

SBF Project Completion Note

Indonesia: Dam Operational Improvement and Safety Project Phase II

1. Project Information

Project ID:	P000010	Instrument ID:	L0010A
Member:	Indonesia	Region:	South-Eastern Asia
Sector:	Water	Sub-sector:	Water disaster resilience
Instrument type:	Loan	E&S category:	B
Co-financier(s):	World Bank		
Borrower:	Republic of Indonesia		
Guarantor:			
Implementing Agency:	Ministry of Public Works and Housings, Indonesia		
Project Team Leader(s):	David Ginting, Investment Officer, Public Sector Clients Department, Region 1, PTL Ghufran Shafi, Senior Investment Officer, Public Sector Clients Department, Region 2, EX-PTL		
Project Team Members:	Jinghui Li, Project admin Asma Bachikh, Team Member Liu Yang, Project Counsel Yi Geng, SFD - Financial Management Specialist Jingrong He, SFD - Procurement Specialist Odil Akbarov, SFD - Environment & Social Development Specialist Edith Zheng, Team Member		
Site Visits by AIIB:	November.2021 July.2021 February.2018 May.2018 November.2018 February.2019 June.2019 March.2020 June.2020 October.2020 March.2021 May.2022 December.2022 June.2023		

2. Project Summary and Objectives

The Dam Safety Operational and Improvement Project Phase II ('DOISP2' or 'Project') aims to increase the safety and functionality of existing dams in selected locations and strengthen the operation and management capacity for dam safety. This was pursued through the Project's five components: (a) Component 1: Dam Operational Improvement and Safety Works and Studies; (b) Component 2: Operations and Maintenance Improvement and Capacity Building; (c) Component 3: Reservoir Sedimentation Mitigation; (d) Component 4: Dam Safety Institutional Improvement, and (d) Component 5: Project Management. On a measurable term, the Project aims to benefit over 11 million people, across 14 Indonesian provinces, whose life and livelihood are dependent on dams' performance in providing safety against flooding and supply of water for irrigation, municipal, and other productive uses.

The Project is a continuation of World Bank's preceding investment in dam safety, i.e., Dam Operational Improvement and Safety Project (DOISP), implemented from 2009 to 2017. While adopting the structure of the preceding financing (i.e., project components, implementation arrangements, etc.), DOISP2 scaled up the coverage of DOISP by increasing the number of funded dams from 63 to 140 (and further increased to 163 during the first Project Change) accompanied with an increase of total funding from USD70 million (World Bank's loan and GOI's counterpart funding) to USD300 million (AIIB and World Bank's loan and GOI's counterpart funding).

The Government of Indonesia (GOI) assigned the Ministry of Public Works and Housing (MPWH) as the Project's Implementing Agency. A Central Project Implementation Unit (CPMU) was established under the Directorate General of Water Resources (DGWR) of MPWH and tasked with the overall management and coordination of the Project's execution, including leading the Project's implementation planning and monitoring and providing advisory support. A Central Project Implementation Unit (CPIU) was established under the Directorate Operations and Maintenance of DGWR which operates under the direction of the DGWR to carry out the CPMU's responsibility on daily basis. All activities under the Project are distributed among 19 Project Implementation Units (PIUs). This consists of four PIUs placed at national-level entities (including the Directorate of Operations and Maintenance of DGWR, Dam Center of DGWR, Research Center for Water Resources of DGWR, and Directorate of Water Resources of the Ministry of National Development Planning (Bappenas)) and 15 PIUs hosted by River Basin Organizations (RBOs, locally known as BBWS and BWS). including BBWS Mesuji Sekampung, BBWS Ciliwung Cisadane, BBWS Citarum, BBWS Cimanuk Cisanggarung, BWS Sumatera I, BWS Sumatera IV, BWS Kalimantan III, BBWS Pemali Juana, BBWS Serayu Opak, BBWS Bengawan Solo, BBWS Brantas, BBWS Pompengan Jeneberang, BWS Bali Penida, BWS Nusa Tenggara I, and BWS Nusa Tenggara II. These RBOs primarily responsible for the implementation of civil works in Project dams across 14 Indonesian provinces, including: Aceh, Riau Islands, Lampung, West Java, DKI Jakarta, Banten, Central Java, DI Yogyakarta, East Java, Bali, East Kalimantan, South Sulawesi, West Nusa Tenggara, and East Nusa Tenggara.

3. Key Dates

Approval:	March 22,2017	Signing:	May 29,2017
Effective:	August 04,2017	Restructured (if any):	July 14,2022

Orig. Closing:	June 30,2023	Rev. Closing (if any):	December 31,2023
Final Maturity Date	May 15,2032		

4. Disbursement Summary (US Dollar million)

a) Committed:	125.00	b) Cancelled (if any):	0.00
c) Disbursed:	125.00	d) Last disbursement: (amount /date)	7.62 / October 11,2023
e) Undisbursed (if any):	0.00	f) Disbursement Ratio (%) ¹ :	100.00

5. Estimated and Actual Costs

Out of USD125 million disbursed under the Project, USD124.89 million of eligible expenses was incurred, and USD 0.11 was refunded to the Bank. The component-wise utilization of loan proceeds was not fully aligned with the initial fund allocation plan. The expenses for Components 1 and 3 exceeded their initial loan allocation with a disbursement ratio of 119% and 132%, respectively. The fund utilization in the remaining Components has been lower than the original estimation. The COVID-19 outbreak impacted the project implementation from 2020 to 2022, reducing expenses for in-person training and official travel as they were replaced by virtual alternatives. The underutilized allocations of Components 2, 4, and 5 were then reallocated to Components 1 and 3 to respond to the urgent need for expanding dam rehabilitation works brought about by cyclones and earthquakes during the Project implementation period (further elaborated in the next section).

