

Document of
The World Bank

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Report No: 46741-ID

PROJECT APPRAISAL DOCUMENT
ON A
PROPOSED LOAN
IN THE AMOUNT OF US\$ 50 MILLION
TO THE
REPUBLIC OF INDONESIA
FOR A
DAM OPERATIONAL IMPROVEMENT AND SAFETY PROJECT (DOISP)

February 20, 2009

Rural Development, Natural Resources and Environment Sector Unit
Sustainable Development Department
East Asia and Pacific Region

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CURRENCY EQUIVALENTS

(Exchange Rate Effective November 25, 2008)

Currency Unit = Rupiah
9,300 = US\$1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AMDAL	Environmental Impact Assessment (under GOI regulations)
AWP	Annual Work Plan
Balai PSDA	River Water Resources Management Unit (under the Provincial government)
Balai	River Agency (under the MPW)
(B)WS	
Bapedalda	Local-government Environmental Office
BAPPENAS	National Planning Agency
BDSF	Basic Dam Safety Facility
BPKP	National Audit Agency
CDMU	Central Dam Management Unit (in MPW)
CPIU	Central Project Implementation Unit
CPMU	Central Project Management Unit
CPS	Country Partnership Strategy
DGWR	Direktorat General Water Resources, MPW
DIPA	Annual budget earmark letter
DOISP	Dam Operational Improvement and Safety Project
DSC	Dam Safety Commission (in MPW)
DSP	Dam Safety Project
DSU	Dam Safety Unit (in MPW)
EAP	Emergency Action Plan
EMP	Environmental Management Plan
ESMF	Environmental and Social Safeguards Management Framework
GOI	Government of Indonesia
ICOLD	International Commission on Large Dams
INACOLD	Indonesian Commission on Large Dams (a Chapter of ICOLD)
JBIC	Japan Bank of International Cooperation
<i>Kabupaten</i>	District
KPPN	Local office of the National Treasury
LARPF	Land Acquisition and Resettlement Policy Framework
MDGs	Millennium Development Goals
MEAV	Modern Equivalent Asset Value
MPW	Ministry of Public Works

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NTB	Nusa Tenggara Barat (a province in Indonesia)
O&M	Operation and maintenance
PDMU	Provincial Dam Management Unit
PIP	Project Implementation Plan
PIU	Project Implementation Unit
PMF	Probable Maximum Flood
PMM	Project Management Manual
PRA	Portfolio Risk Assessment
<i>Dinas PUP</i>	Provincial Public Works Office
RAP	Resettlement Action Plan
RCWR	Research Center for Water Resources, Bandung (formerly Institute for Water Resources Research, IWRR)
SID	Surveys, Investigations and Designs
UKL/UPL	Environmental Management and Monitoring Plan (as per GOI regulations)
WATSAL	Water Resources Sector Adjustment Loan
WOP	Without project
WP	With project

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INDONESIA
Dam Operational Improvement and Safety Project (DOISP)

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INDONESIA

DAM OPERATIONAL IMPROVEMENT AND SAFETY PROJECT (DOISP)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

EASIS

Date: February 20, 2009	Team Leader: Guy J. Alaerts
Country Director: Joachim von Amsberg	Sectors: General water, sanitation and flood protection sector (100%)
Sector Manager: Sonia Hammam	Themes: Water resource management (P); Other environment and natural resources management (S)
Project ID: P096532	Environmental screening category: Partial Assessment
Lending Instrument: Specific Investment Loan	

Project Financing Data

[X] Loan [] Credit [] Grant [] Guarantee [] Other:

For Loans/Credits/Others: IBRD Loan US\$50.0 Million

Total Bank financing (US\$m.): 50.00 Million

Proposed terms: FSL in US dollars, with 9-year grace period and payable over 24.5 years with level payment.

Financing Plan (US\$m)

Source	Local	Foreign	Total
Borrower	18.50	1.93	20.43
International Bank for Reconstruction and Development	29.10	20.90	50.00
Total:	47.60	22.83	70.43

Borrower:

Ministry of Finance

Jl. Lapangan Banteng Timur No. 2-4

Indonesia

10710

Tel: 62 (0)21 384-1067 Fax: 62(0)21 380-8395

Bappenas

Jl. Taman Suropati No. 2

Jakarta

Indonesia

10310

Tel: 62 (0)21 319-36207

Responsible Agency:

Ministry of Public Works, Directorate General of Water Resources
 Jl. Pattimura No. 20
 Indonesia
 Tel: (62-21) 739-6616 Fax: (62-21) 720-8285

Estimated disbursements (Bank FY/US\$m)

FY	2009	2010	2011	2012	2013	2014		
Annual	0.10	5.40	12.20	14.00	11.65	6.65		
Cumulative	0.10	5.50	17.70	31.70	43.35	50.00		

[

Does the project include any critical risks rated “substantial” or “high”?

[] Yes [X] No

Ref. PAD III.E.

Does the project meet the Regional criteria for readiness for implementation?

[X] Yes [] No

Ref. PAD IV.H.Project development objective **Ref. PAD II.B., Technical Annex 3**

The objectives of the Project are to (i) increase the safety and the functionality with respect to bulk water supply of large Ministry of Public Works-owned reservoirs; and (ii) strengthen the safety and operational management policies, regulations and administrative capacity of Ministry of Public Works.

Project description **Ref. PAD II.C., Technical Annex 4**

1. Dam Operational Improvement and Safety Works and Studies (base cost \$31.48 million): to design and implement construction of localized rehabilitation and remedial works on about 34 dams/reservoirs;

2. Operations & Maintenance Improvement and Capacity Building (base cost \$13.24 million): to improve operation and maintenance capacity and procedures; to conduct participatory programs with local communities to protect the greenbelt of reservoirs;

3. Reservoir Sedimentation Mitigation (base cost \$13.12 million): to conduct surveys and community participatory programs with local communities to protect the upstream catchments;

4. Dam Safety Institutional Improvement (base cost \$2.14 million): to support the strengthening of the regulatory framework;

5. Project Management (base cost \$4.36 million): to provide for overall project and financial management support.

Which safeguard policies are triggered, if any? **Ref. PAD IV.G., Technical Annex 10**

Environmental Assessment (OP/BP 4.01)

Safety of Dams (OP/BP 4.37)

Significant, non-standard conditions, if any, for:

Ref. PAD III.F.

Covenants applicable to project implementation:

- (i) Maintain until completion of the Project the PIUs established for the first year of Project implementation and establish, by no later than December 31, 2009 and thereafter maintain, until completion of the Project, PIUs in the remaining BBWS/BWS Offices and Dinas PUP Offices in the Project Provinces; in each case with terms of reference and staffing acceptable to the Bank. Establish by no later than December 31, 2009 and thereafter maintain until completion of the Project, the PIU in each of RCWR and DSU, in each case with terms of reference and staffing acceptable to the Bank.
- (ii) Carry out the Project in accordance with the Project Management Manual acceptable to the Bank.
- (iii) Cause each PIU to prepare and furnish to the CPMU by not later than June 1 in each year of Project implementation, commencing June 1, 2009, for the following Fiscal Year, for its review a draft Annual Work Plan meeting the requirements set out in the PMM, which shall include a detailed description of the Sub-projects and the Preparation Activities proposed to be undertaken in the following Fiscal Year.
- (iv) Cause the CPMU to consolidate and furnish to the Bank, not later than July 1 in each year of Project implementation, commencing July 1, 2009, for review and no-objection, the Annual Work Program for the Project based on the Annual Work Plans prepared by all PIUs for the following year (and, commencing July 1, 2010, a report reviewing performance of the Annual Work Program of the year to date).
- (v) No later than March 31 in each year of Project implementation, commencing March 31, 2009, send to the Bank a report on O&M budget containing the information required as set out in the Project Management Manual, including: (a) the O&M budget allocation in the immediately preceding Fiscal Year; and (b) the percentage thereof that was spent in accordance with the Project Management Manual.
- (vi) Apply the provisions of the Environmental and Social Safeguards Management Framework (ESMF) in Sub-project implementation, including, where applicable in accordance with the ESMF: (i) screening of each Sub-project to ensure that potential environmental and social impacts for each Sub-project are identified prior to implementation; (ii) development of an environmental management plan to mitigate potential adverse environmental impacts associated with these works fully consistent with the ESMF prior to commencement of Sub-project implementation; (iii) application of the DSC Guidelines in the operation of each dam and in all Project activities; and (iv) application of community participation procedures for dam management and water catchment area management.
- (vii) For the purpose of overseeing implementation of dam safety measures, (i) during the first year of Project implementation and prior to the approval of the first Annual Work Plan, assign an Independent Expert with qualifications and terms of reference acceptable to the Borrower and the Bank who has not been involved in the design or implementation of the Project, to review and oversee the Sub-projects and the Preparation Activities in the first year of Project implementation and to assist in developing preparation criteria for the establishment of a Dam Safety Panel and (ii) by no later than the first anniversary of the date of this Agreement, or such

later date as may be agreed in writing between the Borrower and the Bank, establish and thereafter retain throughout the Project, a Dam Safety Panel for the second and later years of Project implementation with qualifications and terms of reference acceptable to the Borrower and the Bank, comprised of three or more individuals who have not been involved in the design or implementation of the Project, to review and oversee Sub-projects and Preparation Activities for large and/or complex dams, which will comprise those dams selected based on the recommendation of the DSC, and any additions requested by the Bank.

(viii) Monitor and evaluate the progress of the Project and prepare Project Reports in accordance with the provisions of Section 5.08 of the General Conditions and on the basis of the indicators set forth in the loan agreement. Each Project Report shall cover the period of one calendar semester, and shall be furnished to the Bank not later than forty-five days after the end of the period covered by such report.

(ix) Implement and document community participation activities in accordance with the Project Management Manual.

I. STRATEGIC CONTEXT AND RATIONALE

A. Country and Sector Issues

1. Notwithstanding Indonesia's robust economic growth, inadequate public services--such as for water--remain a key weakness in addressing poverty and enabling greater private sector investment. The 2008 Country Partnership Strategy (CPS) prioritizes the strengthening of the nation's institutions, and investments in, among others, water infrastructure, climate change and disaster mitigation.

2. A priority in the Government of Indonesia's (GOI) development plans and the Millennium Development Goals (MDGs) is to substantially improve access to water for its growing population. Urban water demand is growing apace with economic development while much of the staple food (rice) is grown in irrigated areas that consume about 85% of the bulk water supply. The country is well endowed with freshwater but high population pressures, and the monsoonal precipitation cycle, render water availability along the year precarious. Thus, the country relies heavily on infrastructure to store bulk water and carry it to the urban and industrial centers and to irrigation areas. The main island of Java is of particular concern: covering about one tenth of the territory it houses 67% of Indonesia's population of 225 million, and its fertile soils produce nearly 60% of its rice. The country has 246 dams with reservoirs on rivers. Of these, about 132 are defined as "large"¹ dams, which are subject to special regulation in the interest of public safety in accordance with the guidelines of the International Commission on Large Dams (ICOLD).

3. *Reservoirs are a vital link in the water supply chain.* Most large cities--such as Greater Jakarta, Surabaya, Makassar and Semarang--depend largely on reservoirs and barrages on the rivers for their water supply. Greater Jakarta depends on one large reservoir for about 80% of its tap water. Reservoirs ensure the 2nd and 3rd annual harvests in the dry season by irrigating about 16-17% of the public up-land irrigation area of about 4.7 million ha, raising rural incomes and stabilizing food prices. Of the total installed power generating capacity in Indonesia, about 18% is generated from hydropower; on Java and Bali this is 13%. Some large dam reservoirs also serve to retain peak flood waters, which otherwise are a common cause for natural disaster.

4. A Bappenas study suggests that *kabupaten* (districts) on Java suffering from flooding in the wet season also have structural water shortage in the dry season and that this water deficit is often compensated by unsustainable groundwater "mining" at high environmental cost. Recent studies and observations have confirmed that Climate Change will further exacerbate the discrepancy between the seasons: the wet season will become shorter with the rainfall coming in fewer, more intense events. The country's stock of reservoirs will, therefore, become pivotal in the adaptation strategies for Climate Change. Accordingly, the country intends to build about 15 new reservoirs in the coming decade. However, dam structures and reservoirs demand both

¹ A "large" dam or reservoir is defined as having (a) a dam wall with height of 15 m or more and a minimum reservoir capacity of 100,000 m³; or (b) a wall with a height of 10-15 m with a width >500 m, or a reservoir capacity >500,000 m³ or spillway discharge >1,000 m³/sec. Of the large dams, about 114 are owned by the Ministry of Public Works (MPW), 18 by the State Power Corporation (PLN) and another 8 are mine tailings dams owned by private corporations.

regulatory and operational safety measures and timely remedial repairs. Failure of the dam structure in itself, or emergency spillway operation, also can lead to disaster. The associated hazard is now growing exponentially because of the ageing of the infrastructure, the backlog in maintenance, and the rapidly expanding urbanized settlements downstream of the dams. The hazard not only comprises the physical damage and loss of life in case of dam break, but also the concomitant disappearance of the storage capacity.²

5. Compared to other countries, reservoir capacity in Indonesia is poorly developed³. In addition, 31 of the large reservoirs were built before 1980, of which 16 before 1950. This stock is coming to the end of its economic lifetime and becoming a safety hazard unless rehabilitated. Furthermore, many reservoirs suffer from severe sedimentation cutting their economic lifetime short. Thus, the reservoirs' functionality and structural integrity are becoming imperiled, and their declining (hydraulic) performance and sustainability demand urgent attention.

6. *Declining Reservoir Performance.* The declining reservoir performance is caused by, notably, on-site factors including: (i) ageing of and damage to structures that severely limit the use of the reservoir; (ii) inoperable electromechanical systems; (iii) inadequate instrumentation for hydrology and dam structure monitoring; and (iv) deficient reservoir operation practices. Capacity for the proper operation and management is still weak, but a basic set of Operations Manuals is now nearing completion⁴. Premature reservoir sedimentation is a complex problem of broad concern. It is caused by off-site erosion in the upstream watershed resulting from (i) debris and wastage caused by natural processes (as much of the territory lies in volcanic or seismic zones or in mountainous areas with unstable slopes and deep, erodible laterite soils), (ii) inappropriate slope and wall cuts, e.g., for roads, and (iii) inappropriate cultivation on deforested bare slopes, and poor agro-forestry techniques. On the other hand, premature decommissioning of dams implies economic damage too and poses separate public safety risks. As the extent of sedimentation is not well described, a reservoir sedimentation survey and program for upstream river stabilization and upstream river and watershed management are new priorities. Annex 1 details the sectoral challenges due to asset ageing and deterioration, reduced capacity in the technical agencies to regulate and carry out works, and the constrained budgets.

7. *Policy Reform for a Programmatic Approach.* Thus far, Indonesia has treated its dams as individual pieces of infrastructure without recognizing their special strategic function in securing bulk water supply; the important safety risks they represent, especially as they are growing older; and the inordinate expense if they need to be replaced. Indonesia's governments over the past decades have prioritized rapid infrastructure development often at the expense of operation and maintenance (O&M). Its administrative system reflects this priority. This focus on construction

² A dam failure of the Juanda reservoir on the Citarum river would not only severely damage downstream settlements, but would also likely destroy the water intakes for Greater Jakarta's water supply, as well as for about 200,000ha of Java's most productive paddy fields. Temporary restoration of the water supply would take months.

³ Reservoir capacity for Indonesia is about 30 m³ per capita, against 2,500 in China and South America, 1,500 in Europe and in Africa and the Middle East, 5,000-6,000 in the USA and Australia, and 250 in the rest of Asia (excl. China).

⁴ The Dam Safety Project (1994-2003) funded preparation of about ten of these manuals; after project completion another set was funded under regular MPW budgets. However, more detailed and upgraded guidelines will need to be prepared.

has boosted agricultural productivity and economic growth. Many of these assets, however, are far from being utilized optimally. Delayed maintenance is a systemic weakness which leads to premature deterioration and poor performance. Furthermore, the general approach to infrastructure management often is overly technical, overlooking the essential social and managerial aspects in design and operation. These biases have led to one-sided administrative and fiscal procedures and insufficient budgets for O&M. This deficiency was recognized by the late 90s, and Indonesia's on-going water resources sector reform, which started in 1998, has made tangible progress in improving and modernizing the policy, legal, regulatory and administrative frameworks. The O&M, budgeting and user participation have been improved, in particular to make irrigation more sustainable.

8. The bias for greenfield development also affected dams and reservoirs. The Bank has financed several such developments, the last being the Kedung Ombo dam in Central Java, completed in 1992. For many years, a generic concern pertained to the absence in Indonesia of: (i) commitment and regulatory capability to maintain the safety of these structures; (ii) policies and tools for the safeguards for such large investments, and (iii) clear management and maintenance plans and instruments for the maintenance and modernization of the structures. A first important step towards policy reform was initiated in 1996 with the establishment of the country's first dam safety institutions (supported by the Dam Safety Project [DSP]). For the first time, DGWR carried out an assessment of the safety of the dams, but no regular data updating system and systematic review of safety records have been put in place yet to guide management and investment priority. Neither did DGWR yet include the upstream and downstream features of the dams for planning or management purpose. Recognizing now the special function of dams and reservoirs, GOI is embarking on a dedicated policy review and development. Building on the basic dam safety institutions set up under DSP, the government is moving to deepen the reform by: (i) strengthening the regulatory framework through a new Government Regulation on Dams, to cover all dams in the country, also those owned by other parties than MPW; (ii) treating dams and reservoirs as a distinct class of strategic infrastructure, introducing a "portfolio" management approach across all dams to replace the conventional case-by-case approach (Annex 1); (iii) strengthening the dam safety and management institutions; (iv) developing a rational method to calculate the O&M needs of each dam⁵; and (v) securing gradually increasing budgets for O&M. In addition, the management approach will shift from a strictly engineering one to one that also incorporates pro-active erosion control in the upper catchments and reservoir greenbelts. GOI is initiating this reform agenda whilst at the same time investing in dam upgrading and rehabilitation. To assist in this programmatic reform effort and in the investments, GOI has requested Bank support; the proposed Dam Operational Improvement and Safety Project (DOISP) would represent a first stage in this longer-term framework.

9. The Bank has consistently supported GOI when it embarked in 1999 on a sector-wide and deep legal, regulatory and administrative reform of its water resources and irrigation sector. This was associated with the Bank's Water Resources Sector Adjustment Loan (WATSAL, 1999-2004). The government has now largely completed the new institutional framework and has started implementing it, notably through the Bank-supported Water Resources and Irrigation

⁵ A calculation method for dedicated O&M for irrigation has been in existence for about ten years and has been a substantial help to secure increased budgets from the National Parliament and local Councils.

Sector Management Project (WISMP, an APL, with a first phase in 2005-2009). The Law 7/2004 on Water Resources sets the stage to introduce Integrated Water Resources Management, better governance as well as improved financial sustainability of hydraulic infrastructure. This new framework facilitates the more programmatic approach to dam and reservoir management.

B. Rationale for Bank Involvement

10. The project would meet key objectives of the CPS which emphasizes the “institutional lens” for supporting the national economy, and which focuses on strengthening the public administration system of the country. The CPS aims to provide support for improving service delivery systems, i.a., of water. The Bank has a long-standing relationship with Indonesia for developing and managing its water resources. This has covered both support to sector-wide policy reforms (notably the 1999-2004 reforms associated with the WATSAL), and investments (such as the irrigation loans in the 90s and the current WISMP). The Strategy also specifically aims to improve public safety and disaster management to mitigate Indonesia’s vulnerability to natural and other disasters which have proven to be major disrupting factors to economic development. Increasing dam safety would substantially contribute to this goal. Furthermore, the CPS intends to assist Indonesia with its efforts to prepare for climate change adaptation. If better managed, the reservoirs can become able to fulfill a key role in mitigating the climatic variability and overcoming longer periods of drought, whether they are caused by global climate change or the cyclical Niño-Niña events. This project would bring the first institutional and policy achievements of DSP to their logical conclusion, by supporting the further development and the implementation of comprehensive regulatory and administrative frames for dam management. The Bank’s involvement would add further value because of the following:

- i. The DSP experience confirmed that works on existing dam structures for safety and operational improvement are technically complex that are still new to both government and national contractors. This requires a dedicated support for capacity building. The Bank has broad experience in technically demanding tasks and institutional development in this sector with a track record in dam safety in India, China, Vietnam, Azerbaijan, Armenia, etc. In Indonesia, no other Donor has sought to take up this challenge.
- ii. The linkage between the loss of reservoir functionality and sediment import from the upper watershed was only recently recognized in Indonesia. Here too, the Bank is able to draw on its broad experience in several regions. Significantly, the land use in the upstream watershed is not under the authority of the agency responsible for water development (MPW). Any catchment-based activity needs a strong coordination with local governments and communities. The Bank-financed WISMP and dedicated water Trust Funds have generated many years of experience with cooperation arrangements between national and local government, and with effective upstream river and catchment management pilots in close cooperation with local governments and communities.

C. Higher Level Objectives to Which the Project Contributes

11. Firstly, the project would contribute towards meeting the Millennium Development Goal to increase access to water supply both for human consumption and for productive uses--a core goal of both GOI and the Bank. Secondly, the Bank and GOI are cooperating to develop the

country's strategies to mitigate Climate Change and articulate policies and invest in infrastructure that will allow the country, over time, to adapt to these changes and reduce its pronounced vulnerability. The stock of reservoirs is a vital element in any adaptation strategy for the hydraulic systems and infrastructure. Thirdly and importantly, DOISP would help maintain the momentum in the Bank's sector-wide engagement and coherent policy and institutional support since 1998, and which aims at improving the performance and the sustainability of this sector. The Bank's approach--which has met with varying but overall substantial success thus far--is based on a long-term and multi-pronged partnership with the government in river basin management, irrigation and flood protection. The central elements in this support focus on: (i) enhanced financial viability and cost recovery of infrastructure; (ii) improved governance (through stakeholder participation in decision-making, and more transparency); and (iii) better planning and broader participation in planning and management decision processes, involving local governments and water users. For the mid-term, this strategy aims at developing the administration's capacity at national and local-government levels to identify and prepare feasible investments proposals, develop partnerships with water users, and secure higher budgets and resources for the maintenance and operation of the infrastructure. Thus far, the Bank has acquired the experience and insights to provide this support, and has gained the government's confidence. The proposed programmatic approach will expand the coverage of this policy and institutional support to a critically important sub-sector.

II. PROJECT DESCRIPTION

A. Lending Instrument

12. GOI has embarked on a longer-term programmatic approach to develop a portfolio management approach across its dam and reservoir sector, improve the aggregate levels of performance and safety of its reservoirs, start improving their financial sustainability, carry out the investigations, designs and actual works, and start addressing the erosion from the upper river catchments (see below). GOI assesses the duration of the institutional reform process and the rehabilitation of its shortlist of 63 priority dams/ reservoirs to be about 8 years. It proposed a programmatic support of which the DOISP would be the first project that provides the support in about the first half of this program. The overall aims of this *program* are: (i) to increase the safety and the functionality of its 63 short-listed prioritized large dams/ reservoirs, and (ii) develop and mainstream the regulatory and administrative arrangements for dam and reservoir management and safety that are more sustainable from a technical, environmental and financial perspective.

13. The proposed duration and phasing of DOISP and its possible successor project would provide the appropriate time framework to finance the upgrading and rehabilitation of short-listed dams and reservoirs in a phased approach of which the sequencing is determined by objective criteria of safety, enhanced performance and cost-benefit considerations. Though the rehabilitation and improvement of some of these dams/ reservoirs can be prepared and implemented within one of the projects, several others will require more extensive preliminary surveys, investigations and designs (SID) which need to start under DOISP to allow implementation of the works under a possible successor project ("DOISP 2"). The implementation activities will provide the platform on which to start applying the new policy and

administrative arrangements, pilot the new concepts, and learn from practice. The longer-term time frame is also considered more feasible to achieve both the institutional and physical objectives, given the current constraints in absorption capacity of the implementing agencies. The long period of administrative decentralization and zero-hiring policy have left the government severely constrained in its implementation capacity.

14. DOISP will be a Specific Investment Loan (SIL). This PAD concerns DOISP only. The project cost of DOISP will be US\$70.43 million. The project size and the ambition for physical works are kept modest in DOISP because of the limited absorption capacity of the administration and recognizing that the Directorate General Water Resources has limited readiness to start works and manage its dam portfolio in a programmatic sense. This modest size would also reduce risk to the Bank. Whereas the institutional activities, preliminary investigations and designs have to be started early and are covered in DOISP, the larger physical works are back-loaded in the successor project. The significance and economic rationale of the first project are not dependent on the follow-up project. An implicit aim of the project is that the enhanced functionality of the reservoirs would in effect reduce or delay the urgency to build costly new reservoirs

B. Project Development Objectives and Key Indicators

15. The Objectives of DOISP are to: (i) increase the safety and the functionality with respect to bulk water supply of large MPW-owned reservoirs, and (ii) strengthen the safety and operational management policies, regulations and administrative capacity of MPW. Outcomes are (a) restored safety, operational performance, and economic life of approximately 34 large dams (Table 1), including reduction of spillway flood risk to downstream population, (b) sedimentation impact reduced on 3 MPW-owned dams; and (c) strengthened national dam safety institutions. An implicit aim is that the enhanced functionality of the reservoirs would in effect reduce or delay the urgency to build costly new reservoirs. The primary beneficiaries are urban communities and over 2.5 million farm households who depend on these reservoirs for their water supply and livelihood, as well as all downstream communities who could be placed at physical and/or environmental risk if the safety of these dams is compromised.

16. The aims of the GOI's own eight-year *program*, comprising DOISP and a successor project, would be (Table 1) to: (i) reduce the number of dams in the shortlist of 63 dams/ reservoirs with serious safety concerns (High or Extreme Risk [score of 76 or higher as per ICOLD protocol]) from 81% to less than 5%; (ii) improve the performance of the dam/ reservoir portfolio for timely delivery of bulk water by restoring 100% of the dams/ reservoirs to their original performance; (iii) increase dam/ reservoir economic life through repairs, rehabilitation, replacement and/or remedial works on the structural parts, and/or restoring reservoir volume by sedimentation mitigation, and (iv) strengthen the national regulatory and administrative framework. The regulatory and administrative strengthening would include (a) the issue of the Government Regulation on Dams and all key implementing Ministerial Decrees specified in the Regulation (by the end of DOISP), (b) the issue and the application of Ministerial Regulations/ Guidelines on the restructuring of administrative procedures, and Standard Operating Procedures for the portfolio management of the stock of dam assets (partly completed by the end of DOISP); (c) the issue of a Ministerial Regulation/ Guideline on the determination of the minimum

financing needs for O&M of dams and reservoirs (by the end of DOISP); and (d) the achievement of 100% coverage of the minimum financing needs from national and local budgets and user fees (by the end of the program). The portfolio approach GOI intends to apply aims at better prioritization of investments and remedial works on dams and reservoirs, by re-assessing the performance and the safety ranking of each dam site every 7-10 years, determining remedial action to upgrade the structure or restore its functionality, and the define and implement a rolling plan of prioritized works across the portfolio based on cost-benefit considerations.

**Table 1. Outcomes and targets of DOISP and of the overall dam program comprising DOISP and a successor project.
(Dam Hazard Index refers to Annex 1, Section 5)**

Outcome/Target	DOISP Project	Dam Program (tentative)
	About 34 dam/ reservoir sites ¹⁾	63 dam/ reservoir sites
<i>Safety improved: ICOLD Risk Index</i>		
Extreme	From 3% of dams to 0%	From 3% of dams to 0%
High	From 81% of dams to < 5%	From 81% of dams to < 5%
Moderate	From 16% of dams to >95%	From 16% of dams to >95%
Overall Risk Index over the sub-set of dams will be reduced by	> 30%	> 30%
<i>Functionality for bulk water supply:</i> Restoration of original ability of reservoirs to deliver bulk water during demand period	> 25 sites	> 49 sites
<i>Economic lifetime:</i> Increased by	5%	10%

¹⁾ DOISP is scheduled to improve 34 dams/ reservoirs. However, as for some sites the detail SID is part of the project, it is possible that the outcome of the investigations requires adjustment of the scope of works which may cause the actual number of completed sub-projects to be marginally higher or lower.

17. The Hazard Index is based on the simplified ICOLD method (Annex 1). MPW will develop regulations to adopt a risk assessment method that incorporates an internationally accepted, suitable standard. The economic lifetime would be assessed based on the enhanced structural integrity of the dam after rehabilitation and repairs, and on the lesser influx and accumulation of sediment into the reservoir.

18. Progress in achieving the Outputs for the physical works would be measured by: (i) number of works completed for rehabilitation and safety, including Basic Dam Safety Facilities⁶ (BDSF) repair/upgrading; (ii) plans, procedures and manuals completed for improved dam operation and maintenance, and spillway emergency operation, and progress in training of the operations and agency staff; (iii) percentage completed of 30 reservoir sedimentation surveys and designs for environmentally sustainable sedimentation mitigation; (iv) progress in upstream river

⁶ These include (i) instrumentation to record data on the structural condition and operational safety of a dam structure; (ii) high spillway discharge warning equipment, (iii) communications equipment, etc.

bed and bank stabilization and community-based catchment management (in 4 pilot sub-catchments) and in community-based reservoir and dam management and reduction of vandalism (in 20 reservoirs); (v) number of improved hydrologic data systems and reviews of spillway capacity risks for about 34 dams ; (vi) number of dam designs and works requiring safety certification; and (vii) number of activities completed to prepare for the second phase of the program, comprising more complex surveying, investigations and design and social and environmental safeguards plans (about 29 dams).

C. Project Components

19. More than half of the total base cost of the project will be allocated to works, equipment and related activities such as studies, designs and emergency plans, on the dam/ reservoir sites (“sub-projects”) and upstream river sites (Table A5-5). The scope of these sub-projects is determined either based on existing surveys and (partial) designs, or on the outcomes of surveys and investigations that will be undertaken in DOISP. Some investigations may be short and straightforward but others are technically complicated and necessitate more than one year of work, such as for geophysical surveys to determine the cause of excessive seepage or piping and preferred remedial works. A first review and pre-screening have allowed to assign a Risk Score to each sub-project for the state prior to and after the rehabilitation, based on the modified ICOLD method (Fig. A1-1, A1-2). The sub-projects have also been assigned to one of four Categories reflecting their respective urgency for rehabilitation, complexity, and readiness for implementation, to allow the sequencing of the sub-projects along DOISP and its successor project (Annex 4). DOISP will address approximately 34 sub-projects which rank highest on the urgency scale (they comprise the sub-projects left on the risk score graph of Fig. A1-1). Fourteen of these sites are considered complex, and a first “phase A” of works will be implemented under DOISP, followed by a more extensive “phase B” to be part of the successor project based on the deeper investigation and detail design under DOISP.

20. **Component 1. Dam Operational Improvement and Safety Works and Studies (Base cost US\$31.48 million).** This Component will restore dam performance and safety by providing for: (i) design and construction of *minor* and localized rehabilitation and remedial works on each of about 34 prioritized large dam/ reservoir sites (“sub-projects”) to restore operational performance and/or safety (including spillway equipment repair and/or minor upgrading); (ii) at Effectiveness, four sub-projects will be ready for implementation starting in Year 1, i.e., the Batujai (NTB), Gondang (East Java), Gembong (Central Java) and Krisak dams (Central Java); (iii) surveys, investigations and designs (SID)--including social and environmental management plans--for *medium to major* works (sub-projects) to restore and/or improve operational performance and safety for approximately 22 dams/ reservoirs to be implemented in the successor project, including the second-phase additional works on about 14 dams/ reservoirs that were subject of first improvement in DOISP; (iv) Basic Dam Safety Facility (BDSF) repair and/or upgrading to improve safety monitoring, and preparedness systems for spillway emergency discharge for about 34 dams; (v) establishing a river inflow and sediment monitoring system to improve the operational hydrology for about 63 dams, and review flood flow data, estimated flood discharge frequency, and PMF or “Flood Envelope Curves” related to watershed area; and (vi) assessment of spillway capacity and downstream flooding risks for approximately 34 dams (including surveys, models and feasibility studies regarding downstream effects to determine the

viability of any spillway modification or operational change, to be undertaken in the successor project). The Quality Assurance of design and construction would be improved by using a peer review system of experts and through agency training in construction management and supervision.

21. Component 2. Operations & Maintenance Improvement and Capacity Building (Base cost US\$13.24 million). This Component would support improved O&M and the strengthening of the capacity of the dam agency through: (i) preparation of O&M plans, Standard Operation Procedures (including rule curves and reservoir water balance) and manuals and undertaking needs based budgeting and O&M activities for about 34 dams and reservoirs, and for 29 dam sites to be rehabilitated under the successor project; (ii) preparation of dam and reservoir management plans and emergency spillway operation plans for about 34 dams; (iii) O&M staff training for dam safety monitoring, maintenance and operations, (iv) participatory programs on reservoir and dam management with local communities living near the reservoir, in approximately 20 reservoirs; and (v) provision of incremental operating costs for O&M of dams and reservoirs (borne by GOI).

22. Component 3. Reservoir Sedimentation Mitigation (Base cost US\$13.12 million). The Component would provide for (i) bathymetric surveys using GPS and digital equipment to determine the available total storage and water level-area-volume relations of approximately 30 of the 63 reservoirs known to be affected by accelerated sedimentation; (ii) feasibility studies, designs and any necessary safeguards plans for “within-reservoir” activities and interventions to be taken in the medium-term (e.g., dredging, hydro-suction, etc.) that can be funded in DOISP or the successor project; (iii) preparation for a sample study for decommissioning of a severely silted reservoir to be financed under the successor project; and (iv) piloting of institutional models and plans for treatment of upstream rivers and (sub-)catchments with construction of sediment retaining and river bank protection structures, mostly through community participation and incentive programs.

23. Component 4. Dam Safety Institutional Improvement (Base cost US\$2.14 million). The Component will support the further strengthening and consolidation of the regulatory framework (Government and Ministerial Regulations) and the national dam safety institution (with activities funded across DOISP and the successor project), by supporting: (i) the preparation of the Government and Ministerial regulatory documents and Concept/ Academic Papers, including the consultations; (ii) a public awareness campaign about dams and reservoirs, and dissemination to all public and private dam owners of the regulations and guidelines regarding dams and reservoirs; (iii) strengthening and development of the DSU better fulfill its regulatory roles for about 63 dams under MPW’s program, and of other public and mines tailings dams through staff recruitment and training (with outsourcing of work to consultants and RCWR); (iv) provision of a fully furnished and equipped DSU office capable of housing about 30 engineers; (v) preparation of new or updated DSC Guidelines; (vi) establishing and supporting a National Dam Safety Panel to review site investigations and designs; (vii) establishing a dam engineer and technician training and certification system in cooperation with INACOLD; and (viii) incremental

costs of the structural CDMU in DGWR to operate as the focal point for dam safety monitoring, review and archiving.

24. The institutional activities aim at: (i) strengthening the capacity of MPW to manage its dam portfolio better and regulate large dams in the country, and (ii) improving the sustainability of the rehabilitation works and the reservoir life. They include regulatory and institutional strengthening, improvements in: safety monitoring and surveillance, operation and maintenance improvements; emergency operation plans and preparedness; and the piloting of replicable community involvement in dam and reservoir protection and in upstream river and catchment improvement.

25. **Component 5. Project Management (Base cost US\$4.36 million).** This Component will provide for overall Project Management by supporting CPMU, CPIU, and each PIU including provision of: (i) the principal Project Management TA Consultant; (ii) the incremental operating costs of the Central Project Management Unit's (CPMU) and Project Implementation Units (PIUs) activities for coordinating all project interventions; and (iii) all TA support to prepare for the successor project.

D. Lessons Learned and Reflected in the Project Design

26. The main lesson learned from Bank-supported dam safety programs in Indonesia and other countries is the importance that must be given to institutional strengthening. Experience gained with successful dam safety projects around the world, and which is being applied in this project, concerns: (a) proper documentation of the pre-project status of dam safety (in this case already undertaken by RCWR for all large dams on Java); (b) attention to both structural and non-structural remedial measures to ensure dam and reservoir sustainability; and (c) putting in place effective mechanisms for maintaining the level of O&M and dam safety achieved at the end of the project.

27. The Dam Safety Project (DSP) helped introduce the country's first dam safety institutions, notably the Dam Safety Commission (DSC) chaired by the Minister of Public Works. It is assisted by the Dam Safety Unit (DSU) and the Central Dam Monitoring Unit (CDMU). A Ministerial Regulation of 1997 set the nation's first guidelines for dam safety. Provincial Dam Monitoring Units (PDMUs) were established in 8 provinces. DSP also piloted relatively successful community-based programs for re-greening of the reservoirs' foreshore (greenbelt) and policing public access. After closure of DSP in 2002, these institutions were mainstreamed, or, at least, continued on a modest scale, and funded by the routine national and provincial budgets. However, the impact of the project was considered doubtful in the ICR (2003) and draft IEG evaluation (2009), given deteriorating staffing levels and little progress on the institutional indicators in the latter half of the project. This poor performance should be assessed in the context of the exceedingly tight financial conditions that prevailed across the country in the wake of the financial crisis. The crisis and the government's zero-hiring policy also forced the main implementer, DGWR, to reduce its overall staff complement by 90% in 2001, which compelled it

to severely rationalize and curtail its administrative structure and work program. For example, it merged the CDMU and the DSU; which ensured at least a minimum pool of qualified staff, but at the expense of losing the desired distance between the “regulator” and the “implementer”. Nonetheless, DGWR has consistently retained its dam safety units and shielded them from excessive attrition (in contrast, for example, to the Hydrology Unit and the Basin Planning Sub-Directorate, which were abolished for several years).

28. Since the ICR and IEG evaluations took place, DGWR has increased budgets both for dam safety and for structural staff. The 2007 earmarked aggregate budget has grown to almost two-thirds of the required level (para. 51), up from 20-30% in 2000-2004. The role of the PDMUs has been partly taken over by the newly established River Agencies (Balai (Besar) Wilayah Sungai, or Balai (B)WS of the national government, however, the monitoring capability at this local level needs to be re-established. In the wake of DSP, the Bandung Institute for Water Resources Research (RCWR) has prepared the Indonesia Earthquake Hazard Map for dams and has started a structural safety review of all large dams on Java. The Indonesia Committee for Large Dams (INACOLD) was also established to certify dam expertise of engineers. A stated goal of DGWR is to establish procedures to achieve adequate routine funding for O&M in about 5-6 years. DOISP would assist in this effort. Finally, in 2006-2008, DGWR prepared the pivotal Government Regulation on Dams, building on its experience with DSP, and this Regulation is expected to be issued early in 2009.

29. A first key lesson from DSP is that the time to build capacity had been underestimated. As outlined in paras. 8, 12 and 13, GOI has now chosen a more realistic path for its further institutional development and for the execution of the dam remedial works. Institutional development and execution of works are now better spaced in time and attuned to the absorptive capacity of the government agencies. The IEG evaluation calls for a long-term commitment (like an Adaptable Program Loan), and, although DOISP will cover only the first half of this program, it has been designed to support this longer-term program and facilitate continuation in a potential successor project. A second key lesson is that the performance of the dam safety institutions, and of dam safety monitoring equipment, was jeopardized because of inadequate funding from routine budgets. Even though this was partly due to the particular circumstances and effects of the financial crisis, GOI is now embarking on a programmatic approach with a more mature regulatory framework and a “portfolio approach” to programming and financing O&M. (See Annex 1, Sections 3 and 4). These institutional features will, on one hand, improve the effectiveness of government expenditures, and, on the other, strengthen the budget preparation mechanisms, which will lead to increasing and better targeted budget allocations.

30. Further recommendations that are applied in the project design are: (i) quality assurance of sub-project preparation and design must be improved; (ii) capacity building in remedial works design and construction needs to begin before commencing the major BDSF and works components, while training in implementing non-structural measures should begin prior to project mid-term; (iii) priorities need to be established for works and investments, based, i.a., on a risk analysis of public hazard and dam safety condition criteria; and (iv) model O&M and other manuals need to be prepared early in the project for guidance of national consultants. Finally, the

Bank has been achieving good results in 2004-2009 with pilots in community-based river and (sub-)catchment conservation, in which the Provincial Balai PSDA play a key role. This approach has proved more effective despite being more time-consuming than others that apply a more “technical” and top-down approach. Therefore, DGWR opted to build on this for the greenbelt and catchment management sub-components in the project.

