PROJECT INFORMATION DOCUMENT (PID)
CONCEPT STAGE

Report No.: PIDC13292

Project Name	Vietnam Dam Rehabilitation and Safety Improvement Project (P152309)
Region	EAST ASIA AND PACIFIC
Country	Vietnam
Sector(s)	Irrigation and drainage (35%), Energy efficiency in Heat and Power (30%), Water supply (30%), Public administration- Water, sanitati on and flood protection (5%)
Theme(s)	Natural disaster management (35%), Water resource management (30%), Rural services and infrastructure (25%), Infrastructure services for private sector development (10%)
Lending Instrument	Investment Project Financing
Project ID	P152309
Borrower(s)	SOCIALIST REPUBLIC OF VIETNAM
Implementing Agency	Ministry of Agriculture and Rural Development (MARD)
Environmental Category	A-Full Assessment
Date PID Prepared/ Updated	29-Oct-2014
Date PID Approved/ Disclosed	12-Dec-2014
Estimated Date of Appraisal Completion	26-May-2015
Estimated Date of Board Approval	30-Sep-2015
Concept Review Decision	Track II - The review did authorize the preparation to continue

I. Introduction and Context

Country Context

1. Vietnam has experienced rapid economic growth over the past two decades. Political and economic reforms launched in 1986 have transformed Vietnam from one of the poorest countries in the world, with per capita income below US$100, to a lower middle income country within a quarter of a century with per capita income of US$1,730 by the end of 2013. The ratio poverty headcount ratio has fallen from 58 percent in 1993 to 17.2 percent in 2012, and most indicators of welfare have improved. Vietnam has been applauded for the equity of its development, which has been better than most other countries in similar situations, and five of the ten original Millennium Development Goal targets have already been attained.

2. Vietnam is an agricultural-based economy and one of the countries most exposed to natural hazards, given its geography, topography, economic structure and population distribution. Water resources are rich with 14 major river basins throughout the country, but distributed unevenly across geographical regions. The agriculture sector has been heavily dependent on irrigation, drainage and flood control. Disaster and hazardous risks present a challenge for Vietnam's quest for continued growth. While floods and typhoons are the dominant hazards, the country is also susceptible to droughts, landslides and seawater intrusion. Vietnam is highly exposed during the monsoon rainy season to a combination of river plain flooding and flash floods as well as associated land-slides. Vietnam is also experiencing the impacts of climate change. Recent experience has illustrated the increasing financial vulnerability from extreme weather events, accentuated by the increasing density of physical and commercial activities in vulnerable areas.

3. Recognizing the importance of ensuring the sustainable development of water resources in Vietnam, the country has invested significant resources over the past decade or more. Water-related expenditure accounted for an estimated 22.9 percent (US$ 1,140.57 million) of total Government expenditure during the period of 2001 to 2011. Over half of the government expenditures were channeled into hydroelectric power plants (50.6 percent), followed by water supply and sanitation (27.8 percent) and agricultural water resources (17.3 percent). During this same period, official development assistance (ODA) gross disbursements in the sector amounted to US$ 240.52 million on average per year, with close to half of ODA disbursements going into water supply and sanitation (46.8 percent).

4. As a result of the investments in water resources development, Vietnam has one of the largest network of dams and hydraulic infrastructure in the world alongside China and the United States. This network comprises over 7,000 dams of different types and sizes. More than 750 can be classified as large dams (over 15m in height or between 5 and 15m with reservoir storage in excess of 3 MCM) and with the number of small dams (less than 15m and 3 MCM) estimated to be in excess of 6,000 largely earth embankment dams. Of the total four million hectares of agricultural land, more than three million hectares are irrigated via 6,648 dams. In addition, there are more than 1,100 hydropower dams either under operation, construction, investigation or planned, with the 268 hydropower dams having a total installed capacity of 13,066 MW. Of these, 86 are defined as large hydropower dams with an installed capacity of 30 MW or greater and size greater than 15 meters. The existing 6,648 irrigation dams and 268 hydropower reservoirs have a combined storage capacity of about 50 billion cubic meters. While the primary focus is on irrigation or hydropower, many of these dams are multi-purpose, supporting flood regulation and bulk water supply where needed.