Table 1. Financing allocation and expenditure among project components

Item	Estimated Costs (USDm)	Actual Cost (USDm)	Financing Allocation (USDm, %)					
			AIIB		WB		Borrower	
			Original	Actual	Original	Actual	Original	Actual
Component 1. DOIS Works and Studies	161.96	161.96	67.48	80.2 (119%)	67.48	80.2 (119%)	27	27
Component 2. O&M Improvement and Capacity Building	23.08	23.08	9.62	3.7 (38%)	9.62	3.7 (38%)	3.84	3.84

¹ Disbursement Ratio is defined as the volume (i.e. the dollar amount) of total disbursed amount as a percentage of the net committed volume, i.e., $f = c / (a - b)$

Component 3. Reservoir Sedimentation Mitigation	55.07	55.07	22.95	30.2 (132%)	22.95	30.2 (132%)	9.17	9.17
Component 4. Dam Safety Institutional Improvement	24.82	24.82	10.34	5.4 (52%)	10.34	5.4 (52%)	4.14	4.14
Component 5. Project Management	35.07	35.07	14.61	5.4 (37%)	14.61	5.4 (37%)	5.85	5.85
Total Cost	300	300	125	124.9	125	124.9	50	50

6. Project Implementation, including major changes to the original Objective, Project Design, and Indicators

The Project has undergone two (non-material) Project Changes to achieve its objective and optimize the loan proceeds.

6.a. Project Change 1 (July 14, 2022): Adjustment of the targets of the Project Development Objective (PDO) and Intermediate Results (IR) indicators.

The targets for the Project Development Objective (PDO) and Intermediate Results (IR) indicators were adjusted to accommodate an expanded project scope, increasing from 140 to 163 dams (141 dams planned for physical rehabilitation and 22 dams for institutional strengthening). This expansion was prompted by the heightened risks of dam failure across Indonesia due to the Seroja Cyclone (2021) and subsequent earthquakes and heavy rainfalls. To maintain feasibility within existing funding, the fund allocation per dam was reduced, triggering the need to revise PDO indicators. The definition of IR 3.3 was also refined to allow for more precise monitoring. These changes were considered non-material as they did not influence the Project's ability to achieve its objective without triggering the application of additional safeguards or fiduciary policies.

Table 2. Reduction of PDO indicators 1 and 2's targets

<i>PDO Indicator</i>	<i>Original Target</i>	<i>Revised Target</i>
PDO1: Overall risk reduction of all dams under Project	20%	18%
PDO2: Number of dams with individual hazard reduced by >20% of risk score	98 dams	75 dams

Table 3. Revision of the definition of IR 3.3

<i>IR Indicator</i>	<i>Original Definition</i>	<i>Revised Definition</i>
IR 3.3: Dams implementing at least 70% of catchment management activities.	70% of budgeted catchment management activities both civil works and soft training are implemented in 60 dams.	To be implemented in 60 dams: 70% of the allocated budget for catchment management activities is disbursed for both civil works and training or technical guidance, or Achieved 70% physical progress in the activities that are funded for catchment management.

6.b. Project Change 2 (June 21, 2023): Extension of the loan closing date by six months from June 30, 2023, to December 31, 2023.

The extension was needed to complete critical rehabilitation works in four dams: Pandanduri Dam, Pelaparado Dam, Sejari Dam, and Jangkih Jawa Dam, and to fully comply with the World Bank's safeguard policies. The rehabilitation of these critical dams, originally planned to be concluded before the loan closing, had to be extended to address the increased structural deficiencies brought by heavy rainfalls throughout the beginning of 2023. The extension of the loan closing date was deemed a non-material Project Change as no additional works, funding, or policies were triggered to complete the abovementioned works.

Components	Physical Progress*	Environmental & Social Compliance	Procurement
Component 1: Dam Operational Improvement and Safety Works and Studies	100%. A total of 141 dams underwent rehabilitation and 142 dams were equipped with Basic Dam Safety Facilities (BDSF).	In compliance. The overall Environmental and Social (ES) management of the Project is consistent with the World Bank's Operational Policies on Environment and Social. During early project implementation, the	In compliance. The Project followed the World Bank's procurement guidelines. All 335 contracts under the Project have been awarded and completed.

		implementing entity struggled meeting the safeguard requirements, primarily due to staffing shortages. As the Bank teams worked closely with the client, all environmental safeguards were successfully fulfilled by project closing.	
Component 2: Operations and Maintenance Improvement and Capacity Building	n/a. No civil work was carried out under this component. The component supported the preparation of 145 documents of O&M Manual and 145 documents of Emergency Action Plan.	See above.	See above
Component 3: Reservoir Sedimentation Mitigation	100%. A total of 8 Reservoir Area Plans was published and implemented, carrying out sustainable landscape management practices across 761 hectares of lands around Project dams.	See above.	See above.
Component 4: Dam Safety Institutional Improvement	n/a. The component supported the enactment of 4 regulations related to water resource management, dam safety, and disaster management.	See above.	See above.

Component 5: Project Management (USD14.61 million)	n/a	See above.	Under this component, 6 contracts have been completed, and 9 are in the final stage of implementation.
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Key challenges encountered during the Project implementation include:

(i) Shortage of staff and consultants. Fiscal restrictions brought by the COVID-19 outbreak drove MPWH to adopt a zero-growth policy for government staff. This policy and the government’s priority on constructing new dams responding to the pandemic further stretched the available financial and human resources and exacerbated the staff shortage. Consultants were mobilized to fill the gaps, but this could only be done in a gradual manner due to delays in the procurement process. The capacity gaps were particularly noticeable in managing the Project's environmental and social safeguard aspects; more details are provided in Section 7 below.