E. Alternatives Considered and Reasons for Rejection

31. The project was conceived originally as a 6-year SIL. Based on the first quick assessment in 2005 of priority investment needs, an outlay of about US\$130 million was considered appropriate to improve the operational performance of a substantial part of large dams through rehabilitation and to strengthen the national dam safety institutions. However, the PIP indicated a list of priority activities costing about US\$200-230 million. Such project size, however, may exceed the absorption rate of MPW within the timeframe of one project. In order to contain exposure risks and avoid bunching near the project's end, a long-term SIL was considered less desirable. The Total Project Cost for DOISP of US\$70.43 million represents a more modest initial financial commitment, whilst the programmatic approach would allow more flexibility to prepare the 2nd phase. GOI explored the possibility to secure a two-tranche APL, associated with its commitment for policy and institutional reform in this sub-sector. However, APLs have often not performed effectively because the triggers could not be met due to political or logistical constraints, and therefore, this option was not further pursued.

III. IMPLEMENTATION

A. Partnership arrangements

32. The DOISP project is not conceived for implementation in a new partnership with other donors. The Bank has taken the lead on intensive donor sector coordination in the turbulent years of 1999-2004; the projects that emerged from that period appear to be well coordinated. The Bank currently is funding two projects that are co-financed by partners, viz., the Water Resources and Irrigation Management Project (WISMP) and the NTB-Water Resources Management Project, supported by the Netherlands Government and the European Union, respectively. ADB is financing a sister project of WISMP. JBIC is the only other donor with a strong presence in Indonesia's dam sub-sector, and it is assisting GOI with the large reservoir dredging operations on two dams/ reservoirs (Wonogiri and Bili-Bili). However, JBIC nor any other donor has a declared interest in the institutional strengthening or in portfolio improvement support. JBIC tends to select large, stand-alone projects with a clear technical content. Recently, Chinese and South Korean consortiums have also entered the sector, however, their interest is limited to construction and financing of new dams. The MPW has expressed a preference that the Bank will provide the support for a portfolio-wide approach.

B. Institutional and Implementation Arrangements

33. The project will be implemented as a “national government” project, involving only national-government budget (APBN). The overall policy oversight will be provided by the National Steering Committee for Water Resources (NSCWR) in Bappenas, which is existing and which has been providing the same useful oversight for the other Bank-funded projects in the sector. A Central Project Management Unit (CPMU) will be established in the Directorate Rivers, Lakes and Reservoirs of DGWR to do overall project and financial management. A Central Project Implementation Unit (CPIU) will be formed in the Directorate of Rivers, Lakes and Reservoirs for central technical tasks and training, and one PIU will be established each in DSU and in RCWR. For project implementation in the field, one PIU will be established in each of the MPW’s regional Balai(Besar)WS Offices (River Agencies), and in provincial Dinas PUP (Provincial Public Works/ Water Resources Office). TA teams will be recruited to assist these Units for project management, and for studies and designs. The budget will be provided to the PIUs through the sectoral APBN budget. The RCWR, a semi-autonomous unit of MPW, will be assigned study, survey and technical review tasks. The training and institution strengthening will be implemented through the CPIU. This arrangement draws on the satisfactory performance of the other Bank-assisted projects with the same counterpart.

34. The community-based reservoir and dam management and the upstream river and catchment activities will be conducted in cooperation with the Provincial Balai PSDAs (through the Dinas PUP) which have a better record of cooperation with local government and communities and catchment conservation. The sites identified in the PIP concern areas where the Balais as well as the local governments have been found responsive for this cooperation. The budget for the activities will be channeled to the Balais through the Tugas Perbartuan mechanism to PIUs in the provincial Dinas PUP (Provincial Public Works Services) under which the Balai PSDA resort, and the Balais in turn will apply these funds for activities by local-governments and communities. This mechanism has been piloted successfully under a Trust Fund-funded project.

35. This project will be operated in an adaptable manner, allowing the government to adjust the implementation of agreed sub-projects as works progress and as insights improve based on the results of the surveys and investigations. As an important project management tool for both the Bank and the government, the PIUs will prepare and the CPMU will consolidate each year (by June and July, respectively) the Annual Work Plan (AWP) and budget for the next fiscal year. The AWP will be approved by NWRSC and will comprise, i.a.: (i) the selected activities (works, studies and designs, training, TA, etc.) with their budget, designated PIUs, and other implementation partners; and (ii) all relevant information regarding any works that are important for clearance purposes, such as feasibility studies, social and environmental safeguards, procurement plans, and financial management information. The semi-annual progress report will provide the overview of activities and budgetary progress, as well as the overview of the overall progress towards achievement of the objectives and performance indicators. For example, some sub-projects need first studies followed by detail design and preparation of procurement documents, as well as environmental and social management plans, which together can span several years. Through its approval of the AWP, the Bank will maintain quality control over the utilization of the funds. The AWP process will also ensure that each sub-project is associated with

a proper safeguards record, and that unexpected safeguard concerns that would have arisen during detail preparation and safeguards screening, will lead to the requisite longer preparation time, and deferment of the implementation to the successor project.

C. Monitoring and Evaluation of Outcomes/Results

36. Monitoring and Evaluation of progress in achieving Project and Component Outcomes in terms of project inputs, outputs, and impact will be undertaken semi-annually by the main TA Consultant for the CPMU. The Semi-Annual Reports will focus on the Project Performance Indicators (see Annex 3) but also include information, analysis, and recommendations for the attention of Bank Supervision Missions. This additional information will include: (i) progress in the execution of various elements of the agreed AWP, including institutional development; (ii) procurement; (iii) difficulties encountered in the course of project implementation, proposed solutions or required assistance; (iv) performance on safeguards and resolution of issues; (v) updated project cost estimates, procurement plan, and implementation schedule; and (vi) updated estimates of Performance Indicators. Financial progress in terms of realization of the AWP by each PIU will be prepared separately by a Financial Management Consultant recruited from among national firms specializing in cost and project accounting. Their Head Office will be located in Jakarta supported by regional offices that will assist and train the individual PIUs in cost accounting. The AWP and associated budget will be prepared by the CPMU and agreed with the Bank prior to the end of each Fiscal Year. A Project Implementation Completion Report will be prepared three months prior to Project Completion.

D. Sustainability

37. The project is geared to assist GOI in improving the sustainability of its dam and reservoir portfolio. It specifically supports institution strengthening and better operational and managerial procedures, and interventions (such as, in the upstream catchments) that directly contribute to the sustainability of the infrastructure and thus to the sustainability of project benefits. The project will contribute to improved and regular maintenance. Such maintenance will require sufficient financial resources, which have not been readily available in the past but have been increasing steadily over the past years (see paras. 49-52). The portfolio approach with its better prioritization of works will notably allow to make more efficient use of the constrained human and financial resources. Because of the project's portfolio management objective, DGWR/MPW will (i) make the O&M and rehabilitation funds more transparent in dedicated budget lines (comparable to budget for O&M of Irrigation), (ii) embed the rational, desired O&M funding levels based on the asset evaluation and risk assessments, in regulations, which will help convince the national Parliament and provincial Councils to allocate appropriate budgets--similar to the effect that was achieved with the issue of the rational method to calculate the minimum O&M budget requirements for O&M of irrigation infrastructure, and (iii) gradually mainstream the "best practices" developed under the project to apply to the national asset portfolio.

E. Critical Risks and Possible Controversial Aspects

Risk	Risk Rating	Risk Mitigation Measure	Risk after mitigation
From Output to Objective			
National and local governments consistently provide inadequate funding and resources for O&M	S	Project will assist developing rational method to calculate minimum financial need for O&M, to demonstrate needs to political decision-makers. MPW/DGWR to commit to establishing, in a time schedule, an annual O&M funding based on 0.25% of dam MEAV, from national, regional and other budgets.	M
Low capacity to conceptualize and implement Project, and dam portfolio. Inadequate skill transfer, and recruitment and training of new staff	M	Project will assist MPW to define longer-term management goals for DGWR and dam safety institutions, and assists in training. Project will assist in adjusting work load to existing capacity constraint by better prioritization. Modest size of first Project limits the ambition level, and reduces risk to Bank. Intensive training program of professionals to start from Year 1.	L
Govt. reneges on its commitment for the reform.	M	The reform ambition is modest in size and politically not sensitive. The Bank has had good experience with GOI's policy reform dialogue over the past 10 years (WATSAL, WISMP). In case of poor performance Bank can opt not to fund the successor project.	M
From Components to Outputs			
Weak Quality Assurance (QA) of surveys, design and construction.	S	National Dam Safety Panel and RCWR to review all survey & planning reports prior to construction. Contractor Prequalification requirements for major works; Bid Documents have provision for Construction Plans, frequent Works & Sign-Off by Contractor & Supervision; Contractors to attend training in remedial works construction.	L
Govt. agencies reluctant to discuss emergency operation plans and warning systems with downstream public	M	The approach would be changed from "Emergency Action Plan for a dam-break catastrophe" to "high spillway discharge operation" to lower the level of public concern. Training provided in communication methods.	M
Community participation in reservoir foreshore greening & dam security is not sustainable.	S	DGWR and local governments will assist community to access post-project incentive programs with community participation	S
Upper-catchment communities will be inadequately motivated to undertake field work due to a perception of lack of community benefits.	S	Successful models (e.g., <i>Probolo</i>) offer good direction. Pilots are to be initiated in those areas only where demand exists and chances for longer-term incentives are likely. National Movement to Protect Water (GNKPA) and the MPW task force with the Ministries of Forestry and Environment will facilitate cooperation and coordination.	M
The scope of erosion-focused	M	If sedimentation surveys indicate early operational and	M

program is too daunting in terms of local cooperation with communities and investment.		
The environmental and social assessment is done improperly, or mitigation plans implemented improperly, leading to local resistance and delays	S The project's Sub-projects concern generally only minor remedial and rehabilitation works on existing dam structures. GOI has its improved standard national procedures to mitigate impact, and these are found adequate but are not always well applied. Bank Team has worked with Client to establish a Safeguards Framework to identify and manage environmental and social impacts. All Sub-projects are screened for impacts and issues as part of the Annual Work Plan preparation, review and approval process.	M
Limited capacity of financial management (FM) staff. CPMU/PIUs have limited dedicated FM staff as they have also other job assignments. In addition, the project has a wide geographic spread that creates project-implementation monitoring and supervision risks.	S These risks will be mitigated by providing project management consultants, including financial management consultants. The project will be managed as a central government project in order to minimize complexity and ensure better coordination during project implementation. All implementing agencies' financial reports are subject to external audit	M
Unfamiliarity with Bank's Procurement Guidelines creates delay in procurement. Corruption and collusive environment to do procurement. Current national budgeting and channeling system will likely contribute to at least two to three months of delay in procurement.	S The Bank provides procurement training. The CPMU assigns a focal point for all procurement. The PMM has a Procurement Section which contains operational instructions based on Bank's Procurement Guidelines as well as template of SBDs and RFPs required under the Project. The PMM includes the established measures to address corruption issues. The CPMU sets up a website accessible to the public which provides information on Project's procurement and results and includes facilities for complaint handling. The PIUs carry out advance procurements.	M
Overall Risk Rating	S	M

Risk Rating - H (High Risk), S (Substantial Risk), M (Moderate Risk), N (Negligible Risk)

38. **Controversial Aspects.** The project's objective and outcomes are generally recognized as broadly beneficial and benign, and not likely to be controversial. Notwithstanding, dams per se are often the subject of controversy. Also in Indonesia, some existing dams and reservoirs have a legacy and as such may attract scrutiny from civic groups. One new dam is under construction (Jati Gede, West Java) funded by other entities (Chinese agencies) and controversy exists--also reflected in the press--regarding fair compensation of resettled local communities. In the past, two dams were constructed that still stir some emotion, one funded by the Bank (Kedung Ombo, 1992) and one funded by JBIC on Sumatra. At the Kedung Ombo site in Central Java some groups of farmers still claim compensation for their resettlement at the time of construction. The project,

however, does not foresee activities on either site. Still, a risk exists that this project would become a subject of discussion in civil society by association. The public consultation on August 5, 2008, suggested that civil society groups and other agencies generally have a positive attitude towards the project, once the purpose and design are clarified. As consultations and transparency seem to be appreciated, the project will endeavor to routinely conduct consultations, as part of the regular safeguards reviews. The CPMU and the Bank Team will monitor press releases and be alert with respect to the need to engage in dialogue. None of the dams/ reservoirs in DOISP is considered to have patent legacy issues. For the purpose of overseeing implementation of dam safety measures, an independent expert and a dam safety panel will be engaged under the Project. Finally, DOISP covers only the first part of GOI's longer-term program, addressing issues at the 34 dam/ reservoir sites that are the least likely to generate controversy. This programmatic, staggered approach is expected to create the flexibility and space to identify and address any controversy early on.

F. Loan/Credit Conditions and Covenants

39. (a) Conditions for Negotiations were met, as follows:
- (i) The Project Management Manual was adopted by a Surat Keputusan signed by the Director General Water Resources (No. 10/SE/AS/XII/08, dated December 17, 2008, and re-issued on February 6, 2009);
 - (ii) The CPMU, CPIU and the nine key PIUs which are to carry out activities in 2009 were established by Surat Keputusan (No. 206/KPTS/D/2008);
 - (iii) Complete and adequate detail design, bills-of-quantities and procurement documents for the four sub-projects to be implemented in 2009 were prepared (the packages for each of the four sub-projects were delivered);
 - (iv) Final drafts of the advertisement with the Request for Expression of Interest, and of the TORs, for the recruitment of the TA teams to support the CPMU and PIUs (advertisement was delivered);
 - (v) Final drafts of the TORs for the recruitment of individual consultants who will provide the support in 2009 awaiting mobilization of the TA teams were prepared and delivered (one community development specialist; one general implementation/procurement specialist; and one financial management specialist);
 - (vi) Confirmed availability of the budget cover (DIPA) for the counterpart funds for the 2009 activities (DIPA document was delivered);

- (b) Covenants on institutional and implementation arrangements:
- (i) Establish, by no later than December 31, 2009 and thereafter maintain, until completion of the Project, PIUs in the remaining BBWS/BWS Offices and Dinas PUP Offices in the Project Provinces; in each case with terms of reference and staffing acceptable to the Bank. Maintain until completion of the Project the PIUs established for the first year of Project implementation and establish by no later than December 31, 2009 and thereafter maintain until completion of the Project, the PIU in each of RCWR and DSU, in each case with terms of reference and staffing acceptable to the Bank.
 - (ii) Carry out the Project in accordance with the Project Management Manual acceptable to the Bank.
 - (iii) Cause each PIU to prepare and furnish to the CPMU by not later than June 1 in each year of Project implementation, commencing June 1, 2009, for the following Fiscal Year, for its review a draft Annual Work Plan meeting the requirements set out in the PMM, which shall include a detailed description of the Sub-projects and the Preparation Activities proposed to be undertaken in the following Fiscal Year.
 - (iv) Cause the CPMU to consolidate and furnish to the Bank, not later than July 1 in each year of Project implementation, commencing July 1, 2009, for review and no-objection, the Annual Work Program for the Project based on the Annual Work Plans prepared by all PIUs for the following year (and, commencing July 1, 2010, a report reviewing performance of the Annual Work Program of the year to date).
 - (v) No later than March 31 in each year of Project implementation, commencing March 31, 2009, send to the Bank a report on O&M budget containing the information required as set out in the Project Management Manual, including: (a) the O&M budget allocation in the immediately preceding Fiscal Year; and (b) the percentage thereof that was spent in accordance with the Project Management Manual.
 - (vi) Apply the provisions of the ESMF in Sub-project implementation, including, where applicable in accordance with the ESMF: (i) screening of each Sub-project to ensure that potential environmental and social impacts for each Sub-project are identified prior to implementation; (ii) development of an environmental management plan to mitigate potential adverse environmental impacts associated with these works fully consistent with the ESMF prior to commencement of Sub-project implementation; (iii) application of the DSC Guidelines in the operation of each dam and in all Project activities; and (iv) application of community participation procedures for dam management and water catchment area management.

- (vii) For the purpose of overseeing implementation of dam safety measures, (i) during the first year of Project implementation and prior to the approval of the first Annual Work Plan, assign an Independent Expert with qualifications and terms of reference acceptable to the Borrower and the Bank who has not been involved in the design or implementation of the Project, to review and oversee the Sub-projects and the Preparation Activities in the first year of Project implementation and to assist in developing preparation criteria for the establishment of a Dam Safety Panel; and (ii) by no later than the first anniversary of the date of this Agreement, or such later date as may be agreed in writing between the Borrower and the Bank, establish and thereafter retain throughout the Project, a Dam Safety Panel for the second and later years of Project implementation with qualifications and terms of reference acceptable to the Borrower and the Bank, comprised of three or more individuals who have not been involved in the design or implementation of the Project, to review and oversee Sub-projects and Preparation Activities for large and/or complex dams, which will comprise those dams selected based on the recommendation of the DSC, and any additions requested by the Bank.
- (viii) Monitor and evaluate the progress of the Project and prepare Project Reports in accordance with the provisions of Section 5.08 of the General Conditions and on the basis of the indicators set forth in the loan agreement. Each Project Report shall cover the period of one calendar semester, and shall be furnished to the Bank not later than forty-five days after the end of the period covered by such report.
- (ix) Implement and document community participation activities in accordance with the Project Management Manual.

IV. APPRAISAL SUMMARY

A. Economic and financial analyses

40. **Project Costs.** Total project cost of DOISP is estimated at US\$ 70.43 million, including total base cost of US\$64.35 million, and physical and price contingencies of US\$6.08 million. Total project cost includes about US\$47.59 million of local costs and US\$22.83 million foreign exchange costs. Detailed cost tables are presented in Annex 5, and project cost summary by components is summarized in Table 2.

Table 2. Project cost by component

Component	Rp Million			US\$ '000		
	Local	Foreign	Total	Local	Foreign	Total
Component 1: Dam Operational Improvement & Safety Works & Studies	179,744.	113,000	292,744	19,327	12,150	31,478
Component 2: O&M Improvement	93,190	29,982	123,173	10,020	3,224	13,244
Component 3: Reservoir Sedimentation Mitigation	82,690	39,353	122,043	8,891	4,321	13,123
Component 4: Dam Safety Institutional Improvement	15,670	4,250	19,920	1,685	457	2,142
Component 5: Project Management	20,535	19,989	40,524	2,208	2,149	4,358
Total Base Cost	391,830	206,574	598,405	42,132	22,212	64,345
Physical Contingencies	4,793	1,967	6,760	516	212	727
Price Contingencies	45,997	3,806	49,802	4,946	409	5,355
Total Project Cost	442,621	212,347	654,968	47,594	22,833	70,427

41. **Financing.** The IBRD loan will finance US\$50.00 million, about 71% of the total project cost, excluding taxes and duties and incremental O&M budget. GOI would finance the remaining US\$20.43 million (about 29%) including the front-end fee and the incremental operating cost for the O&M of the 63-dam portfolio (Table 3). The financing by project component and the disbursement schedule are presented in Annex 5.

Table 3. Financing Plan (US\$M)

Financier	Local	Foreign Exchange	Total
Government	18.49	1.94	20.43
IBRD	29.10	20.90	50.00
Total	47.59	22.84	70.43

Economic and Financial Analysis

42. It should be noted that both economic and financial analyses are tentative as it is generally cumbersome to attribute benefits unequivocally to improved safety and operation of dams, and to improved management of upper watersheds. Most benefits are indirect. Also, basic data, such as census data, is often unreliable and incomplete in Indonesia and necessitates the use of approximations.

43. **Economic Analysis.** The primary beneficiaries are urban and rural communities of about 2 million households that depend on reservoirs for their water supply and livelihood as well as all downstream communities, who on one hand will benefit from improved operational performance, and on the other could be placed at physical, economic and environmental risk if dam safety is compromised. The primary benefits include: (i) reduced risks of dam failure; (ii) prolonged life of dams and reservoirs and restored performance, and strengthened institutional capacity for asset management; and (iii) mitigated watershed erosion and sedimentation. The improvements--both of institutional/ operational and physical nature--that reduce the risk of dam failure will

consequently prevent or minimize damages to downstream property and environment, loss of life, loss of bulk water supply, and eventual (expensive) replacement of a dam or for construction cost of alternative water supply.

44. The economic life of dams and reservoirs would be extended through interventions of remedial works and provision of adequate O&M budget. Inadequate dam O&M budget in the past has caused deferred maintenance and premature rehabilitation costs. Many dams suffer from operational deficiencies, while some dams have structural and mechanical problems that could pose a safety hazard. The sedimentation mitigation and watershed treatments would reduce reservoir sediment influx, and restore reservoir storage capacity, and flood routing capacity. Due to the combined effect of sediment accumulation and structural weakening which imposes precautionary lowering of the reservoir's active storage, the bulk water supply reliability to the irrigated areas and other water users is decreasing.

45. The economic rationale of dam rehabilitation and safety is foremost the protection of human lives. Conversion of this protection into economic analysis is precarious. The further benefit analysis relates to: (i) avoidance of direct physical damage to private and public assets downstream of the dam at risk; (ii) avoidance of the very large indirect negative multiplier effects on the various sectors of the economies downstream of the reservoirs, irrigated agriculture being the main driver of those local economies; and (iii) avoidance of replacement of the reservoir capacity. It is difficult to estimate the probability of failure of any given dam unless extensive and detailed historical data exists on a dam portfolio, which is commonly not the case in developing countries. Experience in industrialized and developing economies suggests that a comprehensive program like DOISP can reduce the probability of dam failure of, at least, one order of magnitude from the existing conditions. The experience of the Armenia Dam Safety Program (two phases, 1999-2009) corroborated this rule. Calculations that seek accurate probability figures generally fail because of the complexity of the risk structure, unless a large number of historical data on the portfolio is available. Therefore, the analysis for DOISP follows advised practice of making an overall assessment of the probability of dam failure based on a risk reduction by 0.1 (i.e., one order of magnitude) between the with and without project alternatives (WP/WOP), followed by sensitivity analysis adopting the ratios of 0.5 and 0.8. Moreover, an economic analysis was undertaken both for the "program" (DOISP followed by a successor project) and for DOISP alone.

46. Adopting guidance from average international values, the rate of dam failure has been assumed at 13% in a 20-year period⁷ in the WOP alternative. This is conservative, as a best estimate of (limited) portfolio dam failure for Indonesia suggests a value of 3.8%/year based on recorded referable dam failures since 1960. The WP would reduce this to 1.3%. To be conservative, the extent of life and assets losses has been taken at 30% for loss of farm incomes and 10% of household assets. The potential losses include: (a) severe safety risk for 8.1 million

⁷ This analysis only takes into account the impact on communities and assets located directly downstream of the reservoir. It does not include the impact on water users and other interests that depend indirectly on the river and reservoir, like the Greater Jakarta conurbation which depends on the functioning of the Curug water intake and pumping station downstream of the Juanda (Jatiluhur) reservoir on the Citarum river (see footnote 2).

people living downstream of the 34 priority dams (and 9.5 million people for the 63 dams); (b) potential flood damage and loss of irrigated area to an area of 270,000 ha for 34 dams (and 310,000 ha for the 63 dams), which produces an annual farm net income of US\$210 million for DOISP (and US\$240 million for DOISP+successor project); and (c) potential destruction of 200,000 homes (235,000 for DOISP+successor project) worth US\$360 million (US\$420 million for DOISP+successor project).

47. Detailed assumptions are presented in Annex 9. The base level of economic rate of return (ERR) is 32.8% for DOISP and 32.3% for the DOISP+successor project, counting only potential losses of agricultural incomes and household assets. The ERR of the program consisting of DOISP + successor project roughly equals that of DOISP due to the small increase in the benefits against a significant increase in additional investment cost. The sensitivity analysis for DOISP shows that for failure rates of 0.5 and 0.8 the ERR reaches 22% and 8.5%, respectively. The threshold level of ERR of 12% is met when the failure rate is 0.75. Even if all the benefits from avoiding damage to non-household assets are excluded, the ERR of DOISP is still 15.4% (and for DOISP+successor project, 13.1%), above the level of 12%.

48. **Financial Analysis.** The purpose of the financial analysis is to assess the fiscal impact and the incremental financial burden on the central and provincial governments, and the water users, particularly from expenditures incurred for, and from revenues generated from O&M of dams and reservoirs. The results would be instrumental to enable GOI to prepare the necessary policies and regulations on whether to continue the present policy of selectively collecting water fees from some groups of users (irrigation currently being exempt, for example).

49. **O&M Expenditures.** No regulations exist to require collection of water fees from the main water users, viz. irrigators (which represent about 99.7% of use from the DOISP reservoirs). Only a small portion of the bulk water is supplied to hydropower, and industrial and domestic users. Except for bulk water supply from reservoirs located in the basins of which the management is entrusted to the PJT I and II⁸, also these non-agricultural water users are currently exempt from river management charges. Thus, annual O&M expenditures for dams and irrigation facilities are fully financed from the central and provincial governments' budgets. The PJT I and II collect fees for water supplied for hydropower, urban and industrial uses (including the Jakarta, Bandung and Surabaya conurbations).

50. The actual O&M expenditures of 63 large dams in 2007 amounted to approximately Rp26.29 billion, compared with the total needs of Rp43.08 billion, as estimated at 0.25% of the Modern Equivalent Asset Value (MEAV) of the dams, or 63% of these needs (Annex 9). Of the O&M expenditures, on the average about 80% were spent for civil works and 20% for salaries. These expenditures were shared between the central and the respective provincial governments at

⁸ PJT I and II are state enterprises assigned to operate and maintain the river infrastructure in the large basins of the Brantas and B. Solo, and Citarum, respectively. These are the most developed basins in the country.

the ratio of 80:20, although the share of the national governments' funding has been increasing to about 84%. The current actual dam O&M expenditures are still inadequate, although overall budget availability has increased significantly over the past 5 years. Therefore, the project would provide incremental O&M budget for 63 dams with a total annual incremental budget of Rp16.80 billion to prevent deferred O&M works. This budget would be wholly borne by GOI.

51. The financial analysis for DOISP considers only water supplied for irrigation because water supply for other uses is less than 0.5%. Two financial cash flows have been compared to illustrate the financial impact on project investments and cost sharing on dam O&M expenditures among central and provincial governments, and water users. It is thus assumed that: (i) under Option I, the present policy will prevail and there will be no water charges in the future, and the O&M expenditures will be fully borne by the central and provincial governments; and (ii) under Option II, the Government will enact regulations and collect water charges in the future and the O&M expenditures will be borne by water users. Detailed assumptions for the analysis are given in Annex 9.

52. Under Option I, the analysis indicates that the annual fiscal burden from the O&M budget on the central and provincial governments would increase by 64% from US\$2.82 to US\$4.63 million. These incremental fiscal burdens could be reduced through a partial collection of water charges from water users. The fiscal burden could be entirely removed if the government wishes to fully collect water charges from all sectors of water users, as under Option II. The water rate is estimated at US\$4.5 per irrigated ha (Rp41,850/ha) based on an annual O&M budget of US\$4.63 million and irrigated paddy area of 1,030,000 ha. A water rate at US\$4.5/ha (Rp41,850/ha) would account for less than 1% of the net financial return per ha of irrigated paddy. In terms of water volume used, the water rate is estimated at Rp6/m³. On this basis, it is expected that gradual introduction of a water charge will not significantly burden farmers, as farmers will be able to absorb the charge. However, given that the recent 2004 Water Law specifically exempts individual farmers from water charges, it is unlikely that this situation can be addressed within the scope of DOISP.

B. Technical

53. The institutional and capacity development objectives and activities are of major significance for the country. GOI's effort to strengthen its regulatory capability for the safety and for improved performance and funding of the dams and reservoirs, is a logical and very meaningful expansion on two longer-term agendas of the government. On one hand, it expands and seeks to consolidate the basic regulatory framework that was established under DSP, and on the other hand it brings the sub-sector of dams and reservoirs as a distinct set of assets into the new regulatory and management framework that covers the water resources and irrigation sector. This latter framework is founded on the seminal 2004 Water Law and its subsequent Government, Presidential and Ministerial Regulations. This framework counts among the more modern and comprehensive in Asia, outlining the principles to address competition for water, Integrated Water Resources Management, governance, sustainability, and the roles of stakeholders. The new draft Regulation on Dams with its subsequent Ministerial Decrees and operational guidelines, and the

planned administrative reform to start applying a programmatic, portfolio approach to dams would articulate one of the more robust and coherent frameworks for dam and reservoir management in Asia.

54. The Project Implementation Plan (PIP) details a prioritization plan for repairs and rehabilitation of dams and reservoirs, and for starting with pro-active erosion control measures involving local communities, that properly balances the need for urgent action with adequate preparation--given GOI's constrained capacity to absorb the funds. As a first, and much needed management innovation, the PIP applies a rational assessment across the portfolio to shortlist and schedule Sub-projects based on criteria of cost-effectiveness with respect to safety and operational improvement, in two phases to synchronize with the policy and institutional development. The type of activities and works, of structural and non-structural nature, are appropriate and sound from a technical perspective, and encompass the typical activities for dam maintenance and improvement. Most of the works can be executed well by national consultants and contractors and are manageable by the DGWR's River Agencies (Balai(B)WS), if assisted by a strong TA Team and with professional training extended on specialized topics. Different from past practice, the project will now also take explicit interest in the downstream and upstream areas: the downstream areas, because the hazard of emergency spillway operation and dam failure events needs to be minimized; and the upstream areas, because of the growing problems with sedimentation in the reservoirs that are caused by land use changes. These activities are at pilot or modest level, but represent a breakthrough in the dam management in the country. They draw on international best-practice and reflect more pro-activity than in many neighboring countries. Thus, the project's innovative value extends not so much to the actual works, but to the portfolio-based planning and management which clearly attempt to capture the upstream and downstream externalities.

55. The policy and institutional reform and the sub-projects address Indonesia's current and future needs well. The relatively modest size of DOISP is particularly suited for this operation, both for the policy and institutional component, and for the sequenced implementation of the works, because of the following reasons. Firstly, the experience with WATSAL and WISMP suggests that policy and institutional reforms have a higher likelihood of satisfactory completion if substantial time is allowed for processing and "socialization". Secondly, the experience suggests that such reforms move better when accompanied by field operations that allow piloting and practicing. Thirdly, human resource analysis shows that DGWR will be still particularly short of experienced staff until about 2011, and its capacity to process simultaneously the institutional and the operational work will remain constrained. Finally, with less complex sub-projects in DOISP, the burden on the staff is further lowered, and administrative and technical experience can be built in preparation for the more ambitious agenda in the successor project. Similarly, the four sub-projects selected for implementation in Year 1 are well manageable, and will offer the opportunity to get the operational project procedures articulated and fine-tuned.

C. Fiduciary

56. **Financial Management:** The main project risk is the limited capacity of financial management (FM) staff. CPMU/PIUs have limited dedicated FM staff as they have also other job

assignments. In addition, the project has a wide geographic spread that creates project-implementation monitoring and supervision risks. These risks will be mitigated by providing project management consultants, including financial management consultants. The project will be managed as a central-government project in order to minimize complexity and ensure better coordination during project implementation. All implementing agencies' financial reports are subject to external audit.

57. Overall, the financial management risks for this financing are assessed as substantial before mitigation, and moderate after mitigation. This assessment has concluded that with the implementation of the proposed recommendations, the risks will be substantially mitigated, and the proposed financial management arrangements will satisfy the Bank's minimum requirements under OP/BP10.02.

58. **Procurement:** Procurement will be carried out in accordance with the World Bank's procurement guidelines (2006 edition) and the provisions stipulated in the Loan Agreement. The Bank's standard documents for Request for Proposal (RFP) and International Competitive Bidding (ICB) as well as NCB documents acceptable to the Bank will be used. Procurement activities will be carried out by a Procurement Committee supported by dedicated staff in the Project Implementation Units (PIUs) in the DGWR and DSU at the central level, as well as in MPW's regional Balai (B)WS Offices and provincial Dinas PUP offices in the sub-projects in the field. The DGWR will provide overall assistance and quality control in procurement to all PIUs with the support of procurement consultants who should be contracted under TA package at the start of the project implementation. A procurement capacity assessment on the DGWR, DSU as well as Balai (B)WS has been undertaken by the Operations Support Unit in the World Bank Jakarta office. Based on this assessment the project has been categorized as being in substantial risk category from a procurement point of view. The risk mitigation action has been agreed as: (i) enhancing procurement capacity through early selection of qualified procurement staff and training, and preparation of easy to understand and straight-forward procurement instruction in the PMM, (ii) enhanced disclosure of procurement information ex-ante and ex-post and monitoring, and (iii) carrying out advance procurement to mitigate the risk of delays in procurement of critical contracts, including contract for procurement consultants. The assessment concluded that, after a successful implementation of the above mitigation measures, the residual procurement risk is expected to be "Moderate".

59. **Governance and Accountability Strategy:** The implementation of a Governance and Accountability Strategy for DOISP depends on the commitment of the government. The Strategy will be part of, and further elaborated upon, in the Project Management Manual. During implementation, the Task Team will monitor the elements of this strategy. Aide Memoires will indicate implementation status of measures incorporated in the strategy. The strategy draws on the strengthened community participation and oversight component of the project, and outlines measures to reduce the risks of collusion, forgery and fraud. Salient information such as procurement information and audit reports will be disclosed through various means. Enhanced complaints resolution mechanism is featured in the project to ensure proper recording, resolution and analysis. Findings of technical and financial audits will be shared with Bank management,

and the CPMU will also ensure that any suspected cases of corruption related to this project be reported immediately to the Bank.

D. Social

60. ***Land Acquisition and Resettlement.*** No involuntary land acquisition is expected to take place, as the physical activities to be financed in DOISP involve only localized minor remedial and rehabilitation works and activities, on land and structures that are owned by the government and where no squatters have been allowed. Whereas DOISP does not trigger OP4.10 and 4.12, the successor project may trigger OP4.12. In the successor project more complex physical activities will be implemented such as expansion of spillways, raising of dam heights to increase reservoir capacity, larger-scale removal of sediment from reservoirs, etc. This may entail involuntary land acquisition, albeit at minor scale for which a LARPF, land acquisition protocols and RAPs will be prepared under DOISP as part of the Environment and Social Safeguards Management Framework (ESMF) for the successor project. That ESMF will be subject to appraisal of the successor project. An analysis has shown that no indigenous people (for GOI: isolated and vulnerable people) are settled in the wider vicinity of the sub-project sites or in the upper sub-catchments that will be subject of community participation activities.

61. ***Community Participation.*** The project will support social development through community participation and incentives approaches in reservoir greenbelt management (sub-component 2.3 on 20 locations) and watershed management (sub-component 3.4 in 4 sub-catchments).

62. ***Community Participation in Reservoir Greenbelt and Dam Management.*** This sub-component will build upon the pilots conducted under DSP. Objectives are to (i) ensure community participation in maintenance and safety of reservoirs and dams and in controlling the use of the reservoir area by outsiders; (ii) ensure community participation in creating income-generating agricultural and silvi-cultural opportunities, utilizing the government-owned reservoir greenbelt zone whilst applying land use practices that stem erosion and shore damage; (iii) strengthen the capacity of local government institutions (district, sub-district and village) in working in a participatory approach. The community participation will take consideration of social diversity and gender. A community participatory approach will be applied, with support from local NGOs familiar with the area. An incentive scheme will be introduced to support the development of the income-generating activities, which would need to be continued (at a lower level of engagement) by the local government and NGOs to improve sustainability. The settlers would be allowed the usufruct and lease of the land, and no land acquisition would be involved.

63. ***Community Participation in Watershed Management.*** This sub-component will replicate successful pilots carried out by Balai PSDA and local government in Central Java in other (sub-) catchments where demand and commitment have been documented. The objectives are to: (i) ensure community participation in increasing and maintaining protective vegetation cover and land surface structures (e.g., drains and terraces) in the catchment, as well as in the rehabilitation

and protection of river banks and beds that are prone to erosion and threaten local settlements, bridges, bathing places, etc.; (ii) stimulate community participation in using income-generating opportunities related to the erosion control measures (tree and crop growing) that do not damage the ecosystem or the vulnerable soils; and (iii) encourage capacity of local government in managing the catchment with a participatory approach. The activities comprise community organization, joint prioritization and planning, financial incentives and technical support, and capacity building.

E. Environment

64. The DOISP sub projects are restricted to improving O&M and safety, and minor localized remedial and rehabilitation works and activities such as (re-)placing of instrumentation, sealing of the crest surface with pavement slabs, stabilization works of local nature at upstream and downstream dam slopes and at the dam toes, cleaning, brush removal and repair work of spillways, etc. The potential adverse environmental impacts associated with these works will mostly be construction-related and will be local, minor and reversible through the use of readily available and simple mitigation measures such as enhancement of good construction practice through enforcement of legal clauses in the civil works contracts. These will be associated with good practice measures for management of small amounts of spoil material, handling of lubricants and other petroleum products for construction plant and equipment, transporting of fill and gravel material, dust and noise management, etc. Thus, DOISP is a Category B Project. Environmental management of DOISP will be based on two approaches: (i) environmental safeguards articulated in an Environmental and Social Safeguards Management Framework (ESMF) that sets out the objectives and principles of the Environmental Management Plans (EMPs) of each individual sub-project, and (ii) mainstreaming environmental issues into portfolio management to enhance sustainable outcomes. The ESMF sets the principles and measures for screening of each sub project, to ensure that all the potential environmental and social impacts for each sub project are identified prior to their implementation; that the corresponding mitigation and monitoring management measures are developed; and that the institutional responsibilities for their implementation are appropriately assigned. Four EMPs have been prepared for the first four sub-projects to be implemented in Year 1. Each year the CPMU will submit an Annual Work Plan (AWP) and budget for the next year for Bank approval, conform with the practice in many Bank-assisted MPW projects. The AWP will comprise, beside the technical preparation documents, the economic feasibility analysis and the EMPs for the next set of sub-projects. The CPMU will report semi-annually of performance on safeguards implementation and raise any issues that need to be resolved.

65. **Environmental Safeguards.** Sub-projects are located in Java (West Java, Central Java, Yogyakarta and East Java), and some in NTB, Lampung, East Kalimantan and South Sulawesi. All DOISP project activities are located on lands already converted and will not lead to alterations in the existing land use patterns. Nearly all sites are located in areas characterized by low population density and low to medium intensity upland agriculture (smallholders, plantations, and common, production and some protection forest in the upper reaches). Thus, water and sediment quality are generally good, and dredge spoils will not require special management. Only the Juanda (Jatiluhur) reservoir lies downstream of a large conurbation (Bandung) and will in the

future be exposed to growing pollution, however, this reservoir will not require dredging or interventions that may affect water quality. The programmatic approach allows more complex sub-projects to be partly prepared under DOISP but implemented under the successor project after separate appraisal. The list of sub-projects under DOISP does not comprise the following types of subprojects: (i) construction of new dams; (ii) activities that are likely to have significant adverse environmental impacts or that are sensitive, diverse, or unprecedented; and (iii) decommissioning of dams. If a subproject is likely to impact on sensitive sites either by being located in close proximity to a sensitive site, or if the nature of the sub-project activity could directly impact on a sensitive site (e.g., national park, wildlife reserve, etc), an Environmental Assessment and an AMDAL may be triggered; implementation of such sub-projects will be deferred to the successor project. Activities that would fall in this category are dam crest raising, large-scale sediment removal (over 500,000 m³); dam decommissioning; etc.

66. No legacy issues were found with the sub-projects. All of the dams/ reservoirs are operational for many decades already and have shaped the regional social and economic geography. The dams have been regulating their respective rivers thereby providing raw water to existing irrigation or water supply schemes, reducing flooding and in a few cases producing modest amounts of hydropower. As such, the benefits of the structures are locally recognized.

67. The four sub projects being prepared for implementation in Year 1 (Batuaji, Gondang, Gembong and Krisak) involve localized repair and rehabilitation. The final screening has shown that the direct and indirect environmental and social impacts both upstream and downstream associated with the activities can be considered minimal, and as such the sub-projects are associated with an EMP (UKL/UPL under GOI regulations) as specified in the ESMF.

68. **Mainstreaming environmental issues.** Beyond putting in place the safeguards for the individual sub-projects, the environmental concerns will become integrated more broadly into the portfolio management that is supported by the project. The project will support institutional strengthening that will, *inter alia*, include developing capacity and procedures/ manuals to identify and scope key environmental issues related to operation and improvement of reservoirs and dams, such as water quality, erosion, sediment removal and disposal, and riparian issues, into the overall operational and decision making processes. The ESMF has adopted a due-diligence approach as part of the screening mechanism given that these dams have been existing for decades, which would identify any environmental legacy issues that may affect a programmatic approach towards their management. Thus, in the medium to long term, the project is likely to have enhanced environmental positive outcomes.

