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Report No.: PAD1610

INTERNATIONAL DEVELOPMENT ASSOCIATION

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF SDR 218.8 MILLION

(US$310 MILLION EQUIVALENT)

TO THE

SOCIALIST REPUBLIC OF VIETNAM

FOR A

MEKONG DELTA INTEGRATED CLIMATE RESILIENCE AND SUSTAINABLE LIVELIHOODS PROJECT

May 19, 2016

Environment and Natural Resources Global Practice
East Asia and Pacific Region

CURRENCY EQUIVALENTS
(Exchange Rate Effective as of April 30, 2016)

Currency Unit	=	Vietnamese Dong (VND)
VND 22,290	=	US$1
US$1.41733	=	SDR 1

FISCAL YEAR
January 1 – December 31

ABBREVIATIONS AND ACRONYMS

CPMU	Central Project Management Unit
CPO	Central Project Office
CRSD	Coastal Resources for Sustainable Development
CQS	Selection Based on Consultants' Qualification
DA	Designated Account
DARD	Department of Agriculture and Rural Development
DC	Direct Contracting
DFAT	Australian Government Department of Foreign Affairs and Trade
ECOP	Environmental Code of Practice
EMDP	Ethnic Minority Development Plan
ESIA	Environment and Social Impact Assessment
EMPF	Ethnic Minority Planning Framework
ESMF	Environment and Social Management Framework
ESMP	Environment and Social Management Plan
FA	Force Account
FAO	Food and Agriculture Organization
FM	Financial Management
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIS	Geographic Information System
GIZ	German Agency for International Cooperation (*Deutsche Gesellschaft für Internationale Zusammenarbeit*)
GoV	Government of Vietnam
GDP	Gross Domestic Product
GRS	Grievance Redress Service
IA	Implementing Agency
ICB	International Competitive Bidding
ICD	International Cooperation Department
ICMB	Investment Construction Management Board
IFR	Interim Financial Report
IMC	Irrigation Management Company
IPM	Integrated Pest Management
IRR	Internal Rate of Return
ISP	Implementation Support Plan
IUCN	International Union for Conservation of Nature
IWRM	Integrated Water Resources Management
JICA	Japan International Cooperation Agency
KMP	Knowledge Management Platform

MARD	Ministry of Agriculture and Rural Development
M&E	Monitoring and Evaluation
MDP	Mekong Delta Plan
MKD	Mekong Delta
MOF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
MPII	Ministry of Planning and Investment Inspectorate
MRC	Mekong River Commission
MTR	Midterm Review
NAWAPI	National Center for Water Resources Planning Investigation
NCB	National Competitive Bidding
NPV	Net Present Value
OOG	Office of the Government
O&M	Operation and Maintenance
PCR	Physical Cultural Resources
PCRA	Procurement Capacity and Risk Assessment
PDO	Project Development Objective
PMF	Pest Management Framework
PSC	Project Steering Committee
PMU	Project Management Unit
POM	Project Operations Manual
PPMU	Provincial Project Management Unit
PPC	Provincial People's Committee
PPSD	Project Procurement Strategy for Development
QBS	Quality-Based Selection
QCBS	Quality-and Cost-Based Selection
RAP	Resettlement Action Plan
REA	Regional Environmental Assessment
RPF	Resettlement Policy Framework
RSA	Regional Social Assessment
SEDP	Socio-economic Development Plan
SIWRR	Southern Institute of Water Resources Research
SPOT	*Satellite Pour l'Observation de la Terre*
SSS	Single-Source Selection
TA	Technical Assistance
TOR	Terms of Reference
VASI	Vietnam Administration for Seas and Islands
VNMC	Vietnam National Mekong Committee
VnSAT	Vietnam Sustainable Agriculture Transformation

Regional Vice President:	Victoria Kwakwa
Country Director:	Achim Fock (Acting)
Sector Director:	Paula Caballero
Sector Manager:	Iain Shuker
Task Team Leaders:	Anjali Acharya, Binh Thang Cao, Greg Browder

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Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project

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Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project (P153544)

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC

Environment and Natural Resources Global Practice

Report No.: PAD1610

Basic Information		
Project ID P153544	EA Category A - Full Assessment	Team Leader(s) Anjali Acharya, Binh Thang Cao, Greg J. Browder
Lending Instrument Investment Project Financing	Fragile and/or Capacity Constraints [ ] Financial Intermediaries [ ] Series of Projects [ ]	
Project Implementation Start Date 01-Nov-2016	Project Implementation End Date 31-Dec-2022	
Expected Effectiveness Date 01-Nov-2016	Expected Closing Date 31-Dec-2022	
Joint IFC No		