(ii) Extreme weather events. Towards the end of 2020 and early 2021, many dams under the project were exposed to heavy rainfalls and the Seroja Cyclone, resulting in increased seepage and risk of failure. Following this, the MPWH produced a list of ten “critical dams” that required immediate rehabilitation to address landslide and seepage risk. The World Bank’s procurement guidelines allowed streamlined procedures for expediting the mobilization of the required rehabilitation works, with several remedial works being acquired through Direct Contracting. The volume of civil works required to rehabilitate four critical dams was increased in early 2023 due to heavy rainfall events that exacerbated the existing seepage and erosion rate and triggered landslides and spillway damage. Urgent repairs were immediately mobilized and completed within the extended loan closing date (the above-mentioned Project Change 2).

(iii) Mobilization of Project funding. Delays in the approval and release of Project funding (loan and counterpart funding) allocated through the Government’s Budget List (DIPA) constrained the awarding of contracts and implementation of project activities. The yearly Project budget allocation set by the Ministry of Finance (MOF) has been (in most years during Project implementation) lower than the need identified in the Project’s Annual Work Plan (AWP). For example, the Project was granted merely 26 percent of the AWP’s estimation at the start of 2023. The CPMU had to undergo lengthy administrative processes within GOI to increase the DIPA allocation, which delayed the procurement of works and their implementation. This was particularly constraining in the second and third years of implementation, as the Project tried accelerating activities to recover implementation delays.

(iv) Multiple changes to the list of Project dams. The list of Project dams underwent several changes that hampered the planning process. The initial Project Implementation Plan (PIP), issued in 2017, listed 140 dams for rehabilitation works. In 2018, this list was expanded to include 33 additional dams. Further reviews of the Project budget revealed fiscal limitations, which only allow the Project to undertake ‘soft interventions’ (i.e., studies, surveys, non-structural improvements without civil works) in several Project dams. In 2019, 11 of the 140 PIP dams had to be removed due to jurisdictional issues (i.e., redefinition of ‘dams’ and ‘weirs’ by MPWH), and one dam was added to the list. These and other smaller changes made to the list, including shifting among dams planned for the rehabilitation works and non-structural interventions, sometimes hindered the macro-level planning of the Project implementation. Towards the end of the Project implementation (i.e., Project Change 1 on July 2022), the final list of 163 Project dams was established, with rehabilitation works planned for 141 dams, and the remaining dams received only institutional strengthening.

7. Implementation of Environmental and Social Policy and project-specific E&S instruments, including the project-level Grievance Redress Mechanism (GRM)

The Bank adopted the World Bank’s Environmental and Social Safeguard Policies under the Project since they are (a) consistent with the Bank’s Articles of Agreement and materially consistent with the provisions of the Bank’s Environmental and Social Policy and relevant Environmental and Social Standards, and (ii) the monitoring procedures that the World Bank has in place to ascertain compliance with its Safeguard Policies are appropriate for the Project. Six safeguard policies of the World Bank were applied for the Project: Environmental Assessment (OP/BP 4.01), Safety of Dams (OP/BP 4.37), Natural Habitats (OP/BP 4.04), Pest Management (OP/BP 4.09), Indigenous People (OP/BP 4.10), and Involuntary Resettlement (OP/BP 4.12). Under these policies, the Project was classified as a Category B project as it did not create any significant or adverse environmental impacts, and those impacts resulting from the project could be mitigated locally.

During the early stages of the project implementation, a lack of capacity and staff shortages resulted in the absence of an assigned environmental specialist from the client’s side to support the implementation. This led to delays or non-submission of safeguard reports and incomplete preparation of several contractors’ Environmental Management Plans (EMPs) and Environmental Management and Monitoring Statement Letters (SPPLs). An Environmental and Social Due Diligence (ESDD) was conducted during Project implementation, as a remedial action, and to assess the risk of non-compliance with the adopted policies. In parallel, the client mobilized additional safeguards consultants to close the capacity gaps. The ESDD concluded that the project activities had no residual impacts despite the delayed submission of several EMPs and SPPLs. Despite these initial setbacks, all environmental documents and requirements were successfully fulfilled by loan closing.

In terms of social safeguards aspects, the Project did not entail any land acquisition. However, several

(food) vendors operating within the restricted areas of three dam sites had to be relocated to prevent future disturbance to the dams' operations. A Land Acquisition and Resettlement Action Plan (LARAP) was prepared for this purpose. At the Malahayu Dam, vendors were provided new kiosks in a nearby tourism area separated from the dam's operational and maintenance zones. At the Cacaban Dam, vendors were temporarily relocated during rehabilitation and later returned to their original sites. At the Cengklik Dam, local vendors were also temporarily replaced to a designated transition site, with eventual relocation completed by the CPIU by loan closing. The Project's Grievance Redress Mechanism (GRM) was systematically incorporated into all PIUs and registered 204 complaints and queries, all of which have been resolved by loan closing. Most complaints were related to construction-related disturbances, such as dust, noise, and temporary issues with access. No sexual harassment or gender-based violence cases were reported against the Project.

8. Results Achieved (Against the original indicators and/or revised indicators. RMF table will be exported on the last page of this PCN.)

All targets set in the PDO and IR indicators are either achieved or overachieved; with nearly all IR indicator targets being overachieved. Some of the most notable Project achievements include the (a) number of Project beneficiaries (a total of 21.55 million, nearly doubling the initial target of 11.2 million) and (b) overall risk reduction of all dams under the project (achieved 31% against its target of 18%). The notable overachievement of Project beneficiaries was mainly attributed to the underestimation of dam utilization during the Project preparation (i.e., most dams were assumed to solely support irrigation services, while it was later revealed that they multipurpose and cater to many usages, including bulk water supply and flood protection). The impact of these achievements on improving the dams' functionality and safety management is elaborated in detail in Section 14.