F. Dam Safety

69. The Bank requires that the Borrower adopt measures to ensure the safety of the new and existing dams it finances because of the serious consequences in case of malfunctioning. The main objective of DOISP is to enhance safety of the dams at national level. As such the scope of the

project goes well beyond the minimum provisions stipulated in OP/BP4.37. In particular, DOISP will:

- specifically assist GOI in designing and mainstreaming programmatic measures of regulatory, administrative and financial nature to enhance the dam safety across the country's dam portfolio;
- progressively be extended to non-GOI owned dams (see Annexes 1 and 4); and
- provide: (i) training and capacity building of both the DSU and the agencies charged with implementation works and operating the dams, (ii) pro-active on-site safety analyses and studies (piping analysis, bathymetric surveys, etc.), (iii) dam safety inspections, and (iv) advice to develop technical and procedural guidelines suited to Indonesia's context needed to enforce the regulatory framework.

70. There is a satisfactory dam safety attitude in Indonesia, and progress is being made on portfolio risk management. Other countries with an important stock of dams in the East Asia region are undertaking modernization and safety enhancement programs. China and India are those with the largest number of dams as well as a significant dam building program. While China is starting to move towards risk-informed dam safety management, India has not yet embraced that approach. Other countries with many dams, such as Vietnam, Lao PDR, Thailand, Philippines, are still far from adopting a portfolio risk management approach.

71. The impending issuance of the country's first Government Regulation on Dams will regulate the development of new dams and the management of existing dams. The Regulation is a strong signal of the Government's commitment to dam safety: all best dam safety practice provisions of the OP & BP would become mandatory requirements for dam developers and owners. It would also ensure the inclusion of activities explicitly aiming at more sustainable management of the dam reservoir greenbelts and the upper catchments, which is in line with the OP's objectives and the growing socio-economic and safety threat of reservoir sedimentation. Most of the post-1970 dams have O&M manuals, however, these are in need of updating and the Regulation requires such manuals to comply with its requirements. A major objective of DOISP is to train operators to apply the O&M practices and procedures of O&M Manuals: currently no manuals are found on site and are not used. Similarly, 20 dam break emergency preparedness plans were prepared under the forerunner Dam Safety Project but were not yet operationalized. Emergency plans and warning procedures in the event of very large spillway releases do not exist for any dam. Both will become mandatory under the Government Regulation.

72. The project will finance the activities by the DSU and other agencies to develop and/or improve such plans consistent with the OP and the Regulation. The nature and technical complexity of the sub-projects in DOISP are low to modest, thus, the requirement for independent review of design and works (BP 4.37) can be covered by appointment of an independent national expert panel where necessary. Indonesia has a small but adequate pool of INACOLD-certified senior dam experts for this purpose. The project does not involve reservoir filling and start-up operations except in a few cases where a dam has to be partially emptied to undertake remedial works, which will be accompanied by consultation with downstream water users. However, for the detail preparation of the larger sub-projects in the successor project, including the second

phase of activities on the Juanda (Jatiluhur) dam, an independent panel of experts (the Panel) will be appointed comprising at least one international expert. These sub-projects are high-risk and comprise significant and complex remedial work. The project budget provides for the expenses of the expert and the Panel.

G. Safeguard policies

Safeguard Policies Triggered by the Project	Yes	No
Environmental Assessment (<u>OP/BP 4.01</u>)	[X]	[.]
Natural Habitats (<u>OP/BP 4.04</u>)	[]	[X]
Pest Management (<u>OP 4.09</u>)	[]	[X]
Physical Cultural Resources (<u>OP/BP 4.11</u>)	[]	[X]
Involuntary Resettlement (<u>OP/BP 4.12</u>)	[]	[X]
Indigenous Peoples (<u>OP/BP 4.10</u>)	[]	[X]
Forests (<u>OP/BP 4.36</u>)	[]	[X]
Safety of Dams (<u>OP/BP 4.37</u>)	[X]	[]
Projects in Disputed Areas (<u>OP/BP 7.60</u>)*	[]	[X]
Projects on International Waterways (<u>OP/BP 7.50</u>)	[]	[X]

H. Policy Exceptions and Readiness

73. There are no policy exceptions.

74. The readiness is based on the fact that the Conditions for Negotiations have been met, which all reflect the readiness. The Project meets the Region's requirements for readiness.

* By supporting the proposed project, the Bank does not intend to prejudice the final determination of the parties' claims on the disputed areas

Annex 1: Country and Sector or Program Background

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

Country Context and Poverty Strategy

1. Indonesia is Southeast Asia's largest country with about 225 million people and a lower middle-income economy in which GDP per capita reached US\$1,920 in 2008. Since the economic and political crisis of the late 1990s, Indonesia has undergone remarkable institutional transformations. The first phase, from 1998 to 2003, was a period of radical political and economic change, typified by democratization and the largest ever decentralization of government which transferred the responsibility for most public service delivery to the sub-national governments. The second phase, from 2004 to 2008, has been a period of consolidating democratic institutions and returning to macroeconomic stability, most notable in Indonesia's first direct presidential elections in 2004 and its reducing debt levels to below 35 percent of GDP.
2. Indonesia has resumed higher levels of growth and, as a result, has now returned to middle-income status. Over the past few years, economic growth accelerated to a 10-year high of 6.3 percent in 2007 and is expected to reach 6 percent in 2008, despite the current slowing of the global economy. In the past year, the growth rate was sufficient to reduce poverty from 17.8 to 16.6 percent and reverse the recent trend towards jobless growth, with unemployment falling from 10.3 to 9.1 percent. A strategy of fiscal consolidation has resulted in significant reduction of government debt levels, while inflation has largely been kept under control.⁹
3. Nevertheless, a large number of people remain vulnerable to poverty. Measurement of poverty in Indonesia is relatively volatile because of the large number of households clustered around the poverty line. Small price changes in goods consumed by poor households have a relatively large effect on the proportion of households classified as poor. Thus, the increase in commodity prices is a source of concern, particularly since food commodities account for a significant proportion of household expenditure among low income groups.
4. Following two price hikes on fuel products in March and October 2005, the Government reduced regressively targeted fuel subsidies and reallocated US\$1.4 billion in public spending to "pro-poor" sectoral programs. The Fuel Subsidy Reduction Compensation Programs in these sectors were intended to alleviate the effects of the fuel subsidy reduction on the poor through sectoral programs, namely: (i) the School Operational Grant Program (Bantuan Operasional Sekolah, or BOS) and the Student Assistance (Scholarship) Program (Bimbingan Konsultasi Mahasiswa, or BKM) in the education sector, which aimed to reduce or eliminate school fees; (ii) the Askeskin program in the health sector, which aimed to increase healthcare access and utilization for the poor, and (iii) the rural infrastructure program, which aimed to improve village infrastructure through a participatory process, while also creating temporary employment. This

⁹ See Development Policy Review, 2008, and the 2008 Country Partnership Strategy "Investing in Indonesia's Institutions" for a fuller presentation of current economic issues.

report assesses only the coverage, targeting and impacts of the first program for the education sector, the BOS program, which focused on primary and junior secondary students.

2. Sector Context

5. *Water in the Economy.* Indonesia has embarked upon a far-reaching institutional transformation as it emerged from the Asian financial crisis. Its GDP has been growing at 5-6% annually since 2002 and public investment has steadily increased. Notwithstanding this robust growth, inadequate public services--such as for water--remain a key weakness to be able to address poverty and secure an environment for private sector investment¹⁰. The 2008 CPS prioritizes the strengthening of the nation's institutions, and investments in, i.a., (water) infrastructure, climate change and disaster mitigation.

6. A priority in the Government of Indonesia's (GOI's) development plans is to substantially improve access to water for its growing population—a key objective under the Millennium Development Goals (MDGs)¹¹. The urban demand is large and growing apace with economic development, and much of the staple food (rice) is grown in irrigated areas, which consumes about 85% of the water. The country is well endowed with freshwater but high population pressures, and the monsoonal precipitation cycle, render water availability along the year precarious. Thus, the country relies heavily on infrastructure to store bulk water and carry it to the urban and industrial centers and to irrigation areas. The main island of Java is of particular concern: covering about one tenth of the territory it houses 67% of Indonesia's population of 225 million, and its fertile soils produce nearly 60% of its rice. The country has 287 dams creating reservoirs on rivers: of these, about 133 are defined as "large"¹² dams to be regulated in the interests of public safety.

7. *Reservoirs are a vital link in the water supply chain.* Most large cities--such as Greater Jakarta, Surabaya, Makassar and Semarang--depend largely on reservoirs and barrages on the rivers for their water supply (Jakarta for 80-90%). The extension of tap water supply in Jakarta for example, is more constrained by the limited available bulk water than the difficulty to expand the urban distribution network, and this constraint affects foremost the poorer communities. Reservoirs ensure the 2nd and 3rd annual harvests in the dry season by irrigating about 16-17% of the public irrigation area of about 4.7 million ha, raising rural incomes and stabilizing food prices. Of the total installed power generating capacity in Indonesia, about 18% is generated from hydropower; on Java and Bali this is 13%. Some large dam reservoirs also serve to retain peak flood waters, a common cause for natural disaster.

¹⁰ Country Assistance Strategy (2004), and Country Partnership Strategy (draft, May 2008).

¹¹ In terms of most MDGs, Indonesia underperforms compared to its neighbors. In terms of access to water supply, in Jakarta 50% of the urban population only has access to piped water, compared to 69% in Colombo, 84% in Ho Chi Minh City, and 100% in Kuala Lumpur.

¹² A "large" dam or reservoir is defined as having (a) a dam wall with height of 15 m or more and a minimum reservoir capacity of 100,000 m³; or (b) a wall with a height of 10-15 m with a width >500 m, or a reservoir capacity >500,000 m³ or spillway discharge >1,000 m³/sec. All impoundment structures (including for mine tailings reservoirs) meeting these criteria are "referable dams" falling under national dam safety assurance regulations. Of the large dams, about 114 are owned by the Ministry of Public Works (MPW), 18 by the State Power Corporation (PLN) and 8 by private (mining) corporations.

8. A Bappenas study¹³ suggests that Kabupaten (districts) on Java that suffer from flooding in the wet season also have structural water shortage in the dry season, and that this water deficit is often compensated by unsustainable mining of groundwater at major environmental cost. La Niña-induced dry spells in 1972 and 1997 triggered food shortages; in 1997-1998 this contributed to the social unrest leading to the fall of the government in May 1998. Recent studies have confirmed that climate change will further exacerbate this discrepancy between the seasons over the next two decades: the wet season will become shorter with the rainfall coming in fewer, more intense events¹⁴. The country's stock of reservoirs will, therefore, become pivotal in the adaptation strategies for climate change. These findings reinforce the conclusion that water storage and conveyance structures are vital for economic growth.

9. Yet, compared to other countries, reservoir capacity in Indonesia is still poorly developed¹⁵. To address the shortage of water storage capacity, the country intends to build about 15 new reservoirs in the coming decade. Currently six larger dams are under preparation: the large Jati Gede dam in West Java which is being financed and built by Chinese groups; the smaller Karian dam in Banten province would be financed and built by a South-Korean consortium; the Jati Barang is being constructed in Central Java with JBIC financing; the Padan Duri Swangi dam in NTB; and the PLN-owned Cisokan pumped storage facility under World Bank finance. These projects are being reviewed by the DSU which will need to certify planning and construction quality and safety.

10. In addition, 29 of the “large” reservoirs were built before 1980, of which 16 before 1950, with the oldest 3 dams dating back to 1910-1920. This older stock is coming (or has come) to the end of its economic lifetime. Furthermore, many reservoirs are increasingly suffering from severe sedimentation caused by land use changes in their upstream catchments under demographic and other pressures, and due to the volcanic nature of the region and its vulnerability to seismic shocks and steep slopes that trigger land slides and intense erosion.

11. On one hand, a compelling economic rationale argues for repairs, rehabilitation and general upgrading to restore the functionality of the older dams/ reservoirs and prolong their economic lifetime. Both the natural degradation and ageing of the dam structure and its components, and the silting up of the reservoirs, determine the economic lifetime. Typically, the electromechanical equipment, such as valves, gates and engines, is supposed to be replaced every 15-25 years, and structures are due for major overhaul, repair and replacement every 30-50 years. The loss of economic lifetime due to siltation depends on the annual influx rate of sediment. In many instances this rate is now exceeding the design assumptions leading to premature loss of economic lifetime and bringing closer the date that the dam/ reservoir would need to be decommissioned. Thus, the reservoirs’ functionality and their structural integrity are becoming imperiled, and their declining (hydraulic) performance and sustainability demand urgent attention.

¹³ *Strategic Initiatives for Water Resources on Java*, Bappenas, 2005.

¹⁴ See, e.g., Rizaldi Boer, Sutardi and Dadang Hilman, *Indonesia Country Report. Climate Variability and Climate Changes, and Their Implication*. Ministry of Environment, Jakarta (2007).

¹⁵ Reservoir capacity for Indonesia is about 30 m³ per capita, against 2,500 in China and South America, 1,500 in Europe and the Middle East, 5,000-6,000 in the USA and Australia, and 400 in the rest of Asia (excl. China).

12. On the other hand, the (partial) failure of dam structures or their components, as well as the emergency operation of their spillway by themselves can lead to calamity, loss of life and major economic loss. This safety hazard (which is expressed as risk or probability of failure, times the likely extent of the damage caused) demands special safety measures--technical as well as regulatory and administrative. Based on existing historical records, the failure risk of large referable dams in Indonesia is estimated at about 3.8% per year, which is slightly above international averages but well above the typical realistic figure for regulated and well-maintained dam structures (about 0.5%). For example, the Sempor dam (West Java) failed in 1966 causing over 200 casualties (Table A1-1). In 2002 the retaining wall of the mine tailings reservoir of the Freeport Mine in Papua province collapsed, after which the reservoir partly emptied causing casualties and depositing large amounts of toxic materials in downstream rivers and wetlands. Dam structures fail regularly, also in industrialized countries, such as the Zeizoun (Syria, 2002), the Taum Sauk pumped storage (Missouri, 2005), the Indira Sagar dam (India, 2005), several smaller dams in Baluchistan (Pakistan) and Afghanistan in 2005, the Kaloko reservoir (Hawaii, 2006), and in August 2008 the Sapta Kosi in Nepal, which took the life of about 200. Most dam failure incidents in Indonesia can be traced back to gradually exacerbated piping (excessive seepage of water through or around the dam body), dam body sliding or settling, inadequate original construction and poor operation. Indonesia is very prone to seismic events. Seismic shocks are believed to play an important role in the gradual weakening of dam structures although no dam failure incident thus far was found directly caused by such shocks.

13. These considerations call for the repair, upgrade and rehabilitation of those existing reservoirs that are most at risk or that offer the opportunity to augment their functionality and safety score at low incremental cost. They also call for the introduction of more rigorous regulation on safety.

14. *Towards a Programmatic Approach.* GOI embarked on a sector-wide legal, regulatory and administrative reform of its water resources and irrigation sector in 1999. This was associated with the Bank's Water Resources Sector Adjustment Loan (WATSAL, 1999-2004). The government has largely completed the new institutional framework and is implementing it, notably through the Bank-supported Water Resources and Irrigation Sector Management Project (WISMP, an APL, with a first phase in 2005-2009). The new March 2004 Law 7/2004 on Water Resources (UU 7/2004) set the stage to introduce Integrated Water Resources Management, better governance (with the introduction of Councils with stakeholder participation) as well as improved financial sustainability of hydraulic infrastructure. The law also facilitates development of a more programmatic approach to dam and reservoir management and safety.

15. The Bank-supported Dam Safety Project (DSP, 1994-2003) financed the establishment of the country's first dam safety institutions: (i) the Dam Safety Commission (DSC)--chaired by the Minister of Public Works--assisted by the Dam Safety Unit (DSU) established in the Directorate General Water Resources (DGWR). A Ministerial Regulation of 1997 set Guidelines for Dam Safety (including criteria for Dam Hazard Classification), and technical guidelines for large dam design, construction, and O&M. In addition to the DSU, a Central Dam Monitoring Unit (CDMU) was established in DGWR together with Provincial Dam Monitoring Units (PDMUs) and Dam Monitoring Units (DMUs) in all provinces having large dams. DSP also showed that it is possible to carry out successful community-based programs for re-greening of the reservoirs' foreshore and police public access.

Table A1-1: Incidents of major dam structural failures in Indonesia in the past five decades (since 1960)

No	Dam Name	Dam Type	Height (m)	Province	River	Year Constructed	Year Failed	Reason for Failure/Comments
1	Sempor	Earth - rockfill	49.0	Central Java	Cingcing-Guling	1964	1967	Major failure due to overtopping when nearly completed. Loss of life 150-200.*
2	Lodan Wetan	Homogeneous earthfill	26.0	Central Java	Lodan	1995/1996	1998	Spillway collapse and dam break due to seepage
3	Cikuluk	Homogeneous earthfill	8.0	Lampung	Cikuluk	1998	2004	Significant damage due to seepage through conduit
4	Lempape	Homogeneous earthfill	9.0	East Kalimantan	Karangmumus	1970	1998	Significant damage due to overtopping
5	Manggar-		9.5	East Kalimantan	Mangga Besar	1978	1980	Sliding and sinking in embankment during the construction
6	Porsea		14.00	North Sumatra	Anak Sungai Asahan	1994	1994	Collapse of the spillway because of piping in the foundation
7	Way Sari		8.00	Lampung	Rante Gowak	1998		Partial damage due to overtopping
8	Plumbon		23.00	Central Java	Baron	1928		Collapse of stilling basin and parts of chute channel because of slide. Dam rebuilt.
9	Way Tengkorak		9.00	Lampung	Way Sekampung	1998		Significant damage due to piping
10	Prambon		13.5	East Java		1995		Significant damage due to overtopping
11	Kedung Sengon		8.0	East Java		1976		Significant damage due to overtopping
12	Batu Nampar		21.00	NTB		1992		Sliding of dam side
13	Freeport Mine		?	Papua	Mine tailings facility	1992	2002	Sliding of dam side. Loss of life (<5). Previous facility failed in 1990.

Note: * From register of Hydrocoop, Int. Association of Experts on Dams, Spillways and Flood Mitigation, Paris.

16. After closure of DSP, and despite the tight financial conditions at that time, these institutions were mainstreamed and funded by the routine national and provincial budgets. Currently, a draft Government Regulation on Dams under Law 7/2004 with about 17 detailed Ministerial Regulations is being finalized to provide “best practice” regulation and, comprehensive guidance on management and safety of dams and reservoirs (see further). In the wake of DSP, the Bandung Research Center for Water Resources (RCWR) prepared the Indonesia Earthquake Hazard Map for dams and recently undertook a structural safety review of all large dams on Java using the Anderson Risk Index method¹⁶. This method provides a fairly rigorous and replicable quantification of the risk level, though it is not generally applied by dam operation or regulatory agencies--such as HydroQuebec, US Army Corps of Engineers, US FEMA, US FERC, etc.--which tend to prefer methodologies that they have developed to fit the specific characteristics of their respective portfolio of dams. The Indonesia Committee for Large Dams (INACOLD) was also established to certify dam expertise of engineers.

17. Component 3 (Reservoir Sedimentation Management) will assist GOI in managing the ‘demand side’ of storage by prolonging the life of those reservoirs where sedimentation management strategies will be found feasible. Longer reservoir lives permit to offset the construction of new storage in the future.

18. While DSP was successful in establishing dam safety institutions, constraints arose due to a lack of a longer-term programmatic vision, and the lingering effects of the financial crisis. In the wake of the fiscal and administrative decentralization in 2000-2003, MPW went through major restructuring and downsizing of which it is now recovering. Thus, several “second generation” issues remain to be addressed. These include the following:

- a) *Declining dam and reservoir performance.* The declining reservoir performance is caused by, notably, on-site factors including: (i) dam structure ageing and damage that severely limits the use of the reservoir and increases the probability of hazardous structural failure; (ii) deficient or inoperable electromechanical systems that decreases performance and increases spillway operational failure risks; (iii) defective or inadequate instrumentation for hydrology and dam structure safety monitoring; and (iv) outdated and deficient reservoir operation practices, rules and procedures. Capacity for the satisfactory O&M and dam management is weak and declining further due to staff attrition. DSP improved and updated several Operations Manuals and Procedures, this task was not completed.
- b) *Declining economic life of reservoirs due to sedimentation.* Reservoir sedimentation is increasing due to watershed degradation. Sedimentation is caused by off-site erosion in the upper watershed resulting from (a) debris and wastage caused by natural processes (as much of the territory lies in volcanic or seismic zones or in mountainous areas with unstable slopes and deep lateritic soils), (b) inappropriate slope and wall cuts, e.g., for roads, and (c) inappropriate cultivation on deforested bare slopes, and poor agro-forestry techniques. As a result some dams are prematurely nearing the end of their economic life, and others have lost

¹⁶ Andersen, Glen R., L. Chouinard and S. Foltz "Condition Rating Procedures for Earth and Rockfill Embankment Dams"; Technical Report REMR-OM-25, Repair, Evaluation, Maintenance, and Rehabilitation Research Program, US Army Corps of Engineers, September 1999. .

a large portion of their reservoir and flood-routing capacity and could become a safety hazard. A few dams may have to be decommissioned. Decommissioning of dams could damage local economic interests, and pose public safety and environmental risks if their decommissioning is not properly regulated. DGWR does not yet know how many of its large dams suffer from severe sedimentation. A national reservoir sedimentation survey and a long-term reservoir catchment management program have now become recognized priorities. Reservoir catchment treatment was facilitated in 2005 by Presidential establishment of the National Movement to Protect Water (GNKPA) that led to a MPW task force with the Ministries of Forestry and Environment to start addressing catchment protection.

- c) *Weakness in national capacity in dam management and regulation.* Up to 2002, INACOLD had certified 14 engineers as dam experts. However, many experienced DGWR and consulting firm staff have since retired. The CDMU was amalgamated with the DSU in the 2005 reorganization of DGWR because of the overall dearth of experienced staff. The DSU's capacity will need to be strengthened to cope with its regulatory role. Due to its staffing limitations a better prioritization is necessary of its activities to allow it to focus on inspections of reservoirs and dams with a high Hazard¹⁷ Rating.
- d) Many staff of the DGWR and of the Provincial Public Works Service (Dinas PU) were redeployed in 2006 to create national-government basin management agencies (*Balai Wilayah Sungai* – Balai WS) that cover about two-thirds of the nation's river basins. These agencies are generally technically competent and will have to assume a key role in dam O&M and rehabilitation. They will need to agree on a role-sharing with the existing Provincial Basin Water Resources Management Units (*Balai PSDA*) that will keep monitoring dams, reservoirs as well as upper catchments, and that also will likely retain less complicated functions in O&M of selected dam sites. Thus, the institutional capacity of these agencies will need to be strengthened with respect to design and construction, O&M and Quality Assurance of design and works.
- e) *Weak O&M funding.* Inadequate budgeting for O&M of MPW-owned dams remains a problem with consequent deferred maintenance and growing premature rehabilitation costs. Dam O&M budgets have been growing markedly in recent years¹⁸, however, they have remained about 65% below nominal requirements based on dam "Mean Equivalent Asset Value". There is no coherent system in DGWR for ensuring the fiscal sustainability of dam O&M. The introduction of dam portfolio risk assessment would allow to better determine priorities for O&M funding and investments.

¹⁷ Hazard is a term used for the potential of harm to occur. In common terminology it is used for both the probability of an event (earthquake, flood, tornado) and for the potential harm arising from a failing facility or structure.

¹⁸ The annual "routine/administration" and "operations" budgets for the DSU amount to US\$70,000 and \$600,000 respectively, on average, since 2003 (the DSU did not exist before the DSP). The national and the provincial governments now spend larger budgets on O&M activities for dams and reservoirs of approximately US\$4-5 million per year (incl. for "routine/administration"). Though inadequate to address the sizeable rehabilitation and improvement needs, these budgets show a growing trend, and have trebled since 2000.

- f) *Emergency procedures require extension.* Under DSP Emergency Action Plans (EAPs) for dam-break events of 20 high-hazard dams were prepared. Yet, these Plans were not yet tested in the absence of proper consultation and dissemination facilities, for fear that the public would be left with the assumption that these dams were unsafe. No EAPs have been prepared for the more likely event of sudden high spillway discharge. Warning systems and spillway emergency operating procedures hardly exist. In addition, as hydrological data in many cases are relatively poor, the calculation of flood inflow risks needs to be improved. In general, a public awareness program of the DSC is needed to improve the public's understanding of the role of dams, their security and of the potential hazards.
- g) *Mine tailings dams.* The DSU is increasingly faced with the public safety and environmental hazards posed by mine tailings facilities. DOISP will not address safety of mine tailings facilities, however, in the context of the establishment of the safety institutions and the certification for public dams, many mine owners are requesting DSU inspections in order to meet the safety regulations. The capacity of the DSU to deal with the specific technical problems and with this additional task has not yet been developed.

19. A generic challenge in Public Works is the erosion of professional expertise which was triggered by the financial crisis, and the ensuing reform in the public administration with its zero-growth policy. The cadre of DGWR was reduced between 2001 and 2004 from 28,000 to about 2,800. This constrains the intentions to develop expertise of technical, managerial and institutional nature, and introduce more multi-disciplinary teams for dam and reservoir management. Part of this reduction was offset by the expansion of mandate, budget and staff resources at the level of the provincial and kabupaten administrations. Over the past 6 years the provinces have established River Water Resources Management Units (Balai PSDA) of which about 50 are now active, albeit with varying levels of competence. The provinces have steadily increased their contribution to the overall budget for O&M of the water infrastructure. Nonetheless, the national budget still accounts for over 80% of the actual expenditures for O&M of these structures. Currently, many of the dams and reservoirs on Java are basically operated and maintained by the Balai PSDA, whilst the heavier expense of rehabilitation and major repairs is borne by the national government through the sectoral budget of MPW, which then carries out the works through its Balai (Besar) WS (River Agency) which are located in the province and through delegated budgets (*Tugas Perbantuan*) by the Balai PSDA. Even though national budgets are again increasing fast, a serious time lag exists in rebuilding the agencies' competences. Due to attrition the number of water professionals across the public administration in national and local governments will further decline until about 2012 after which a new generation of professionals will be taking over. Thus, achieving a situation with adequate staffing is feasible only in a mid-term frame, under the successor project to DOISP.

20. The dam and reservoir portfolio in Indonesia will grow in strategic importance. The physical assets are in urgent need of rehabilitation and improvement. Over the past decade GOI has gone a long way in setting up the institutional framework to manage this portfolio, however, the capacity in general needs to be further strengthened, the institutions improved to ensure sustainability, and a longer-term systematic investment program initiated to improve the operational performance and the safety of the infrastructure. The government aims to develop towards a "portfolio" approach, rather than one based on individual projects. The new regulatory framework is outlined in section 3 below, and the portfolio approach is defined in section 4.

3. The Regulatory Framework and the Draft Government Regulation on Dams

21. DSP supported the Government with establishing the first basic institutional structure for dam safety and a first set of operational manuals (see below). However, no appropriate regulatory framework existed thus far. Prior to issue of the Water Resources Law 7/2004, Indonesian dams were only regulated by a MPW Decree establishing the DSC in 1993 and MPW Ministerial Regulation (*Permen*) No. 72/PRT/1997 “Regarding Dam Safety”. This *Permen* is applicable to all Dam Owners (government, power corporations, and private sector) and sets out the institutional framework for the DSC including establishment of a DSU to serve as its implementation unit. It however does not set out specific requirements for general dam development and management, dam surveillance, inspection and reporting that would be required of a National Dam Safety Assurance Program, nor for enforcement. Mine tailings and effluent storage structures are only implicitly covered by its provisions, while construction, operation, management and decommissioning of dams, and conservation of reservoirs are not mentioned. *Permen* 72/PRT/97 reflect the traditional “technical” and top-down approach of GOI, and has no provision for public consultation and participation, or social and environmental sustainability.

22. Although no specific requirement for a Government Regulation (PP) on dams and reservoirs was included in the Water Law, MPW decided to prepare a modern and innovative PP regulating dams and reservoirs in general that reflects the overarching policy concepts of the law. This PP is being prepared by a drafting committee with members from DGWR, PLN, the private sector and INACOLD. It is now in a final stage of preparation. The draft PP contains the following sections and innovative features, which are considered of international standard.

- (a) *Dam Development.* This covers development planning, construction and initial filling of the dam reservoir with explicit provisions for effluent storage dams. The PP states that:
 - (a) planning must consider i.a. environmental supporting capacity, Basin Water Resources Management Plan and the basin area's Spatial Structure Plan;
 - (b) the Dam Development Plan shall be made through a public consultation in which relevant agencies and community elements are involved; and
 - (c) the Basin Water Resources Management Plan of its river basin. All development stages are regulated subject to Licenses issued by the Minister upon recommendation from the DSC. These are: (a) feasibility study is needed to obtain a “Development Principle License”; (b) construction of the design must have a “Construction Implementation License” with land acquisition involving resettlement requiring a Land Acquisition & Resettlement Study (with suitable compensation in cash and/or replacement land) and, provision for rescue of historic sites and relocation of endangered species; and (c) during construction, the Developer must submit an Initial Reservoir Filling Plan, a Dam Management Plan (DMP), a Management Unit Establishment Plan (MUEP) and an Emergency Plan (EP) in order to receive an Initial Reservoir Filling License.
- (b) The DMP has to contain guidelines and procedures for dam and reservoir O&M, spillway discharge operating procedure cognizant of downstream (d/s) river capacity, prevention of flooding and safety of the d/s population. The DMP has to be prepared after a

consultation of agencies and d/s stakeholders and shall be consulted with the appropriate Water Resources Management Council of the river basin. The DMUEP shall contain i.a. needs for human resources, job descriptions and funding sources; the EP must be prepared with the communities affected by the potential risks of the dam inclusive of dam safety measures and community and environmental rescue/relief in case of an emergency.

- (c) *Dam Management.* Dam and reservoir management is intended to ensure sustainable functions and benefits of the dam and reservoir and dam safety. Thus the DMP, DMUEP and EP provisions for Dam Development will also apply to existing dams. Provisions include management planning, O&M, water resources management (inclusive of the reservoir ‘greenbelt’), protection & preservation, effective water use and dam decommissioning. The PP requires that the Dam Management Unit Head must hold a certificate in dam expertise issued by an institution authorized by law (e.g. INACOLD). Furthermore, aside of requiring adequate O&M funding by the Dam Owner and proper dam monitoring instrumentation and surveillance, reservoir sedimentation has to be monitored and reservoir volume has to be surveyed at least once every 5 years along with a review of dam O&M procedures and “Operating Rules”.
- (d) *Reservoir Water Conservation.* This section provides for reservoir protection and preservation, and water quality management and control of water pollution. Reservoir protection and preservation shall be implemented by establishing and managing water source, vegetative and or civil engineering protection areas through adopting an approach sensitive to local communities’ social, economic and cultural conditions. Its activities include: (a) ensuring sustainable water absorption and catchment areas; (b) building erosion and sedimentation control structures; (c) monitoring and control of land use in accordance with reservoir use zones and the spatial structure/regional plan; (d) controlling the effective use of land in upstream areas; (e) establishing reservoir lines of demarcation and purposes of reservoir demarcation areas and regulating their spatial use (including the reservoir greenbelt, interference from nearby activities and allowance for local social, cultural and economic conditions); (g) supervising the use of land in the reservoir catchment areas; (h) raising awareness, participation, and empowerment of interested parties in preserving reservoirs and environment; (i) controlling water weeds; (j) monitoring and reporting the quantity and quality of reservoir water in relation to water utilization and environmental sanitation; and (k) monitoring water quality, prevention of pollutant entry and managing water pollution in the reservoir (e.g. from cage fisheries).
- (e) *Control of Water Destructive Power.* This shall be exercised through regulating the opening and closing of the dam gates in discharging water in order to prevent the water flow from exceeding the downstream capacity and thus avoiding environmental destruction, pollution the prevention of d/s flooding.
- (f) *Dam Decommissioning.* The Owner must decommission a dam if it is of no more of benefit (e.g. silted up) and/or, has risks of dam failure that endangers the safety of the public. A Trust Fund has to be established to ensure proper O&M of the decommissioned structure.

- (g) *Dam Safety.* A dam structure can be only altered or rehabilitated to improve its function or improve its safety after Ministerial approval of the relevant design. Dam safety scope includes dam planning, construction, O&M, alteration, rehabilitation and decommissioning. Safety evaluation of these aspects from dam development to management has lead to a ministerial approval and license. Emergency measures have to be taken in accordance with the Emergency Plan. Monitoring, examination, evaluation and inspection of dams is intended for early determination of problems or signs of dam failure and the dam safety status of the dam. Revised provisions are given for the organization of DSC and DSU. An Independent Specialist Panel appointed by the Dam Owner and approved by the DSC is required for detailed technical considerations, particularly for dams higher than 45 m. Dam failures have to be promptly investigated by an independent review panel and clear provision for allocation of failure responsibility is given. Dam safety, the DSC, DSU and Independent Panels are to be further regulated by separate Ministerial Regulations.
- (h) *Public Roles.* The public have the equal opportunity to participate in the process of the development and management of dams and reservoirs and is intended to create: (a) equal position among all interested parties; (b) transparency in the process of the development and management of dams and reservoirs; and (c) sense of belonging and sense of responsibility for sustainable function of dams and reservoirs. Public participation may take the form of: (i) providing input and suggestions for the development and management of dams and reservoirs; (ii) participating in public empowerment programs; (iii) attending public consultations, through consultation and socialization; (iv) utilizing the public's right to access information on plans for development, management and decommissioning of dams and reservoirs; (v) raising reasoned objections to a dam and reservoir development, management plans announced; (vi) receiving reasonable compensation for the losses suffered as a result of the development and management of dams and reservoirs; (vii) submit reports and complaints to the authorities for any losses they suffer in relation to the development and management of dams and reservoirs; (viii) file a representative lawsuit to the court over dam and reservoir issues that adversely affect their lives.
- (i) *Other Provisions.* These include: (a) clear provisions for improved documentation and information; (b) supervision over dam and reservoir development and management to ensure compliance of dam and reservoir development and management; and (c) administrative sanctions.
23. Seventeen implementation and Guideline *Permen* are to be drafted and issued, with priority for those relating to Dam Safety, Emergency Plans, the DSC and DSU. Other important *Permen* will cover the Planning, the Licensing and Certification for dam development and management, Decommissioning, and O&M Guidelines.
24. All the provisions of the PP and the key implementation *Permen* (with respect to existing dams) have been included in the design of DOISP and in its PIP, and are to be fully implemented

over the APL Program Period of about 8 years. *The Bank Team has assessed the current draft of the PP as reflecting best international practice and of strategic relevance to the country.*

4. Dam Portfolio Management

25. DGWR is responsible for over 113 large dams that are “referable” in the sense of being subject to all the dam safety regulation and management provisions of the existing *Permen* and the forthcoming PP. In addition, it operates about 130 smaller irrigation dams lower than 15 m. All DGWR dams are earthen embankment dams with a concrete or masonry spillway, many of them over 30-40 years old. Embankment dams are complex structures requiring good structural maintenance standards and monitoring of the structural condition by specialized instrumentation. Thus, this large inventory of structures, or “portfolio”, makes large demands on the planning capacity, on trained and experienced staff, as well as recurrent O&M and periodic repair budget resources. Because the numbers of qualified staff have been dwindling rapidly while O&M budgeting has been hitherto neglected, most dams are in poor condition because of deferred maintenance of spillway structures and dam outlet works, settlement of the dam crest, erosion of the embankment’s surface protection, and seepage through the embankment and its foundation. No dam designs and their operational rules have been modernized to adjust for the changing conditions in the upstream areas (catchment), to the hydrological circumstance, or in the downstream areas that exert a changing demand and that would be vulnerable to spillway discharges or break. Yet, especially Java has witnessed rapid economic and demographic developments, which impose henceforth a regular re-assessment of the performance of the existing structure and of the operational rules. In addition, the dam monitoring instrumentation is not well maintained nor frequently read. Their data are often not well processed to determine new safety hazard that may be developing within the embankment and foundation due to piping and small earth tremors. The risks of dam overtopping and spillway failure are exacerbated by sedimentation in the reservoir which not only reduces water supply reliability but progressively reduces the reservoir’s capacity to buffer flood inflows, which would lead to higher spillway discharges well below the Design Flood Inflow. This situation poses an increasing safety hazard.

26. In recognition of this weakness in the policy and institutional setting, MPW will embark on a reform that would, over time, introduce a more programmatic, “portfolio” management of the assets. This portfolio management approach entails notably the following:

- (a) Manuals, Standard Operation Procedures (SOPs) and administrative procedures (and concomitant staffing and budget resources) to plan and budget for maintenance, upgrading and modernization of dams and reservoir and appurtenant structures (for safety and for operation purposes) in a prioritized manner guided by objective and verifiable criteria on safety and cost-benefit assessments, on a 7-10 year basis. In the aftermath of DSP, the RCWR has developed a solid procedure and exhaustive reports on a first batch of dams, including extensive seismic maps and seismic risk assessment. However, this valuable work is conducted at the level of the research institute and is still to be embedded in routine SOPs capable of informing DGWR’s planning processes. This inspection procedure would include frequent reading and processing of dam structure monitoring instrumentation to determine at an early stage whether an unsafe condition is developing within the embankment (piping failure conditions can develop rapidly). The overarching goals would be to minimize the overall risk and hazard posed by the

country's dams in a cost-effective way, and minimize the hazard in individual locations. Such plans would need to be made as a rolling, multi-year plan, with a time horizon of about 10 years, and each year being updated based on new information acquired from the inspection and assessment.

- (b) This planning process will also integrate the opportunities to optimize, or increase the performance (in terms of capacity to deliver bulk water supply and mitigate floods) of the dams and reservoirs, and enhance their sustainability and economic lifetime. An important aspect of sustainability and economic lifetime (which is determined by the structural integrity of the retaining structure and the influx and accumulation of sediment) is the management of the sediment, by providing flushing mechanisms, dredging, and activities upstream in the catchment rivers and vulnerable slopes to stem the erosion.
- (c) The programmatic nature of the portfolio management will include, for the first time, the upstream, downstream and hydrological aspects. The upstream (catchment) management is now recognized as an important factor as the land use changes strongly affect the hydrograph and river discharge characteristics entering the reservoir. For example, as rainfall patterns change, this integrated analysis will allow DGWR to decide whether it is more cost-effective to adjust (increase) the discharge gate and spillway sizes, than to invest in interventions in the upstream catchment (small retaining reservoirs, etc.). Although catchment and land management are not under the authority of MPW, MPW may decide to engage in cooperative partnerships with local governments and other Ministries, such as under the GNKPA (National Movement for Watershed Conservation) with the Ministries of Forestry, Environment and Agriculture. The downstream aspects refer to the rapidly changing land uses and settlements downstream, and the construction of private and public assets (roads and bridges) in the floodways. Whereas until now the hazard mitigation of spillway operation and dam break is following a strictly technical approach, the programmatic approach would include the opportunities for risk and hazard reduction in the overall cost-benefit and priority analysis of the dams proper. Finally, as the hydrological circumstances in Indonesia are subject to cyclical and other changes, they will need to be managed in an integrated, cost-effective manner, through interventions at the dam site of reservoir, and/or in the upstream and downstream areas.
- (d) A practical risk indexing tool for prioritization of maintenance, repair and evaluation tasks for the dam inventory will be introduced and become the SOP. Such risk assessment and portfolio management tools are now being developed and used by all major dam agencies in the USA, Canada and Australia and increasingly in Europe.
- (e) The development and application of a rational method to calculate the minimum financing needs for the O&M of dams. This approach has met with success in the irrigation sector, where the presence of such methodology has encouraged the national and the local-government Councils to allocate growing budget. It also has facilitated the identification of other sources of income such as user fees. The development and socialization is a lengthy process. The format of the methodology would be in the form of a Ministerial Decree of MPW.

- (f) The institutional reform involved to develop a working portfolio-based administrative structure is substantial, however, it is not politically very sensitive, it is within the institutional capacity of DGWR, and is assessed to be implementable in an eight-year period.

5. Portfolio improvement and Risk assessment under DOISP and the successor project

27. DGWR has reviewed the status and risk score of its portfolio based on available records and existing studies and designs such as the RCWR studies, the earlier DSP assessments, reviews with the Dam Operators, and the study by the Project Preparation TA. A short-list was determined of 63 dam/ reservoir sites that have the highest urgency for repairs, rehabilitation, upgrading and/or replacement. From this short-list, 34 sites (“sub-projects”) are selected for funding under DOISP, based on criteria of urgency, readiness and complexity (see Annex 4). Tables A4-3, A4-4, A4-5 and A4-6 list the sub-projects selected for implementation under DOISP. Table A4-7 lists the sub-projects earmarked for implementation under the successor project; this list is tentative and subject to preparation and appraisal of the DOISP successor project. The PIP provides detailed tables describing the portfolio providing all further relevant technical characteristics of the status of each short-listed dam, and the details of the interventions deemed necessary (e.g. investigations, dam safety provisions, foundation improvements, spillway and embankment improvements, riprap improvements, electromechanical works, sediment removal, etc.).