Practice Manager	Senior Global Practice Director	Country Director (Acting)	Regional Vice President
Iain Shuker	Paula Caballero	Achim Fock	Victoria Kwakwa

Borrower: Government of Vietnam			
Responsible Agency: Ministry of Agriculture and Rural Development			
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Project Financing Data(in US$, millions)

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

Total Project Cost:	387.00	Total Bank Financing:	310.00
Financing Gap:	0.00		

Financing Source	**Amount**
BORROWER/RECIPIENT	77.00
International Development Association (IDA)	310.00
Total	387.00

Expected Disbursements (in USD Million)

Fiscal Year	2017	2018	2019	2020	2021	2022	2023
Annual	5	20	60	65	70	80	10
Cumulative	5	25	85	150	220	300	310

Institutional Data

Practice Area (Lead)

Environment & Natural Resources

Contributing Practice Areas

Agriculture, Water

Cross Cutting Topics

[X]	Climate Change
[ ]	Fragile, Conflict & Violence
[X]	Gender
[X]	Jobs
[ ]	Public Private Partnership

Sectors / Climate Change

Major Sector	Sector	%	Adaptation Co-benefits %	Mitigation Co-benefits %
Agriculture, fishing, and forestry	General agriculture, fishing and forestry sector	40	80	20
Public Administration, Law, and Justice	Public administration- Water, sanitation and flood protection	20	80	
Water, sanitation and flood protection	General water, sanitation and flood protection sector	40	80	
Total		100		

☐ I certify that there is no Adaptation and Mitigation Climate Change Co-benefits information applicable to this project.

Themes

Major theme	Theme	%
Social protection and risk management	Natural disaster management	10
Rural development	Rural services and infrastructure	10
Environment and natural resources management	Climate change	40
Environment and natural resources management	Environmental policies and institutions	15
Environment and natural resources management	Water resource management	25
Total		100

Proposed Development Objective(s)

The project development objectives (PDO) are to enhance tools for climate-smart planning and improve climate resilience of land and water management practices in selected provinces of the Mekong Delta in Vietnam.

Components

Component Name	Cost (US$, millions)
Component 1: Enhancing Monitoring, Analytics, and Information Systems	56.4
Component 2. Managing Floods in the Upper Delta	79.2
Component 3. Adapting to Salinity Transitions in the Delta Estuary	81.6
Component 4. Protecting Coastal Areas in the Delta Peninsula	81.9
Component 5: Project Management and Implementation Support	10.9

Systematic Operations Risk- Rating Tool (SORT)

Risk Category	Rating
1. Political and Governance	Moderate
2. Macroeconomic	Moderate
3. Sector Strategies and Policies	Substantial
4. Technical Design of Project or Program	Substantial
5. Institutional Capacity for Implementation and Sustainability	Substantial
6. Fiduciary	Substantial
7. Environment and Social	Substantial
8. Stakeholders	Moderate
9. Other	
OVERALL	Substantial

Compliance	
Policy	
Does the project depart from the CAS in content or in other significant respects?	Yes [ ] No [X]
Does the project require any waivers of Bank policies?	Yes [ ] No [X]
Have these been approved by Bank management?	Yes [ ] No [ ]
Is approval for any policy waiver sought from the Board?	Yes [ ] No [X]
Does the project meet the Regional criteria for readiness for implementation?	Yes [X] No [ ]

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

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Legal Covenants

Name	**Recurrent**	**Due Date**	**Frequency**
Sections I and II of Schedule 2 set forth the Project implementation arrangements	Yes	N/A	Continuous

Description of Covenant

The recipient shall maintain the implementation arrangements and the project monitoring, reporting and evaluation as described respectively in Sections I and II of Schedule 2 of the Financing Agreement.