Remarks:

Some of the indicators were not monitored in the first two years of project implementation as the PMU were hired starting only the second year.

9. Investment Sustainability (operational, financial/commercial, institutional)

This section summarizes the sustainability of Project benefits stemming from Project achievements elaborated in Section 14.

(i) Financial: The Project has supported GOI in adopting improved methodologies for O&M budgeting by refining the risk assessment and cost estimation methodologies at the central (MPWH) and river basin (RBOs) levels. While implementing these improved methodologies has been focused on Project dams, they are expected to be rolled out nationally and bring lasting benefits to all dams in the country. The improved risk assessment methodology allows MPWH to plan and allocate its limited resources among dams/RBOs according to dam-specific risk levels. At the RBO level, the Project enhanced the applied approach to estimate the needs-based budget for O&M. A technical guideline elaborating the approach was produced under the Project. By the loan closing, 13 RBOs have registered needs-based budgets for the O&M of their Project dams to MOF. This approach is expected to be continuously applied to dams

under these RBOs, even to those beyond the Project's scope, after the loan closing. It will consistently provide MOF with the required insights to make informed decisions when granting O&M budgets for dams.

(ii) Institutional: The Project improved the institutional arrangements in dam safety management nationally by supporting the formulation of key regulations that will continue to be enforced beyond the Project implementation period. The Ministerial Regulation on Dams (27/PRT/M), whose issuance was supported under the Project, clearly sets the roles and responsibilities for dam safety, lays out guidelines and standards, and empowers the regulator to undertake the formulated tasks. This regulation has been the main legal basis for dam safety management in Indonesia and will continue to serve as an important reference for developing spin-off guidelines on dam safety management (including the ones below).

(iii) Operational: The above Ministerial Regulation on Dams requires periodic reviews and licensing of large dams' (focusing on their safety and operational performance) by the Dam Safety Commission (DSC). A fully functional dam safety monitoring system, updated Emergency Action Plan (EAPs), and O&M Manuals are among the requirements for such certification – all of which were produced in all Project dams using the loan proceeds. The EAPs also provide an inter-agencies coordination platform within the GOI as their preparation and implementation process spans beyond the MPWH's workspace. Other Ministerial Regulations formulated under the Project (i.e., 01/PRT/M on Dam Safety Management and 06/PRT/M on Water Resources Management) will continue to require the implementation of preventive measures in managing dam safety and operational risks as they regulate spatial use and planning around, and beyond, the reservoir areas.

Further, the Project also harnessed innovative technology and community participation to sustain satisfactory dam safety and performance levels. The Project funding was instrumental in establishing the Dam Technology Centre (DTC) at MPWH, which utilizes the latest technologies in remote observations to monitor the operational performance of dams (focusing on irrigation, bulk water supply, and flood protection) and detect early anomalies in their structures. The Centre will continue to improve the cost-efficiency of dam monitoring and, with its service, gradually expand to cover dams beyond the Project's scope using MPWH's own resources in the future. DOISP2 has also tapped into the 'social capital' generated by empowering communities surrounding Project dams to monitor the dams' condition, discuss with dam managers, and participate in the implementation of land use plans for areas adjacent to dams (many deteriorated by deforestation that accelerated the rate of soil erosion and sedimentation at reservoirs).

10. Compliance and Alignment with AIIB's Policies and Strategic Priorities

The Project demonstrated alignment with and contribution to the Bank's efforts to support 'sustainable economic development', as envisioned by AIIB's Article of Agreement and Corporate Strategy (the Project's contribution to Indonesia's economy is elaborated in Section 14). The Project showed 'Commitment to Sustainability' as spelled out by the Corporate Strategy, i.e., investing in addressing climate impacts on key physical environments, including water (defined as 'Environmentally Sustainable' by the Strategy) and enabling community participation ('Social Sustainable and Inclusivity'). DOISP2 investments cover the Strategy's Thematic Priorities of Green Infrastructure and Technology-enabled Infrastructure.

Further, the Project aligns with the Guiding Principles of the AIIB's Water Sector Strategy, namely Promoting Sustainable Infrastructure and Adopting Innovative Technology. The Project strengthened the safety and operational level of dams compromised by the aging process and climate risks, primarily through rehabilitation works, and will continue to sustain such performance levels through its institutional and technological augmentations. This has also enabled the Project to align with the Guiding Principles of AIIB's Climate Action Plan, namely Client Focus, Adding Value to Projects, and Innovative. DOISP2 has been tailored to address Indonesia-specific development challenges, historically impeded by limited water storage capacity and underdeveloped flood and climate resiliency. The investment enriches GOI's ongoing self-funded programs to strengthen its dams (focusing on their physical conditions) by integrating improvements into the regulatory, institutional, and technological domains.