28. The prioritization on risk within the site short-list portfolio was based on a risk scoring using a modified ICOLD Condition Rating Method¹⁹ for the current pre-Project hazard condition and an estimated post-Project condition upon completion of each site’s remedial works. This scoring allows to prioritize the sub-projects (works and activities per dam/ reservoir site) over DOISP and DOISP 2 based on the level of urgency. It also allows to assess the differential between the “before” and “after project” safety condition. It is to be noted that this Risk scale is not linear and that the Risk cannot be reduced to zero, as part of the Risk is static, i.e., is derived from the value of the assets and the number of people at risk downstream. The risk reduction that would be achieved by the project is substantial nonetheless, and amounts to about 20-60% on the Risk Score, depending on the dam site. Fourteen high-urgency sub-projects that are complex and require extensive preparatory SID, would be subject of a phase A under DOISP, and a follow-up phase B under the successor project, viz., Krisak, Juanda (Jatiluhur), Watas Lindang, Malahayu, Cacaban, Wonorejo, Wlingi, Tempuran, Simo, Plumbon, Kedung Uling, Merancang, Salomekko and Sanggeh (see Tables A4-3 through 7).

29. Across the portfolio of dams, DOISP aims to progressively reduce the Portfolio Risk Profile (PRP) to socially tolerable levels. The PRP is shown in Figure A1-1. Fig. A1-1 also shows the “before” and “after project” score for DOISP. Fig. A1-2 shows the (tentative) risk score differential over the successor project, including for the follow-up phase B for the dam/ reservoir sites that had been subject a first phase A in DOISP. The PRP will be progressively updated during the implementation of DOISP and used as the key result indicator for project monitoring purposes. DOISP and the overall program aim to reduce the risk score by 30% on

¹⁹ ICOLD Bulletin 72, p.41, 1988.

average through the project interventions, so that, after the project no dams will have an Extreme Risk qualification for the safety risk, and at least 95% of the dams will have a Moderate Risk score, which is considered socially tolerable from a safety and cost-effectiveness perspective. The economic returns cannot yet be calculated with accuracy because detailed quantitative information is lacking on downstream economic activities and on the activities that depend on a reliable bulk water supply. Also, it is precarious to assign an economic value to life. Comparing DOISP with similar life-protection investments in other sectors reveals an attractive level of investment (Annex 9). The Economic Analysis (Annex 9) suggests that the returns on the project investment will substantially exceed 12%.

Fig. A1-1. Risk score for DOISP + its successor project. Short-list of dam/ reservoir sites, and the risk score differentials before and after the DOISP Project. The 34 first dam/ reservoir sites (on the graph's left) are the DOISP sub-projects.
 (The ICOLD “risk score” reflects both probability of failure, and lives and assets at risk.)

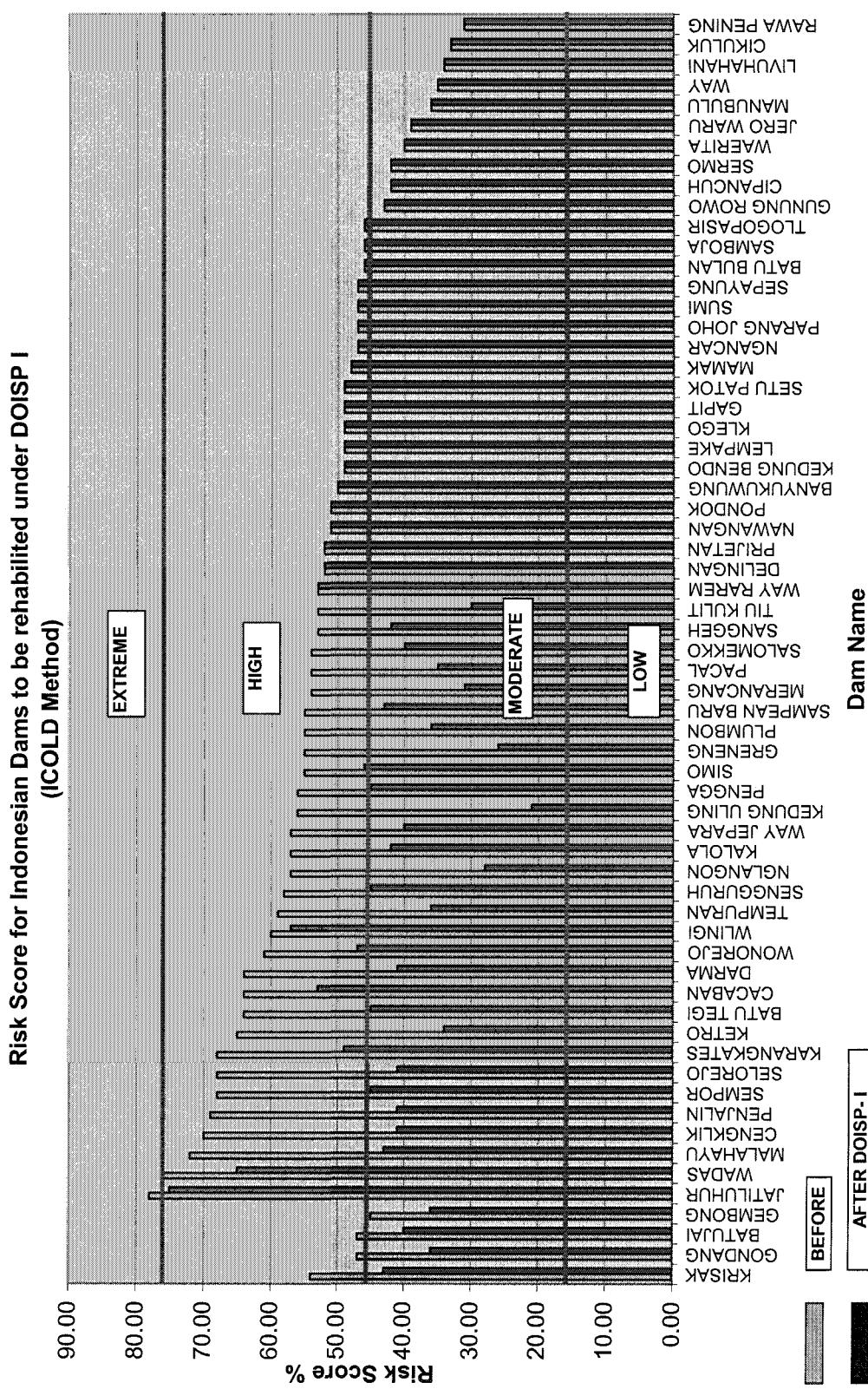
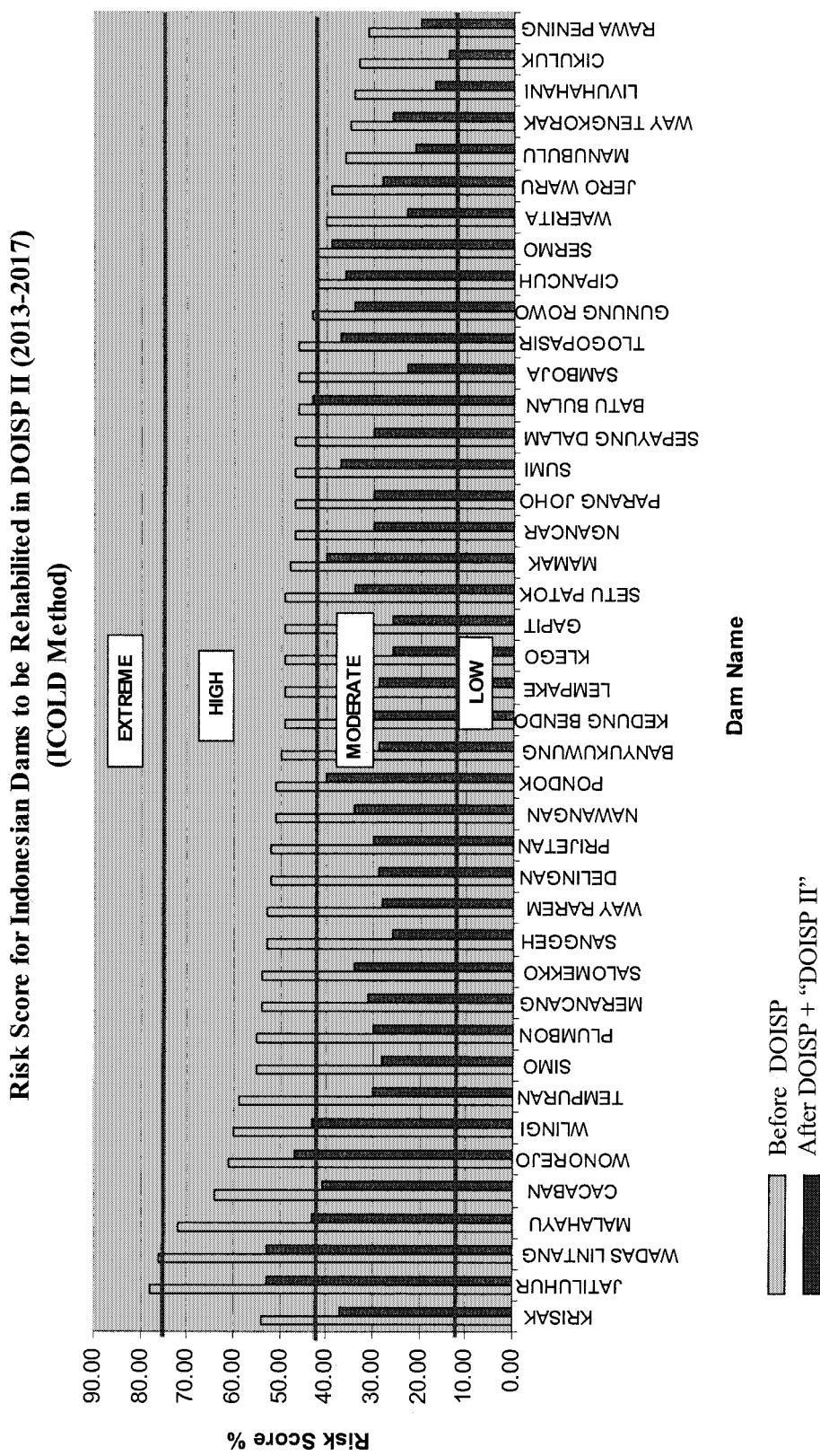


Fig. A1-2. Risk score differentials (tentative) before and after the DOISP Successor Project (“DOISP II”), comprising 29 new sites and 14 follow-up “phase B” of sites that had been subject of a “phase A” under DOISP.
 (The ICOLD “risk score” reflects both probability of failure, and lives and assets at risk.)



Annex 2: Major Related Projects Financed by the Bank and/or other Agencies

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

	No.	Years	Title	ISR/ICR	Loan size (US\$ M)
1.	IBRD 4711 IDA 3807 TF 052124	2005 -	Water Resources and Irrigation Sector Management Project (WISMP)	IP: Satisfactory DO: Satisfactory	84.00
2.	World Bank administrated TF 055997	2005 -	Nusa Tenggara Barat – Water Resources Management Project (NTB-WRMP)	IP: Mod. Satisfactory DO: Mod. Satisfactory	10.00
3.	World Bank administrated TF 027755	2002 - 2005	Indonesia Water Resources and Irrigation Reform Implementation Project (IWIRIP)	Satisfactory	12.50
4	CPL-37420 SCL-3742A SCPD-3742S	1994 - 2003	Dam Safety Project (DSP)	PPAR: Outcome: Mod. Unsatisfact.	35.2
4.	JBIC IP.495	Active	Medan Flood Control (MFC)		81.33
5.	JBIC IP.510	Active	Water Resources Existing Facilities Rehab		123.26
6.	JBIC IP.509	Active	Decentralization Irrigation System Management Project		226.75
7.	JBIC IP.475	Active	Bali Beach Conservation (BBC)		79.73
8.	JBIC IP.534	Active	Integrated Water Resources & Flood Management Project for Semarang City		98.23
9.	JBIC IP.523	Active	Komering Irrigation Project Stage II Phase II (KIP)	-	115.66
10.	JBIC IP.504	Active	Batanghari Irrigation Project		57.28
11.	JBIC IP.505	Active	Project Type Sector Loan for Water Resources II		156.64
12.	JBIC IP.524	Active	Urgent Disaster Reduction for Mt. Merapi/Progo		137.85
			Urgent Disaster Reduction for Mt. Bawakaraeng		
13.	JBIC IP.522	Active	Lower Solo River Improvement Project (LSRIP)		78.38
14.	JBIC IP.546	Active	Participatory Irrigation Rehabilitation & Improvement Management Project		103.25
15.	JBIC IP.547	Active	Decentralization Irrigation System Management Project 2		75.21
16.	ADB 2064-INO	Active	Participatory Irrigation Sector Project (PISP)		88.00
17.	Chinese Exim Bank	Active	Jati Gede Dam (West Java)		215.62

Annex 3: Results Framework and Monitoring
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

Table A3-1. Results Framework

PDO	Project Outcome Indicators	Use of Project Outcome Information
(i) Increase the safety and the functionality with respect to bulk water supply of large MPW-owned reservoirs; and	<p>(i) (a) Reduction in dam failure risk of about 34 rehabilitated dams using an appropriate Risk Assessment Method & achieving operational Spillway Emergency Operation Plans for these dams. ‘Extreme’ Hazard dams reduced from 3% to 0%; ‘High’ Hazard dams reduce from 81 to <5%; ‘Moderate’ Hazard dams increased from 0% to >95%. Overall Hazard of the 34 dams reduced by > 30% on Risk Score.</p> <p>(b) DGWR Dam Portfolio management <i>improved</i> by established: Annual Dam O&M Funding Program, Dam HR Development Program, Dam Hydrology Program, Dam QA system and a functional CDMU. (c) DSU has completed > 75% of its priority dam inspection & certification load (including 2-3 large mine tailings dams).</p> <p>(ii) (a) Government Regulation on Dams and Ministerial Decrees issued.</p> <p>(b) Administrative procedures and capacity enhanced.</p>	<p>YR1 – DSU completes priority national dam inspection DOISP Period implementation program (inclusive of DOISP “referable” remedial works cases).</p> <p>YR 2 end/MTR – Assessment of establishment of: (i) DGWR dam portfolio management and, development of Spillway Emergency Operation Plans and, (ii) efficacy of DSU regulatory activities.</p> <p>YR4/5 – Early ICR “Lessons Learned” applied to successor project PDO Design.</p> <p>Enables proper implementation and attainment of PDOs. Informs preparation of successor project.</p>
Intermediate Outcomes	Intermediate Outcome Indicators	Use of Intermediate Outcome Monitoring
Outcome (a) The functionality, safety and economic life of restored large MPW-owned dams is improved and sustainable, while <i>basic operational safety</i> of un-repaired dams has been kept at a manageable level during the Project.	Outcome (a) (i) Dam Portfolio Risk Assessment indicates that functionality of about 34 MPW-owned dams is restored, safety risks of at least 21 dams greatly reduced, and that the risks of 29 un-restored dams (under successor project) are still manageable; (ii) Spillway Emergency Operation Plans (SEOPs) publicly accepted and warning system communications functional for 34 dams. (iii) Economic Lifetime expectation increased by 5%. (iv) Bulk water supply capability restored for > 25 dams.	Outcome (a) YR2 end at MTR: Portfolio Risk Assessment of any completed Cat 1 (&2) Sub-Project works and implementation review indicates any need changes in works QA management. YR3- Some SEOPs tested and lessons applied for SEOP improvement. YR4/5 – Outcome used in Design of successor project.
Outcome (b) (i) DGWR aware of the level of	Outcome (b) (i) Reservoir Survey of 30 or more	Outcome (b) YR2-4/5: Mitigation designs and

<p>serious sedimentation of important large dams and can formulate a mitigation program to prolong economic life & ensure dam safety (inclusive of decommissioning planning if necessary).</p> <p>(ii) (Sub-)catchment management and improvement carried out reducing erosion, based on community participation</p>	<p>severely sediment-impacted large dams completed and structural and non-structural sedimentation mitigation program for these dams is ready for execution.</p> <p>(ii) At least 25% of the households in the pilot areas join and participate. Fifty percent of erosion-prone sites in and along rivers in the (sub-)catchment identified and improved.</p>	<p>plans begun as each reservoir survey is completed with final program formulated during YR 4/5.</p>
<p>Outcome (c) DSU adequately staffed as per its DOISP Priority Implementation Plan and, national consulting firms and contractors certified by INACOLD as eligible for dam design and works.</p>	<p>Outcome (c) Fifteen structural and/or functional certified DSU staff, and a total of 15 private engineering firms and contractors certified.</p>	<p>Outcome(c) YR2 end MTR: Capacity of DSU assessed and Staff Development Plan adjusted.</p>

Table A3.2. Arrangements for results monitoring.

		Target Values (by end of year)					Data Collection and Reporting		
Project Outcome Indicators	Baseline	YR2	YR3	YR4	YR5	Frequency and Reports	Data Collection Instruments	Responsibility for Data Collection	
1. Dam Portfolio Risk Assessments	RCWR/ PIP	4	10	20	22	As per schedule	-PRA done by field inspection of 63 dams -TA team & CPMU	-TA team & RCWR under CPMU -CPMU	
2. DGWR Dam Portfolio management programs established for 63 dams.	0	>6%	>22%	>54%	100%	TA/CPMU semi-annual reports			
3. DSU's DOISP referable dam works & national field inspections and certifications as per DSU Priority Plan	0	10%	25%	50%	>75%	TA/CPMU semi-annual reports	-TA team site visits & DSU reports	-DSU/CPMU	
Intermediate Outcome Indicators									
Component I 34 dams rehabilitated (of which 14 as Phase A, and to be continued with Phase B in successor project).	0	4	14	24	34	TA/CPMU semi-annual reports	- Site visits & completed Sub-project works handed over to Dam Operators (certified by DSU where applicable), & Sub-Project designs approved by Dam Safety Panel. - Site visits/ SEOPs approved by downstream communities and a Provincial (or lower) WR Council.	TA team/CPMU DSU Dam Safety Panel	
SEOPs for 34 dams.	0	0	10%	50%	>90%	TA/CPMU semi-annual reports		TA team/CPMU	
Component II O&M Manuals etc. for 34 dams / interim O&M procedures for 22 dams completed.	0/0	10%	30%	50%	>90%	Final and Interim O&M Manuals & Procedures	Site visits/ completed documents	TA team/CPMU	
SEOPs operational for 34 dams Staff training for 63 dams' MOUs between communities and dam operator for greenbelt mgmt	0	0	5% 30% 40%	50% 60% 60%	>90% 100% 80%	SEOP initiation reports Annual Training Reps TA/ CPMU semi-annual reports	Site visits/SEOP drills Course & site visits Site visits, documents	TA team/CPMU TA team/CPMU TA team/CPMU	
Component III Reservoir Survey for 30 DOISP dams Community participation in catchment management: No. of hh in (sub-)catchment joining activity	0	10%	30%	60%	100%	Reservoir Survey Reports TA/CPMU semi-annual reports	Reservoir Survey Reports Surveys and reports from village heads and <i>camat</i> s	TA team/CPMU TA team/CPMU	
Component IV DSU staff recruited & trained INACOLD certification of consulting firms & contractors	0	20%	40%	60%	100%	Annual DSU Report INACOLD Report	TA & CPMU monitoring INACOLD Report	CPMU TA team/CPMU	

Annex 4: Detailed Project Description
INDONESIA: Dam Operational Improvement and Safety Project 1 (DOISP)

Project Component Activities

1. The Project has five Components: (I) *Dam Operational Improvement and Safety Works and Studies*, (II). *Operations & Maintenance Improvement and Capacity Building*. (III). *Reservoir Sedimentation Mitigation*, (IV) *Dam Safety Improvement*, and (V) *Project Management*. The activities are described below.
2. More than half of the total base cost of the project will be allocated to works, equipment and related activities such as studies, designs and emergency plans, on the dam/ reservoir sites (“sub-projects”) and upstream river sites (Table A5-5). The project would have sizeable funding for “non-tangible outputs”, notably, the designs, studies and investigations (SID) for the DOISP and most of the sub-projects earmarked for the successor project; the participatory and community strengthening activities in the greenbelts and upper catchments; and the safety-related activities such as the reservoir sedimentation surveys, emergency spillway operation rules, emergency preparedness activities, training and the preparation of regulations and SOPs. The scope of these sub-projects is determined either based on existing surveys and (partial) designs, or on the outcomes of surveys and investigations that will be undertaken in DOISP. Some investigations may be short and straightforward but other may take more than one year and be technically complicated, such as determining the cause of excessive seepage or piping and preferable remedial works. A first review and pre-screening has allowed to assign a Risk Score to each sub-project prior to and after the rehabilitation based on a modified ICOLD method (Fig. A1-1). The sub-projects have also been assigned to one of four Categories reflecting their respective urgency for rehabilitation, complexity, and readiness for implementation, to allow the sequencing of the sub-projects along the two projects (Annex 4). DOISP will address approximately 34 sub-projects which rank highest on the urgency scale (they comprise the 34 sub-projects left on the risk score graph of Fig. A1-1). However, 14 of these sites have some complexity; a first “phase A” of works will be implemented under DOISP, but a more extensive second phase (“phase B”) will be part of the successor project based on deeper investigation and detail design under DOISP. This includes the large Juanda (Jatiluhur) and Wadas Lintang dams.
3. **Component 1. Dam Operational Improvement and Safety Works and Studies (Base cost US\$31.48 million).** This Component would restore dam performance and safety by providing for: (i) design and construction of *minor* rehabilitation and remedial works [sub-projects] to restore operational performance and/or safety (including spillway equipment repair and/or minor upgrading) of about 34 large dams; (ii) at Effectiveness, four sub-project will be ready for immediate implementation starting in Year 1 with finalization in Year 2, i.e., the Batujai (NTB), Gondang (East Java), Gembong (Central Java) and Krisak dams (Central Java); (iii) surveys, investigations and designs--including social and environmental management plans--for *medium to major* works [the “sub-projects”] to restore and/or improve operational performance and safety

for approximately 22 dams to be implemented in the successor project, including the second-phase additional works for approximately 14 dams/reservoirs that were subject of first improvement in DOISP; (iv) BDSF repair and/or upgrading to improve safety monitoring, and preparedness systems for spillway emergency discharge for about 34 dams, and interim BDSF repairs and emergency spillway discharge arrangements for approximately 22 dams scheduled for later major structural works in the successor project; (v) establishing a river inflow and sediment monitoring system to improve the operational hydrology for 63 dams, and review flood flow data, estimated flood discharge frequency, and PMF or “Flood Envelope Curves” related to catchment area; and (vi) assessment of spillway capacity and downstream flooding risks for approximately 34 dams (including surveys, models and feasibility studies regarding downstream effects to determine the viability of any spillway modification or operational change, to be undertaken in the successor project). The Quality Assurance of design and construction would be improved by using a peer review system of experts and through agency training in construction management and supervision.

4. Component 2. Operations & Maintenance Improvement and Capacity Building (Base cost US\$13.24 million). This Component would support improved O&M and the strengthening of the capacity of the dam agency through: (i) preparation of O&M plans, Standard Operation Procedures (including rule curves and reservoir water balance) and manuals, and undertaking needs-based budgeting and O&M activities for about 34 dams and reservoirs, and for approximately 29 dams to be rehabilitated under the successor project; (ii) preparing dam and reservoir management plans and emergency spillway operation plans for about 34 dams; (iii) O&M staff training for dam safety monitoring, maintenance and operations, (iv) conducting participatory programs on reservoir and dam management with local communities living near the reservoir, in 20 reservoirs; and (v) incremental operating costs for O&M of dams and reservoirs (borne by GOI). The Potential Failure Mode Assessment (PFMA) approach, developed by the US-FERC (Federal Energy Regulatory Commission), will be used to that effect. The method is described in chapter 14 of the FERC Dam Safety Guidelines (<http://www.ferc.gov/industries/hydropower/safety/guidelines/eng-guide/chap14.pdf>).

PFMA is aimed at identifying issues, and adopting measures to counteract them, following a process which involves dam operators. In addition to providing an effective way for the identification of needed safety measures, the PFMA approach represents a powerful training instrument which is designed to address the staff directly involved with day to day surveillance, and O&M of the dams. The PFMA method will be properly adapted to the case of Indonesia, and PFMA workshops will be held at all high hazard dams in the portfolio. Besides training, the process will produce outputs directly safety-related such as OMS Plans and Emergency Action Plans.

5. Component 3. Reservoir Sedimentation Mitigation (Base cost US\$13.12 million). The Component would provide for (i) bathymetric surveys using GPS and digital equipment to determine the available total storage and water level-area-volume relations of approximately 30 of the 63 reservoirs known to be affected by accelerated sedimentation; (ii) feasibility studies, designs and any necessary ESMF plans for “within-reservoir” activities and interventions to be taken in the medium-term (e.g., dredging,

hydro-suction, flushing, etc.) that can be funded in DOISP or the successor project; (iii) preparation for a sample study for decommissioning of a severely silted reservoir, to be financed under the successor project; and (iv) piloting of institutional models and plans for treatment of upstream rivers and (sub-)catchments with construction of sediment retaining and river bank protection structures, partly through community participation and incentive programs.

6. Component 4. Dam Safety Institutional Improvement (Base cost US\$2.14 million). The Component will support the further strengthening and consolidation of the regulatory framework (Government and Ministerial Regulations) and the national dam safety institution (with activities funded across DOISP and the successor project), by supporting: (i) the preparation of the Government and Ministerial regulatory documents, on safety, management procedures and financing, and Concept/ Academic Papers, including the consultations; (ii) a public awareness campaign about dams and reservoirs, and dissemination to all public and private dam owners of the regulations and guidelines regarding dams and reservoirs; (iii) strengthening and development of the DSU better fulfill its regulatory roles for all 63 dams under MPW's program, and of other public and mines tailings dams through staff recruitment and training (with outsourcing of work to consultants and RCWR); (iv) provision of a fully furnished and equipped DSU office capable of housing approximately 30 engineers; (v) preparation of new or updated DSC Guidelines; (vi) establishing and supporting a National Dam Safety Panel to review site investigations and designs; (vii) establishing a dam engineer and technician training and certification system in cooperation with INACOLD; and (viii) incremental costs of the structural CDMU in DGWR to operate as the focal point for dam safety monitoring, review and archiving.

7. The institutional activities aim at (i) strengthening the capacity of MPW to manage its dam portfolio better and regulate large dams in the country, and (ii) improving the sustainability of the rehabilitation works and the reservoir life. They include regulatory and institutional strengthening, improvements in: safety monitoring and surveillance, operation and maintenance improvements; emergency operation plans and preparedness; and the piloting of replicable community involvement in dam and reservoir protection and in upstream river and catchment improvement.

8. Component 5. Project Management (Base cost US\$4.36 million). This Component will provide for overall Project Management by supporting CPMU, CPIU, and each PIU including provision of: (i) the principal Project Management TA Consultant; (ii) the incremental operating costs of the Central Project Management Unit's (CPMU) and Project Implementation Units (PIUs) activities for coordinating all project interventions; and (iii) all TA support to prepare for the successor project.

Implementation Schedule for Sub-projects in DOISP

9. Table A4-1 outlines the criteria and considerations to determine the sequencing and scheduling of the sub-projects over DOISP and the successor project, and within DOISP. Table A4-2 lists the main activities by type and implementation schedule, in Year 1 of the DOISP project, during DOISP, and during the successor project.

10. The prioritization and sequencing of the sub-projects in DOISP and the successor project, respectively, are based on considerations regarding safety improvement needs, complexity, cost-effectiveness and readiness. The complexity criterion is important in this case, as the current capacity of DGWR is constrained, and as a modest agenda for DOISP would provide the right environment to train the staff and gradually develop stronger administrative procedures (see Annex 1, Sections 3-4). Tables A4-3 to 6 groups the DOISP sites into the implementation schedule by year based on the priority as defined in Table A4-1, and the urgency derived from the safety concerns.

Table A4-1. Criteria of implementation priority for DOISP + successor project Sub-projects

Category 1 Sub-projects	Category 2 Sub-projects	Category 3 Sub-projects	Category 4 Sub-projects
<i>Majority to be implemented during DOISP</i>	<i>Several to be implemented during DOISP</i>	<i>Prepared during DOISP; based on further assessment, a first Phase A of number of Cat. 3 sub-projects can be implemented in DOISP, with second Phase B in successor project</i>	<i>Prepared during DOISP; a small number of activities will be initiated on urgent sub-projects as Phase A; however, the Phase B in successor project would require extensive surveying, special design and safeguards assessments</i>
Sub-projects with relatively low safety priority.	Sub-projects with moderate safety urgency.	Sub-projects with moderate to serious risks involved requiring urgent attention.	Sub-projects with moderate to serious safety issues, of which parts require urgent attention.
Sub-projects for which the design and tender documents have already been prepared;	Sub-projects which require detailed site investigations, topographic survey, hydrological studies, evaluation, design and preparation of tender documents;	Sub-projects of a large scale requiring major studies and design inputs to improve dam safety before rehabilitation and modifications can be implemented;	Sub-projects of a large scale requiring major surveys, investigations and design studies to improve performance or diversification of water utilization before rehabilitation and modifications;
Sub-projects for which repairs and rehabilitation works can be implemented with only minor design work;	Sub-projects which require consultation with stakeholders.	Sub-projects which may require land acquisition or resettlement and approval by local government authorities; and Sub-projects which involve community	Sub-projects which have social or environmental impacts requiring detailed EIS ²⁰ ; and

²⁰ EIS: Environmental impact statement, AMDAL in Indonesian (analisa mengenai dampak lingkungan).

		participation.	
Sub-projects requiring emergency repair works to prevent major deterioration or imminent failure;			Sub-projects which might attract other sources of funding and require negotiations with other Government organizations such as Fisheries, Tourism and PLN.
Sub-projects which can be completed by local contractors as LCB contracts under minimum supervision.			

Table A4-2. Sequencing of Preparation and Implementation of Sub-projects and Activities
 (“implement” means that most of the activity is carried out in that year)

Comp.	Activity/ Sub-project	In DOISP Year 1	In DOISP Years 2-5	In successor project	Total
1	DOISP Sub-Projects	4 implemented	30	N/A	34
	(Of which as a Phase A)	(1 implemented)	(13)	N/A	
1	Successor Sub-projects	N/A	N/A	29	29
	DOISP Sub-projects continued as Phase B	N/A	N/A	14	14
1	Special Design Studies DOISP		22	N/A	22
1	Special Design Studies Successor Project	Nil	Nil	17	17
1	O&M SOPs, manuals	Nil	34	29	63
1	Emergency SOPs, EAPs	Nil	34	29	63
2	Greenbelt commun. participation activity	Preparation	Implement 20	Implement 20	40
3	Upstream river/ sub-catchment activity	Preparation	Implement 4	Implement 5	9
3	Bathymetric survey	Preparations	Implement 30	Implement 20	50
5	Recruitment of Technical services and TA	<ul style="list-style-type: none"> • Recruit individual consultants • Recruit 2 TA Teams for DOISP 	<ul style="list-style-type: none"> • Recruit TA to prepare PIP Successor project • Recruit TA Team for Successor project 		

11. **Category 1 Sub-projects** (20 sites) are intended to be mostly implemented during DOISP. They are generally projects which involve only minor design work, no investigations, and for which tender documents have been prepared during the previous DSP or by the dam owner but that have not been implemented due to lack of funding. They may also include projects which should immediately be implemented because a

delay may cause a rapid deterioration of dam safety conditions or functionality of the dam. The scope of work for the emergency or remedial works for these Sub-projects should be carried out by local contractors as local competitive bidding (LCB) contracts under the supervision of local authorities such as Balai Besar Wilayah Sungai and only minimum guidance and monitoring by the TA consultant.

12. **Category 2 Sub-projects** (18 sites) are projects which have been assessed as requiring operational and/or safety improvements but detailed site investigations and topographic surveys need to be carried out before the scope of rehabilitation works can be defined in sufficient detail to enable preparation of detail designs and tender documents for the various components of the projects. Many of these sub-projects can be carried out in DOISP but the less urgent will be delayed to the successor project. The evaluation of these sub-projects is expected to be undertaken as soon as project is initiated, followed by site investigations, design, tendering and construction during 2010 to 2013. Depending on the results of the investigations, a sub-project (such as Krisak) may require more time and can be split into a phase A under DOISP, and a phase B under the successor project. Currently, this is the case for 14 sub-projects. Category 2 sub-projects may also require consultations with stakeholders because the planned remedial or rehabilitation works may affect the population living in the upstream reservoir area or downstream of the dam site, e.g. the downstream population has to be consulted about Spillway Emergency Operation Plans/Procedures and Warning System. Periodic sediment sluicing to extend the useful life of the dam may be an activity affecting the population living downstream.

13. **Category 3 Sub-projects** (20 sites) require safety improvements similar to Category 2 projects but for which the original design may be modified to enhance not only safety of the dam but also the performance of the project. This may involve raising of the dam crest to increase water storage which would then be available for additional irrigation areas. Category 3 Sub-projects would require site investigations, stakeholder involvement, preparation of detail designs and tender documents and possibly the acquisition of land and the resolution of resettlement issues before tenders for construction can be called. During DOISP only site investigations, detail designs and contract preparation will be undertaken for Category 3 sites. Project implementation works will be undertaken under the successor project. However, if Category 3 sub-projects are found to be ready or particularly urgent they can be included in DOISP.

14. **Category 4 Sub-projects** (5 sites) would be more demanding projects of a larger scale and more complex nature. Diversification may involve increasing the dam height for additional storage which would then allow the reservoir to be used for recreational or other commercial purposes. A change in purpose would involve negotiations with other government authorities responsible for fisheries, tourism or power generation. These sub-projects would also comprise activities and works that pertain to improved spillway operation, or in the case of the Juanda/Jatiluhur reservoir, to replacement of the existing fixed spillway saddle dam with a gated structure. This sub-project would also entail more extensive downstream adjustments and works to allow proper spilling. Sources of funding the construction works and the use of revenue to maintain the dam, associated infrastructure and operating personnel will have to be considered. The change in water utilization could result in environmental and social changes which need to be addressed

in detailed environmental impact studies. Tender design, detail design and construction (of the bulk of the work on these sub-projects) are likely to involve international expertise to ensure that the modified project complies with international safety standards. During DOISP, primarily site investigations, detail designs and contract preparation will be undertaken for Category 4 Sub-projects; however, on the Jatiluhur and the Wadas Lintang also first activities of only localized nature will be initiated (Phase A). Nearly all project implementation works will be undertaken under the successor project. These sub-projects concern: Penjalin (Penjalin river, Central Java), Darma (Cisanggarung river, West Java), Juanda/ Jatiluhur (Citarum river, West Java), Wlingi (Brantas river, East Java), and Karangkates (Brantas river, East Java).

15. A first Phase A of 14 Category 3 and 4 sites will be included in DOISP to be followed by a Phase B under successor project, based on ample investigations. These will refer to works that are urgent but limited in scope and local impact and do not necessitate extensive technical designs and safeguard requirements. Similarly, several of the less-urgent Category 1 and 2 sub-projects will be started only in the successor project.

16. The four Sub-projects prepared for immediate start of implementation in Year 1 are the following: Batujai, Gondang, Gembong and Krisak. They are selected because of their lower complexity, and to limit the burden on the implementation capacity of the DGWR staff during the year of start-up. The detail description of the four sub-projects is provided in Table A4-8.

Selection of Sub-projects/ Activities in DOISP

17. The selection of the Activities and the programmatic sequencing thereof along the two successive projects are determined by a set of criteria, as follows.

18. First, the urgency was determined by the Risk Score. The Risk assessment is in itself a combination of various pertinent factors. It notably combines the Risk (as a quantitative probability or, due to the lack of reliable data, as a qualitative professional assessment based on visual inspection and survey²¹) with the probable extent of damage in the event of failure. The latter may also include considerations of damage in the case of emergency spillway operation. The Score is expressed as a non-dimensional index number that is non-linear and cannot reach zero, thus its interpretation needs to be approached with caution. The Score in Indonesia is assessed in the interim through the ICOLD method which is simplified but practical. The Score by itself needs further interpretation as it is an amalgamation of diverse considerations (such as dam age and status, and downstream population), and , therefore, prioritization within an asset portfolio may not necessarily imply that the Score of all sites in the portfolio should be reduced to the same level or by the same proportion. Finally, the Score does not reflect political considerations.

²¹ International practice differs. New Zealand and the US Army Corps of Engineers apply qualitative methods whereas Australia and USBR apply quantitative probabilities.

19. Second, the benefits and costs associated with reduction of Risk were assessed. The benefits and “socially acceptable cost” of hazard reduction should be based primarily on national policy with respect to life-protection initiatives. International experience suggests that implementation of a comprehensive dam safety program like DOISP can reduce the probability of failure by at least one order of magnitude from the existing conditions. The Armenia Dam Safety Program (two phases: 1999-2009) experience corroborated this guidance. It is not advisable that the risk be 'calculated', because any such attempt would fail in capturing essential elements of the program, or necessarily assign arbitrary parametric values to them. It is good practice to make an overall assessment of probability of failure reduction, and then carry out sensitivity analysis. In the case of DOISP, the most credible value for the post/ pre project probability of failure is 0.1, i.e. one order of magnitude reduction. The economic analyses (Annex 9) have also been carried out assuming ratios of 0.5 and 0.8. In judging the results, one should keep in mind that the primary objective of dam safety programs is protecting human lives, and preventing the huge multiplier effects that would be induced in various sectors of the economy by the catastrophic consequences of a major dam failure.

20. The third consideration concerns the cap on project expenditure. The National Planning Agency has set a ceiling for the amount the loan and the project budget. The Selection, sizing, prioritization and sequencing of the Activities have therefore been essential tasks in project preparation.

21. Fourth, the selection, sequencing and implementation of the Activities is further defined by the administrative capacity of, and the budgeting regulations for, the PIUs. For example, the works are mostly implemented by, or through the PIUs located in the Balai (Besar) WS which cover river basin territories in which the reservoirs are located, and the works/ Activities should be sequenced in such a way that the PIU can handle them. Similarly, larger and more complex Activities need to be reviewed by the DSU, and in some instances by the Dam Safety Panel, for quality control purposes. This process may also introduce additional absorption constraints.

22. **Sub-projects in DOISP.** Based on the above considerations, the Activities at the dam sites have been prioritized and a schedule has been made for the four and a half years of DOISP (mid-2009 - 2013), as outlined in Tables A4-7-10. Many of the works initiated in a particular year will require an implementation duration exceeding one year, thus spilling in the subsequent year. No new sub-projects are scheduled to be initiated in Year 5 (2013). Except for the Year 1, for which the detail designs and procurement documents were prepared prior to negotiations, this sequencing may be adjusted as the surveys and investigations during Sub-project preparation may reveal new information, or as external circumstances may facilitate or constrain the implementation of the Sub-project.

Table A4-3. Dam sites scheduled for initiation of repair/rehabilitation in Year 1 (2009)

No	Site Name*	River/ Basin	Province/ PIU	Risk Score (ICOLD)	Downstream Hazard Category **	Year Built	Height (m)	Reservoir Volume (1000m ³)
1	Krisak	Krisak Bengawan Solo	Central Java/ BBWS Solo	54	3	1943	20.00	3,717
2	Gondang	Jurug Gondang	East Java/ BBWS Solo	47	4	1986	22.00	25,900
3	Batujai	Panunjak	NTB/ BWS NT I	47	4	1982	16.00	23,500
4	Gembong	Juwono Sani	Central Java/ BBWS Pemali Juana	45	3	1993	38.00	9,500

NOTES:

* Fourteen sub-projects requiring a detailed preparatory investigation prior to the final design.

** Downstream Hazard Category as per Indonesian Dam Safety Commission rating (DSP).

*** Fourteen dams/ reservoirs whose remedial works cannot be completed under DOISP. For nine sites Phase A works under DOISP will involve relatively simple to medium rehabilitation and remedial works, as well as special design studies to determine the remedial solutions required. Phase B works will require further detailed investigation to address the more complex problems and will lead to more complex rehabilitation to be carried out under the successor project. For 5 dams, viz., Wonorejo, Tempuran, Merancang, Plumbon and Salomekko, the rehabilitation works on the upstream face of the dam will require studies for detail design as well as for reservoir lowering and initial filling certification. (The phase A costs are included in the cost tables).