Definition	Irrigation	Hydropower
Dams > 50m	3	32
Dams 15m – 50m or >=3 MCM	551	54
Dams <15m & < 3 MCM	6,648	201

5. The development of this infrastructure platform has resulted in a number of inherent challenges. Many of the medium and small-size reservoirs were built in the 1960s-1980s with limited technical investigations, inadequate design, and poor quality construction. These issues have been compounded by limited operations and deferred maintenance. As a result, many of these dams have deteriorated and the safety is below accepted international safety standards, presenting a substantial risk to human safety and economic security. The deterioration of these dams, coupled

with the increased risk and uncertainty resulting from hydrological variability due to climate change and rapid upstream development, has placed many reservoirs at risk. The risks are wide spreading, resulting from inadequate cross section e.g. too thin to be stable, through subsidence of the main structure, seepage through main and/or auxiliary dam and around the intake structure, deformation of up/downstream slope, spillway malfunction, and inadequate and ineffective use of safety monitoring devices.

6. Failure to secure the operational safety of the existing network and strengthen the capacity for further development has the potential to undermine Vietnam's economic gains. In the past five years there have been an estimated 30 dam failures. These have resulted in devastating regional flooding, significant loss of human life, and substantial economic losses. The damage costs associated with water-related disasters have been estimated at VDN 18,700 billion or US$ 1.25 billion between 1995 and 2002. The impacts associated with natural flooding have been further exacerbated by the uncoordinated operation along cascades of dams within individual river basins and the limited capacity for timely monitoring and forecasting of high flows, particularly in the narrow and steep topography of the Central Highlands. The public outcry resulting from recurrent flooding and dam failure has been reflected in the media and has led to civil society campaigns which have raised the awareness of this problem in all spheres of Government.

7. Recognizing the importance of securing the foundations for sustained and secure economic growth, the Government first launched a sectoral program focused on dam safety in 2003. This has been revisited in an effort to revitalize the program and is expected to be formally approved by end 2014. Based on information available from MARD there are about 1,150 dams in need of urgent rehabilitation or upgrading. Of these, an initial assessment highlights 311 reservoirs urgently requiring investments to improve their safety. The total cost of the program is estimated to be in excess of VND17 trillion (approx. US$800 million). In support of this renewed effort, Government has allocated an initial VND 15 billion (about US$ 0.7 million equivalent) for rehabilitating prioritized dams annually.

Sectoral and Institutional Context

8. Vietnam's legislation governing the water sector consists of a complex system of legal documents issued by different state agencies. The new Law on Water Resources was approved in 2012 and came into effect in January 2013. The Law is aligned with principles of Integrated Water Resources Management (IWRM), such as river basin management, environmental flows, and water quality management. This Law also provides a series of legislative provisions towards integrated water resources management including safety of reservoirs.

9. The national legal framework for dam safety is prescribed through Decree No. 72 which was issued in May, 2007 and has been revised with Government's approval anticipated by December 2014. This revised Decree defines a set of dam safety related issues, providing for classification of individual dams, procedures for safety reviews and quality assurance for dam designs, acceptance of completed dams, operational procedures for reservoirs, dam safety and hydro-meteorological monitoring, periodic safety inspection and reporting requirements, rehabilitation and protection measures, along with flood storm prevention and the protection of downstream communities.

10. The roles and responsibilities of the various government agencies are prescribed in a series of subsequent Government Circulars. These were formulated and came into effect to direct dam

safety and reservoir management. Circular No. 33 (February 2008) details the role of Ministry of Agriculture and Rural Development (MARD) for irrigation dams and Circular No 34 (October 2010) details the role of Ministry of Industry and Trade (MoIT) in relation to hydropower dams. The Ministry of Natural Resources and Environment (MoNRE) is responsible for developing inter-reservoir water regulation plans and operating rules in 11 river basins where there is a cascade of dams and reservoirs (Decree 21/2013/ND-CP dated March 4, 2013). The roles and responsibilities of MoNRE, MARD, and MoIT relating to the integrated management of hydropower and irrigation reservoirs are detailed in Decree No. 112. This includes provisions for inter-reservoir water regulation plans covering serious drought, water contamination, environmental incidents, or disasters. The decrees and circulars also define the roles and responsibilities of their provincial and district level organizations and other relevant entities.