11. Any outstanding issues not yet resolved, if applicable

No outstanding issue

12. Lessons learned that can be considered for future investments

Lesson Tag	Lesson Description
Disbursement; Environmental; Financial management; Procurement; Social; Technical; Project Management	A strong implementation support structure manned by capable and responsive key experts is crucial for implementing a large-scale and decentralized dam rehabilitation project. Ensuring a successful large-scale dam rehabilitation project across many provinces demands a strong support team of skilled experts (including those in dam safety and fiduciary, environmental, and social safeguards). The Project spanned 14 provinces and covered around two-thirds of dams nationwide, requiring careful oversight and strict standards compliance. While the Project implementation started with central coordination (with experts pooled at the MPWH), it was later decentralized to three regional hubs, improving response times and accessibility to technical assistance. Early placement of experts at the RBOs (or regional

	<p>hubs) and regular collaboration among RBOs could have made operations more efficient, yet with a careful balance between the need for decentralized support and cost-effectiveness.</p>
<p>Institutional; Social; Technical</p>	<p>For sustained and optimized dam safety and operational performance, physical rehabilitation must be coupled with strengthening institutional capacity and facilitating community participation. This has been pursued by, and observed to be impactful under, the Project through (a) the institutionalization of capacity-building activities by operationalizing the DTC and strengthening Dam Safety Organizations (DSOs) at the RBO level. Both efforts have established and nurtured a pool of multidisciplinary professionals (who are proficient in the key aspects of dam safety (i.e., hydrology, civil structure, geotechnical, etc.), capable of supporting RBOs that have historically been challenged by a scarcity of skilled professionals at the field level, (b) the initiation of community participation programs and supporting community groups with interests related to dam operations. These have increased the surrounding population's awareness of the importance of dam safety and have also (in several cases) mobilized community support in undertaking visual inspections of dams' condition to complement the dam safety monitoring by RBOs (which are often done in an intermittent manner). This has brought cost-efficiency to dam safety monitoring, which has been restricted by the limited budget allocation.</p>
<p>Financial management; Technical; Project Management</p>	<p>Responsiveness to emerging and unpredicted needs is crucial to safeguarding the dams' safety and operational performance. It has been observed that the Project's performance has not been only determined by the effectiveness of Project activities but also by exogenous drivers beyond its control, such as extreme weather and population growth. The risk profiles of Project dams have changed multiple times during the Project implementation due to such drivers. The Project design has been flexible to accommodate sudden fluctuations of safety risks, including</p>

	<p>inducting and re-prioritizing dams due to emerging risks mostly triggered by heavy rainfalls, cyclones, landslides, and seepages. The Project design was responsive to this by streamlining procurement procedures to accelerate urgent works, which has been observed to be more reactive when compared to works funded through the national budgeting process. Such flexibility has been observed to be effective as it is based on a strong procurement planning process incorporated early into the project design. Lastly, the flexibility in Project scope should, however, be ideally coupled with the ability to adjust the Project fund, as the inclusion of several critical dams left financing gaps in other dams and compromised the Project’s ability to achieve the intended impact.</p>
<p>Environmental; Institutional; Technical; Project Management</p>	<p>Sustainable solutions to sedimentation require effective coordination among ministries, agencies, and communities managing the use of lands surrounding the dams. Unplanned and uncontrolled land-use changes have been the primary drivers of sedimentation in Project dams’ reservoirs. Measures to remove sediment, such as dredging and hydrosuction, are costly, and disposal options have been limited by MPWH’s restricted ability to negotiate land access. Check dams, which capture sediments before entering reservoirs, can be filled quickly in areas with accelerated soil erosion. A well-prepared, -consulted, and -implemented land use plan could significantly reduce soil erosion and sedimentation rates yet require cross-ministerial and inter-agency coordination for optimum impact. While regulations are in place to prevent deforestation in reservoir catchments, MPWH has limited influence over its actual implementation. Proactive engagement among MPWH, the Ministry of Environment and Forestry, the Ministry of Agriculture, Sub-national Governments (SNGs), and local communities is central to managing land use and sediment influx. There is a need to establish communication with, and introduce incentives to, SNGs and local communities upstream of the reservoirs as their participation in catchment management is central while they</p>

	<p>might not be highly dependent on the dams downstream.</p>
<p>Technical; Other; Project Management</p>	<p>The Project’s impacts could be further optimized through increased support for energy generation and technological augmentation. The Project largely adopted the design of its proceeding WB-financed dam safety project (i.e., DOISP), focusing on physical rehabilitation and building institutional capacity. As a result, the Project may have missed the opportunity to optimize its impacts. This could have been achieved by expanding activities to support energy generation and technological augmentation. Towards its closing, the Project only supported the installation of turbines at the Pandanduri Dam and Batujai Dam, which showed late realization and limited progress in generating renewable energy. Despite the substantial potential for renewable energy from dam operations (including hydropower, floating solar, mini- and micro-hydro at dam outlets, etc.), its actual generation remains limited. In terms of investments in technologies, the modernization of dam appurtenances has provided the much-needed optimization of dam surveillance, which has historically been intermittent and labor-intensive. In retrospect, the marginal benefit from investing more in technological augmentation could have been higher than rehabilitating some non-critical dams. Technologies introduced under the Project have been focused on monitoring activities (sensors technologies), with limited effort in other aspects of dam operations such as risk forecasting and simulation, remote operation, automatization, machine learning, etc. Instead of maintaining business-as-usual, future financings in dam management, regardless of funding sources, should optimize their impacts and cost-effectiveness by accommodating significant investments in technological augmentation and renewable energy generation.</p>

13. Borrower’s Feedback

The Borrower’s feedback is reflected in Annex 1 based on the feedback received from the CPMU.

14. Achievement of Project Results

Through a combination of physical rehabilitation and non-structural dam safety measures, the Project has achieved its objectives of ‘increasing safety and functionality of existing dams in selected locations’ and ‘strengthening the operation and management capacity for dam safety.’ Rehabilitation works were carried out in 141 out of 163 Project dams. Non-structural measures were applied in all Project dams, ranging from developing impactful regulations and guidelines on dam safety management, optimizing the dams’ O&M budget planning process, training dam operators and managers, to mobilizing community participation in safety maintenance and monitoring. Details of the Project results and their concrete examples are elaborated hereunder.