Table A4-4. Dam sites scheduled for initiation of repair/rehabilitation in Year 2 (2010)

No	Site Name	River/ Basin	Province/ PIU	Risk Score (ICOLD)	Hazard Category **	Year Built	Height (m)	Reservoir Volume (1000m ³)
1	Jatiluhur* <i>(Phase A****)</i>	Citarum	West Java/ BBWS Citarum	78	5	1967	96.00	2,556,000
2	Wadaslintang <i>*</i> <i>(Phase A****)</i>	Serayu – Opak	Central Java/ BBWS Serayu Opak	76	4	1987	125	440,000
3	Malahayu* <i>(Phase A****)</i>	Kabuyutan	Central Java/ BBWS Cimanuk Cisanggarung	72	3	1940	30.00	39,880
4	Cengklik *	Suplesi Bendung Watu Leter	Central Java/ BBWS – Solo	70	3	1931	14.50	9,773
5	Penjalin*	Penjalin	Central Java/ BBWS Pemali Juana	69	5	1934	23.00	9,500
6	Karangkates*	Brantas	East Java/ BBWS Brantas	68	4	1973	96.00	343,000
7	Selorejo*	Konto Brantas	East Java/ BBWS	68	3	1970	46	62,300

No	Site Name	River/ Basin	Province/ PIU	Risk Score (ICOLD)	Hazard Category **	Year Built	Height (m)	Reservoir Volume (1000m ³)
			Brantas					
8	<i>Sempor</i>	Petahanan Sempor	Central Java/ BBWS Serayu Opak	68	4	1967	42.00	39,963
9	<i>Ketro*</i>	Ketro Bengawan Solo	Central Java/ BBWS Solo	65	5	1984	15	2,800
10	<i>Batutegi</i>	Way Sangharus Way Sekampung	Lampung/ BBWS Mesuji Sekampung	64	4	2001	120.00	500,000

Table A4-5 Dam sites scheduled for initiation of repair/rehabilitation in Year 3 (2011)

No	Site Name	River/ Basin	Province/ PIU	Risk Score (ICOLD)	Hazard Category **	Year Built	Height (m)	Reservoir Volume (1000m ³)
1	<i>Cacaban* (Phase A***)</i>	Cacaban	Central Java/ BBWS Pemali Juana	64	4	1958	36.00	90,000
2	<i>Darma</i>	Cisanggarung	West Java/ BBWS Cimanuk Cisanggarung	64	4	1962	36.00	37,900
3	<i>Wonorejo* (Phase A***)</i>	Wangi Gondang	East Java/ BBWS Brantas	61	5	1999	100.00	122,000
4	<i>Wlingi* (Phase A)</i>	Brantas	East Java/ BBWS Brantas	60	4	1972	28.00	24,000
5	<i>Tempuran* (Phase A***)</i>	Kedung Padas	Central Java/ BBWS Pemali Juana	59	3	1916	18.00	2,143
6	<i>Sengguruh Jawa Timur</i>	Lesti-Brantas	East Java/ BBWS Brantas	58	3	1982	33.00	23,000
7	<i>Kalola</i>	Walanae – Cenrenae	South Sulawesi/ BWS Pompong Jeneberang	57	3	1995	34.80	70,000
8	<i>Nglangon*</i>	Nglangon	Central Java/ BBWS Pemali Juana	57	3	1914	15.00	2,184
9	<i>Way Jepara</i>	Lampung	BBWS Mesuji Sekampung	57	3	1979	16.00	15,000
10	<i>Tiu Kulit*</i>	Sumbawa	NTB/ BWS NT I	53	4	1994	26.40	11,000

Table A4-6. Dam sites scheduled for initiation of repair/rehabilitation in Year 4 (2012) and completion in Year 5 (2013).

No	Site Name	River/ Basin	Province/ PIU	Risk Score (ICOLD)	Hazard Category **	Year Built	Height (m)	Reservoir Volume (1000m ³)
1	<i>Kedung Uling*</i> <i>(Phase A***)</i>	Bengawan Solo	Central Java/ BBWS Solo	56	3	1917	8.00	900
2	<i>Pengga</i>	Dodokan	NTB/ BWS NT I	56	3	1994	33.00	27,000
3	<i>Greneng*</i>	Central Java	Central Java/ BBWS Pemali Juana	55	4	1918	13.00	2,300
4	<i>Plumbon*</i> <i>(Phase A****)</i>	Baron Bengawan Solo	Central Java/ BBWS Solo	55	3	1928	23.00	1,050
5	<i>Sampean Baru*</i>	Mandiro Sampean	East Java/ BWS Bondowoso	55	3	1983	26.00	1,500
6	<i>Simo*</i> <i>(Phase A****)</i>	Pemali – Juana	Central Java/ BBWS Pemali Juana	55	3	1904	10.00	430
7	<i>Merancang*</i> <i>(Phase A****)</i>	Mahakam	East Kalimantan/ BWS Kalimantan III	54	4	1995	8.00	20,000
8	<i>Pacal</i>	Pacal Bengawan Solo	East Java/ BBWS Solo	54	4	1924	35.00	41,180
9	<i>Salomekko*</i> <i>(Phase A****)</i>	Walanae – Cenrenae	South Sulawesi/ BWS Pompengan Jeneberang	54	4	1998	30.00	7,000
10	<i>Sanggeh*</i> <i>(Phase A****)</i>	Pemali – Juana	Central Java/ BBWS Pemali Juana	53	3	1909	7.20	420

23. **Sub-projects scheduled for the successor project.** Using the categorization above, the sub-projects earmarked for the successor project are listed in Table A4-7. The list comprises the 29 remaining sub-projects that were not subject of works under DOISP, and the 14 follow-up “phases B” on sub-projects that had been already initiated through a phase A under DOISP but for which the phase B has necessitated more extensive investigations.

Table A4-7. Sub-projects scheduled under DOISP 2 (tentative)

No	Dam Name	River/ Basin	Province/ PIU	Risk Score	Hazard Category **	Year Built	Height (M)	Reservoir Volume (1000m ³)
1	<i>Krisak (Phase B)</i>	See Tables A4.3-6		54	3	1943	20.00	3,717
2	<i>Jatiluhur (Phase B)</i>			78	5	1967	96.00	2,556,000

No	Dam Name	River/ Basin	Province/ PIU	Risk Score	Hazard Category **	Year Built	Height (M)	Reservoir Volume (1000m ³)
3	<i>Wadaslintang (Ph B)</i>			76	4	1987	125	440,000
4	<i>Malahayu (Phase B)</i>			72	3	1940	30.00	39,880
5	<i>Cacaban (Phase B)</i>			64	4	1958	36.00	90,000
6	<i>Wlingi (Phase B)</i>			60	4	1972	28.00	24,000
7	<i>Simo (Phase B)</i>			55	3	1904	10.00	430
8	<i>Sanggeh (Phase B)</i>			53	3	1909	7.20	420
9	<i>Wonorejo (Phase B)</i>			61	5	1999	100.00	122,000
10	<i>Tempuran (Phase B)</i>			59	3	1916	18.00	2,143
11	<i>Kedung Uling (Ph B)</i>			56	3	1917	8.00	900
12	<i>Merancang (Phase B)</i>			54	4	1995	8.00	20,000
13	<i>Plumbon (Phase B)</i>			55	3	1928	23.00	1,050
14	<i>Salomekko (Phase B)</i>			54	4	1998	30.00	7,000
15	<i>Way Rarem*</i>	Rante Gowak	Lampung/ BBWS Mesuji Sekampung	53	3	1984	32.00	72,400
16	<i>Delingan*</i>	Tempuran Bengawan Solo	Central Java/ BBWS Solo	52	3	1924	27.00	3,270
17	<i>Prijetan</i>	Prijetan Bengawan Solo	East Java/ BBWS Solo	52	3	1917	23.00	8,750
18	<i>Nawangan*</i>	-	Central Java/ BBWS Solo	51	3	1976	25.00	800
19	<i>Pondok</i>	Bengawan Solo	East Java/ BBWS Solo	51	4	1996	30	25,300
20	<i>Banyu Kuwung*</i>	Batok	Central Java/ BBWS Pemali Juana	50	4	1995	13.50	2,400
21	<i>Situ Patok*</i>	Cimanuk	West Java/ BBWS Cimanuk Cisanggarung	50	2	1927	27.30	14,000
22	<i>Gapit</i>	Sumbawa	NTB/BWS NT I	49	3	1997	24.60	-
23	<i>Kedung Bendo*</i>	K. Bendo K. Madiun	East Java/ BBWS Solo	49	4	1948	13.00	1,700
24	<i>Klego*</i>	Kancil Serang	Central Java/ BBWS Pemali Juana	49	3	1989	14.00	2,740
25	<i>Lempake*</i>	Mahakam	East Kalimantan/ BWS Kalimantan III	49	5	1970	9.00	N/A

No	Dam Name	River/ Basin	Province/ PIU	Risk Score	Hazard Category **	Year Built	Height (M)	Reservoir Volume (1000m³)
26	<i>Mamak*</i>	Sumbawa	NTB/ BWS NT I	48	1	1992	41.50	30,000
27	<i>Ngancar</i>	Jarak River	Central Java/ BBWS Solo	47	4	1946	19.00	2,050
28	<i>Parang Joho*</i>	Jumok Kedung Padas	Central Java/ BBWS Solo	47	3	1980	20.00	1,760
29	<i>Sepayung Dalam</i>	Rode	NTB/ BWS NT I	47	3	1993	17.00	1,600
30	<i>Sumi</i>	Sumbawa	NTB/ BWS NT I	47	4	1999	45.00	16,300
31	<i>Batu Bulan*</i>	Sumbawa	NTB/ BWS NT I	46	4	2002	39.00	53,600
32	<i>Samboja *</i>	Mahakam	Kalimantan/ BWS Kalimantan III	46	4	1979	8.2	3,720
33	<i>Telogo Pasir</i>	Bengawan Solo	East Java/ BBWS Solo	46	4	1931	14.50	2,673
34	<i>Gunung Rowo</i>	Gunung Wadi Jratun Seluna	Central Java/ BBWS Pemali Juana	43	3	1925	21.00	5,160
35	<i>Cipancuh*</i>	Indramayu	West Java/ BBWS Cimanuk Cisanggarung	42	3	1923	15.00	7,800
36	<i>Sermo</i>	Ngrancah Serang	Yogyakarta/ BBWS Serayu Opak	42	1	1985	56.6	2,000
37	<i>Waerita*</i>	Flores	NTT/ BWS NT II	40	4	1994	12.00	324
38	<i>Jero Waru*</i>	Sumbawa	NTB/ BWS NT I	39	3	1999	13.00	N/A
39	<i>Manubulu*</i>	Rote	NTT/ BWS NT II	36	3	1994	15.00	722
40	<i>Way Tengkorak</i>	Way Sekampung	Lampung/ BBWS Mesuji Sekampung	35	2	1989	8.00	470
41	<i>Livuhahani</i>	Rote	NTT/ BWS NT II	34	3	1992	15.00	25,1
42	<i>Cikuluk *</i>	Way Sekampung	Lampung/ BBWS Mesuji Sekampung	33	3	1988	9.00	185
43	<i>Rawa Pening</i>	Tuntang Jratun Seluna	Central Java/ BBWS Pemali Juana	31	4	1938	8.20	35,000

Table A4-8. Detail description of works/activities in Sub-projects of Year 1

Dam	Category	Risk Score	Risk Class	Existing Problem	Proposed Remedy
Krisak	2	54	High	<p>Dam inspection road and the crest road in poor state.</p> <p>Seepage emerging along the Spillway wing walls and chute. The toe drain is full of sediments.</p> <p>Stone masonry Irrigation Channel immediately on D/S of dam is damaged at many places.</p> <p>Spillway stilling basin and D/S channel are cracked in some places.</p> <p>Wooden deck of intake bridge in poor condition.</p> <p>Nine stand pipes are damaged.</p> <p>Two V notch weirs are damaged.</p> <p>Ten surface monuments are damaged.</p> <p>Staff gauge is damaged. Dip meter missing.</p> <p>Paint of Intake gate in poor condition.</p> <p>Leakage observed in intake, flushing and outlet gates.</p>	<p>Package 1 – Civil Works</p> <ol style="list-style-type: none"> 1. Cleaning of sediments from toe drain. 2. Repair of Irrigation outlet channel stone masonry 3. Repair cracks in the spillway stilling basin and the D/S channel. 4. Replace the wooden deck of intake structure bridge 5. Repair the inspection road and repair of the dam crest with an ATB layer 6. Replacement of 9 stand pipe piezometers, 2 V-notch Weirs, 10 Surface monuments, repair to staff gauge and provision of a dip meter. <p>Package 2 – Electro-Mechanical and deferred maintenance</p> <ol style="list-style-type: none"> 1. Intake gate re-painting. 2. Replacement of rubber seals in the intake, flushing and outlet gates. 3. Routine maintenance of all gates. <p>Package 3 – Investigation and design</p> <ol style="list-style-type: none"> 1. Detailed study to determine the cause of new seepage emerging from the Spillway wing walls and along chute
Gondang	1	47	High	<p>Crest road and approach roads are damaged.</p> <p>Rip rap is deficient in certain areas.</p> <p>Plants and shrubs are present on the dam body.</p> <p>Channel on D/S of V notch weir filled with debris.</p> <p>Fifteen Stand Pipe Piezometers are damaged.</p>	<p>Package 1 – Civil Works</p> <ol style="list-style-type: none"> 1. Both dam crest and the approach road should be rehabilitated with ATB. 2. Add Rip rap where necessary. 3. Removal of plants and shrubs from dam body 4. Cleaning of channel on D/S of V notch. Hand rails should be installed along dam crest, both U/S and D/S. 5. All malfunctioning instruments should be replaced.
Batujai	2	47	High	<p>Rip rap deficient in some areas</p> <p>Crest road damaged for a</p>	<p>Package 1 – Civil Works</p> <ol style="list-style-type: none"> 1. Refurbishment of rip rap in

Dam	Category	Risk Score	Risk Class	Existing Problem	Proposed Remedy
				<p>length of 100 m Parapet damaged for 100 m length Toe drain damaged Following instruments damaged:</p> <ul style="list-style-type: none"> 1. V notch 1 2. Stand Pipes 3 3. Dip meter 1 <p>Electro Mechanical works</p> <ul style="list-style-type: none"> 1. Rubber seals in the flushing gates damaged 2. Paint of spillway gates in poor condition 	<p>certain areas</p> <ol style="list-style-type: none"> 2. Repair crest road 3. Repair parapet wall 4. Repair/replace damaged instruments <p>Package 2 – Electro-Mechanical and deferred maintenance</p> <ol style="list-style-type: none"> 1. Rubber seals in the flushing gates shall be replaced 2. Repaint spillway gates
Gembong	1	45	Moderate	<p>Crest road is badly cracked and rainwater can easily penetrate into the clay core No protection on D/S edge of crest road for safety of people Spillway stilling basin and D/S channel are damaged</p> <p>Vegetative growth near the dam toe Thirteen surface settlement points damaged Two V-notch weirs damaged Nine stand pipe piezometers damaged The electric wiring system is damaged A generator is required for lighting the outlet tunnel.</p>	<p>Package 1 – Civil Works</p> <ol style="list-style-type: none"> 1. Asphalt concrete overlay is recommended for the dam crest. 2. Parapet wall to be provided on D/S edge of crest road for safety of people 3. Repair of the spillway stilling basin and the channel on D/S. 4. Removal of plants from dam toe 5. Replacements of Thirteen surface movement monuments, two V-notch weirs and Nine stand pipe piezometers. <p>Package 2 – Electro-Mechanical and deferred maintenance</p> <ol style="list-style-type: none"> 1. Repairs to the electric wiring system 2. A generator is required for lighting the outlet tunnel.

Community Participation in Reservoir Greenbelt and Dam Management (Sub-component)

24. The intentions of this sub-component are to (i) introduce a sustainable community participation program in reservoir management that will assist the Dam Owner to reduce the risk around the dam from vandalism and similar action damaging the dam safety equipment by people from neighboring communities or by people from outside, and (ii) assist in avoiding improper land use that would lead to erosion. This program is designed based on the satisfactory results obtained in pilots in DSP. The following interventions are proposed to achieve the above intention.

- (a) Carry out a community educational programs for the communities residing around the reservoir, and highlighting the importance of community participation, and of community policing in the safety of the dam.

(b) Improve income of the community by providing an agriculture-oriented incentive scheme, including usufruct of land plots in the greenbelt, and provision of seeds and seedlings as well as extension service. The incentive would increase the community's awareness and willingness to participate in maintaining and protecting the function of the dam and the reservoir.

25. Twenty sites out of 34 reservoirs were selected by using the following criteria: (i) the reservoir is having a serious problem with siltation and foreshore erosion; (ii) the reservoir is strategic in terms of its function; (iii) the population living surrounding the reservoir; (iv) the potential for vandalism; (v) reasonable access; and (vi) the sites are related to Category 1 or 2 sub-projects above.

Table A4-9. Community participatory activities on Dam Safety

Intervention from the project	Community Participation on the dam safety
<ul style="list-style-type: none"> - Provision of non-cash grant to support livelihood program - Skills training - Basic village infrastructure 	<ul style="list-style-type: none"> - Participating in light maintenance i.e. weed and grass removal - Preventing vandalism from internal or external actors - Informal visual monitoring of the dams

Sub-component Reservoir Watershed Management Pilot

26. This sub-component will replicate successful sub-catchment management programs that have been implemented in Central Java since 2002, and further supported through Bank-managed trust funds. It has two objectives:

- (a) Support community participation in watershed conservation. In this program 2 critical sub-catchments will be selected in each of four dam catchments as pilots to apply the watershed conservation measures by involving participation of the concerned community in better land use techniques, water drainage, erosion control, and river bed and bank stabilization. A monitoring and evaluation program will be developed to evaluate the achievement of the program implementation.
- (b) Formulating a Watershed Conservation Plan in selected sub-catchments and initiating a longer term coordinated effort amongst several local agencies to address land use, inadequate agricultural technique, soil stabilization and social forestry. The institutional frame work necessary for the implementation of the master plan will be formulated through public consultation, focusing in resolving the institutional and financial issues. A local regulation (of Camat or Bupati level) for watershed conservation plan would be prepared and agreed.

27. Four dam (sub-)catchments have been selected as pilot for implementation in DOISP, based on stated readiness and willingness from the local community and the local government, including the provincial Balai PSDA. Only two Balai PSDA /Dinas PUP will be selected to ensure that each PIU has a critical size. The dam catchments are: (i) Wonogiri catchment representing a typical dam upstream area on Java island, situated in kabupaten Wonogiri (Central Java), and (ii) Batujai catchments area representing dam in Nusa Tenggara islands, situated in kabupaten Lombok Tengah (NTB). The two remaining (sub-) catchments will be in the same provinces, and are to be determined in the first year of the project.

Table A4-10. Selected sites for Sub-catchment Management Pilot

No.	Descriptions	Selected Dam Sub-Catchments			
		Batu Tegi	Wonogiri	Kalola	Batujai
1	River Basin	Mesuji-Sekampung	Bengawan Solo	Pompengan-Jenebrang	Nusa tenggara 1
2	Dam Location	Wonogiri	Tanggamus	Boyolali	Lombok Tengah
3			Air Naningan	Ngemplak	Maniang Pajo
4			Air Naningan	Margorejo	Batujai
5	Construction Year	1995-2002		1992-1995	1977-1982
6	Catchments Area	424 Km2		122 Km2	169 Km2
7	Related Dinas PSDA	Lampung	Jawa Tengah	Sulawesi Selatan	Nusa Tenggara Barat
8	Related Balai PSDA	Seputih-Sekampung	Bengawan Solo	Walanae Cenrancae	Lombok Tengah

28. The conservation plan will consider the two different statuses of the land, i.e., (i) public lands, and (ii) community/private lands. Both types need different approaches regarding incentive arrangements and regulations under the project. The Project intervention will be in-stream as well as off-stream.

29. The Watershed Conservation Plan will include a sustainable institutional model of inter-agency coordination at all levels of activity that includes the participation of the concerned communities in the watershed management. The plan will consider following aspects:

- (a) Selecting 2 up to 3 critical sub-sub-catchments within the catchments of the selected reservoirs, as sub-catchment conservation pilot.
- (b) Formulating the inter-agency catchment organization structure to include stakeholders, from community level, and defining a good inter-agency coordination.
- (c) Developing a simplified hydrological model for predicting the impact of land treatment on flood discharges and sediment yield and preparing mitigation strategies.

- (d) Defining the possible and workable budget sources necessary to finance the watershed management activities. Possible compensation mechanism from the downstream beneficiaries to the upstream communities will be observed during pilot program, incorporating lessons learned from Lombok-based pilots in the region of Sesuat.
- (e) Defining the provision of possible incentives to the poor people living in the catchment areas to increase their livelihood.

30. Public consultation meetings to discuss aspect the above will be held within the GPKNA framework where all the stakeholders are identified as follows: Regulator, Operator, Developer, and User.

Regulator	Operator	Developer	Users
1. Central Government	1. BBWS/BWS	1. Project Entity	1. Communities
2. Provincial Government	2. Balai PSDA	2. Local Government	2. Farmers
3. District Government	3. Sub-Dinas PLA	Enterprise 3. Private Investor	

31. Besides the public consultation meetings, the project will carry out watershed conservation trainings for related *kabupaten* officials and members of local Council (*Dewan Perwakilan Rakyat Daerah*) to provide them the comprehension and understanding of the importance of watershed conservation.

32. Pilot community participation in catchment conservation. The implementation of the pilot program will cover two activities:

- a. Development of catchment conservation measures: This depends on the sub-catchment condition and the community preferences. The conservation measures consist of physical and vegetative measures and the adoption of incentive schemes by the community group. In adopting the conservation measures it is necessary to consider the land use type.
- b. Adoption of the incentive schemes: The schemes may provide non-cash support for livelihood program such as equipments, goods and tools for any small business run by the community, individually or in a group, to suit the community priorities

Table A4-11. Summary of Intervention Program by Type of Land use

	Public Lands	Community Lands
Off-stream Intervention	(i)regreening with wood trees in protected forest (ii)no program allowed in production forest, as this land type is managed by Perhutani	(i)re-greening with wood or fruit trees (ii)terracing and pedestrian roads (iii)training on better agriculture practices (iv)infiltration wells or bio-pores
In-stream intervention	(i)gully plug, (ii)check dams / groundsill, (iii)river bank protection,	
Provision of non-cash grant to the community	(i) non agriculture activities (trader, handicraft, other economic related activities)	(i)agriculture related activities (intercrop or better agriculture practices) (ii)non agriculture activities (trader,

	(ii)Replication of Green KDP project	handicraft, other economic related activities)
Other Activities	(i)awareness campaign on water conservation to the surrounding community (ii)Training on improving skills related with current livelihood (iii)organization management training	

33. **Implementation Arrangement.** The arrangement will emulate the successful program that was piloted by the Balai Probolo in the Kalong sub-catchment, and its replication under the Netherlands trust Fund program in the Dulang sub-basin. The Balai PSDA under Dinas Pengairan Propinsi (Provincial Water Resources Office) will implement the program. The budget will be located at this Balai PSDA (PIU) for various activities under this program. Dinas PSDA will involve kabupaten government through its Dinas in whole process of the program. Incremental operation cost of concerned dinas in kabupaten will be channeled through this Balai.PSDA. During implementation, it is expected that province and kabupaten government will provide parallel financing to expand the activities within the same sub-catchment or to near by sub-catchment under the same project management.

34. The Balai PSDA will engage qualified NGOs through a competitive selection to assist in providing facilitation during project implementation. The generic scope of works under services to be provided by the NGO are as follows:

- (a) Facilitating dialogue amongst stakeholders, and ensure that watershed conservation plan can be prepared and agreed for implementation
- (b) Disseminating the project idea to the community, and establish community group and provide training for project implementation
- (c) Assist community group during project implementation, ensure that the process accords with project implementation manual.
- (d) Carrying out seminar or workshop local or regional to strengthen project implementation, and to disseminate the lesson learnt to other Balai PSDA
- (e) Assist local government (province or kabupaten) in preparing academic paper or draft local regulation regarding catchment management.

35. The scheduling of the participatory reservoir management and the (sub-) catchment management activities in the period 2009-2013 is presented in Table A4-12. The Table also indicates the work load by PIU (in the provincial Dinas PUP), and suggests that this is feasible.

Component Dam Safety Institutional Strengthening

36. Annex 1, Sections 3-4 outlines the overarching regulatory framework as articulated by the draft Government Regulation on Dams. DOISP will provide TA support to facilitate further development and processing of this Regulation. However, as the Government Regulation process is driven primarily by the Government, the project

will dedicate more resources and expertise to the preparation of the implementation Regulations, Manuals and SOPs. Table A4-13 lists the set of existing and planned Guidelines and Manuals. This set needs to be completed with the new Ministerial Regulations, and needs to be reviewed and updated. Furthermore, many of the existing operational manuals for dams sites, in urgent need of updating, will be revised during DOISP.

Table A4-12. Scheduling of Participatory Reservoir Management, and Catchment Management 2009-2013

PIU	Year 1	Year 2	Year 3	Year 4	Year 5
PUP Lampung	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Baturegi Dam -Baturegi Catchment	Implementation of Community Participation on: -Reservoir and Dam Management in Baturegi Dam -Catchment Management in Baturegi Dam	Implementation and guidance to the participating community groups	Post Implementation guidance to the participating community groups
	Provision of Training to Dinas and Balai PSDA	Community Preparation for Situpatok Dam	Implementation of Community participation on Reservoir and Dam management in Situpatok Dam	Implementation and guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP West Java	Provision of Training to Dinas and Balai PSDA	Community Preparation for lot 1 -Cacaban Dam -Gempong Dam -Gunung Roro Dam -Wadaslintang Dam -Cengklik Dam -Wonogiri Dam -Wonogiri Catchment	Implementation of Community Participation of Lot 1 Community Preparation for Lot 2: -Malahayu -Ngancar -Parangjoho -Plumbon -Banyukuwung	Implementation of Community Participation on Reservoir and Dam Management of Lot 2 in: -Malahayu -Ngancar -Parangjoho -Plumbon -Banyukuwung	Implementation and guidance to the participating community groups
	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Selorejo Dam -Gondang Dam -Karangkates	Implementation of Community Participation of Reservoir and Dam Management in Selorejo, Gondang, and Karangkates	Implementation and guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP NTB	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Batujae Dam -Pengga Dam -Batujae Catchment	Implementation of Community Participation on Reservoir and Dam Management in Batujae and Pengga, and Catchment Management of Batujae	Implementation and guidance to the participating community groups	Post Implementation guidance to the participating community groups
	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Kalola Dam -Kalola Catchment	Implementation of Community Participation on Reservoir and Dam Management, and Catchment Management in Kalola	Implementation and guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP South Sulawesi	Provision of Training to Dinas and Balai PSDA	Community Preparation for Sembaja Dam	Implementation of Community Participation on Reservoir and Dam Management in Sembaja Dam	Implementation and guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP East Kalimantan	Provision of Training to Dinas and Balai PSDA				Post Implementation guidance to the participating community groups

Table A4-13. Status of Dam Safety Commission Guidelines

No.	Document	Status
A.	General Guidelines	
1.	Ministerial Regulation on Dam Safety	OV
2.	Government Regulation on Dams & Reservoirs	UP
3.	Organization & Management of Dam Safety	OV/D
4.	Registration of Dam Safety Professionals	I
5.	Registration and Inventory of Dams	I/OV
6.	Guidelines & Operational Procedures for DSC	I
7.	Guidelines for Development & Decommissioning of Dams	I
B.	Technical Guidelines	
1.	General Guidelines on Dam Development	D
2.	General Dam Design Criteria	I
3.	Filling of Reservoirs	I
4.	Safety Inspection & Evaluation of Dams	I
5.	Dam Safety Review	I
6.	Revision of Guideline on Downstream Hazard Classification of Dams	OV/D
7.	Preparation of Emergency Action Plans	UP
8.	Dam Safety Unit (DSU) Development Plan	OV/UP
9.	Guidelines & Operational Procedures for Dam Monitoring Units (DMUs)	UP
10.	Operations, Maintenance & Surveillance of Dams: Phase 1-General	I
11.	Operations, Maintenance & Surveillance of Dams: Phase II- Management	I
12.	O&M & Surveillance of Dams: Phase III- Dam Instrumentation & Monitoring Systems	I
13.	O&M & Surveillance: Phase IV- Inspection of Hydro-Mechanical and Electrical Equipment	I
14.	O&M & Surveillance: Phase V- Standard Operating Procedures for Hydro-Mechanical and Electrical Equipment	I
15.	Selection of Hydro-Mechanical Equipment	I
16.	Calculation of Flood Handling Capacity of Reservoirs & Spillways	D
17.	DAMOSY Manual	D/OV
18.	Guideline for Tailings Dams	-
19.	Construction of Earth Dams	-
20.	Dam Sedimentation Control & Mitigation	-
21.	Visual Inspection Manual	-
22.	Guidelines for Tunneling	-
23.	Grouting Manual	UP
24.	Cut-Off Well/Trench Guidelines	UP
25.	Design Criteria for Concrete Dams	UP
26.	Roller Compacted Concrete Dams	-
27.	Concrete Face Rockfill Dams	-
28.	Dam Development on Soft Soils	D
29.	General Guidelines for Development & Management of Dams	D
30.	Testing of Earth Dam Embankments During Construction	I
31.	Reservoir Sedimentation Surveys	UP

Legend: I = Issued D = Still in draft form

OV = Old version still valid

UP = Still under preparation

Annex 5: Project Costs

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

1. **Project Costs.** The project cost is expressed in May 2008 constant prices based on the average unit prices expected to prevail during project preparation. Unit prices in Rupiah are converted to US\$ at the average official exchange rate of 9,300 that prevailed for several years (about 2002-2008) and during the period project preparation. Costs of civil works are based on estimates of quantity of works, instrumentation and electromechanical equipment of individual dams investigated by the Preparation TA Team and recent bid prices, plus 20% for survey and design. Unit prices of equipment and materials are based on prices quoted by local and foreign suppliers. Rates of national staff allowance, and international and national consultants are based on prevailing local and international consultant rates. Physical contingencies are included only in the cost of civil works. Price contingencies are based on the forecasted annual rates of local inflation and MUV, and applied to civil works, goods and recurrent costs except for the services as they are already expressed in US\$.

2. Total project cost of DOISP 1 is estimated at US\$70.43 million, including total base cost of US\$64.34 million, and physical and price contingencies of US\$6.08 million. The Total project cost includes about US\$42.13 million of local costs and US\$22.21 million foreign exchange costs. The project cost summary by components and expenditures is summarized in Table A5-1.

Table A5-1. Project Cost Summary by Component/Sub-component

Component	Rp Million			US\$ '000		
	Local	Foreign	Total	Local	Foreign	Total
Component 1: Dam Operational Improvement & Safety Works & Studies	179,744.	113,000	292,744	19,327	12,150	31,478
Component 2: O&M Improvement	93,190	29,982	123,173	10,020	3,224	13,244
Component 3: Reservoir Sedimentation Mitigation	82,690	39,353	122,043	8,891	4,321	13,123
Component 4: Dam Safety Institutional Improvement	15,670	4,250	19,920	1,685	457	2,142
Component 5: Project Management	20,535	19,989	40,524	2,208	2,149	4,358
Total Base Cost	391,830	206,574	598,405	42,132	22,212	64,345
Physical Contingencies	4,793	1,967	6,760	516	212	727
Price Contingencies	45,997	3,806	49,802	4,946	409	5,355
Total Project Cost	442,621	212,347	654,968	47,594	22,833	70,427

3. **Financing.** The IBRD loan will finance US\$50.00 million, or about 71% of the total disbursements excluding taxes and duties. GOI will finance the remaining US\$20.43 million (about 29%) including the front-end-fee and the incremental O&M budget for the dams/ reservoirs, as summarized in Table A5-2:

Table A5-2. Financing Plan (US\$M)

Financier	Local	Foreign Exchange	Total
Government	18.49	1,94	20.43
IBRD	29.10	20.90	50.00
Total	47.59	22.83	70.43

4. The financing by project component is presented in Table A5-3:

Table A5-3. Financing by Project Component/Subcomponent and Financier

Component	Government		World Bank		Total
	US\$000	%	US\$000	%	
Component 1: Dam Operational Improvement & Safety Works & Studies	7,116	20	27,058	80	34,174
Component 2: O&M Improvement	9,294	64	5,263	36	14,557
Component 3: Reservoir Sedimentation Mitigation	3,066	20	11,992	80	15,058
Component 4: Dam Safety Institutional Improvement	231	10	2,022	90	2,253
Component 5: Project Management	719	16	3,665	84	4,384
Total Project Cost	20,426	29	50,000	71	70,426
Front-End-Fee	125	100	0	0	125
Total Disbursements	20,551	29	50,000	71	70.551

5. **Disbursements.** Estimated disbursements are presented Table A5-4:

Table A5-4. Estimated Disbursement 2009 through December 31, 2013 (IBRD FY/US\$ M)

	FY09	FY10	FY11	FY12	FY13	FY14
Annual	0.10	5.40	12.20	14.00	11.65	6.65
Cumulative	0.10	5.50	17.70	31.70	43.35	50.00

Table A5-5. DOISP Component Inputs (US\$ millions) (Base Cost)

COMPONENT OUTPUTS	<u>Comp 1</u>	<u>Comp 2</u> <i>t</i>	<u>Comp 3</u>	<u>Comp 4</u>	<u>Comp 5</u>	TOTAL
1. Surveys, Investigations and Designs (SID); sediment surveys incl. for successor project	6.40	0	0.48	0	0	6.88
2. Emergency plans, O&M and safety manuals, etc.	13.25	8.14*	0	1.10	0	22.49
3. Equipment (hydrology, instrumentation, electro-mechanical)	0	0	1.58	0	0.50	2.08
4. Civil works (Sub-projects, river and catchment protection works)	11.83	0.43	9.15	0	0.50	21.91
5. Community-based development	0	1.00	0.66	0	0	1.66
6. Training; strengthening of regulatory capacity	0	2.57	0.49	0.53	0	3.59
7. Project and financial mgmt, and reporting	0	0	0	0	1.67	1.67
TOTAL Investment	31.48	12.14	12.37	1.63	2.67	60.29
8. Incremental Operating Costs	0	1.10	0.76	0.49	1.69	4.06
TOTAL Overall	31.48	13.24	13.12	2.14	4.36	64.34

* Of which \$7.2 M is the budget for dam O&M borne by GoI.

Annex 6: Implementation Arrangements
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

1. The proposed institutional framework for project implementation is based on a “national-government” project, in which the project budgets (both Loan proceeds and counterpart budgets) are APBN, and programmatic decision-making is centralized in the national government, i.e. MPW. Local governments, notably the provincial Balai PSDA (river basin management units) and kabupaten Agricultural Services, will participate in the implementation, however, they will receive the budgets through the national budgets (Tugas Perbantuan and Dekonsentrasi budgets). The framework outlined in this section is designed with a view to enable the effective and efficient use of project funded resources to achieve the implementation objectives under the five project components. The implementing agencies (CPMU, CPIU and PIUs) and their key assignments/ roles are listed in Table A6-1. The organizational diagram is outlined in Fig. A6-1.

2. The overall policy oversight will be provided by the National Steering Committee for Water Resources (NSCWR) in Bappenas, which is existing and which has been providing the same useful oversight for the other Bank-funded projects in the sector. The implementing agency is DGWR in MPW. A Central Project Management Unit (CPMU) will be established in the Directorate Rivers, Lakes and Reservoirs to do overall project and financial management. A Central Project Implementation Unit (CPIU) will be formed in the DSU for central technical tasks and training, and other PIUs in MPW’s regional Balai (Besar)WS Offices (River Agencies) that will implement the sub-projects in the field. TA teams will be recruited to assist these Units for project management, and for studies and designs. The relevant provincial Dinas Public Works (that oversee the Balai PSDAs) will be assigned as PIU. The budget will be provided to the PIUs through the sectoral APBN budget. The RCWR, a semi-autonomous unit of MPW, will be assigned study, survey and technical review tasks through a sub-budget allocation of the CPIU. The training and institution strengthening will be implemented through the CPIU. This arrangement draws on the satisfactory performance of the other Bank-assisted projects with the same counterpart.

Table A6-1 CPMU and PIUs as Project Implementation Units in MPW and in Provincial Administration, and supportive Dinas PUPs

	Name of PIU	Scopes of Activities	Related Project Component
1	CPMU: Dit. Planning CPIU: Dit. Rivers, Lakes and Reservoirs	<ul style="list-style-type: none"> - General and Financial Management of Project Implementation. - Supervision of Implementation by all PIUs - Provision of Training Program to B/BWS and Dinas - Investigation and design of highly complex sub-projects, e.g. (part of) Jatiluhur 	5 5 1, 2, 3, 4
2	PIU, DSU/DSC	<ul style="list-style-type: none"> - National Dam Safety Assurance (Component 1, 4, 5) - Provision Training to B/BWS and Dinas (1, 4) 	1, 4, 5 1, 4
3	PIU – BWS Mesuji/Seputih Sekampung	<ul style="list-style-type: none"> - Study, Investigation and Design and Rehabilitation of Dam (2): Batutegei, Way Jepara 	1, 2, 3

4	Dinas PUP Lampung	1) Community Participation in Reservoir Management (1): Batutegi - Community Participation in Watershed Management: (Batutegi) - Sediment retaining and river bank protection in watershed	3 3
5	PIU – BBWS Citarum	o Study, Investigation and Design and implementation of works, and Instruments Replacement (1) Jatiluhur	1
6	PIU – BBWS Cimanuk Cisanggarung	- Study, Investigation and Design and Rehabilitation of Dams (1): Darma	1, 2, 3
7	Dinas PUP West Java	- Community Participation in Reservoir Management (1): Setu Patok	3
8	PIU – BBWS Bengawan Solo	- Study, Investigation and Design and Rehabilitation of Dams (7): Krisak, Gondang, Cengklik, Ketro, Kedung Uling, Plumbon, Pacal	1, 2, 3
9	PIU – BWS Serayu Opak	- Study, Investigation and Design and Rehabilitation of Dam (2): Wadas Lintang, Sempor	1, 2, 3
10	PIU – BBWS Pamali Juana	- Rehabilitation on Dams (9): Gembong, Penjalin, Cacaban, Tempuran, Nglangon, Simo, Greneng, Sangeh, Malahayu	1, 2, 3
11	PIU – Dinas PUP Central Java	- Community Participation in Reservoir Management (13): Cacaban, Gembong, Gunung Rowo, Wadas Lintang, Cengklik , Wonogiri, Malahayu, Ngancar, Parangjoho, Plumbon, Karangkates, Ngancar, Banyukuwung - Community Participation in Watershed Management (1): Wonogiri - Sediment retaining and river bank protection in watershed	3 3
12	PIU – BBWS Brantas	- Study, Investigation and Design and Rehabilitation of dams (5): Selorejo, Karangkates, Wonorejo, Wlingi, Sengguru,	1, 2, 3
13	PIU – BWS Bondowoso	- Study, Investigation and Design and Rehabilitation of Dami: Sampean Baru	1, 2, 3
14	Dinas PUP East Java	- Community Participation in Reservoir Management (2): Selorejo, Gondang	3
15	PIU – BWS NTB Nusa Tenggara I	- Study, Investigation and Design and Rehabilitation of Dams (3): Batujai, Pengga, Tiu Kulit	1, 2, 3
16	PIU – Dinas NTB	- Community Participation in Reservoir Management : Batujai - Community Participation in Watershed Management: Batujai - Sediment retaining and river bank protection in watershed	3
17	PIU – BWS Kalimantan 3, Kalimantan Timur	- Study, Investigation and Design and Rehabilitation of Dam: Mrancang	1, 2, 3
18	Dinas PUP Kalimantan Timur	- Community Partcipation in Reservoir Management: Samboja	1
19	PIU – BBWS Pompengan Jeneberang, South Sulawesi	- Study, Investigation and Design and Rehabilitation of Dam (2): Kalola, Salomeko	1, 2, 3
20	Dinas PUP South Sulawesi	- Community Partcipation in Reservoir Management : Kalola - Community Participation in Watershed Management: Kalola - Sediment retaining and river bank protection in watershed	3 3
21	RCWR: (under CPIU)	- Carry out Special Study and Research - Provide Trainings for Trainers	1, 2, 3, 4 1, 2, 3, 4

3. The RCWR, which is the backbone of water resources development and management will be assigned to carryout hydrology studies and spillway capacity assessment of 63 dams. To carry out these tasks the budget will be channeled through the PIU in DGWR. A delegated budget-holder will be established in RCWR to receive delegated budget from DGWR. In carrying out the above studies and assessment the RCWR will use its experts, except as necessary in carrying out some field surveys the said PIU can contract it to third-party surveyors.