11. The operation and management of the dams, along with emergency preparedness procedures and overall dam safety measures are prescribed in Flood Prevention and Protection Plans. These are the responsibility of the Provincial People's Committees (PPC). The PPCs are responsible for guiding and monitoring operation of reservoirs and execution of safety plans of the dams during the disaster events and in the upstream catchments on behalf of the communities in accordance with the provisions of Decree No. 72. These plans are compiled and carried out in coordination with MARD, MoNRE, and MoIT, along with the Steering Committees for Natural Disaster Prevention and Control, which is led by the Minister MARD.

12. The operation and maintenance of medium and large-size irrigation dams is the responsibility of the provincial irrigation management companies (IMCs) with branch offices at district level. The operation and management of small dams is typically the responsibility of the local authorities acting through its Agricultural Cooperatives. While the technical capacity of the IMCs is generally good and sufficient to meet the minimum management responsibilities, the capacity of the local authorities is limited, requiring significant support and guidance from technical agencies at the provincial and district level. In contrast, the responsibility for the operation and maintenance of hydropower dams rests with its owners. Large and medium-size hydropower dams are managed by state-own corporations and have sufficient technical expertise to perform their tasks. However, management of smaller hydropower dams is the responsibility of the investors, who are often from private sector and lack the technical expertise to manage these dams. This poses a number of safety risks, especially during the flood season. Strengthening the institutional arrangement to ensure more effective dam safety and reservoir management is a core Government objective to be supported by the project.

Relationship to CAS

13. The proposed project contributes directly to the goals articulated in both the Socio-Economic Development Strategy (SEDS) of the Government of Vietnam and the 2012-2016 Country Partnership Strategy (CPS). Activities financed under the project would improve the safety of dams along with the people and downstream infrastructure, thereby directly contributing to the following:

- SEDS Goal 11: Protect and Improve Quality of the Environment, Proactively and Effectively Respond to Climate Change, as well as Prevent and Fend off Natural Disasters
- CPS Outcome 2.1: Improved natural resources management
- CPS Outcome 2.3: Enhanced Preparedness for Natural Hazards and Climate Change:

14. The project is directly aligned with and contributing to the twin goals of shared prosperity and alleviation of extreme poverty. The project would increase protection to communities living downstream of dams and would support the management and operation of essential hydraulic infrastructure. The project would focus on rehabilitation and safety of large dams, the failure of which have a devastating impact and are critical to supporting national food and power production. It will also support the rehabilitation of small dams, which support local livelihoods and community resilience and are a fundamental part of hunger eradication and poverty reduction in poor rural provinces. Dams are predominantly located in rural areas, where the highest levels of poverty are typically found in Vietnam.

15. The project is derived directly from the dam safety component under the Vietnam Water Resources Assistance project (VWRAP - P065898) which was part of the sustainable development pillar under the Bank's Country Assistance Strategy. The VWRAP supported the formation of the MARD's Dam Safety Unit and the development of Decree 72 on Dam Safety. The project also financed safety works completed for six of the largest irrigation dams and designs for safety works on another ten large dams. The institutional developments supported under VWRAP triggered follow-up actions such as the development of several regulations for dam safety and of Emergency Preparedness Plans (EPP) for the rehabilitated dams.

16. The project also builds on the lessons learned from a number of related World Bank projects. This includes the need for an integrated, holistic approach to dam safety and operations within the context of the river basin and to ensure the adequacy of the supporting institutional environment. These lessons are derived from the Small Hydropower Cumulative Impact Assessment that provides an analysis of environmental flows in the context of hydropower operations and a better understanding of the potential impacts associated with small hydropower plants. The Vietnam Managing Natural Hazards Project (P118783, approved in July 2012), develops hazard protection plans and early warning systems that provide a number of lessons and the foundations for the dam safety measures.