(i). Increasing the safety and functionality of existing dams in selected locations

The increased safety level was evident and measurable through the first two PDO indicators (i.e., ‘risk reduction of all Project dams’ and ‘number of dams with risk score reduction of least 20 percent’). The overall risk score reduction across Project dams was 31.8 percent, exceeding the original target of 20 percent and the revised target of 18 percent during the first Project Change. The number of dams with a risk score reduction of at least 20 percent was 130, exceeding both the original target of 90 and the revised target of 75. These risk levels were reduced due to physical rehabilitation and non-structural interventions funded by the Project. Some of the most common rehabilitation works include strengthening and waterproofing dam bodies, rehabilitation of spillways, reservoir dredging, and repairing gates, valves, and other hydromechanical instruments. In addition to these rehabilitations, the Project upgraded and or equipped 142 dams with Basic Dam Safety Facilities (BDSF) by improving access to and mobility within dam sites, communication facilities, monitoring instruments, inspection equipment, emergency repair tools, standby power supplies, site lighting, etc. Lastly, the Project has strengthened the performance of RBOs by furnishing and updating their key operational and technical guidelines, including guidelines on dam body construction, geophysical investigation, embankment drilling, seismic hazard analysis, field equipment, dam inspection, etc.

Improvements in dam safety through non-structural measures are most notable through the Project’s support in developing EAPs for all of its dams. EAPs lay out the procedure for coordination and action in case of a dam breach or other specified emergencies to protect life, economic assets, and the environment downstream. Further, the Project also mobilized community participation in dam safety management by facilitating the signing of 39 Memorandum of Understandings (MOUs) on greenbelt management between local communities and dam operators. The MOUs aim to enable joint efforts to conserve the forests and vegetated areas upstream of Project dams to halt soil erosion and sedimentation rate, which imposes risks to reservoirs’ capacity and dams’ stability.

In terms of dams’ functionality, the Project has enabled 141 dams to achieve ‘improved operation’. The status of ‘improved operation’ was granted if the dams met the following criteria: i) hydro-mechanical equipment was repaired; ii) sediments in the irrigation intake structure were removed; iii) the spillway was repaired; iv) dam and reservoir leakage has stopped; and v) O&M manual is available and utilized. These achievements were also verified by the DCS’s process for granting dam operational licenses. By the Project closing, 64 dams had obtained or renewed their operational licenses, with 60 dams in advanced certification stages. Lastly, a total of 21.6 million people were estimated to benefit from the

Project (nearly doubling the target of 11.2 million people) through enhanced protection against dam failure or flooding and improved irrigation and water supply from the Project dams.

(ii). Strengthening the operation and management capacity for dam safety.

The capacity strengthening was evident and measurable through the last two PDO indicators (i.e., ‘number of RBO with need-based O&M budget and plan’ and ‘number of regulations issued on dam safety’). The targets set for both indicators were fully achieved. This led to a comprehensive capacity-strengthening entailing aspects related to institutional arrangement on dam safety management, managerial capacity for O&M planning, and operational capacity in O&M implementation.

In terms of institutional arrangement, the Project supported issuing four government regulations that further improve the safety management of all dams in Indonesia. Most notable was the Ministerial Regulation on Dams (27/PRT/M), the main regulation for dam safety in the country, which defines the detailed roles and responsibilities in dam safety, lays out guidelines and standards, and empowers the regulator to meet the prescribed requirements. It sets a certification requirement for all large dams and demands fully functioning dam safety instruments, EAPs, and O&M Manuals. This regulation has been instrumental in guiding the operational review and licensing process at DSC nationally. It has also been the main legal reference for the country’s ongoing effort to patch gaps in its regulatory setting on dam safety management.

Further, the Project strengthened the capacity at the central (MPWH) and local (RBOs) levels in planning O&M budgets and managing their limited resources to generate optimum impacts on dam safety. The Project has supported GOI in adopting improved methodologies for O&M planning by strengthening the risk assessment and cost estimation processes at all levels. The improved risk assessment methodology allows MPWH to plan (i.e., estimation and scheduling exercises for utilizing) its limited resources among RBOs according to their dam-specific risk levels. At the RBO level, the Project refined the adopted approach to estimate the needs-based budget for O&M. A technical guideline was produced under the Project for this purpose. By the loan closing, 13 RBOs have registered needs-based budgets for the O&M of their Project dams at MOF’s asset management system. This methodology has also been incorporated when updating and developing the O&M manuals of 145 Project dams. Prior to the Project, annual O&M funding was estimated simply by referring to the 0.25 percent of the Modern Equivalent Asset Value of respective dams. Such gross oversimplification has failed to capture fluctuations in dam risk levels brought by changing dams and reservoirs’ conditions, intensifying extreme weather events, raising construction costs (reflecting on records of past O&M works), and growing concentration of surrounding population and assets. The past method has, therefore, contributed to the historical underfunding for O&M and, Inadvertently, to the vicious cycle of deferred/insufficient maintenance, underperforming dams, and large capital investments.

Lastly, the Project has supported the establishment of key entities at the central and river basin levels dedicated to dam safety management and empowering them with the required human resources and technologies. The Project contributed significantly to establishing the DTC under MPWH, equipped with the latest technologies in real-time hydrological data collection (including water level, discharge, storage, etc.), forecasting, and risk simulation. By the loan closing, the Center has the capacity to

monitor 149 Project dams, with a subset of dams empowered with live CCTV networks. At the basin level, 67 Dam Monitoring Units (DMUs) were established at all Project RBOs. They are tasked with on-site monitoring of dams and regular reporting of their observations to DGWR. This has historically been challenging due to the absence of a dam-specialized unit at RBOs and the widely scattered distribution of dams across Indonesia's geography. Further, the Project invested heavily in training and capacity building for dam operational staff in the DMUs/RBOs and DGWR. By the Project closing, all these operational staff had received annual training, with 1,042 receiving dam professional certification issued by the Indonesia Committee on Large Dams, a member of the International Commission on Large Dams.