4. The overall institutional structure and the management levels for implementing the project is summarized in Table A6-2.

Table A6-2 Principal Tasks and Units

Principal tasks	Unit
- Direction of the project	- Director General of Water Resources (DGWR) – Jakarta.
National coverage in: - General Management and Financial System. - Programming and Controlling Overall Project Management.	Project Management Unit (CPMU) at the <i>Directorate of Programming Guidance.-Jakarta.</i> [Assisted by Technical Assistance Team-1 for assistance of General Management and Financial Management Systems - Jakarta]
- Operational Management Programming and Controlling, - Procurement and supervision on design. - Procurement and supervision on rehabilitation/ installation	- Project Implementation Units (PIUs) at the implementation agencies: <i>Dit.River, Lake and Reservoir, DSU, RCWR, 8 BBWS, 2 BWS and 2 Dinas PSDA.</i> [Assisted by Technical Assistance Team-2 for Technical Assistance which include also teams for Environmental&Social and Quality Assurance - Jakarta]

5. **Project Management Unit (CPMU).** Considering the working procedure and the structural organization within the Directorate General for Water Resources, in accordance with the PW Ministerial Decree, no. 01/PRT/M/2008, 18 January 2008, it is proposed this CPMU will have national coverage to be located in the Directorate of Planning and Programming Guidance and chaired by the Director. The team members are the Heads of sub-directorates of the two directorates concerned. The members of the CPMU are:

- | | |
|-----------|--|
| Chairman | : Director of Planning and Programming Guidance (DPPG)
<i>(Bina Program)</i> |
| Secretary | : Chief of sub-dit.for Program and Budget, DPPG
<i>(Program dan Anggaran)</i> |
| Members | : Chief of sub-dit.for Policy and Strategic, DPPG
<i>(Kebijaksanaan and Strategi)</i>
Chief of sub-dit.for Performance Evaluation, DPPG (<i>Evaluasi Kinerja</i>)
Chief of sub-dit. for Dam, Directorate of River, Lake and Reservoir
<i>(Bendungan)</i> |

Chief of sub-dit. for OM and Disaster Handling., Directorate of River, Lake and Reservoir.(*OP dan Penanggulangan Bencana*)

6. Roles and Responsibilities. The CPMU will be responsible for the overall project implementation. This will include providing overall project implementation and financial guidance to all Project Implementation Units (PIUs). This CPMU will be supported by a Technical Assistance Team -1 for General Management and Financial Management Systems.

7. The Heads of the provincial Dinas PSDA will manage and coordinate Balai PSDA and Units in kabupaten government involved, in the implementation of the community participation components (Table A6-3).

Table A6-3. Coordination for participatory programs between province and kabupaten

No	Province of Dinas PSDA	Balai PSDA	Acting O&M	Community Location		
				District	Sub-District	Village
1	2	3	4	5	6	7
1	Jawa Barat	Cimanuk-Cisanggarung	BPSDA	Cirebon	Mundu	Setu Patok
2	Jawa Tengah	Pemali.	BPSDA	Tegal.	Slawi.	Sirampok.
		Pemali.	BPSDA	Brebes.	Banjarharjo.	Malahayu.
		Seluna.	BPSDA	Boyolali.	Ngemplak.	Margorejo.
		Seluna.	BPSDA	Rembang.	Sulang.	Banyu Kwg.
		Seluna.	BPSDA	Pati.	Gembong	Gembong.
		Probolo	BBWS	Kebumen	Wadaslintang	Sumber Rejo
		Bngwn Solo	BBWS	Wonogiri	Batu Warno	Ngancar
		Bngwn Solo	BBWS	Wonogiri	Eromoko	Demesan
		Bngwn Solo	BBWS	Wonogiri	Eromoko	Puolarjo
		Bngwn Solo	BBWS	Wonogiri	Wonogiri	
3	Jawa Timur	Bngwn Solo	BPSDA	Lamongan	Sugih	Gondang
		Bango Gedangan	PJT	Malang	Ngantang	Selorejo
4	Lampung	Seputih Sekampung	BBWS	Tanggamus	Air Nanangan	Air Nanangan
5	Sulawesi Selatan	Walanae -Cenrancae	BBWS	Wajo	Maniang Pajo	Kalola
6	Kalimantan Timur	Mahakam	BBWS	Kutai	Samboja	Wonotirto
7	Nusa Tenggara Barat	Sumbawa	BWS	Sumbawa	Moyo Hulu	Batu Bulan
		Lombok		Lomb. Tngh	Praya Barat	Batujai
		Lombok		Lomb. Tngh	Praya Barat	Pengga

No	Province of Dinas PSDA	Balai PSDA	Acting O&M	Community Location		
				District	Sub-District	Village
1	2	3	4	5	6	7
		Bima		Bima	Sape	Mangga

8. For effective management, these PIUs will be assisted by the Technical Assistance Team-2 which includes also assistance of Environmental and Social matters as well as Quality Assurance. The office of these teams will be in Jakarta.

9. **Kabupaten and Community.** Project activities which focus on or are related to the community (*masyarakat*) living in the areas surrounding the reservoir greenbelts and catchment areas will involve the officers of the local/kabupaten government. This will include those agencies responsible for public works which are water resources related. The activities will require sustained guidance from the local/district government. Activities will be executed by the communities themselves with exception for the technical activities having complex problem, which may need to be contracted out to local contractors or NGOs.

10. The Head of the provincial Dinas for Public Works or Water Management will be responsible in general and for financial management of the component. The PIU will be located there. The implementation of activities will be carried out by the Balai PSDA. The community will be divided in groups and a local coordination team will be established. They will be strengthened with guidance delivered by officers of the district government and on-site guidance by NGOs. The coordination at work level will be carried out through periodical meetings among Balai PSDA, district government, and communities, to be arranged by Balai PSDA. The management of the community to execute the activities will be guided by the coordination team of the community groups, based on the community agreement and facilitated by the NGO.

11. **Annual Work Plan.** To operate the project in a programmatic and adaptable manner, allowing the government to adjust the implementation of agreed sub-projects as works progress and as insights improve, the project will apply Annual Work Plans that will need to be reviewed and cleared by the Bank on technical and safeguards criteria. The PIUs will prepare each year (by June) and the CPMU will consolidate (by July) the Annual Work Plan (AWP) and budget for the next fiscal year. The AWP will comprise, i.a., (i) the selected activities (works, studies and designs, training, TA, etc.) with their budget, PIUs, and other implementation partners; and (ii) all relevant information regarding any works that are important for clearance purposes, such as social and environmental safeguards, procurement plans, and financial management information. The semi-annual progress report will provide the overview of activities and budgetary progress, as well as the overview of the overall progress towards achievement of the objectives and performance indicators. For example, some Sub-projects need first studies followed by detail design and preparation of procurement documents, as well as environmental and social action plans, which together can span several years. Through

its approval of the AWP, the Bank is in a position to maintain quality control over the utilization of the funds.

12. **Implementation Schedule.** The implementation schedule is outlined in Tables A6-1 and 2 for the activities pertaining to preparation for and implementation of the sub-projects .of Component 1, and for the activities pertaining to the reservoir greenbelt and dam management and upper catchment management, respectively.

Fig A6-1 Organizational Diagram and Flow of Funds

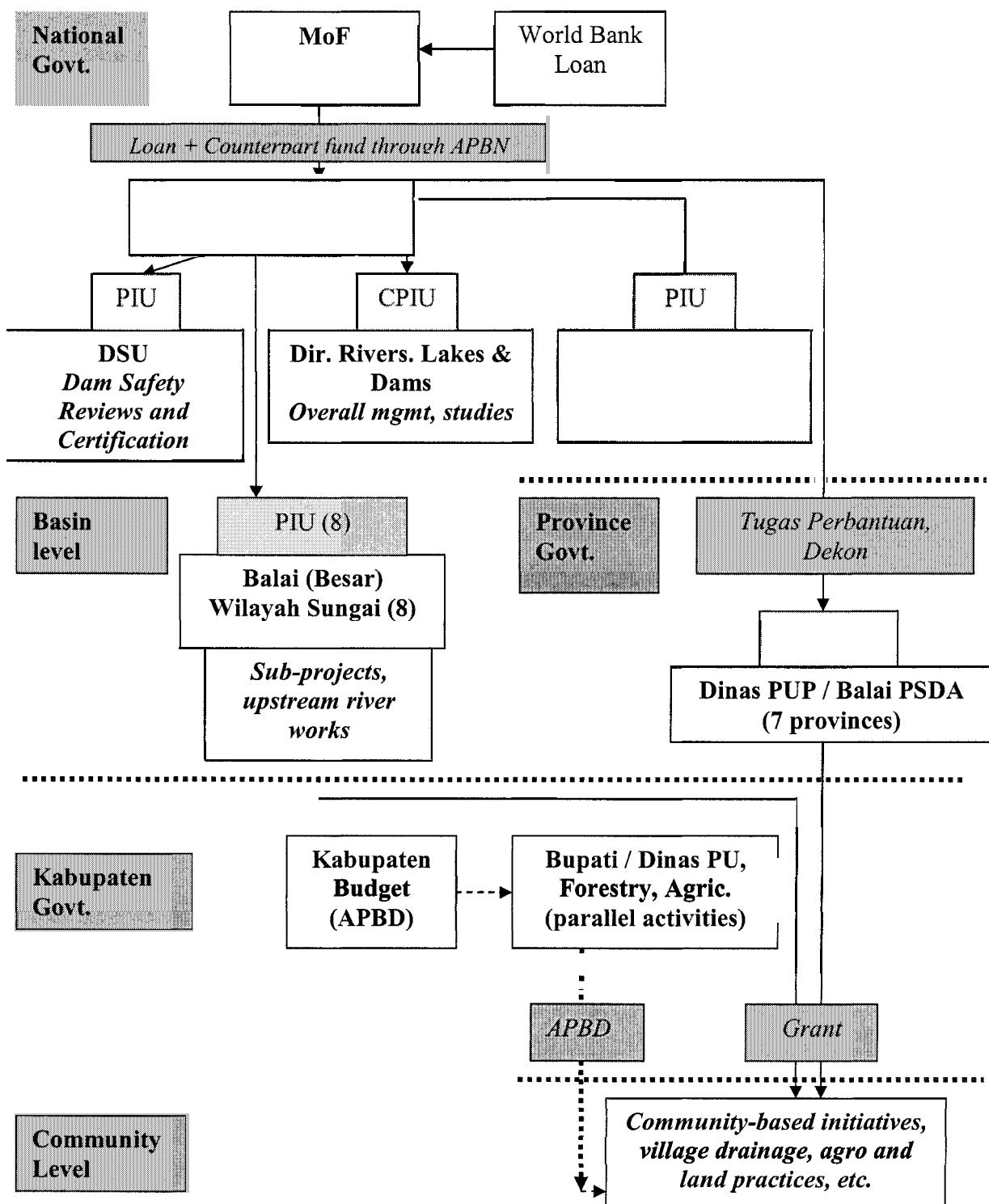


Table A6-1. Schedule for Preparation and Implementation of Sub-projects on Dams and Reservoirs, 2009-2013

Names of PIU	Year 1					Year 2					Year 3					Year 4					Year 5				
	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5	Year 1	Year 2	Year 3	Year 4	Year 5
BWS Mesuji/Seputhi Sekampung	SID Batutegi	SID Batutegi (con't) Construction Batutegi	SID Way Jepara																						
BBWS Citarum	SID Jatiluhur	SID Jatiluhur (con't) Construction Jatiluhur	SID Cengklik (con't) Construction Ketro	SID Ketro (con't) Construction Cengklik	SID Kedung Uling SID Plumpon	Construction Kedung Uling Construction Plumpon SID Paclal	Construction Plumpon SID Paclal	Construction Kedung Uling Construction Plumpon SID Paclal	Construction Kedung Uling Construction Plumpon SID Paclal	Construction Kedung Uling Construction Plumpon SID Paclal															
BBWS Bengawan Solo	Construction Krisak Construction Gondang SID Cengklik SID Ketro																								
BBWS Pemali Juana	Construction Gembong SID Malahayu SID Penjalin	SID Malahayu (con't) SID Penjalin (con't) Construction Malahayu Construction Penjalin	SID Nglanong SID Greneng	SID Nglanong SID Greneng	Construction Tempuran Construction Cacaban SID Nglanong SID Greneng	Construction Tempuran Construction Cacaban SID Nglanong SID Greneng	Construction Tempuran Construction Cacaban SID Nglanong SID Greneng	Construction Tempuran Construction Cacaban SID Nglanong SID Greneng	Construction Tempuran Construction Cacaban SID Nglanong SID Greneng	Construction Tempuran Construction Cacaban SID Nglanong SID Greneng	Construction Ngiangon Construction Greneng SID Simo SID Sanggeh														
BBWS Serayu Opak	SID Wadaslintang SID Sempor	SID Wadaslintang (con't) SID Sempor (con't) Construction Wadaslintang Construction Sempor	SID Wadaslintang (con't) SID Sempor (con't) Construction Wadaslintang Construction Sempor	SID Karangkates (con't) SID Selorejo (con't) Construction Karangkates Construction Selorejo SID Wonorejo SID Wlingi	SID Karangkates (con't) SID Selorejo (con't) Construction Karangkates Construction Selorejo SID Wonorejo SID Wlingi SID Darma	Construction Wonorejo Construction Wlingi SID Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh	Construction Sengguruh								
BBWS Brantas	SID Karangkates SID Selorejo																								
BBWS Cinanuk Cisanggarung																									
BWS Nusa Tenggara I	Construction Batujae	SID Pengga	Construction Pengga SID Tiu Kulit																						
BWS Kalimantan 3			SID Mrancang																						
BBWS Pontopongan Jeneberang			SID Kaloka SID Salomeko	Construction Kaloka Construction Salomeko																					
BWS Bondowoso					SID Sampelan Baru	Construction Sampelan Baru																			

Table A6-2. Schedule for Preparation and Implementation of Community-Based Reservoir and Catchment Management, 2009-2013

Name of PIUs	Year 1	Year 2	Year 3	Year 4	Year 5
PUP Lampung	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Batutegi Dam -Batutegi Catchment	Implementation of Community Participation on: -Reservoir and Dam Management in Batutegi Dam -Catchment Management in Batutegi Dam	Post Implementation guidance to the participating community groups	Post Implementation guidance to the participating community groups
	Provision of Training to Dinas and Balai PSDA	Community Preparation for Situpatok Dam	Implementation of Community participation on Reservoir and Dam management in Situpatok Dam	Post Implementation guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP West Java (as separate PIU)	Provision of Training to Dinas and Balai PSDA	Community Preparation for lot 1 -Cacaban Dam -Gembong Dam -Gunung Royo Dam -Wadaslintang Dam -Cengklik Dam -Wonogiri Dam -Wonogiri Catchment	Implementation of Community Participation for Lot 1 Community Preparation for Lot 2: -Malatiayu -Ngancar Parangjoho Plumbon -Banyukuwung	Implementation of Community Participation on Reservoir and Dam Management of Lot 2 in: -Malatiayu -Ngancar Parangjoho Plumbon -Banyukuwung	Post Implementation guidance to the participating community groups
	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Selorejo Dam -Gondang Dam -Karangkates	Implementation of Community Participation of Reservoir and Dam Management in Selorejo, Gondang, and Karangkates	Post Implementation guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP East Java	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Batujae Dam -Pengea Dam -Batujae Catchment	Implementation of Community Participation on Reservoir and Dam Management in Batujae, and Pengea, and Catchment Management of Batujae	Post Implementation guidance to the participating community groups	Post Implementation guidance to the participating community groups
	Provision of Training to Dinas and Balai PSDA	Community Preparation for -Kalola Dam -Kalola Catchment	Implementation of Community Participation on Reservoir and Dam Management, and Catchment Management in Kalola	Post Implementation guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP South Sulawesi	Provision of Training to Dinas and Balai PSDA	Community Preparation for Sembaja Dam	Implementation of Community Participation on Reservoir and Dam Management in Sembaja Dam	Post Implementation guidance to the participating community groups	Post Implementation guidance to the participating community groups
PUP East Kalimantan	Provision of Training to Dinas and Balai PSDA				

Annex 7: Financial Management and Disbursement Arrangements

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

Summary and Conclusion

1. The project will be financed by an IBRD loan and implemented over four years. The implementing agency is the Directorate General Water Resources (DG WR) at the Ministry of Public Works (MPW). The purpose of this project financial management assessment is to determine whether the financial management system of the implementing agency has the capacity to produce timely, relevant and reliable financial information on project activities, and whether the accounting systems for project expenditures and underlying internal controls are adequate to meet fiduciary objectives and allow the Bank to monitor compliance with agreed implementation procedures and appraise progress towards its objectives.
2. The main project risk is the limited capacity of financial management (FM) staff. CPMU/PIUs have limited dedicated FM staff as they have also other job assignments. In addition, the project has a wide geographic spread that creates project-implementation monitoring and supervision risks.
3. These risks will be mitigated by providing project management consultants, including financial management consultants. The project will be managed as a central government project in order to minimize complexity and ensure better coordination during project implementation. All implementing agencies' financial reports are subject to external audit.
4. Overall, the financial management risks for this financing are assessed as substantial before mitigation, and moderate after mitigation. This assessment has concluded that with the implementation of the proposed recommendations, the risks will be substantially mitigated, and the proposed financial management arrangements will satisfy the Bank's minimum requirements under OP/BP10.02.

Country Issues

5. Based on the Country Financial Management Assessment, Public Expenditure and Financial Accountability Report, and other assessments/reports, there are major acknowledged deficiencies in the public financial management area that have been accepted by the government. These are

- Inefficient budget formulation process;
- Fragmented cash management and government banking arrangements;
- Unreliable accounting and reporting systems;
- Lack of capacity in audit institutions;
- Poor salary and incentive structure, and lack of sanctions in the civil service;

- External audits are not risk-based and do not focus adequately on systemic issues.

6. Recent public financial management reforms in Indonesia have taken place as part of the broader macroeconomic stabilization reform agenda set out in the public financial management strategy 2001 and the Government White Paper of 2003. The Indonesian public financial management reform agenda is led by the Government, with technical support being provided by many donors, including the World Bank through GFMRAP.

7. Major progress in laying the foundations for public financial management reform has been achieved to date, including the enactment of a new State Finance Law and Audit Law, and the introduction of revised government accounting standards. Important changes have been made to the budgeting process, including the introduction of a unified budget, which commenced in financial year 2005. In addition, the government has been developing a Treasury Single Account for better cash management.

8. This project will avail of the country system to the maximum extent possible in several areas, including planning and budgeting, flow of funds mechanism, accounting and reporting, and auditing arrangements.

Strengths and Weaknesses

9. The project has strengths and weaknesses in several areas. The project design has the following strengths:

- CPMU and some local PIUs have previous experience in managing Bank financed projects, including the Dam Safety Project (DSP) and Water Resources and Irrigation Management Project (WISMP).
- The project will use central government budget documents (DIPA), instead of local budget mechanisms. Central government budget documents do not need to be included in local budgets, which require a longer budget-preparation process.

10. The main weaknesses noted during the assessment are as follows:

- CPMU/PIUs have limited capacity due to lack of dedicated FM staff
- A local PIU in Kalimantan does not have prior experience with Bank financed projects
- Project implementation involves a wide geographic spread
- Community capacity to manage community activities during pilot program

11. The project's weaknesses may create some risks for project financial management. The project includes several mechanisms to mitigate the risks. Among these are:

- The project will provide technical assistance, including financial consultants to assist the CPMU/PIUs in managing project implementation.
- The project will utilize an information system for the dissemination of project information, and the monitoring and evaluation of project implementation.

- The adoption of the incentive mechanism for community activities as applied in other Bank financed projects (KDP, UPP) but without using “block grants”.
- PMU/PIUs financial reports to be subject to external audit.

Risk Assessment Summary

12. A detailed analysis of the financial management risks arising from the country situation, the proposed project entities, and specific project features and related internal controls was completed during the assessment, and is summarized below. These risks have been rated on a scale of *high, substantial, moderate and low*. The overall financial management risk is assessed as substantial before mitigation and moderate after mitigation provided that all mitigating measures are effectively implemented and the project is effectively supervised.

Table A7-1. Risk Analysis and Mitigation.

Issues	Risks	Summary Comments And Risk Mitigation	Residual Risks	Condition of Negotiations/of Effectiveness (Y/N?)
A. Inherent Risks				
Country Level				
1. Public Financial Management	H	Government recognizes existing weaknesses in public financial management and has several programs to improve it, including through a Bank-financed project (GFMRAP). However, making substantial progress on the country issues has been challenging and will remain challenging.	S	
Overall Country Risk	H		S	
Entity Level				
1. Implementing Entity Organization <i>Status of the entity</i>	M	The project will be implemented by DG WR, MPW, MPW regional offices and local government agencies (Dinas PSDA). The regional offices (Balai) have a direct relationship with DG WR and will coordinate with Dinas for the implementation of local activities.	L	
Overall Entity Risk	M		L	
Project Level				
1. Project Complexity	S	The project will have a wide geographic spread. It will be managed as a central government project in order to minimize	M	

		complexity and ensure better coordination during project implementation.		
2. Financial management staff capacity. <i>Inadequacy of financial management staff</i>	S	CPMU/PIUs have limited dedicated FM staff to manage project implementation as they also have other job assignments. The project will hire FM consultants to assist the CPMU/PIUs in project implementation.	M	
Overall Project Risk	S		M	
B. Control Risk				
1. Budget <i>Delays in issuance and effectiveness of budget documents</i>	S	Delays in the issuance and effectiveness of DIPA may be minimized through prior circulars on working unit (Satker), and revision of documents when approved DIPA differs from proposal.	M	
2. Accounting <i>Reliability of accounting system</i>	S	All transactions should be recorded in the government accounting system and included in the financial reports. PIUs will prepare a separate set of project financial reports. The reports will be consolidated by CPMU.	M	
3. Internal Control <i>Inadequate payment verification</i>	S	The project will strengthen payment verification controls by incorporating additional performance certification prior to the making of payments. The supervision consultant will review and verify contractor performance. Financial control procedures will be included in the project management manual (PMM).	M	Done
4. Flow of Funds <i>Not used for intended purposes</i>	M	The flow of funds will follow the existing government system where the CPMU/PIUs will transfer directly to the contractor/supplier accounts.	L	
5. Financial Reporting <i>Reliability and timeliness of financial reports</i>	S	The CPMU/PIUs will prepare separate reports and conduct regular reconciliations (monthly and quarterly) with the special account. The quarterly reports should be submitted to the Bank 45 days after close of the quarter.	M	
6. External Audit	S	The auditor will use agreed audit terms of reference and CPMU will develop a	M	Done

<i>Poor follow-up on audit findings</i>		monitoring system to ensure that adequate follow-up action takes place in respect of audit findings. The TOR, monitoring system and procedures will be included in the PMM.		
Overall Control Risk	S		M	
Overall Risk	S		M	

Institutional Arrangements

13. A Central Project Management Unit (CPMU) will be established in the Directorate Rivers, Lakes and Reservoirs, DG WR, MPW. Local Project Implementation Units (PIUs) will be formed in the DSU as well as in the MPW's Balai (Regional Offices of MPW), and these will be responsible for implementing the sub-projects in the field. TA teams will be recruited to assist these Units.

14. The greenbelt and upstream river and catchment work will be conducted in cooperation with the Provincial Balai PSDA, which have a good record of catchment conservation and cooperation with local government and communities. The sites identified in the PIP concern areas where the Balai and local governments have been found responsive and willing to engage in such cooperation.

Budgeting

15. The project will follow the existing government budgeting system. The budget will be included in the GoI annual budget and MPW budget documents (DIPA). The budgets for local PIUs will be channeled through DIPA Balai and PSDA. There is a risk of project implementation delay arising from the tardy issuance of DIPA. Delay in the issuance and effectiveness of DIPA may be minimized through prior circulars on the work unit (Satker) decree, and revision of documents when approved DIPA differ from proposals.

Accounting and Reporting

16. All financial transactions will be recorded in the government accounting system and included in government accountability reports. CPMU/PIUs will prepare a separate set of project financial reports that are suitable for project monitoring purposes. Specific accounting procedures are set out in the Project Management Manual (PMM).

17. CPMU/PIUs will maintain separate accounting records for all payment requests (SPM) and remittance orders (SP2D) on a cash basis. CPMU will be responsible for preparing aggregate Interim Financial Reports (IFR) and submitting these to the Bank on a quarterly basis in formats agreed on with the bank. A Special Purpose Financial Statement for this project will be prepared annually for audit purposes.

Internal Control

18. The project will strengthen payment verification controls by incorporating additional performance certification prior to the making of payments. The supervision consultant will review and verify contractor performance. Financial control procedures will be included in the Project Management Manual (PMM).

Audit Arrangements

19. The Financial Management Unit is responsible for preparing general purpose financial statements. The audit of these statements will be carried out by auditors acceptable to the Bank. The annual audit report will be furnished to the Bank no later than six months after the end of the Government's fiscal year.

20. The audit assignment will be in accordance with the agreed terms of reference. It is expected that the external audit will go beyond merely providing an opinion on the accounts to include opinions on the internal control framework and compliance with the project management manual. CPMU will develop a monitoring system to ensure that adequate follow-up action takes place in respect of audit findings. The TOR, monitoring system and procedures will be included in the PMM.

21. The audit will also include an assessment of the reliability of project financial statements, and the verification of accounting information on a sample basis. The scope of audit will include a review and reconciliation of: (a) Special Account transactions and (b) quarterly interim financial reports.

Disbursement Arrangements

22. The applicable disbursement method is advance to the designated account. The designated account will be solely used to finance eligible project expenditures. Although the designated account will be under the name of DG Treasury MOF, the CPMU will be responsible for reconciling the designated account and preparing applications for the withdrawal of additional advances, duly approved by DG Treasury before their submission to the Bank. Copies of the designated account's bank statement will be provided to the CPMU by Directorate Cash Management, DG Treasury, MOF.

23. The ceiling on the advance to designated account will be USD 5 Million. Applications for replenishment to the designated account or reporting of use of the designated account will include: (i) list payments for contracts under the Bank's prior review, (ii) statements of expenditures for all other expenses, and (iii) designated account reconciliation statements.

24. All documentation for expenditures submitted for disbursement will be retained by the implementing unit and be made available to the auditors for the annual audit, and to the Bank and its representatives if requested.

Table A7-2. Allocation of Loan Proceeds

Category*	Amount of the Loan Allocated (expressed in USD)	Percentage of Expenditures to be financed (inclusive of Taxes)
(1) Goods, works, services, consultants' services and incremental operating costs for Part 1 of the Project	27,058,000	80%
(2) Goods, services, consultants' services, training and workshops and incremental operating costs for Part 2 of the Project	5,263,000	80%, except for Part 2(d) 100% for Part 2(d)
(3) Goods, services, consultants' services, training and workshops and incremental operating costs for Part 3 of the Project	11,992,000	80%, except for Part 3(d) 100% for Part 3(d)
(4) Goods, services, consultants' services, training and workshops and incremental operating costs for Part 4 of the Project	2,022,000	80%
(5) Goods, services, consultants' services, training and workshops and incremental operating costs for Part 5 of the Project	3,665,000	80%
TOTAL AMOUNT	50,000,000	

Flow of Funds

25. The project work units (Satker) at DG WR and PSDA will execute the project budget and administer it. All contractor or consultant invoices will be submitted to the commitment officer in the Satker. He/she will review and verify the invoices and relevant supporting documents, and then submit them to the verification officer. The verification officer will review and verify the invoices and documents before issuing the payment request (SPM) to the related local treasury office (KPPN). The KPPN will then issue a payment order (SP2D) to its operational bank which will arrange for remittance of the funds from the designated account to the respective contractor's or consultant's account.

Supervision Plan

26. Risk-based supervision of project financial management will be conducted during project implementation. This will involve a review of the project financial management system, including project expenditures, accounting, reporting and internal control framework. In addition, the review will include a review of external audit reports and follow-up action taking in respect of these audit findings. Financial management supervision will be conducted by a financial management specialist and Bank consultants.

Annex 8: Procurement Arrangements

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

A. General

1. Procurement for the proposed project would be carried out in accordance with the World Bank's "Guidelines: Procurement under IBRD Loans and IDA Credits" dated May 2004; revised October 2006, and "Guidelines: Selection and Employment of Consultants by World Bank Borrowers" dated May 2004, revised October 2006 and the provisions stipulated in the Legal Agreement. The various items under different expenditure categories are described in general below. For each contract to be financed by the Loan/Credit, the different procurement methods or consultant selection methods, the need for pre-qualification, estimated costs, prior review requirements, and time frame are agreed between the Borrower and the Bank in the Procurement Plan. The Procurement Plan will be updated at least annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

Procurement of Works

2. Works procured under this project would include: rehabilitation and repairs of dam body, repairs or upgrading of spill way, electrical and mechanical repairs or replacement, small dredging upstream the intake gate, installation of basic safety facilities, conservation works in the greenbelt and in upper catchment, and improvement of access road to the dam. The procurement will be done using the Bank's Standard Bidding Documents (SBD) for all ICB. For contracts of below a specific thresholds, procurement will be done through NCB or Shopping. Model Bidding Documents for both NCB and Shopping for Works are available and shall be described in the Project Management Manual (PMM) agreed with and satisfactory to the Bank. For smaller contracts that are often scattered in remote locations procurement may be carried out through a Force Account (FA) arrangement. Under this arrangement there will be (i) contract agreement between the PIU and the Community Group, and (ii) Grant to Community to stimulate the livelihood of the Community through the Community/Women Group. Guidelines and Procedures of the procurement through FA or with community participation shall be specified in the PMM. Although not anticipated, procurement through Direct Contracting will be included, subject to Bank's prior approval, for flexibility and to anticipate any emergency situation.

Procurement of Goods

3. Goods procured under this project would include: safety equipments, electrical and mechanical, and office support facilities. The procurement will be done using the Bank's SBD for all ICB. Model Bidding Documents for both NCB and Shopping for Goods are available and shall be described in the Project Management Manual (PMM) agreed with and satisfactory to the Bank. Where appropriate, to ensure the quality of equipment installation, procurement of specific goods will be packaged together the civil works.

Procurement of non-consulting services

4. Procurement of non-consulting services would include surveys such as sedimentation, topography, and geo-technical, and will be carried out through NCB. The procurement will be done using national standard documents agreed and satisfactory to the Bank.

Selection of Consultants

5. Consulting services will be procured for technical assistance for engineering, general project management, procurement management, financial management, technical assistance, studies and designs, facilitation of community participation activities. There will be three consultant packages of high value, i.e. one engineering TA and implementation management TA for DRLR for an estimated amount of US\$6.5 millions and US\$1.25 millions respectively, and one engineering TA for DSU for an estimated amount of US\$1.7 millions. The other consultant packages will be mostly small (less than US\$200,000) in terms of values. Selection of consultants will follow Bank's QCBS or QBS method as appropriate. Short lists of consultants for services estimated to cost less than \$400,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines. The PIU may consider short list consisting only of qualified institution or research agency or a university to carry out specific studies. Community facilitation may better be provided by NGO; therefore its selection should be based on short list of qualified NGOs only. For smaller contracts below US\$200,000, selection of consultants can be done through CQS method. Consultant may be selected through SSS method based on appropriate justifications stated in paragraph 3.10 of the Guidelines and subject to Bank's prior approval. To provide special advices to the project management, dam panel members, the project will need to recruit individual consultants. Individual consultants should be selected through a comparison of qualifications of at least three qualified candidates among those who have expressed interest in the assignments or have been approached directly by DGWR. In addition, with appropriate justifications specified in paragraph 5.4 of the Consultant Guidelines, and after concurrence by the Bank, individual consultants may be selected on a sole-source basis.

6. *Operating Costs:* Procurement of operating cost (non investment expenditures) such as travel cost, stationeries, rental costs etc. will be carried out using the implementing agency's administrative procedures agreed and satisfactory to the Bank and as will be reflected in the PMM.

7. *Others:* The project will finance overseas and in-country trainings. Selection of training provider (institute or university) should be preceded by a comparison of several alternative providers. Provision of Grant to the community group should be in accordance with a manual agreed and satisfactory to the Bank.

8. The procurement procedures and SBDs to be used for each procurement method, as well as model contracts for works and goods procured, are presented in the Project Management Manual (PMM).

B. Assessment of the agency's capacity to implement procurement

9. Procurement activities will be carried out by Project Implementation Units (PIUs) located in central and local government, as described in Annex 6. In central government there will be two PIUs, one under Directorate of River, Lake and Dam of Directorate General Water Resources (DGWR), and one under Dam Safety Unit, of the Ministry of Public Works. At local level there will be ten PIUs in the River Basin Management Office (Balai or Balai Besar Wilayah Sungai) - a unit that is responsible to central government, and in two of the provincial Dinas agencies (Provincial Water Resources Office).

10. An assessment of the capacity of a representative sampled Implementing Agency²²(PIU) to implement procurement actions for the project has been carried out by the Bank in May 2008. The assessment reviewed the organizational structure for implementing the project and the interaction between the project's staff responsible for procurement Officer and the Ministry's relevant central unit for administration and finance. The agency is staffed by senior engineers supported by some young engineers, financial and administration staff. The procurement unit is staffed by combination of engineers, administration and financial staff. As required by the Procurement Regulations, procurement activities under the Project will be led by the accredited procurement officers. The PIU has sufficient number of experienced procurement accredited staffs who will be assigned to the Project. The Project will prepare a Project Management Manual which will, in addition to the procurement procedures, contain the Standard Bidding Documents (SBDs) to be used for each procurement method, as well as model contracts for works and goods procured.

11. The key issues and risks concerning procurement for implementation of the project have been identified in the Procurement Capacity Assessment Report and include: (a) low capacity in the World Bank's Procurement, (b) differences between the World Bank's Guidelines and the Country Procurement Regulations (Keppres no.80/2003) creates implementation problems, (b) instances of corruption and collusion in procurement in project's implementation in Indonesia, and (c) difficulties in budget planning process which impacts procurement. The corrective measures which have been agreed are listed below:

- To mitigate the risk associated with the low capacity in handling Bank financed procurement and delays in procurement the Bank will provide procurement training during the preparation phase of the Project as well as at project launching. DGWR should also conduct procurement workshop as part of annual budget

²² In addition to Central PIU, three BWS were sampled: Balai Besar Brantas (East Java), Solo (Central Java) and Lombok (West Nusa Tenggara) out of an estimated total of ten BWS/BBWS.

preparation. *As a condition of negotiations*, the DGWR shall have drafted the TOR and any relevant recruitment documents in order to hire a procurement consultant who has sufficient hands-on experience in Bank Procurement to support project implementation. The consultant may be hired as an individual consultant or as part of project management consultant firm. The consultant will be based at the central PIU and support procurement committee and procurement management at both the central and local PIUs. The consultant will also assist staffs assigned by DGWR to act as a focal point for all procurement related transactions between the central and local PIUs with the Bank, and monitor progress in procurement.

- To mitigate the risk associated with the use of Country Procurement Regulations (Keppres no.80/2003 and other local regulations), DGWR will prepare an operational instructions for procurement in the PMM which is based on Bank's Procurement Guidelines and includes SBD and RFP templates required under the Project. Following the Financing Agreement, the Procurement Section should clearly state that Bank rules shall prevail in the case of conflicts between the Bank procurement guidelines and Keppres 80/2003 or other local rules and regulations.
- To mitigate the risk of corruption, DGWR will include, in the PMM, the established measures to address corruption issues such as procedures to include independent members of civil society as observers for procurement, steps to process report and investigate any cases of collusion, fraudulent, corrupt and coercive practices, as well as steps to process remedial actions, and other measures specifically described in Annex 11 "Governance and Accountability Strategy". This would include automatic referrals to BPK and KPK (the national Corruption Eradication Commission) to conduct investigative audits if there are strong indications of such irregular practice. To enhance procurement monitoring as well as disclosure, DGWR should set up a website accessible to the public which provides information on Project's procurement and results and includes facilities for complaint handling.
- To mitigate the risk of delays due to budgeting process, DGWR will do advance procurements of all critical packages as specified in the Procurement Plan, in addition to closer coordination with MOF to resolve any budgeting issue. In particular, DGWR should do advance selection of several key individual consultants, including for procurement, until the project management consultant is hired.

12. Based on the above, the initial project risk in terms of procurement is "Substantial". After successful implementation of the above mitigation measures, the procurement risks can be rated as 'Moderate' based on the following reasons:

- The mitigation action plan has been identified and treated as conditions of negotiation.
- The Project consists mainly of standard contracts of construction works and goods which are relatively small in value. There will be three consultant packages of significant, while other packages are relatively small value (refer to paragraph 190).
- The procurement unit at each of the implementing unit is sufficiently staffed with procurement accredited staffs, and has sufficient procurement experience to procure contracts with similar scopes and amount funded by Government budget or other donors. At the time of the appraisal, procurement staffs at the CPIU had received training from the Bank. Final drafts of the TORs for the recruitment of individual consultants who will provide the support in 2009 awaiting mobilization of the TA teams were prepared and delivered for negotiations, including one general implementation/procurement specialist.
- While current public procurement environment and administrative arrangement in general remains fragile to aspects leading to fraud and corruption, current corruption eradication activities by KPK provide noticeable and positive impacts on how implementing unit ensure integrity of procurement transactions.

The proposed thresholds for procurement are as follows:

No.	Procurement Method	Procurement Method Threshold	Prior Review Threshold	Comments
Goods, Works, Non-Consulting Services				
1.	ICB (Goods)	$\geq \$200,000$	All	
2.	NCB (Goods)	<\$200,000	First Contract and all subsequent contracts above \$100,000	
3.	ICB (Works)	$\geq \$3,000,000$	All	
4.	NCB (Works)	<3,000,000	First contract and all subsequent contracts above \$500,000	
5.	Shopping	<\$50,000	None	All subject to ex-post review
6.	Direct Contracting	Bank's prior approval	All	
7.	Force Account and Community Participation	<\$15,000	None	All subject to ex-post review Procedures included in PMM

Consultant Firm				
1.	QCBS, QBS	≥\$200,000	>\$100,000	
2.	CQS	<\$200,000	>\$100,000	
3.	SSS	Bank's prior approval	All	None anticipated Included for flexibility
Individual Consultant				
1.	Competitive	N/A	None	Prior review contracts will be specified in Procurement Plan
2.	Sole-source	Bank's prior approval	All	

C. Procurement Plan

13. The Borrower, at appraisal, has developed a procurement plan for project implementation which provides the basis for the procurement methods. This plan has been agreed between the Borrower and the Project Team at negotiation, and is available at Central Project Management Unit (CPMU) and will be published in the project web site. It will also be available in the project's database and in the Bank's external website. The Procurement Plan will be updated in agreement with the Project Team annually or as required to reflect the actual project implementation needs and improvements in institutional capacity.

D. Frequency of Procurement Supervision

14. In addition to the prior review supervision to be carried out from Bank offices, the capacity assessment of the Implementing Agency has recommended annual supervision missions to visit the field to carry out post review of procurement actions.

E. Details of the Procurement Arrangements Involving International Competition

A. Goods, Works, and Non Consulting Services

- i. List of contract packages to be procured following ICB and direct contracting: All contracts for Goods and Works above USD 200,000 and USD 3,000,000 respectively will be procured through ICB. There is neither ICB package nor direct contracting foreseen in the first and second year of project implementation.
- ii. All ICB contracts, first NCB contracts for Goods and Works, NCB for Goods and Works estimated to cost at or above USD 100,000 and USD 500,000 respectively per contract and all direct contracting will be subject to prior review by the Bank.

B. Consulting Services

(a) List of consulting assignments with short-list of international firms.

1	2	3	4	5	6	7
Ref. No.	Description of Assignment	Estimated Cost (US\$)	Selection Method	Review by Bank (Prior / Post)	Expected Proposals Submission	Comments (Expected Mobilization)
1.	TA Consultant, (incl. Job Analysis, Dev't Modul & Curr., Comp. Standar)	6.75millions	QCBS	Prior	April 2009	July, 2009 ²³ - Dec 2013
2.	TA Consultant DSU strengthening	1.72 millions	QCBS	Prior	April 2009	July, 2009 – December 2013
3	TA Consultant Implementation & Financial Management	1.10 millions	QCBS	Prior	April 2009	June, 2009 – December 2013
4	Special Study Jatiluhur Dam – BBWS Citarum	690,000	QCBS	Prior	January 2010	April, 2010 – March, 2011
5	Hydrometric Data Analysis – DRLR	620,000	QCBS	Prior	February 2010	April, 2010 – March, 2011

(b) Consultancy services estimated to cost above US\$ 100,000 per contract and single source selection of consultants (firms) will be subject to prior review by the Bank.