II. Proposed Development Objective(s)

Proposed Development Objective(s) (From PCN)

17. The Project Development Objective is to support the implementation of the Government dam safety program by improving the safety of prioritized dams and reservoirs as well as to protect people and assets of the downstream communities.

Key Results (From PCN)

18. Key results of the project would be as follows:

(i) Dams returned to full operation with reduced risk of failure, measured using risk indices before and after rehabilitation (number);

(ii) Project dams where emergency response plans, including dam break analyses, have been prepared and disseminated to the population (number);

(iii) Dams with enhanced functionality through more coordinated operation, measured by effective operational rules and communication procedures being in place (number);

(iv) Basin-wide integrated dam reservoirs operation plan and emergency preparedness plan prepared for improved dam safety and flood management (number);

(v) Share of required budget per state made available for adequate O&M of dams (%); and

(vi) Dam safety regulations and guidelines strengthened as per the amended Decree 72 for dam

safety management at the national level (yes/no).

(vii) Direct Project Beneficiaries (number), of which female (%)

(viii) Intended beneficiaries that are aware of project information, project supported investments and their needs addressed (percentage)

III. Preliminary Description

Concept Description

19. The program is intended to support the Government's dam safety program. This will be achieved by supporting both the structural safety of the dams and reservoirs themselves, along with the operational safety required to safeguard the populations at risk and downstream socio-economic infrastructure. This is directly aligned with the Government definition of dam safety outlined in Decree 72. The project will also support Government to ensure a more holistic, basin level integrated development planning to improve institutional coordination, future development and operational safety.

20. The selection of dams to be rehabilitated under the project will be based on an a priori agreed selection criteria aimed at prioritizing those interventions that address the risks within an explicit poverty and inequality framework. Prioritization will be based on the probability and impact of failure, both in terms of population impacted and socio economic infrastructure, including structural risks, hydrological risk, downstream hazard and economic benefits. These will be categorized further according to the level of readiness, to prioritize those within the set of dams ready for rehabilitation with detailed engineering designs and those requiring rehabilitation for which detailed designs are still required. Established procedures for prioritizing interventions developed by International Commission on Large Dams (ICOLD) and others – for example Portfolio Risk Assessment – will be applied. Building on lessons learned from Vietnam Water Resources Assistance Project this activity will establish clear criteria to measure the dam safety risks in the future, including (i) Probability of dam failure (structural risks based on height and storage volume); (ii) Impact of dam failure on downstream populations; (iii) Impact of dam failure on downstream infrastructure; (iv) Poverty context and impact; (v) Areas with ethnic minorities; and (vi) Readiness.

21. The project is designed to improve the safety of the dams and related works, as well as the safety of people and socio-economic infrastructure of the downstream communities as defined in Decree 72 governing the management of dam safety in Vietnam. This adopts the international convention in defining dams based on height and volume. Specifically, the Decree defines the following: (i) large dams from 15m high or with reservoir capacity of three million cubic meters or more; (ii) medium dams from 10m to 15m high or dams with reservoir capacity from one to three million cubic meters; and (iii) small dams from 5m to 10m high or dams with reservoir capacity between 50,000 and one million cubic meters.

22. The project would be an optimized mix of both structural and non-structural measures. Structural measures include rehabilitation and upgrading safety work of existing dams, including instrumentation, such as safety monitoring equipment. Such physical works represent the large part of the project budget (>80%). Non-structural dam safety activities, which are a critical and key component of the Bank-supported activities under the project, would include support to strengthen the legal and institutional framework; safety monitoring; operational procedures, operations and maintenance (O&M); and emergency preparedness plans. These measures also include an

assessment of the resources to ensure sustained O&M and monitoring.