Aside from fully meeting its intended water-focused objectives, the Project results will transcend to contribute to Indonesia's economic productivity and climate resiliency.

(iii). Contributing to economic productivity through water-food-energy nexus.

The Project indirectly, but substantially, benefits the agriculture sector as most dams are used for irrigation supply. The agriculture sector remains vital to Indonesia's economy as, despite its declining contribution to the national economy, its outputs still account for about 13 percent of the country's GDP. As a subset of the sector, irrigated agriculture, primarily for rice cultivation, has long required substantial assistance in alleviating the high water stress in key basins supporting 35 percent of Indonesia's rice production (including basins covered under the Project). The reservoirs' rehabilitation under the Project will improve overall water availability (easing water stress), while sedimentation works in irrigation inlets will improve conveyance efficiency for food production. This, in turn, will improve the productivity of crops cultivated under irrigation and generate benefits for the wider agriculture sector, which still employs 30 percent of the country's labor force. The improvements in irrigated agriculture will contribute to Indonesian food security (rice is the country's staple food) and economic productivity (the country is ranked third globally in rice production). While the installed capacity for hydropower generation among Project dams is still limited, the regulations and guidelines issued through the Project's contribution will be applicable to all Indonesian dams, including hydropower dams. These documents will contribute to safeguarding and optimizing the national hydropower generation capacity and, therefore, to Indonesia's ongoing energy transition process and efforts to achieve its climate agendas. The impact is expected to be most notable in 60 new dams constructed by GOI in the last ten years, with the majority furnished with hydropower generation capacity. Lastly, the project will improve the country's overall water security through enhanced water availability (for irrigation, municipal, and productive usage) and protection against water-related hazards (flooding and drought). As the limited storage capacity and resiliency against flooding are expected to significantly impede Indonesia's long-term development plan (as elaborated in the World Bank's report of 'Indonesia Vision 2045: Toward Water Security', 2022), the Project is expected to have a lasting contribution to the country's effort in sustaining its economic growth and preserving its accumulated gains.

(iv). Strengthening disaster resiliency against climate-driven water risks.

The physical rehabilitation funded by the Project (in 141 out of the country's 292 dams) to enhance dams' structural integrity and their reservoirs' storage capacity will strengthen the resiliency against

flooding and drought. These hazards are expected to be heightened by the increased frequency, intensity, and irregularity of extreme weather events driven by the changing climate. Further, the Project has coupled the above physical works with non-structural intervention with externalities benefiting the country's disaster preparedness and contingency planning, notably through developing and disseminating EAPs in 145 Project dams distributed across 14 of Indonesia's 38 provinces. These EAPs outline the procedure for coordination and action in case of a dam failure or other specified emergencies (including flooding in areas surrounding Project dams) to protect life, economic assets, and the environment downstream. As a cross-sectoral plan, the preparation of these EAPs has further strengthened the coordination among agencies key to disaster response and risk management (including MPWH, local governments, disaster management authorities, and communities), while its implementation will provide a platform for joining efforts. As mentioned in the previous sections, the Project has also empowered community participation in disaster monitoring and reporting. All of these will contribute to creating an enabling environment (characterized by inter-agencies synergy and community participation) to effectively respond to any natural disaster, including those beyond the Project's main interest. The scope of both physical and non-physical interventions under the Project has been extensive, with their benefits expected to be identifiable even at the national level.

The Project was AIIB's first water project, demonstrating the substantial potential that the Bank's investment could have on its member water sector and on its overall economic and climate ambitions. Despite the inherently higher investment risks, such investment is crucial to the Bank's effort to 'foster sustainable economic development' and 'address development challenges' (envisioned in AIIB's Article of Agreement) as dams are among a few key infrastructures where water, food, and energy security intersect – making it an ideal platform to optimize the depth and breadth of investment impacts beyond the water sector.

Annex: Client Feedback on the Project

- 1. Are the services and support provided by the Project Team professional, sufficient and in time, during project preparation and project implementation? [please provide some specifics or examples as an illustration.]**

Yes, the AIIB Team has always been present during the project implementation. The AIIB Team coordinates seamlessly with the World Bank in managing the project implementation, which makes the coordination between MPWH and the Banks more efficient. During the project implementation, the AIIB team responded professionally and effectively to MPWH's request for project restructuring (in 2022) and extension of the loan closing date (in 2023). Both requests were handled swiftly, and approval was given nearly simultaneously with the World Bank's.

- 1. Is it convenient to access to the Project Team's services and support? [please provide some specifics or examples as an illustration.]**

Yes, the Project Team Leader has always been easily accessible through WhatsApp and email. He coordinated with the AIIB's Project Team if the MPWH Team needed support or consultation. For example, the MPWH Team could easily access the AIIB team's support in processing the project restructuring and loan extension, which resulted in efficient conclusions for both requests.

- 1. Does the Project Team demonstrate flexibility and efficiency during project preparation and project implementation? [please provide some specifics or examples as an illustration.]**

Yes, as described above. The MPWH's team appreciates the facilitative approach that the AIIB Project Team (as the co-financier) has taken to support the Project and strengthen the World Bank's Team without creating additional complications or obstacles to DOISP2's implementation.

- 1. What is the value addition of AIIB's financing in the Project?**

AIIB's financial contribution has enabled a scalable improvement to dam safety and performance across Indonesia by scaling up the investments provided by the World Bank and the Government of Indonesia. We also appreciate the AIIB team's practical approach as a co-financier to DOISP2, which allows seamless coordination with us and the World Bank without creating additional obstacles and complications during the project implementation. Lastly, we appreciate the AIIB Team's proactive approach to engaging us in an initial discussion to strengthen the sustainability of DOISP2's impacts and modernize/optimize the dam management in the country.