(c) Short lists composed entirely of national consultants: Short lists of consultants for services estimated to cost less than US\$ 400,000 equivalent per contract may be composed entirely of national consultants in accordance with the provisions of paragraph 2.7 of the Consultant Guidelines.

²³ Requires Request for Expression of Interest / start recruitment in October. 2008

Annex 9: Economic and Financial Analysis
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

A. Economic Analysis

1. **Introduction.** The proposed project would: (i) support operational and physical improvements of 34 dams; (ii) promotion of a structured O&M program by ensuring adequate dam O&M budget funding and assets management for 63 dams; (iii) initiation a program to address watershed erosion and sedimentation; and (iv) establishment sustainable institutional arrangements and program for community participation in reservoir management; and strengthen national dam safety assurance institutions and bringing all public and privately owned dams under their purview. The project works throughout the country, which are mostly located in Java Island.

2. The proposed project would: (i) ensure dam safety or reduce risks of dam failure; (ii) prolong the life of dams and reservoirs and restoring their performance, and strengthen institutional capacity for asset management; and (iii) mitigate watershed erosion and sedimentation. Operational and physical improvements would ensure safety and reduce risks of dam failure and consequently prevent or minimize damages to downstream property and environment, loss of life, loss of reservoir supply and replacement costs of the dam or construction cost of alternative water supply. The economic life of dams and reservoirs would be extended through interventions of remedial works and sediment removal, and provision of adequate O&M budget.

3. The remedial works would also prolong the life of dams, while the improved O&M would increase their operational performance. Inadequate dam O&M budget inevitably caused deferred maintenance and premature rehabilitation costs. Many dams suffer from operational deficiencies, while some dams have structural and mechanical problems that could become a safety hazard. Some dams are prematurely nearing the end of their economic life, others have lost a large proportion of their reservoir capacity. As a result, the volume of water storage in many reservoirs is decreasing as well as the irrigated areas. The sedimentation mitigation and watershed treatments would reduce reservoir sediments, restore capacity of reservoir storage, and reservoir and flood routing capacity.

4. The economic rationale of dam rehabilitation and safety is foremost the protection of human lives. Conversion of this protection into economic analysis is precarious. Further benefits relates to (i) avoidance of direct physical damage to private and public assets downstream of the dam at risk; (ii) avoidance of the very large indirect negative multiplier effects on the various sectors of the economies downstream of the reservoirs, irrigated agriculture being the main driver of those local economies; and (iii) avoidance of replacement of the dam and reservoir.

5. The primary beneficiaries are both urban and rural communities of over 9.5 million people over the whole program of DOISP + the successor project (and 8.1 million

people under DOISP) dependent on reservoirs for their water supply and livelihood as well as all downstream communities of 63 dams and 34 dams respectively, who could be placed at physical and/or environmental risk if dam safety is compromised.

6. **Economic Analysis.** It is difficult to estimate the probability of failure of any given dam. International experience suggests that a comprehensive dam safety program like DOISP can reduce the probability of dam failure by, at least, one order of magnitude from the existing conditions for “moderately intensive” repairs and rehabilitation, and up to two orders of magnitudes for “deep” rehabilitation and replacement of larger components of the structure and its equipment. The experience with the Armenia Dam Safety Program (two phases: 1999-2009) corroborated this value of one order of magnitude. Calculations that seek accurate probability figures generally fail because of the complexity of the risk structure, unless a large number of historical data on the portfolio is available, which is never the case in developing countries. Therefore, it is a good practice to make an overall assessment of probability of dam failure reduction, and then carry out sensitivity analysis. In the case of DOISP, the most credible value for the with/without project (WP/WOP) probability of dam failure is 0.1, i.e. one order of magnitude reduction. However, economic analysis has also been carried out assuming the ratios of 0.5 and 0.8. In judging the results, one should keep in mind that the primary objective of dam safety programs is protecting human lives, and preventing the huge multiplier effects that would be induced in various sectors of the economy by the catastrophic consequences of a major dam failure. In addition, the economic analysis has been undertaken in the context of a programmatic approach for the overall DOISP program (including the successor project) and for the DOISP project alone.

7. The rates of dam failure have been assumed at 13% in a period of 20 years in the WOP alternative, and reduced to 1.3% in the WP alternative²⁴. This is conservative, as a best estimate of (limited) portfolio dam failure for Indonesia suggests a value of 3.8%/year based on recorded referable dam failures since 1960 (Annex 1). To be conservative, the extent of life and assets losses has been taken at 30% for loss of farm incomes and 10% of household assets. Potential losses include: (i) severe safety risk for 8.1 million people living downstream of 34 highly risky dams (9.5 million for DOISP+successor project); (ii) potential flooding and loss of irrigated area through the guaranteeing of water supply to an area of 270,000 hectares (310,000 ha for DOISP+successor project), which produces annual farm net income of US\$210 million (US\$240 million for DOISP+successor project); and (iii) potential destruction of 200,000 homes (235,000 for DOISP+successor project) worth US\$360 million (US\$420 million for DOISP+successor project).

²⁴ This analysis only takes into account the impact on communities and assets located directly downstream of the reservoir. It does not include the impact on water users and other interests that depend indirectly on the river and reservoir, like the Greater Jakarta conurbation which depends on the functioning of the Curug water intake and pumping station downstream of the Juanda (Jatiluhur) reservoir on the Citarum river (see footnote 2).

8. The base level of economic rate of return (ERR) of 32.8% for DOISP and 32.3% for the DOISP + successor project, counting only potential losses of farm incomes and household assets. The ERR of the DOISP + successor project roughly equals that of DOISP itself due to the modest increase in the benefits against the significant increase in additional investment costs. The results of the ERRs are robust; benefits actually have been under-estimated because the loss of other non-household assets has not been accounted for, e.g. the replacement costs of the dam and of other important infrastructure.

9. **Sensitivity Analysis.** The sensitivity analysis shows that for WP/WOP ratios of probability of dam failures of 0.5 and 0.8, the ERRs reach 22% and 8.5% respectively. The threshold level of ERR of 12% is met when the ratio of probability of dam failure is 0.75. If the project cost were to increase 20% and the extent of potential net farm incomes were to reduce to 20% and to 10% for household assets, the ERR decreases to 31.2%. Moreover, even if all the benefits from the assumed damage to household assets are excluded, the ERRs of the DOISP (15.4.3%) and of the DOISP + successor project (13.1%) are still well above the level of 12%. The results of the sensitivity analysis on ERRs and NPVs are summarized in Table A9-1.

Table A9-1. Sensitivity Analysis on ERRs and NPVs for DOISP and DOISP + Successor Project

	DOISP+Successor project		DOISP	
	ERR (%)	NPV (US\$M)	ERR (%)	NPV (US\$M)
Base Case1/	32.3	115	32.8	108
Base Case2/	13.1	4	15.4	12
If ratio of WP/WOP Dam Failure of 0.5			22	41
If ratio of WP/WOP Dam Failure of 0.75			12	-
If ratio of WP/WOP Dam Failure of 0.8			8.5	-11
If Project costs +20%, extent of loss of net farm incomes 20% and of houses 10%			31.2	93

1/ Counting potential losses of farm incomes and household assets.

2/ Counting only potential losses of farm incomes.

10. Majors assumptions used in the economic analysis are summarized below:

- (a) The analysis has been carried out in early 2008 constant prices for the DOISP program (DOISP + successor project) and DOISP alone;
- (b) Project costs included physical contingencies, net of price contingencies and taxes. Local costs have been adjusted to border prices by using a Standard Conversion Factor (SFC) of 1.0 as used by WISMP. Project costs of the successor project have been estimated and included in the analysis of the overall program;

- (c) Incremental O&M costs have been included for the overall program and DOISP itself;
- (d) The rates of dam failure have been assumed at 13% in WOP and reduces to 1.3% in WP over the period of 20 years owing to project investments;
- (e) Potential losses included only losses of farm incomes and household assets. To be conservative, the extent of life and assets losses has been taken at 30% for loss of farm incomes and 10% of household assets including (a) potential flooding and loss of irrigated area through the guaranteeing of water supply to an area of 310,000 hectares (270,000 ha for DOISP), which produces annual farm net income of US\$240 million (US\$210 million for DOISP); and (iii) potential destruction of 235,000 homes (200,000 for DOISP) worth US\$420 million (US\$360 million for DOISP) as summarized in Table A9-2:

Table A9-2. Assumptions for the Economic Analysis

	DOISP+successor project	DOISP
Total Irrigation Service Area (ha)	686,500	601,100
Annual Cropped Area (ha) ^{1/}	1,030,000	900,000
Total Annual Net Production Value (US\$m) ^{2/}	810	710
30% of Net Production Value (US\$m)	240	210
Number of Houses	2,346,000	2,000,000
Total Value of Houses (US\$m) ^{3/}	4,200	3,600
10% Value of Houses (US\$m)	420	360
Total potential losses (US\$m)	660	570

1/ Cropping intensity of 1.5.

2/ US\$790/ha.

3/ US\$1,800 per house.

- (f) Economic prices of farm inputs and outputs have been derived from the World Bank Commodity Price Forecast, October 2008; average prices have been used;
- (g) Per ha crop budget for irrigated paddy in financial and economic prices have been used in valuing the net farm incomes; and
- (h) The potential losses were summed for all 34 and 63 dams, respectively, and then integrated into a 20 year calculation considering benefits of foregoing these losses by annual rates of dam failure.

B. Financial Analysis

11. The purpose of the financial analysis is to assess the fiscal impact and the incremental financial burden on the central and provincial governments, and the water users, particularly from expenditures incurred for and from revenues generated from O&M of dams and reservoirs. The results would be instrumental to enable GOI to prepare the necessary policies and regulations on whether to continue the present policy of selectively collecting water fees from some groups of users (irrigation currently being exempt, for example).

12. **O&M Expenditures.** No regulations exist to require collection of water fees from the main water users, viz. irrigators (representing about 99.7% of the users from the DOISP reservoirs). Only a small portion of the bulk water is supplied to hydropower, and

industrial and domestic users. Except for bulk water supply from reservoirs located in the basins of which the management is entrusted to the PJT I and II--state enterprises--also these non-agricultural water users are currently exempt from river management charges. Thus, annual O&M expenditures for dams and irrigation facilities are fully financed from the central and provincial governments' budgets. The PJT I and II, active in the largest river basins in East, Central and West Java collect fees for water supplied for hydropower, urban and industrial uses (including the Jakarta, Bandung and Surabaya conurbations).

13. The actual O&M expenditures of the 63 short-listed large dams amounted in 2007 to Rp26.29 billion, compared with the total needs of Rp43.08 billion, as estimated at 0.25% of the Modern Equivalent Asset Value (MEAV) of the dams, or 63% of these needs (Table A9-3). Of the O&M expenditures, on the average about 80% were spent for civil works and 20% for salaries. These expenditures were shared between the central and the respective provincial governments at the ratio of 80:20, although the share of the provincial governments' funding has been decreasing about 16%. The current actual dam O&M expenditures are still inadequate, although budget availability has increased overall over the past 5 years. Therefore, the project would provide incremental O&M budget for 63 dams with a total annual incremental budget of Rp16.80 billion to prevent deferred O&M works. This incremental budget will be financed by GOI.

14. The financial analysis for DOISP considers only water supplied for irrigation because water supply for other uses is less than 0.5%. Two financial cash flows, Options I and II, have been prepared to illustrate the financial impact on project investments and cost sharing on dam O&M expenditures among central and provincial governments, and water users. It is thus assumed that: (i) under Option I, the present policy will prevail and there will be no water charges in future, and the O&M expenditures will be fully borne by the central and provincial governments; and (ii) under Option II, the Government will enact regulations and collect water charges in the future and the O&M expenditures will be borne by water users.

15. Under Option I, the analysis indicates that the annual fiscal burden from the O&M budget on the central and provincial governments would increase by 64% from US\$2.82 to US\$4.63 million. These incremental fiscal burdens could be reduced through a partial collection of water charges from water users. The fiscal burden could be entirely removed if the government wishes to fully collect water charges from all sectors of water users, as under Option II. The water rate is estimated at US\$4.5 per irrigated ha (Rp41,850/ha) based on an annual O&M budget of US\$4.63 million and irrigated paddy area of 1,030,000 ha. A water rate at US\$4.5/ha (Rp41,850/ha) would account for less than 1% of the net financial return per ha of irrigated paddy. In terms of water volume used, the water rate is estimated at Rp6/m³. On this basis, it is expected that gradual introduction of a water charge will not significantly burden farmers, as farmers will be able to absorb the charge. However, given that the recent 2004 Water Law specifically exempts individual small farmers from water charges, it is unlikely that this situation can be addressed within the scope of DOISP.

16. Major assumptions used in the financial analysis are:

- (a) The analysis has been undertaken in early 2008 constant prices. Project costs included physical contingencies and financial charges. The costs and revenues in Rupiah have been converted to US dollar at the average official exchange rates of US\$1.00=Rp 9,300 prevailing during project preparation.
- (b) Total project cost of DOISP is estimated at about US\$73 million, including US\$50 million IBRD loan and US\$23 million GOI counterpart funds. The project includes remedial works of 34 dams, and incremental O&M costs of 63 dams, reservoir sedimentation mitigation and intervention, watershed management, dam safety assurance and capacity building and project management support.
- (c) Loan repayment and interest charges are borne by the central Government. IBRD loan is repayable over 15 years, including a grace period of 5 years for principle at the lending rate of 3.5% per annum.
- (d) Incremental O&M budget has been estimated based total O&M needs (2.5% of dam MEAV) less 2007 actual O&M expenditures of 63 dams.
- (e) To address the issue of deferred O&M budget of 63 dams under the project, the analysis has included incremental dam O&M costs of 63 dams in the analysis.
- (f) The O&M cost sharing ratio between central and provincial government at 80:20 has been maintained.
- (g) Total irrigation service areas of 63 dams are 686,500 ha and total annual cropped areas of about 1,030,000 ha at the cropping intensity of 150%.
- (h) Water charges per ha and season have been estimated at US\$4.5 (Rp41,850) per ha based on total annual irrigated areas of 1,030,000 of 63 dams and the estimated total O&M budget of 63 dams.
- (i) Per ha financial crop budget for irrigated paddy has been prepared and used to assess the impact of water charges.

Table A9-3 Calculation of O&M requirements on 34 DOIISP dams. Summary of Dam Profile and Downstream Data

MEAV	Actual Constr Cost	Total needed O&M Cost	Cost	Rp million	(Rp Million)	Population	Houses	Irrigation Service	Hydro-power (MWH)	Hydro-power (m3/s)	Dom. water (m3/s)
					US\$ M			Area (ha)			
Krisak	185118		463	150	313	0.034	5000	1250	274		
Gondang	190145		475	150	325	0.035	130000	32500	10500		
Batuaji	85282		622	518	104	1/	0.011	130000	32500	3350	
Gembong	135254		338	28	310	0.033	130000	32500	3855		
Ir. H Juanda (Jatiluhur)	812923	2372039	5930	3625	2305	2/	0.248	500000	125000	240000	350
Wadaslingtan	712605		2832	2360	472	1/	0.051	500000	125000	31634	92
Sempor	320898		1553	1294	259	1/	0.028	500000	125000	17000	6
Malahayu	109999		2160	1800	360	1/	0.039	130000	32500	18456	
Penjalin	154022		385	150	235	0.025	130000	32500	29000		
Cengklik	261962		655	36	619		0.067	1000000	250000	1578	
Ketro	62326		156	40	116		0.012	130000	32500	400	
Selorejo	363783		1264	1054	210	1/	0.023	130000	32500	5700	49
Karangkates	660643		2523	2103	420	1/	0.045	1000000	250000	34000	488
Batutegi	808170		2020	1208	812	0.087	130000	32500	90000	125.	
Cacacaban	149314		373	25	348	0.037	130000	32500	17481		
Tempuran	81987		205	37	168	0.018	5000	1250	923		
Tiu Kulit	190317		476	150	326	0.035	5000	1250	1800	.075	
Nglangon	63239		158	119	39	0.004	5000	1250	750		
Darma	96784		288	240	48	1/	0.005	130000	32500	22316	
Wonorejo	678318		1696	795	901	0.097	500000	125000	7540	6.02	8.02
Wingi	216163		862	718	144	1/	0.015	500000	125000	13600	188
Sengguru	200354		2786	2322	464	1/	0.050	500000	125000	0	98.5
Way Japara	44770		112	80	32	0.003	130000	32500	6651		
Kalola	154845		387	150	237	0.025	130000	32500	6803	14219	

Kedung Uling	77959		195	40	155		0.017	130500	32625	569	
Pacal	70533		176	40	136		0.015	130000	32500	16600	
Plumbon	34013		85	38	47		0.005	130000	32500	1045	
Pengga	173013		433	150	283		0.030	500000	125000	3589	0.4
Simo	128142		320	18	302		0.032	5000	1250	482	
Sanggah	36596		92	80	12		0.001	5000	1250	263	
Greneng	64587		162	57	105		0.011	5000	1250	251	
Sampean Baru	129351		323	112	211		0.023	500000	125000	9800	
Merancang	143425		359	75	284		0.031	130000	32500	3160	
Salameko	194470		1461	1218	243	1/	0.026	5000	1250	1742	
Total DOISP	1	7791310	9350426	32325	20980	11345	1.220	8120500	2030125	601112	

1/ Where actual O&M cost exceeds total O&M needs, incremental annual O&M cost has been estimated at 20% of actual O&M cost.
 2/ Estimated at 2.5% of the actual construction cost.

Annex 10: Safeguard Policy Issues

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

A. General

1. The project implementation plan (PIP) outlines the following investment program for DOISP (see also Annex 4):

- 2009 (Year 1): 4 sub projects (dams/ reservoirs),
- 2010 (Year 2): 10 sub projects (dams/ reservoirs),
- 2011 (Year 3): 10 sub projects (dams/ reservoirs),
- 2012-2013 (Year 4/5): 10 sub projects (dams/ reservoirs),
- 2009-2013: activities based on community participation in 20 reservoir greenbelts and upper (sub-)catchments, the latter on a pilot basis, and emulating successful earlier models.
- 2009-1013: institutional strengthening and studies, for portfolio-wide dam safety programs including mainstreaming of safeguards.

2. DOISP would be the first project in an 8-year programmatic engagement comprising two projects aiming at reducing the risks, and improving the operational performance of in total 63 dams /reservoirs, and strengthening the regulatory, administrative and financial capacity to manage the dam infrastructure. DOISP will address the works and activities (sub-projects) on 34 dam/ reservoir sites that are prioritized based on urgency, and readiness for implementation. The more complex sub-projects (29, plus “second phases” in 14 sub-projects that need to be continued from DOISP) will be (partly) prepared under DOISP for implementation under the follow-up project, including the safeguards requirements. The DOISP sub-projects have been assessed (Annex 4) as having a safety urgency, and they can be prepared and implemented within a reasonable short period, and do not involve complex operations from a technical and safeguards perspective.

3. The 34 short-listed sub-projects have been pre-screened based on World Bank and GOI criteria (see also below) and according the World Bank guidelines and the GOI regulations regarding social and environmental safeguards (see the Environmental and Social Safeguards Management Framework [ESMF]). The ESMF is meant for use by the different stakeholders; including planning or development authorities, implementing agencies, relevant environmental protection and management authorities, appointed

certified contractors, and environmental experts carrying out assessment of plans and programs. The DOISP sub projects are restricted to improving O&M and safety, and minor localized remedial and rehabilitation works and activities such as (re-) placing of instrumentation, sealing of the crest surface with pavement slabs, stabilization works of local nature at upstream and downstream dam slopes and at the dam toes, cleaning and (limited) sediment removal, brush removal and repair work of spillways, etc. The potential adverse environmental impacts associated with these works will mostly be construction-related and will be local, minor and reversible through the use of readily available and simple mitigation measures such as enhancement of good construction practice through enforcement of legal clauses in the civil works contracts. Typical activities are those as relevant for the four first sub-projects to be implemented in Year 1 as described in Table A10-1. These will be associated with good practice measures for management of small amounts of spoil material, handling of lubricants and other petroleum products for construction plant and equipment, transporting of fill and gravel material, dust and noise management, etc. Thus, all sub-projects are assessed as Category B, and DOISP is a Category B Project.

4. The DOISP sub-projects are located on Java (West Java, Central Java, Yogyakarta and East Java), and some in NTB, Lampung, East Kalimantan and South Sulawesi. All project activities are located on lands already converted and will not lead to alterations in the existing land use patterns. Nearly all sites are located in areas characterized by low population density and low to medium intensity agriculture in the upland, vicinity and downstream of the reservoir (such as smallholder plots; plantations; and community-owned forest [*hutan masyarakat*], production forest and some protection forest in the upper reaches). Only the Jatiluhur reservoir lies downstream of a large conurbation (Bandung) and will in the future be exposed to growing pollution. The project will not fund any activity within or close to natural habitats, declared forest and wildlife reserves and protected areas, and none of these sensitive areas are identified in the vicinity of the dams/ reservoirs, or within a distance that would allow physical impacts.

B. Environmental Safeguards

5. Environmental management of DOISP will be based on two approaches: (i) environmental safeguards articulated in the ESMF that sets out the objectives and principles of the Environmental Management Plans (EMPs) of each individual sub-project, and (ii) mainstreaming environmental issues into portfolio management to enhance sustainable outcomes. The ESMF sets the principles and measures for screening of each sub project, to ensure that all the potential environmental and social impacts for each sub project are identified prior to their implementation, and that the corresponding mitigation and monitoring management measures are developed, and that the institutional responsibilities for their implementation are appropriately assigned. Four EMPs have been prepared for the first four sub-projects to be implemented in Year 1.

6. Each year the CPMU will submit an Annual Work Plan (AWP) and budget for the next year for Bank approval, conform with the practice in many Bank-assisted MPW projects. The AWP will comprise, beside the technical preparation documents, the economic feasibility analysis and the EMPs for the next set of sub-projects. In the event that the detail screening raises unforeseen environmental or social concerns, this will be reflected and addressed in the EMP. In the event that these unforeseen concerns would require a more comprehensive Environmental Assessment (EA) and a more in-depth AMDAL--as per to GOI regulations--then the sub-project may be further prepared under DOISP, however, its implementation will be deferred to the successor project. This procedure will ensure that sub-projects that would have more significant negative or potentially irreversible impacts, will be subject to the full appraisal conducted for the successor project.

7. Sub-projects are located on lands already converted and will not lead to alterations in the existing land use patterns. Nearly all sites are located in areas characterized by low population density and low to medium intensity upland agriculture. Thus, water and sediment quality are generally good to very good. Thus, water and sediment quality are generally very good. Some reservoirs have moderate eutrophication problems with seasonal water hyacinth blooms which need to be cleared when they obstruct the reservoir outlets. Only the Juanda/Jatiluhur reservoir lies downstream of a large conurbation (Bandung) and will in the future be exposed to growing pollution. These water quality issues need to be addressed through different dedicated river basin and water quality management programs. DOISP will not finance the following types of subprojects: (i) construction of new dams; and (ii) activities that are likely to have significant adverse environmental impacts or that are sensitive, diverse, or unprecedented. If a subproject is likely to impact on sensitive sites either by being located in close proximity to a sensitive site, or if the nature of the sub-project activity could directly impact on a sensitive site (e.g., national park, wildlife reserve, etc), an Environmental Assessment and an AMDAL may be triggered; implementation of such sub-projects will be deferred to the successor project. Activities that would fall in this category are, for example, dam crest raising, large-scale sediment removal (over 500,000 m³); and dam decommissioning.

8. The participatory activities in 20 reservoir greenbelt areas and 4 pilot (sub-) catchments will apply community participation approaches. Any activities will therefore be of very local nature and mostly build on existing local community practices. They will not entail sizeable construction, agricultural programs or other interventions that could have a major or irreversible negative impact, and would require EMPs. However, in the event an intervention would be more sizeable than currently planned, the same procedure will be applied as in the case of the sub-projects.

9. The first 4 sub-projects (Batuaji (NTB), Gondang (East Java), Gembong and Krisak (Central Java)) involve localized repair and rehabilitation (Table A10-1). The screening has shown that the indirect and direct environmental and social impacts both

upstream and downstream associated with the activities can be considered minimal, and as such the sub-projects are associated with an EMP outlining the impact mitigation measures, and an UKL/UPL (under GOI regulations). These four EMPs have been reviewed by the World Bank task team.

Table A10-1. DOISP Year 1 sub-projects that were part of DOISP appraisal.

Dam/Sub Project	Category	Proposed Civil Works	EA Category	EA Document
Krisak	2	1. Cleaning of sediments from toe drain. 2. Repair of Irrigation outlet channel stone masonry 3. Repair cracks in the spillway stilling basin and the D/S channel. 4. Replace the wooden deck of intake structure bridge 5. Repair the inspection road and repair of the dam crest with an ATB layer 6. Replacement of 9 stand pipe piezometers, 2 V-notch Weirs, 10 Surface monuments, repair to staff gauge and provision of a dip meter.	B	UKL/UPL (/EMP)
Gondang	1	1. Both dam crest and the approach road should be rehabilitated with ATB. 2. Add Rip rap where necessary. 3. Removal of plants and shrubs from dam body 4. Cleaning of channel on D/S of V-notch. Hand rails should be installed along dam crest, both U/S and D/S. 5. All malfunctioning instruments should be replaced	B	UKL/UPL (EMP)
Batujai	2	1. Refurbishment of rip rap in certain areas 2. Repair crest road 3. Repair parapet wall 4. Repair/replace damaged Instruments.	B	UKL/UPL (EMP)
Gembong	1	1. Asphalt concrete overlay is recommended for the dam crest. 2. Parapet wall to be provided on D/S edge of crest road for safety of people 3. Repair of the spillway stilling basin and the channel on D/S. 4. Removal of plants from dam toe 5. Replacements of 13 surface movement monuments, two V-notch weirs and Nine stand pipe piezometers.	B	UKL/UPL (EMP)

10. No legacy issues were identified with the 34 sub-projects. All of the dams/reservoirs are operational for many decades already and have shaped the regional social

and economic geography. The dams have been regulating their respective rivers thereby providing raw water to existing irrigation or water supply schemes, reducing flooding and in a few cases producing modest amounts of hydropower. As such, the benefits of the structures are locally recognized.

11. **Mainstreaming Environmental Issues.** Beyond putting in place the safeguards for the specific sub-projects, the environmental concerns will become integrated more broadly into the portfolio management that is supported by the project. The project will support institutional strengthening that will, *inter alia*, include developing capacity and procedures/ manuals to identify and scope key environmental issues related to operation and improvement of reservoirs and dams, such as water quality, erosion, sediment removal and disposal, and riparian issues, into the overall operational and decision making processes. The ESMF has adopted a due-diligence approach as part of the screening mechanism given that these dams have been existing for decades, which would identify any environmental legacy issues that may affect a programmatic approach towards their management. Thus, in the medium to long term, the project is likely to have enhanced environmental outcomes.

12. **Documentation for Appraisal.** The following safeguards documents were part of project appraisal:

- Environmental and Social Safeguards Management Framework;
- Environmental Management Plans for Batujai, Gendong, Gombang and Krisak sub-projects.

13. **Consultations.** The Government held a consultative workshop on the draft ESMF and EMPs in Semarang, Central Java --a central location for the first set of sub-projects-- on August 5th, 2008 to seek comments and ensure broad participation in its design before it is finalized (minutes in the ESMF). Participants at the workshop were presented with draft copies of the ESMF in the national language, Bahasa. The ESMF was revised to incorporate some recommendations. Discussions focused on the following:

- Brief summary presentations on the overall project objective and the modus operandi.
- Institutional arrangements for project implementation.
- A review of the list of potential sub projects in DOISP and the rationale for their selection.
- The list and brief description of the activities being proposed for each sub project.
- Status of project preparation.
- Key environmental and social challenges for the DOISP project as a whole and for individual subjects identified for implementation in Year 1.

- A review of the Indonesian AMDAL system as it would apply to this project.
- A brief review of the World Bank's Environmental Assessment OP4.01 and how it would apply to this project.
- The key provisions of the ESMF in terms of screening requirements, processes and responsibilities, Sub project EA categorizations, preparation of EA and EMP documentation, their review and approval process, etc.
- Implementation of the EMP as part of the sub project implementation.
- Standard proposed mitigation measures to manage the environmental and social impacts.
- Grievance mechanism for potentially affected people and communities to have their voices heard should they feel that their concerns have not been heard.

14. The overwhelming response for participants at the workshop was positive appreciation for the DOISP as these dams have played a positive role overall in terms of provision of water for their irrigation needs and also welcome the opportunity for much need safety improvements to ensure continued availability of the services being provided by the dams. The participants also expressed keen interest in ensuring that the provisions of ESMF were adhered to and that adverse impacts on individuals and communities should be addressed in a timely and adequate manner.

15. ***Environmental and Social Safeguards Management Framework.*** The ESMF is part of the PMM and has following contents: (1) Introduction and purpose; (2) Project description; (3) Environmental and Social Management Screening Requirements; (4) Environmental and Social Screening of DOISP1 Subprojects; (5) Environmental Management Procedures; (6) Environmental Management of Sub-projects; (7) Land Acquisition and Access to Resources; (8) Capacity Building, Training and Technical Assistance; (9) Budget. The ESMF contains following annexes: (1) List of Dams /Reservoirs to be rehabilitated under DOISP; (2) GOI and World Bank Procedure for Screening; (3) Types of Activities to be accompanied by AMDAL or UKL/UPL according to GOI Procedures; (4) Screening of DOISP-1 Subprojects; (5) Minutes of Meetings on Public Consultation; (6) DOISP Typical Environmental Impacts And Mitigation Measures; (7) Environmental Assessment Process World Bank Implementing Policies Basic Principles; (8) GOI Standard Outlines for Environmental Impact Analysis (AMDAL) and Environmental Management and Monitoring Plans (UKL/UPL); (9). Institutional Arrangement for ESMF Implementation; (10) Data requirements for preparing environmental documents; (11) Screening on Presence of Indigenous People in the wider vicinity of Sub-project sites; (12) Community Participation in Dam Management; Community Participation in Water Catchment Area Management.

C. Key Environmental Issues in DOISP

16. **Potential legacy issues.** As stated before, all the dams / reservoirs considered for financing are existing dams, many decades old and some having been built as far back as the early 1900's; they are in various states of disrepair. Significantly, at the time of their planning and construction, many of the key environmental considerations that would go into the modern planning and the design process for dams today, were not required in the most part in those earlier times of national development. Furthermore, these dams/ reservoirs have already shaped the regional social and economic geography. Significant and in most cases irreversible physical and social changes have occurred over the past century and are manifest in these watershed areas due to the construction and operations of many of these older dams. For example significant land use changes have occurred in many of the downstream corridors, which has resulted in the original river beds and channels being utilized as paddy fields with traces of the original channels now recognizable as very narrow streams. The dams have been regulating their respective rivers thereby providing raw water to existing or new irrigation or water supply schemes, reducing flooding and in a few cases producing modest amounts of hydropower. As such, the benefits of the structures are locally recognized, and the structures have become part of what the local communities now consider as the "normal" situation. In Indonesia, some more recently constructed reservoirs on Java and Sumatra are still subject of controversy, and one hydropower dam in West Sumatra has posed concerns due to downstream damage caused by its operation. However, none of these dams is on the DOISP shortlist, and none of the sub-projects under DOISP have been observed to have legacy issues. The project on the other hand, will provide institutional strengthening under the portfolio management approach which will help to better address over time any legacy issues in the country.

17. **Water and Sediment Quality in Reservoirs.** The reservoirs are located in relatively remote and upper parts of river basins and are fed from rivers and brooks that flow through rural areas with low-intensity agricultural activities, plantations as well as protected and fallow areas. The population density is low. Human settlements are limited to small villages. There are no mining operations or industries registered in the upper catchments of the sub-projects under DOISP. Thus, the sediment accumulating in the reservoirs is all of sandy and loamy composition with some organic natural matter. Eutrophication is generally modest, although some reservoirs have seasonal problems with blooms of water hyacinth which tends to clog spillways and gates. The experience shows that sediment dredged from these reservoirs is generally in demand by farmers and builders, for landfill and for construction purposes. In some cases the sediment, of volcanic origin, is fertile and in demand by farmers. In the case of the Wonogiri reservoir in Central Java (not part of DOISP) which is heavily silted up, the sand bars are often exposed and contractors pay fees for permits to mine the sediment. Thus, the sediment is generally of good to adequate quality. The exception to the situation concerns the Jatiluhur (Juanda) reservoir on the Citarum river (West Java) which lies downstream of a large conurbation with industries (Bandung). Here the sediment may potentially contain trace materials that may complicate easy disposal, however, the reservoir does not suffer

sedimentation problems and does not require dredging. The activities and works under DOISP will not interfere with or alter the water and sediment quality, beyond stirring up of some sediment during sediment removal activities. No additional impoundment would be created which might give rise to public health concerns. This will be monitored. Sediment removal will be limited to the areas near inlets and outlets, and will not exceed 500,000m³, the limit under GOI regulations under which no EA is required for clean or natural sediment. Disposal of dredge spoil in these quantities is no problem as it will be either collected and carried away by the neighboring community or contractors, or could be stored and dried on land owned by the dam operator along the reservoir border.

18. The sub-projects that will be financed under the successor project would likely include activities that may have more substantive and more widespread negative impacts and that will trigger an Environmental Assessment or AMDAL. These can comprise, for instance, increasing of reservoir capacity by raising of the crest elevation; reservoir flushing and dredging at a larger scale (above 500,000m³); and substantial increase of the spillway capacity or other major changes on the spillways.

D. Social safeguards

19. ***Land Acquisition.*** It is very likely that no land acquisition will take place, as the physical activities to be financed in DOISP involve only minor remedial and rehabilitation works and activities, and community-based activities, at local scale. No social adverse impact is anticipated. In the successor project, more complex physical activities will be implemented. In DOISP the preparation allowing for detailed design studies as well as any required safeguards preparation will be developed. These sub-projects in the successor project may entail larger-scale or potentially more intrusive activities such as expansion of the spillways, raising of dam heights to increase reservoir capacity, larger-scale removal of sediment from reservoirs, etc. Land acquisition will probably take place such as for the raising of dam heights; temporary land acquisition will also likely to happen for construction of temporary roads to the sites. Nonetheless, these activities may still require only small-scale land acquisition with minor social adverse impact. To anticipate any adverse impact due to land acquisition, a Land Acquisition and Resettlement Policy Framework (LARPF) and Resettlement Action Plans (RAPs) will be developed as part of the ESMF during project preparation for the successor project. They will be subject to the appraisal process of the successor project.

20. The Ministry of Social Welfare has a repertory with maps and data on locations of indigenous people²⁵. It appears that no indigenous peoples (isolated and vulnerable people under GOI regulations) are living in the wider vicinity of the 34 reservoir areas

²⁵ Special Bulletin – Data and Information on Empowering Indigenous People, 2002, Min. of Social Welfare, Jakarta.

under DOISP. Indigenous people may be living in the same or the adjacent province, however, the physical distance to the project and the localized nature and size of the works on the dams, reservoirs and catchment sites are such that no impact can be generated that might affect the indigenous people.

21. ***Community Participation.*** Beside of physical development DOISP also actively supports social development through community participation and incentives in reservoir management (sub-component 2.3 on 20 locations) and watershed management (sub-component 3.4 on 4 locations). The integration of this community participation mechanism will be explored with other existing projects in the area, if available (such as WISMP and PNPM).

22. ***Community participation in reservoir management*** This sub-component will build upon the pilots conducted under DSP. Objectives are to (i) ensure community participation in maintenance and safety of reservoirs and dams and in controlling the use of the reservoir area by outsiders; (ii) ensure community participation in creating income-generating agricultural and silvicultural opportunities, utilizing the government-owned reservoir greenbelt zone whilst applying land use practices that stem erosion and shore damage; (iii) strengthen the capacity of local government institutions (district, sub-district and village) in working in a participatory approach. The community participation will take consideration of social diversity and gender. A community participation approach will be applied, with support from local NGOs familiar with the area. An incentive scheme will be introduced to support the development of the income-generating activities, which would need to be continued (at a lower level of engagement) by the local government and NGOs to improve sustainability. The settlers would be allowed the usufruct and lease of the land, and no land acquisition would be involved. The participation framework consist of seven steps: (1) social mapping and facilitating in planning; (2) reflection focus group discussion: 'Life on the side of Reservoir' (*Hidup Berdampingan Dengan Waduk*); (3) community organization and establishment of Community Forum in reservoir area; (4) self-mapping: 'Community interaction with the reservoir' (*Interaksi Masyarakat dengan Waduk*); (5) strategic plan of community participation in reservoir management; (6) action plan of community participation in reservoir management; and (7) implementation of community participation in reservoir management (Figure A10-1). The activities involve no land acquisition.

23. ***Community Participation in Watershed Management.*** This sub-component will replicate successful pilots carried out by Balai PSDA and local government in Central Java in other (sub-) catchments where demand and commitment have been documented. The objectives are to (i) ensure community participation in increasing and maintaining protective vegetation cover and land surface structures (e.g., drains and terraces) in the catchment, as well as in the rehabilitation and protection of river banks and beds that are prone to erosion and threaten local settlements, bridges, bathing places, etc.; (ii) stimulate community participation in using income-generating opportunities related to the erosion control measures (tree and crop growing) that do not damage the ecosystem or the

vulnerable soils; and (iii) encourage capacity of local government in managing the catchment with a participatory approach. The activities comprise community organization, joint prioritization and planning, financial incentives and technical support, and capacity building. The activities involve no land acquisition. Seven steps in its implementation are (1) social mapping and facilitating in planning; 2. reflection focus group discussion on 'Life in Nature' (*Hidup di Alam*); (3) community organizing; (4) self-mapping: 'Using and conservation catchment area by community' (*Pemanfaatan dan Pelestarian Daerah Tangkapan Air oleh Masyarakat*); (5) community participation strategic plan in catchment area; (6) annual community participation action plan in the catchment area; and (7) implementation of community participation in the catchment area (Figure A10-1).

24. These sub-components will provide financing for the project's duration in 20 + 4 locations. The financing will cover, i.a., social specialists (in CPMU), facilitators including community organizers (under provincial and BWS/BBWS responsibility), training for facilitators (under CPMU), and partnership funds (under provincial and BWS/BBWS responsibility). Partnership packages will be given gradually in each year: 20% in year 1, 50% in year 2, 20% in year 3, and 10% in year 4/5. The packages will be divided over three types of dam/catchment area, based on the number of households in the dam or catchment area and on the size or coverage area of dam/catchment area (Tables A-10.3 and A.10-4). Detailed guidelines for community participation activities are provided in the ESMF.

Figure A10-1. Diagram of Community-Based Development for Reservoir Greenbelt and Catchment Protection.