23. It is proposed that the project consist of four principle components.

Component 1: Dam Safety Rehabilitation (estimated cost = US$400 million)

24. This component will improve dam safety through physical rehabilitation of existing infrastructure. This will include two different approaches required for the rehabilitation of large/ medium and small, community-managed dams. The difference between the two relates not only to the types of works and the regulatory framework, but also the institutional and implementation arrangements required to undertake such works and ensure their sustainable operation and maintenance. This would include support to (i) Detailed design, supervision and quality control of rehabilitation works for prioritized dams and associated infrastructure; (ii) rehabilitation works, including civil works, hydro-mechanical works and installation of hydrological and safety monitoring equipment; (iii) preparation of Operation and Maintenance Plans and Emergency Preparedness Plans; and (iv) adoption of standardized checklist for community-managed dams.

Component 2: Dam Safety Management and Planning (estimated cost = US$90 million)

25. This component will improve the planning and operational framework for dam management to safeguard the people and socio-economic infrastructure within downstream communities. This would include provision of support to: (i) hydrological observation network and information systems; (ii) integrated development planning and operational coordination mechanisms between irrigation and hydropower reservoirs; (iii) regulatory and institutional support and strengthening on coordination mechanism including national dam policy on registration, regulation, inspection, safety compliance and penalties; (iv) technical specifications, safety standards and regulations to internationally-accepted levels; and (v) capacity enhancement, basin-wide integrated dam reservoir operation plans, emergency preparedness plan including dam break analysis, downstream flood mapping and benchmarking, awareness raising and evacuation drills for local communities living downstream.

Component 3: Project Management Support (estimated cost = US$10 million)

26. This component will provide the necessary enabling environment to support project implementation. This will include support for the following: (i) Project Steering Committee composed of MARD, MoIT and MoNRE to coordinate all project interventions; (ii) Project Management Unit (PMU) within MARD to provide the necessary support services for timely and effective project implementation, including monitoring & evaluation, procurement, financial management, safeguard monitoring, etc.; (iii)Technical Assistance for beneficiary departments within MoIT and MoNRE to provide the necessary support services for timely and effective project implementation; (iv) Establishment and operations of a National Dam Safety Review Panel; (v) Independent audits of prioritized dams before and after rehabilitation; and (vi) Incremental operating costs for project related activities.

Component 4: Disaster Contingency (US$ 0 million - no fixed allocation, but not to exceed 20% of the total project cost)

27. This component will improve the response capacity of the Government in case of an

emergency relating to dam failure during project implementation. In the event of an emergency, this contingency component would facilitate rapid utilization of loan proceeds by minimizing the number of processing steps and modifying fiduciary and safeguard requirements so as to support rapid implementation. This component would allow expenditures to be made in accordance with the rapid response procedures of OP/BP 10.00 subject to the list of positive goods and services to be defined during project development. Such a component is not a substitution for insurance, and does not remove the need for construction covering dams included under the project. A generic positive list may be combined with a list of excluded goods that could trigger safeguard policies. This is intended to help ensure sufficient liquidity in the case of an emergency by financing the government's overall response to the emergency and providing some measure of protection to Government's fiscal accounts.

IV. Safeguard Policies that might apply

Safeguard Policies Triggered by the Project	Yes	No	TBD
Environmental Assessment OP/BP 4.01	×		
Natural Habitats OP/BP 4.04	×		
Forests OP/BP 4.36			×
Pest Management OP 4.09		×	
Physical Cultural Resources OP/BP 4.11	×		
Indigenous Peoples OP/BP 4.10	×		
Involuntary Resettlement OP/BP 4.12	×		
Safety of Dams OP/BP 4.37	×		
Projects on International Waterways OP/BP 7.50	×		
Projects in Disputed Areas OP/BP 7.60		×	

V. Financing (in USD Million)

Total Project Cost:	550.00	Total Bank Financing:	500.00
Financing Gap:	0.00		

Financing Source	Amount
BORROWER/RECIPIENT	50.00
International Development Association (IDA)	500.00
Total	550.00

VI. Contact point

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