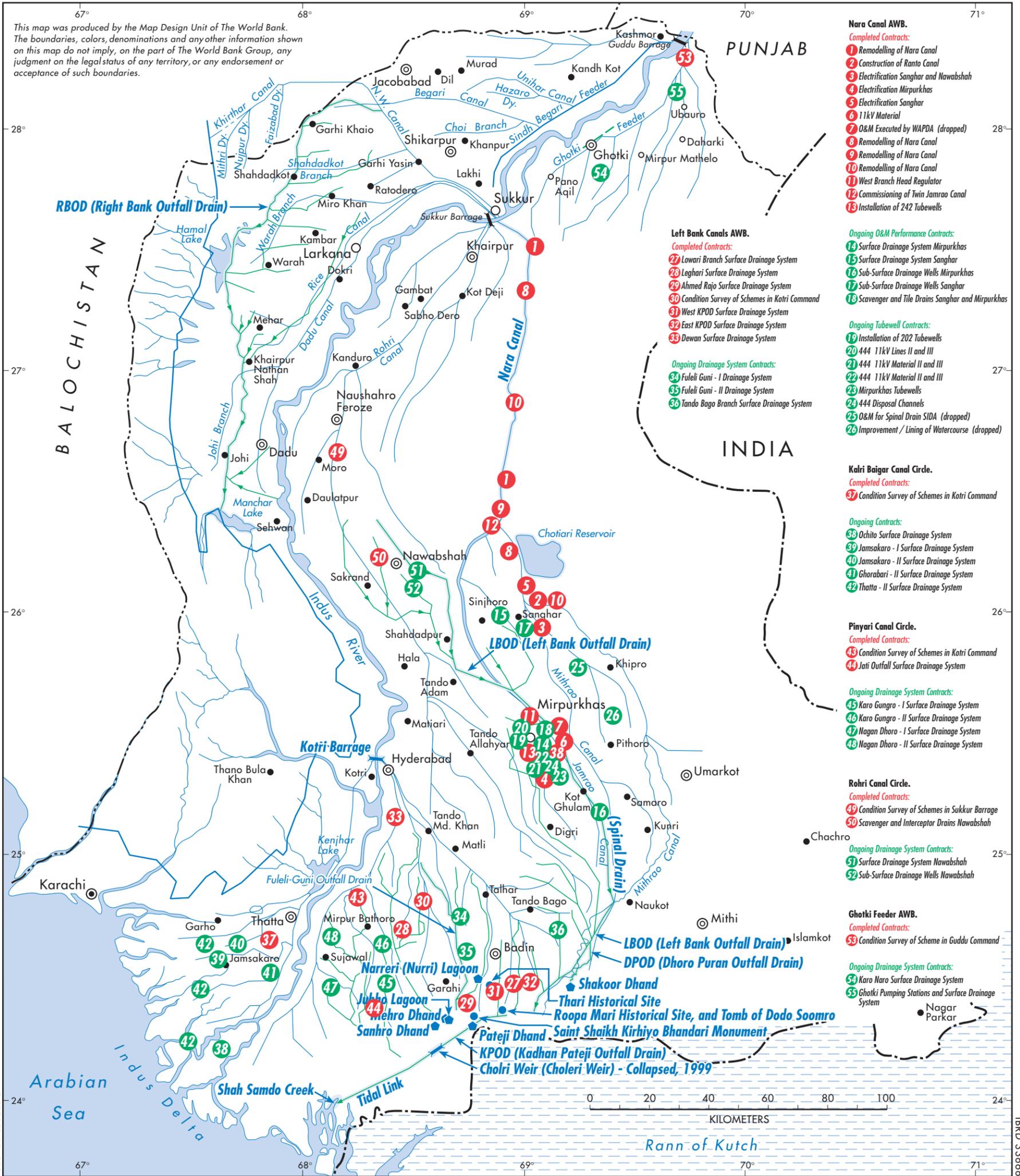
NATIONAL DRAINAGE PROGRAM (NDP) PROJECT

Location of Contracts for Subprojects*

- 53 COMPLETED CONTRACTS
- 55 ON-GOING CONTRACTS
- CULTURAL SITES MENTIONED IN REQUEST
- ◆ DHANDS AND LAGOONS MENTIONED IN REQUEST
- ▬ WEIRS/BARRAGES MENTIONED IN REQUEST
- ▬ CANALS MENTIONED IN REQUEST
- ▬ DRAINS MENTIONED IN REQUEST
- ▬ RIVERS OR STREAMS
- ▬ CANALS
- ▬ DRAINS
- ▬ BRANCH/DISTRIBUTARY CANALS
- ▬ BARRAGES

- SELECTED TOWNS
- MAJOR CITIES
- TEHSIL HEADQUARTERS
- ⊙ DISTRICT HEADQUARTERS
- ⊙ PROVINCE HEADQUARTERS
- PROVINCE BOUNDARIES
- INTERNATIONAL BOUNDARIES

* This map includes contracts for drainage works, irrigation works, electrification works, O&M performance, and condition surveys. Contracts shown more than once indicate multiple locations for the contract.



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