- 1. Will you consider working with the AIIB again in infrastructure development? Please provide a few specific reasons.**

Yes, the AIIB Team has demonstrated itself to be a capable professional team that can support our work in improving dam safety and operational performance. The AIIB team has always been professional, accessible, and practical in supporting the Project. In the

future, AIIB could consider working as a co-financier or stand-alone financier in water management project.

1. Do you have any suggestion to the Project Team and/or the AIIB?

Please consider (1) strengthening the presence of the AIIB Project Team in the country, especially if it is considered to be a stand-alone financier in the water sector, (2) supporting the mobilization of grant resources to prepare studies and investments to support dam safety and water resources management.

1. Other comments (such as comments on the reporting requirements, approval of project changes, etc.)

No comment. The implementation processes (e.g., reporting requirements, project restrictions, etc.) were synchronized with the World Bank's, which resulted in efficient implementation from both technical and administrative aspects.



Project Completion Note

Prepared on 09/04/24

Project Objective Indicators	Indicator level	Unit of Measure	Cumulative Target Values																			Frequency	Responsibility	Comments
			Baseline		2017		2018		2019		2020		2021		2022		2023		End Target					
			Year	Value	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Year	Target	Actual			
Overall risk reduction of all dams under project	Project	%	2017	4	4	n/a	4	n/a	7.47	n/a	8.12	8.26	8.3	10.45	14.19	14.19	16.18	16.99	2023	18	31.8			Overachieved
Number of dams with individual hazard reduced by > 20% of risk score	Project	Number	2017	16	16	n/a	16	n/a	22	n/a	25	28	28	30	60	60	66	69	2023	75	127			Overachieved
River Basin Organizations (Balai) with need-based O&M budget and plan operationalized within a national dam asset management system	Project	Number	2017	0	0	n/a	0	n/a	0	n/a	0	3	3	5	5	5	10	13	2023	13	13			Achieved
Issuance of regulation on dam safety	Project	Number	2017	0	0	n/a	0	n/a	0	n/a	0	2	2	2	3	3	3	4	2023	3	4			Overachieved

Project Intermediate Indicators	Indicator level	Unit of Measure	Cumulative Target Values																			Frequency	Responsibility	Comments
			Baseline		2017		2018		2019		2020		2021		2022		2023		End Target					
			Year	Value	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Target	Actual	Year	Target	Actual			



Project Completion Note

Prepared on 09/04/24

Project beneficiaries	Project	million people	2017	2.3	2.3	n/a	n/a	n/a	n/a	6.5	16.6	16.59	21.55	21.55	21.55	21.55	21.55	2023	11.20	21.55			Overachieved
Project beneficiaries, of which female	Project	%	2017	50	50	n/a	50	n/a	50	n/a	50	50	50	50	50	50	50	2023	50	50			Achieved
Number of dams rehabilitated	Project	Number	2017	35	35	n/a	n/a	n/a	n/a	38	38	38	49	66	66	78	80	2023	140	141			Overachieved
Number of dams with BDSF operational	Project	Number	2017	10	10	n/a	n/a	n/a	n/a	22	27	27	44	66	66	70	82	2023	98	145			Overachieved
Number of dams where emergency action plans updated and disseminated	Project	Number	2017	56	56	n/a	n/a	n/a	n/a	72	72	72	92	92	92	70	145	2023	140	145			Overachieved
Dam operational staff receiving annual training	Project	%	2017	0	0	n/a	n/a	n/a	n/a	100	100	100	100	100	100	100	100	2023	90	100			Overachieved
O&M Manuals (including related training) for Dams completed	Project	Number	2017	0	0	n/a	n/a	n/a	n/a	67	80	67	67	67	67	83	134	2023	140	145			Overachieved
Community-Dam Management MOUs signed on Greenbelt Management	Project	Number	2017	0	0	n/a	n/a	n/a	n/a	15	17	17	31	33	33	39	39	2023	30	39			Overachieved
Land area under sustainable landscape management practices	Project	Hectare	2017	10	10	n/a	n/a	n/a	n/a	62	62	62	167	167	167	722	761	2023	300	761			Overachieved



Project Completion Note

Prepared on 09/04/24

Communities joining catchment management activities (% of which female)	Project	%	2017	37	37	n/a	n/a	n/a	n/a	37	37	37	37	37	37	68	68	2023	50	69.95			Overachieved
Dams implementing at least 70% of catchment management activities	Project	Number	2017	0	0	n/a	n/a	n/a	n/a	60	60	60	0	60	0	63	63	2023	60	86			Overachieved
Dams providing real time data	Project	Number	2017	30	30	n/a	n/a	n/a	n/a	52	52	52	149	149	149	149	149	2023	80	149			Overachieved
Dam Technology Center established and operationalized	Project	Number	2017	0	0	n/a	n/a	n/a	n/a	1	1	1	1	1	1	1	1	2023	1	1			Achieved
CDMU staff trained	Project	Number	2017	0	0	n/a	n/a	n/a	n/a	12	19	19	19	19	19	19	19	2023	5	19			Achieved
DSU staff trained	Project	Number	2017	0	0	n/a	n/a	n/a	n/a	26	146	146	146	146	146	146	146	2023	15	146			Overachieved
INACOLD certification of Dam Professional	Project	Persons	2017	40	40	n/a	n/a	n/a	n/a	104	1042	1,042	1042	1,042	1042	1,042	1,042	2023	240	1,042			Overachieved