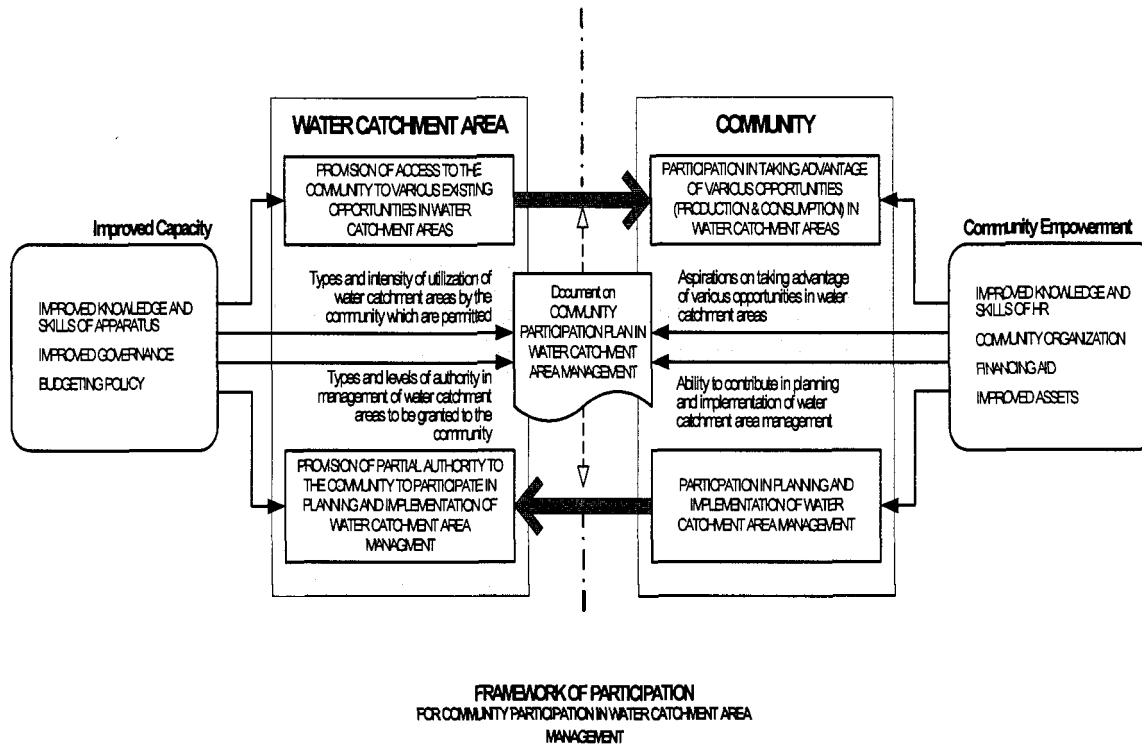


Table A10-2. Distribution of Partnership Fund Allocation - Reservoir management (indicative)

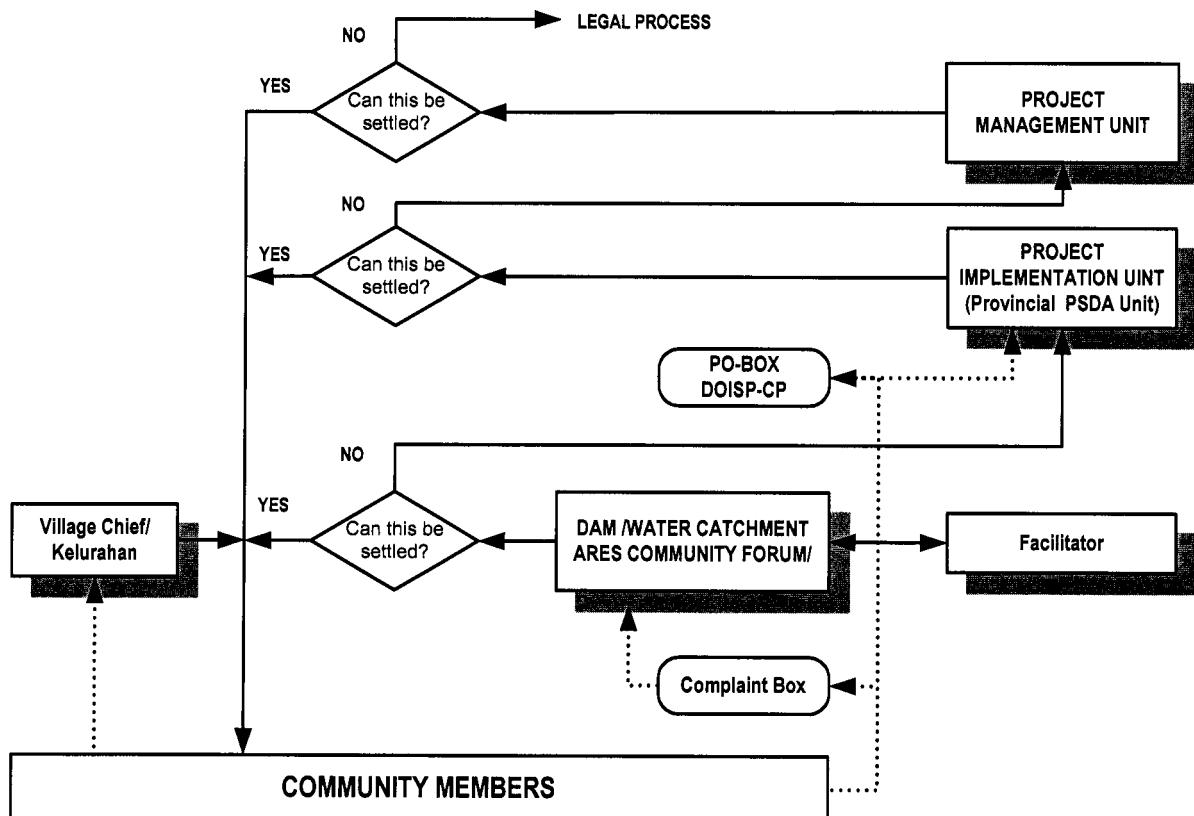
CATEGORY			Size of Reservoir		
			Small	Medium	Large
Number of HHs, surrounding reservoir	Low	HH < 200	Rp. 300 Mill.	-	
	Medium	200 < HH < 500	Rp. 400 Mill.	Rp. 600 Mill	Rp. 800 Mill.
	High	HH > 500	Rp. 500 Mill.	Rp. 800 Mill	Rp. 1.000 Mill

Table A10-3. Distribution of Partnership Fund Allocation--Catchment management (indicative)

CATEGORY			Area of Sub-Catchment		
			Small	Medium	Large
Number of hhs in catchment area	Low	HH <250	Rp. 1.5 Bill	-	-
	Medium	250 < HH <500	Rp. 2.0 Bill	Rp. 3.0 Bill	Rp. 4.0 Bill
	HH	HH > 500	Rp. 2.5 Bill	Rp. 4.0 Bill	Rp. 5.0 Bill

25. **Grievance resolution mechanism.** This procedure will address and resolve complaints from the community concerning the process of participation and performance of the community forum (Figure A10-2).

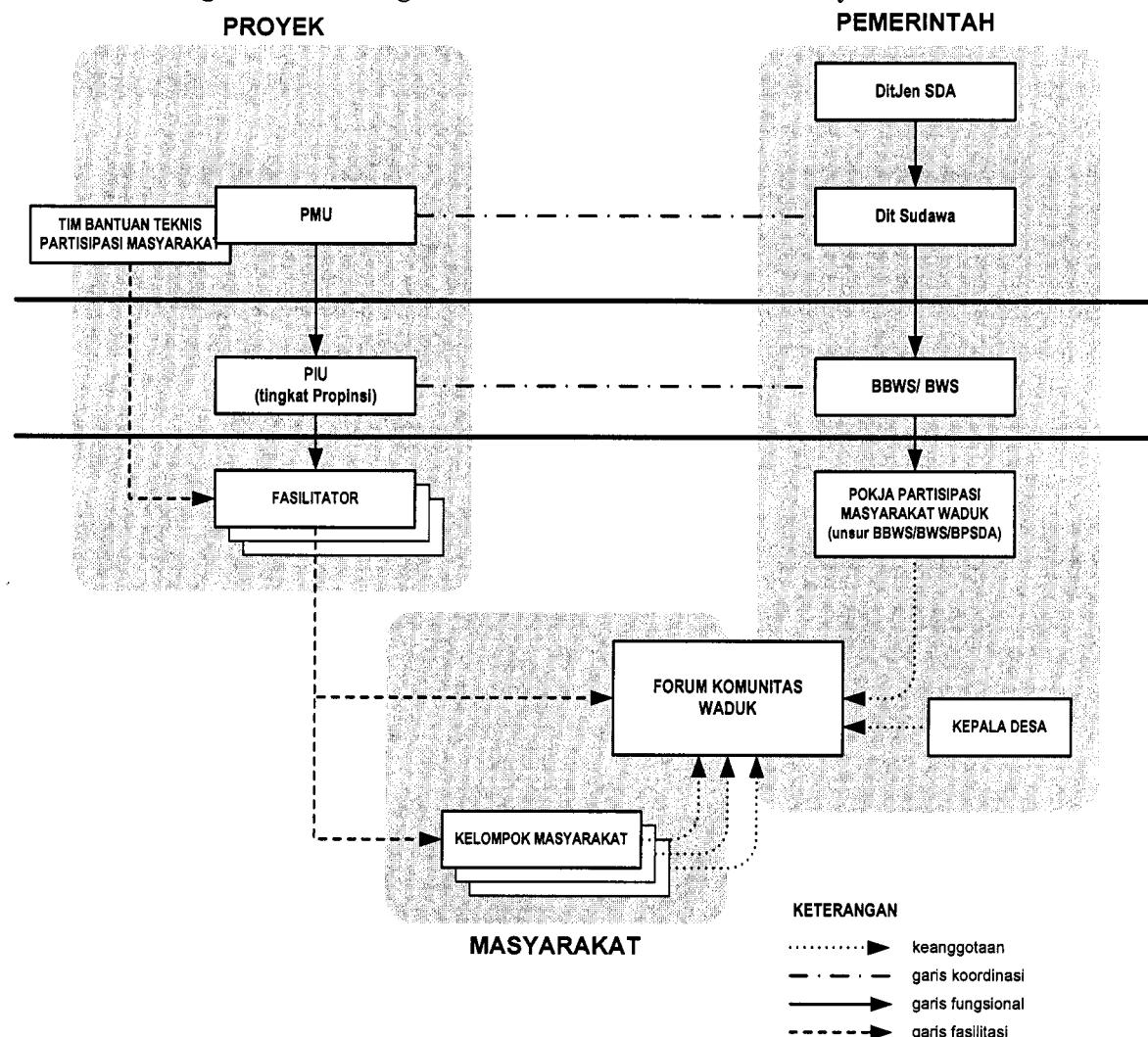
Figure A10-2. Grievance Resolution Procedure



26. **Monitoring and Evaluation.** Internal monitoring on the implementation of the sub-components will be undertaken annually by the CPMU. External monitoring and evaluation will be divided into two types. First, by the mid-term review, and second, by project closure. This activity will be based on TORs approved by the World Bank and conducted by an independent consultant/NGO/university to assess whether the process of participatory steps was implemented as per the technical guidelines, whether the empowerment, capacity building and the incentives have been effective, what benefit emerged for the community and for the project, and whether implementation still faces problems that require further assistance.

27. **Organization of the Project.** Figure A10-3 describes the involvement of the various levels of government and the communities living in reservoir area and cactment area. See diagram B.

Figure A10-3. Diagram of Government and Community Involvement.



E. Dam Safety

17. The Bank requires that the Borrower adopt measures to ensure the safety of the new and existing dams it finances because of the serious consequences in case of malfunctioning. The main objective of DOISP is to enhance safety of the dams at national level. As such the scope of the project has necessarily to go beyond the minimum provisions stipulated in OP/BP4.37. In particular, DOISP:

- will specifically assist GOI in designing and mainstreaming programmatic measures of regulatory, administrative and financial nature to enhance the dam safety across the country's dam portfolio;
- will progressively be extended to non-GOI owned dams (Annexes 1 and 4).
- will provide: (i) training and capacity building of both the DSU and the agencies charged with implementation works and operating the dams, (ii) pro-active on-site safety analyses and studies (piping analysis, bathymetric surveys, etc.), (iii) dam safety inspections, and (iv) advice to develop technical and procedural guidelines suited to Indonesia's context needed to enforce the regulatory framework.

18. There is a satisfactory dam safety attitude in Indonesia, as testified by the existence and operations of the DSC and DSU, and the imminent issuance of the new Government Regulation on Dam Safety. Progress is being made on portfolio risk management. Other countries, with an important stock of dams, in the East Asia region are undertaking modernization and safety enhancement programs. China and India are those with the largest number of dams as well as a significant dam building program. While China is starting to move towards risk-informed dam safety management, India has not yet embraced that approach. Other countries with many dams, such as Vietnam, Lao PDR, Thailand, Philippines, are still far from adopting a portfolio risk management approach.

19. The impending issuance of the country's first Government Regulation on Dams will regulate the development of new dams and management of existing dams. The Regulation is a strong signal of the Government's commitment to dam safety: all best dam safety practice provisions of the OP & BP would become mandatory requirements for dam developers and owners. It would also ensure the inclusion of activities explicitly aiming at more sustainable management of the dam reservoir greenbelts and the upper catchments, which is in line with the OP's objectives and the growing socio-economic and safety threat of reservoir sedimentation. Most of the post-1970 dams have O&M manuals: however, these are in need of updating and the PP requires such manuals to comply with its requirements. A major objective of DOISP is to train operators to apply the O&M practices and procedures of O&M Manuals: currently no manuals are found on site and are not used. Similarly, 20 dam break emergency preparedness plans were prepared under the forerunner Dam Safety Project but were not yet operationalized. Emergency plans and warning procedures in the event of very large spillway releases do not exist for any dam. Both will become mandatory under the Government Regulation.

20. The project will finance the activities by the DSU and other agencies to develop and/or improve such plans consistent with the OP and the Regulation. The nature and technical complexity of the sub-projects in DOISP are low to modest, thus, the requirement for independent review of design and works (BP 4.37) can be covered by appointment of an independent national expert panel where necessary. Indonesia has a small but adequate pool of INACOLD-certified senior dam experts for this purpose. The project does not involve reservoir filling and start-up operations except in a few cases where a dam has to be partially emptied to undertake remedial works, which will be accompanied by consultation with downstream water users. However, for the detail preparation of the larger sub-projects in the successor project, including the second phase of activities on the Juanda/Jatiluhur dam, an independent panel of experts (the Panel) will be appointed comprising at least one international expert. These sub-projects are high-risk and comprise significant and complex remedial work. The project budget provides for the expenses of the expert and the Panel.

21. This safeguard is embedded in the relevant covenant in the Loan Agreement, as follows: "For the purpose of overseeing implementation of dam safety measures, (i) during the first year of Project implementation and prior to the approval of the first Annual Work Plan, assign an Independent Expert with qualifications and terms of reference acceptable to the Borrower and the Bank who has not been involved in the design or implementation of the Project, to review and oversee the Sub-projects and the Preparation Activities in the first year of Project implementation and to assist in developing preparation criteria for the establishment of a Dam Safety Panel and (ii) by no later than the first anniversary of the date of this Agreement, or such later date as may be agreed in writing between the Borrower and the Bank, establish and thereafter retain throughout the Project, a Dam Safety Panel for the second and later years of Project implementation with qualifications and terms of reference acceptable to the Borrower and the Bank, comprised of three or more individuals who have not been involved in the design or implementation of the Project, to review and oversee Sub-projects and Preparation Activities for large and/or complex dams, which will comprise those dams selected based on the recommendation of the DSC, and any additions requested by the Bank."

Annex 11: Governance and Accountability Strategy
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

A. Overview

1. The Dam Operational Improvement and Safety Project aims at increasing the functionality and safety of selected MPW-owned reservoirs, to benefit both rural and urban communities dependent on reservoirs for water supply and livelihood, and downstream communities who may be at risk if dam safety is compromised. The project has 5 components, including: improvement works on reservoirs and dams, reservoir sedimentation and up-river erosion control, and reservoir operation and dam safety institutional support.
2. The MPW will be the executive and main implementing agency, and smaller parts of the execution of works and studies/monitoring would be implemented by the Provincial Water Resources Agency and its *Balai PSDA*. Both executing and implementing agencies have extensive experience in dealing with donor funded projects, including Bank sponsored projects. For some of the catchment protection activities, local governments (*kabupaten*) would implement (minor) complementary activities which may involve community based programs. The project has risks associated which may vary between the agencies and activity types, and the annex serves as a mechanism to identify and address the risks.

C. Objective

3. As the project works at national-government, local-government and community level, there are different risks associated with each. The MPW has previous experience in working with the Bank's projects and its corruption risk mitigation mechanism, but may need assistance in strengthening its internal audit capacity. Community-based programs involving local government and community may require a clearly defined, yet simple approach to prevent corruption.
4. The objective of the corruption prevention plan is to present mechanisms to address risks associated with each and to strengthen control over the Project, to ensure project objectives are achieved. The action plan (i) maps potential risks in the project; (2) presents mechanisms to address the risks, and (iii) designates responsibility for the implementing mechanism. The plan consists of six components:

- Enhanced disclosure and transparency;
- Mitigation of collusion;
- Mitigation of forgery and fraud;

- External oversight;
- Complaints handling mechanism; and
- Sanctions and remedies.

C. Risks associated with the project

5. *Risks associated with project management at national government and Balai PSDA levels.* The majority of procurements will be managed centrally by the MPW. Problems may lie in the lack of transparency in procurement processes, allowing unfair practices to occur, such as collusion among bidders and/or project staff, intervention from senior officials against decisions made by the procurement committee, biased evaluation, manipulation of procurement information, and payment of kickbacks. Collusive practices and poor supervision may result in sub standard construction quality. There are also risks whereby documents for payment may be incomplete, falsified, and payments maybe delayed.

6. *Risks associated with Community Participation/ Development type of activities.* The Directorate General of Water Resources (DGWR) has little experience in managing Community Participation/ Development type of activities, which may result in poor supervision and reporting of the activities. The provincial *Balai PSDAs* that were selected for the catchment protection components have a better record. In community based programs, lack of experience may be an issue in procuring small works and/or materials. Limited experience with financial reporting may result in poor accounting of expenses. Both may be aggravated when the funds are managed by an elite group with little disclosure of information.

7. *Reputational Risks.* Dam improvement or construction is politically sensitive, due to its perceived impact to the environment and the livelihood of the community.

D. Measures to mitigate the risks of corruption (see Table below)

8. *Enhanced Disclosure and Transparency.* The DGWR will dedicate a specific page on the DOISP project implementation in its website <http://sda.pu.go.id>. The webpage would include the project overview and locations, the project management manual and monthly updated information on project activities. The website would also contain (or linked to MPW's website on procurement) related information (notably, procurement plan, invitation to bid, bidding documents, summary of public bid openings, scope and amount of contract awarded). A quarterly newsletter would be published on the website including information concerning list of contracts, implementation progress, number, typology and status of complaints. The Ministry will send a quarterly newsletter

to civil society forum in each project province in hard copy or through electronic mailing system.

9. At the community level, a public information board will display the amount and scope of incentives/materials, implementation progress, and updated financial management status. Public meetings will be regularly organized to report on the use of funds.

10. *Mitigation of Collusion.* All procurement will be directly undertaken by the MPW itself, whether physically in Jakarta or through its authorized budget-holder in the PIU in the Balai (Besar) WS in the relevant province. The plan is built around a centralized model to enable easier monitoring. The MPW has in place a “semi” e-procurement system for public bidding which is up to the limit of what is currently allowed under Indonesian law. The website www.pu.go.id and/or <http://sda.pu.go.id>. will be used for publishing key information, including: invitation to bid, download of bidding documents, and information on bid award (estimated cost, scope of works, contractor details). To promote transparency in the procurement process, non-government observers will be invited to witness the public bid opening process. The mechanisms of selection and roles of observers will be specified in the project operational manual.

11. The MPW will establish procedures to maintain proper project and procurement filing including filing of advertisements, bidding documents, evaluation reports, contract award and final contract documents, for audit purposes. As the project will involve procurement of small works and materials at local government and community level, the Project Management Manual (PMM) will define simple procurement procedures to be adhered to. An audit will also be performed to ensure the quality of community works.

12. *Mitigation of Forgery and Fraud.* The executing and implementing agencies will establish guidelines for submission of complete documentation required to request payments to KPPN (local office of the National Treasury). Regular audit of financial management reports will be done by both the Inspectorate General of MPW and BPKP. The audit includes procurement process and results (quality and quantity of goods/works/services, verification of payments, price comparison between contract price and market price, conducted at least once a year. The Inspector General will make copies of the audit reports available to the Bank upon request. Audit report and formal responses of the government will be made available through the project website. The PMM will define financial management responsibilities by community recipients. The project will also appoint an independent institution to conduct an audit of the provision of the grants.

13. *External Oversight.* The project will design a communication plan to reach out to various stakeholder groups: community groups, non-government organizations, members of local legislature, media, and research/academic institutions. Community participation

will be promoted in the project, through dam safety education as well as watershed conservation efforts. The project's monitoring and evaluation plan will also include engagement with different groups to oversee the quality of project implementation, including procurement (bid opening). Public meetings will be organized to provide avenues for the community to participate in the decision making process to manage funds under the project.

14. *Complaints Handling Mechanism.* The MPW has an established a system to receive, record and track complaints. The project will make use of the existing system. Multiple channels would be made available: hotline, text messages, PO Box, and the ministry's website. However, the Ministry may need assistance in better managing the complaints that they receive for better tracking and analysis. A timeline should be provided to respond to the complaints, with copy of files to the project management unit, World Bank and DGWR. Based on the Bank's experience in community participation programs, a simple complaint handling unit should be established in the community. Complaints can be received through a complaints box or through project administrator.

15. *Sanctions and Remedies.* Evidence of fraud, corruption, collusion and coercive practices will result in: (i) possibility of termination of contract, (ii) additional penalties imposed (fines, blacklisting), (iii) disbursement suspended for sub project, and (iv) retrieval of funds. The government will apply its own system with regards to investigation, determination and enforcement of sanctions.

Corruption Prevention Matrix

No	Activities	Risks	Mitigation	Action by
2	Preparation of owner's estimates	Inflation of prices in the estimates Information leaked to potential bidders Collusion between bidders and/or project staff in preparing estimates	The Project Operational Manual will provide guidelines on preparing owners estimates Administrative and/or criminal sanctions will apply for any officials, procurement committee members or bidders for proven involvement in such collusive practices.	PMU/MPW
3	Preparation of bidding documents	Low capacity	Technical support and assistance to be provided Validation of bidding documents	World Bank
4	Advertisements	Inadequate advertisement coverage Fictitious advertisement	Establish standard format for advertisement Proper filing of advertisement for audit purposes	PMU
5	Bid/proposal preparation	Collusion between bidders and/or project staff Intimidation against certain bidders	Project website to facilitate semi e-procurement, where bid documents are available without charge Minimize possibility of meetings between bidders by avoiding pre-bid meetings	Procurement Committee
6	Receipt of Expression of Interests/Bids	Bids/EOI misplaced Changes of time and venue Acceptance of late entries	Single mailing address will be used for submission of bids/EOI Administrative and/or criminal sanctions will apply for any officials, procurement committee members or bidders for proven involvement in such collusive practices.	Procurement Committee MPW
7	Bid Opening	Manipulation of public bid opening records	Publish bid opening records at the website, copy of bid opening records should be submitted to the Bank promptly Independent observers to witness bid openings, selection and role of observers will be specified in the Project Operational Manual	Procurement Committee
8	Shortlisting	Manipulation of information in favour of certain bidders	Narrative justification is required for prior review contracts. Guidelines to prepare the justification will be described in the Project Operational Manual	Procurement Committee
9	Technical Evaluation	Unfair evaluation	Requiring summary of evaluation to be available when requested	Procurement Committee
10	Ranking Announcement	Intimidation against qualified bidder(s)	Administrative and/or criminal sanctions will apply for any officials, procurement committee members or bidders for proven involvement in such collusive practices.	PMU/MPW
11	Price Evaluation	Price proposals changed	Administrative and/or criminal sanctions will apply for any officials, procurement committee members or bidders for proven involvement in such collusive practices.	PMU/MPW
12	Award	Delays which provide opportunity for collusion Extortion, kick backs	The project operational manual shall establish a timeline which minimize delays. Guidelines will also be provided on negotiations/clarifications Administrative and/or criminal sanctions will apply for any officials, procurement committee members or bidders for proven involvement in such corrupt practices.	Procurement Committee
		Poorly maintained	The Project Operational Manual will provide guidelines for proper filing	PMU

Corruption Prevention Matrix

No	Activities	Risks	Mitigation	Action by
14	Implementation	Violation of specifications in the contract, fraudulent practices, poor quality	Enhanced project supervision Community participation in monitoring of the project will be promoted through community education programs Evidence of fraud, corruption , collusion and coercive practices will result in termination of relevant contract, possibly with additional penalties imposed (fines, blacklisting, in accordance to the Bank and/or government regulations).	PMU/MPW
15	Procurement of community works	Lack of capacity	Simple and clear guidelines for procurement of small works will be defined in the Project Operational Manual	PMU
Financial Management				
1	Payment for procurement	Overpayment Fictitious payments Payment delays, creating opportunity for corruption	Project Operational Manual will define supporting documents to be presented for payments. Regular audit will be performed to verify payments	PMU BPKP
2	Payment for trainings, workshops	Manipulation of accounts, fictitious payments	Project Operational Manual will define supporting documents to be presented for payments. Regular audit will be performed to verify payments	PMU
3	Funds flow from local government to community	Illicit charges	Amount of community grants to be published at website and in project locations	PMU
4	Auditing	Non disclosure of audit reports	Disclosure of audit reports and formal responses when requested	PMU/MPW
5	Financial Management by Community	Lack of capacity	Simple and clear guidelines for bookkeeping to be detailed in the Project Operational Manual	PMU
Complaints Handling				
1	Complaints Handling	Issues not recognized and addressed	Multiple channels of complaints should be available (email, mail/PO Box, sms, hotline) MPW website at www.pu.go.id to receive suggestions & complaints Complaints to be properly recorded, responded to and analyzed.	PMU & MPW
Sanctions				
1	Sanctions	Inconsistent sanction Lack of enforcement	Develop clear guidelines on the different levels of sanctions Monitor enforcement	PMU/MPW

Annex 12: Project Preparation and Supervision
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

	Planned	Actual
PCN review	12/04/2006	03/28/2006
Initial PID to PIC	08/29/2006	08/28/2006
Initial ISDS to PIC	08/29/2006	08/28/2006
Appraisal	09/08/2008	11/10/2008
Negotiations	11/11/2008	02/13/2009
Board/RVP approval	12/11/2008	03/19/2009
Planned date of effectiveness	01/01/2009	05/01/2009
Planned date of mid-term review	05/01/2011	11/30/2011
Planned closing date	12/31/2012	12/31/2013

Key institutions responsible for preparation of the project:

Directorate General Water Resources, Ministry of Public Works, Jakarta
 National Planning Agency (Bappenas), Jakarta

Bank staff and consultants who worked on the project included:

Name	Title	Unit
Guy Alaerts	Lead Water Resources Spec.	EASRE
Ilham Abla	Operations Officer	EASIS
Alessandro Palmieri	Lead Dam Adviser	OPCQ
Unggul Suprayitno	Financial Management Spec.	EAPCO
Bisma Husen	Procurement Spec.	EAPCO
Viviane Rambe	Environmental Spec.	EASIS
Andrew Sembel	Environmental Spec.	EASIS
Lis Nainggolan	Social Safeguards Spec.	Consultant
James Monday	Sr. Environmental Mgmt Spec.	EASRE
Dayu Amurwanti/ Amien Sunaryadi	Governance Spec.	EAPCO
Theodore Herman	Water Resources Spec.	Consultant
Melinda Good	Legal Counsel	LEGES
Cynthia Dharmajaya	Program Assistant	EASRE
Dewi Sutisna	Program Assistant	EASIF

Bank funds expended to date on project preparation:

- | | |
|--------------------|-----------|
| 1. Bank resources: | \$470,000 |
| 2. Trust funds: | -- |
| 3. Total: | \$470,000 |

Estimated Approval and Supervision costs:

- | | |
|---------------------------------------|----------|
| C. Remaining costs to approval: | \$9,000 |
| D. Estimated annual supervision cost: | \$75,000 |

Annex 13: Documents in the Project File
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

1. *Project Implementation Plan* (Main Report, and Volume with Annexes), Ministry of Public Works, Jakarta, November 2008.
2. *Report on the Assessment of the Safety of Indonesian Dams*, 4 Volumes, Research Center for Water Resources, Bandung, 2002-2006 (in Indonesian).
3. *Seismic Maps for Indonesia and Exposure of Dams to Seismic Risks*. Research Center for Water Resources, Bandung, 2002-2006 (in Indonesian).
4. *Environmental and Social Safeguards Management Framework* (Main Report and Annexes), Ministry of Public Works, Jakarta, October 2008 (in English and in Indonesian).
5. *Environmental Management Plan for Gondang Sub-project (UKL/UPL)*. Ministry of Public Works, Jakarta, 2008. (in English and in Indonesian).
6. *Environmental Management Plan for Gembong Sub-project (UKL/UPL)*. Ministry of Public Works, Jakarta, 2008. (in English and in Indonesian).
7. *Environmental Management Plan for Batujai Sub-project (UKL/UPL)*. Ministry of Public Works, Jakarta, 2008. (in English and in Indonesian).
8. *Environmental Management Plan for Krisak Sub-project (UKL/UPL)*. Ministry of Public Works, Jakarta, 2008. (in English and in Indonesian).

Annex 14: Statement of Loans and Credits
INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

Project ID	FY	Purpose	Original Amount in US\$ Millions						Difference between expected and actual disbursements	
			IBRD	IDA	SF	GEF	Cancel.	Undisb.	Orig.	Frm. Rev'd
P105002	2008	National Program for Community Empower	41.19	190.00	0.00	0.00	0.00	169.51	-60.00	0.00
P097104	2008	ID-BERMUTU	24.50	61.50	0.00	0.00	0.00	81.00	-2.81	0.00
P096921	2008	ID - National UPP (PNPM UPP)	52.68	125.00	0.00	0.00	0.00	180.34	0.00	0.00
P083742	2007	ID-Farmer Empower. Agric.Tech.&Info	32.80	60.00	0.00	0.00	0.00	87.42	7.58	0.00
P079906	2007	ID-Strategic Roads Infrastructure	208.00	0.00	0.00	0.00	0.00	195.78	55.38	1.11
P089479	2006	ID-Early Childhood Education and Dev	0.00	67.50	0.00	0.00	0.00	67.04	-0.41	0.00
P085375	2006	ID-WSSLIC III (PAMSIMAS)	0.00	137.50	0.00	0.00	0.00	141.90	21.76	0.00
P077175	2006	ID-Domestic Gas Market Development Proj.	80.00	0.00	0.00	0.00	0.00	47.74	14.41	0.00
P071296	2005	ID-USDRP	45.00	0.00	0.00	0.00	0.00	34.05	6.60	0.00
P092019	2005	ID Kecamatan Development Project 3B	80.00	80.00	0.00	0.00	0.00	30.46	-107.63	-8.27
P076174	2005	ID-Initiatives for Local Govern. Reform	14.50	15.00	0.00	0.00	0.00	16.23	12.08	0.00
P085374	2005	ID-HIGHER EDUCATION	50.00	30.00	0.00	0.00	0.00	60.77	26.37	0.00
P085133	2005	Govt Finl Mgt & Revenue Admin Project	55.00	5.00	0.00	0.00	0.00	55.14	43.97	13.48
P084583	2005	ID-UPP3	67.30	71.40	0.00	0.00	0.00	27.61	-43.87	0.00
P078070	2005	ID-Support for Poor and Disadvant Areas	69.00	35.00	0.00	0.00	0.00	79.97	43.14	0.00
P064728	2004	ID-LAND MANAGEMENT & POLICY DEVT	32.80	32.80	0.00	0.00	0.16	34.64	20.71	0.00
P074290	2004	ID-Eastern Indonesia Region Transp. 2	200.00	0.00	0.00	0.00	1.00	136.14	119.14	0.00
P071316	2004	ID - Coral Reef Rehab and Mgmt Prog II	33.20	23.00	0.00	0.00	0.17	37.60	22.69	0.00
P059931	2003	ID-Water Resources & Irr.Sector Mgt Prog	45.00	25.00	0.00	0.00	0.00	54.12	51.00	26.50
P063913	2003	ID-Java-Bali Pwr Sector & Strength	141.00	0.00	0.00	0.00	0.00	74.41	67.95	35.84
P079156	2003	ID-KECAMATAN DEV. 3	204.30	45.50	0.00	0.00	0.00	2.28	0.97	0.00
P076271	2003	ID-PPITA	17.10	0.00	0.00	0.00	0.00	4.52	4.52	4.52
P073772	2003	ID-Health Workforce & Services (PHP 3)	31.10	74.50	0.00	0.00	0.00	65.26	53.23	14.00
P072852	2002	ID-UPP2	29.50	70.50	0.00	0.00	0.00	58.15	-95.53	13.36
P059477	2000	ID-WSSLIC II	0.00	77.40	0.00	0.00	0.00	7.92	-0.34	0.00
Total:			1,553.97	1,226.60	0.00	0.00	1.33	1,750.00	260.91	100.54

INDONESIA
STATEMENT OF IFC's Held and Disbursed Portfolio
In Millions of US Dollars

FY Approval	Company	Committed				Disbursed			
		Loan	Equity	Quasi	Partic.	Loan	Equity	Quasi	Partic.
2006	Bank Danamon	155.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	BonaVista School	1.00	0.00	0.00	0.00	1.00	0.00	0.00	0.00
2006	Buana Bank	5.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2006	Centralpertwi	45.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	Medan NP School	1.75	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2002	P.T. Gawi	11.05	0.00	0.00	3.49	4.90	0.00	0.00	3.49
1989	PT Agro Muko	0.00	2.20	0.00	0.00	0.00	2.20	0.00	0.00
1997	PT Alumindo	2.73	0.00	0.00	0.00	2.73	0.00	0.00	0.00
1989	PT Astra	0.00	0.20	0.00	0.00	0.00	0.20	0.00	0.00
1994	PT Astra	0.00	0.19	0.00	0.00	0.00	0.19	0.00	0.00
2003	PT Astra	0.00	0.12	0.00	0.00	0.00	0.12	0.00	0.00
	PT Astra Otopart	0.00	0.70	0.00	0.00	0.00	0.70	0.00	0.00
2005	PT Astra Otopart	24.00	0.00	0.00	0.00	24.00	0.00	0.00	0.00
2000	PT Bank NISP	0.00	2.85	2.86	0.00	0.00	2.85	2.83	0.00
2002	PT Bank NISP	0.00	2.04	0.00	0.00	0.00	2.04	0.00	0.00
2004	PT Bank NISP	35.00	0.00	0.00	0.00	35.00	0.00	0.00	0.00
1997	PT Berlian	0.00	3.35	0.00	0.00	0.00	0.00	0.00	0.00
1993	PT Bina Danatama	0.05	0.00	0.00	0.00	0.05	0.00	0.00	0.00
1996	PT Bina Danatama	0.00	0.00	2.58	4.81	0.00	0.00	2.58	4.81
2004	PT Ecogreen	30.00	0.00	0.00	0.00	30.00	0.00	0.00	0.00
2005	PT Ecogreen	25.00	0.00	0.00	0.00	20.00	0.00	0.00	0.00
	PT Grahawita	0.00	0.00	3.75	0.00	0.00	0.00	3.75	0.00
1991	PT Indo-Rama	0.00	3.82	0.00	0.00	0.00	3.82	0.00	0.00
1995	PT Indo-Rama	0.00	1.57	0.00	0.00	0.00	1.57	0.00	0.00
1999	PT Indo-Rama	0.00	0.81	0.00	0.00	0.00	0.81	0.00	0.00
2001	PT Indo-Rama	20.00	0.00	0.00	0.00	0.33	0.00	0.00	0.00
2004	PT Indo-Rama	48.00	0.00	0.00	0.00	41.00	0.00	0.00	0.00
1992	PT KIA Keramik	0.23	0.00	0.00	2.00	0.23	0.00	0.00	2.00
1996	PT KIA Keramik	1.65	0.00	0.00	53.49	1.65	0.00	0.00	53.49
1995	PT KIA Serpih	4.50	0.00	0.00	49.50	4.50	0.00	0.00	49.50
1997	PT Kalimantan	9.38	0.00	0.00	0.00	9.38	0.00	0.00	0.00
	PT Karunia (KAS)	16.45	0.00	0.00	3.56	16.45	0.00	0.00	3.56
2006	PT Karunia (KAS)	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	PT Makro	0.00	2.34	0.00	0.00	0.00	2.34	0.00	0.00
2000	PT Makro	0.00	1.21	0.00	0.00	0.00	0.71	0.00	0.00
2006	PT Makro	0.00	0.66	0.00	0.00	0.00	0.66	0.00	0.00
1998	PT Megoplast	0.00	2.50	0.00	0.00	0.00	2.50	0.00	0.00
1993	PT Nusantara	0.00	0.00	10.16	7.90	0.00	0.00	10.16	7.90
2004	PT Prakars (PAS)	15.36	0.00	0.00	3.20	15.36	0.00	0.00	3.20

1997	PT Sayap	0.83	0.00	0.00	0.00	0.83	0.00	0.00	0.00
2001	PT Sigma	0.00	1.03	0.00	0.00	0.00	1.03	0.00	0.00
2006	PT TAS	7.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
1995	PT Viscose	7.81	0.00	0.00	0.00	7.81	0.00	0.00	0.00
2004	PT Viscose	8.31	0.00	0.00	0.00	8.31	0.00	0.00	0.00
1997	PT Wings	0.72	0.00	0.00	0.00	0.72	0.00	0.00	0.00
2001	Sunson	11.62	0.00	0.00	7.35	11.62	0.00	0.00	7.35
2005	WOM	0.00	15.82	0.00	0.00	0.00	15.74	0.00	0.00
2006	WOM	20.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2004	Wilmar	33.33	0.00	0.00	0.00	33.33	0.00	0.00	0.00
Total portfolio:		560.77	41.41	19.35	135.30	269.20	37.48	19.32	135.30

Approvals Pending Commitment					
FY Approval	Company	Loan	Equity	Quasi	Partic.
2005	Bank NISP SELF	0.03	0.00	0.00	0.00
2006	Bank NISP Swap	0.00	0.00	0.00	0.00
2006	Orix Indonesia	0.08	0.00	0.00	0.00
Total pending commitment:		0.11	0.00	0.00	0.00

Annex 15: Country at a Glance

INDONESIA: Dam Operational Improvement and Safety Project (DOISP)

Indonesia at a glance

9/28/07

POVERTY and SOCIAL		Indonesia	East Asia & Pacific	Lower-middle-income	
2006					
Population, mid-year (millions)		223.0	1,000	2,276	
GNI per capita (Atlas method, US\$)		1,420	1,863	2,037	
GNI (Atlas method, US\$ billions)		316.7	3,639	4,635	
Average annual growth, 2000-06					
Population (%)		1.3	0.9	0.9	
Labor force (%)		1.9	1.3	1.4	
Most recent estimate (latest year available, 2000-06)					
Poverty (% of population below national poverty line)		18			
Urban population (% of total population)		49	42	47	
Life expectancy at birth (years)		68	71	71	
Infant mortality (per 1,000 live births)		28	26	31	
Child malnutrition (% of children under 5)		26	15	13	
Access to an improved water source (% of population)		77	79	81	
Literacy (% of population age 15+)		90	91	89	
Gross primary enrollment (% of school-age population)		117	114	113	
Male		119	115	117	
Female		115	113	114	
KEY ECONOMIC RATIOS and LONG-TERM TRENDS					
	1986	1996	2005	2006	
GDP (US\$ billions)	80.1	227.4	287.0	364.8	
Gross capital formation/GDP	29.5	30.7	24.6	24.6	
Exports of goods and services/GDP	19.5	25.8	33.6	30.9	
Gross domestic savings/GDP	28.5	30.1	28.9	29.4	
Gross national savings/GDP	23.8	27.8	25.7	26.4	
Current account balance/GDP	-4.9	-3.4	0.1	2.7	
Interest payments/GDP	3.0	2.2	1.1	1.3	
Total debt/GDP	53.6	56.7	48.2	35.3	
Total debt service/exports	37.3	36.6	16.8	22.3	
Present value of debt/GDP			49.3		
Present value of debt(exports)			129.0		
(average annual growth)	1986-96	1996-06	2005	2006-10	
GDP	7.0	2.7	5.7	6.5	
GDP per capita	6.1	1.3	4.3	5.3	
Exports of goods and services	9.1	3.8	16.4	8.3	
STRUCTURE of the ECONOMY					
(% of GDP)	1986	1996	2005	2006	
Agriculture	24.2	16.7	13.1	12.9	
Industry	33.7	43.5	46.8	47.0	
Manufacturing	16.7	25.6	27.7	28.0	
Services	42.0	39.9	40.2	40.1	
Household final consumption expenditure	60.4	62.4	63.0	62.0	
General govt final consumption expenditure	11.0	7.6	8.1	8.6	
Imports of goods and services	20.5	26.4	29.3	26.1	
(average annual growth)	1986-96	1996-06	2005	2006	
Agriculture	3.3	2.5	2.7	3.0	
Industry	6.9	2.4	4.7	4.7	
Manufacturing	11.2	3.5	4.6	4.6	
Services	8.1	3.2	7.0	7.2	
Household final consumption expenditure	7.7	3.1	3.5	5.0	
General govt final consumption expenditure	4.3	4.9	6.6	9.6	
Gross capital formation	10.6	-1.3	8.4	1.4	
Imports of goods and services	10.3	1.8	17.1	7.0	

Development diamond^a

Legend: — Indonesia — Lower-middle-income group

Economic ratios^a

Legend: — Indonesia — Lower-middle-income group

Growth of capital and GDP (%)

Legend: — GCF — GDP

Growth of exports and imports (%)

Legend: — Exports — Imports

Note: 2006 data are preliminary estimates.

This table was produced from the Development Economics LDB database.

^a The diamonds show four key indicators in the country (in bold) compared with its income-group average. If data are missing, the diamond will be incomplete.