Team Composition

Bank Staff

Name	**Title**	**Specialization**	**Unit**
Anjali Acharya	Senior Environmental Specialist	Team Leader (ADM Responsible)	GEN02
Binh Thang Cao	Senior Agricultural Specialist	Team Leader	GFA02
Greg J. Browder	Lead Water Resource Mgmt Specialist	Team Leader	GWA02

Name	Title	Specialization	Unit
Nina Masako Eejima	Senior Counsel	Legal	LEGES
Thu Ha Le	Counsel	Legal	LEGES
Chau-Chin Shen	Senior Finance Officer	Disbursements	WFALN
Anna Wielogorska	Procurement Hub Leader	Procurement	GGO08
Ba Liu Nguyen	Procurement Specialist	Procurement	GGO08
Ha Thuy Tran	Financial Management Specialist	Financial Management	GGO20
Son Van Nguyen	Senior Environmental Specialist	Environmental Safeguards	GEN02
Nghi Quy Nguyen	Social Development Specialist	Social Safeguards	GSU02
Nagaraja Rao Harshadeep	Lead Environment Specialist	Water Resources/ GIS	GENDR
Phuong Hoang Ai Nguyen	Environmental Specialist	Climate Change	GEN02
Tijen Arin	Senior Environmental Economist	Environmental Economics	GEN02
Anders Jensen	Sr. Monitoring and Eval Specialist	M&E	
Dinesh Aryal	Sr Natural Resources Mgmt. Specialist	Natural Resources Mgmt	GEN01
Chris Jackson	Lead Rural Development Specialist	Rural Development	GFADR
Quyen Thuy Dinh	Program Assistant	Program Assistant	EACVF
Pierre Arnoux	Consultant	Social safeguards	GSU02
Ha Thi Van Nguyen	Consultant	Environmental safeguards	GEN02

Extended Team

Name	Title	Location
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Dutch Technical Team Michel Tonnejik Gerardo Van Halsema Dirk Frits Jasper Sirela	 Principle Consultant, RoyalHaskoningDHV, Asst. Professor, Wageningen University, Sr Advisor, Dirks Water Advisory Services Principle Consultant, RoyalHaskoningDHV,	 The Netherlands
German Technical Team Johannes Wolcke Thorsten Albers Stefan Groenwold	 UNIQUE forestry and land use GmbH Expert, Von Lieberman GmbH Technical Advisor, ICMP, GIZ	 Germany Germany Vietnam
IUCN Technical Team Jake Brunner Andrew Wyatt	 Head, Indo-Burma Group, IUCN Program Manager, IUCN-Vietnam	 Vietnam

Locations

Country	First Administrative Division	Location	Planned	Actual	Comments
Vietnam	An Giang, Dong Thap, Ben Tre, Tra Vinh, Soc Trang, Bac Lieu, Ca Mau, Kien Giang, Vinh Long				

I. STRATEGIC CONTEXT

A. Country Context

1. **Vietnam has experienced rapid and inclusive economic growth since the early 1990s.** Economic renovation (*Doi Moi*) launched in 1986 has transformed Vietnam from one of the poorest countries in the world to a lower-middle-income country—with per capita income (GNI) of US$1,980 in 2015—within a quarter of a century. The distribution of growth has been as remarkable as its pace: the mean income for the bottom 40 percent of the Vietnamese population increased by an annual average of 6.8 percent while the Gini coefficient increased only slightly, ensuring that the rapid income gains got translated into shared prosperity and significant poverty reduction. The percentage of people living in extreme poverty dropped from around 50 percent in the 1990s to under 3 percent by 2015.

2. **Development of the agriculture sector, particularly in the Mekong Delta, has contributed significantly to the development of Vietnam.** Vietnam's annual rice exports of US$4 billion accounts for more than a fifth of the global total. Rice is cultivated on 82 percent of the arable land. It provides 80 percent of the carbohydrate intake of the average Vietnamese. The Mekong Delta alone contributes to 50 percent of Vietnam's rice (90 percent for export), 70 percent of its aquaculture products, and a third of Vietnam's gross domestic product (GDP).

3. **The Mekong Delta is densely populated.** It is home to 22 percent of Vietnam's population, most of which live in coastal rural areas and are highly dependent upon rice or shrimp farming for their livelihoods. Many of these delta households are 'near poor' and are still vulnerable to external shocks that can push them back under the poverty line. In recent decades, the push to increase agricultural and aquaculture production, greater liberalization and diversification of rural markets, and urban development in the delta have improved opportunities for poor people. Yet, the new economic processes also highlight many environmental and social problems that vulnerable groups face.

4. **The pace of change is rapid and challenged by climate change impacts.** In addition to increased pressures from the unsustainable use of land and water resources, economic growth of the Mekong Delta is challenged by climate change impacts, with increased saline intrusion in coastal areas, greater coast erosion, and higher levels of flooding from the combination of land subsidence and sea-level rise in the southern part of the Ca Mau Peninsula. Upstream hydropower development in the Mekong Basin will also reduce sediment load down to the delta as well as impede fish migratory routes. Intensification of agriculture (that is, moving from two to three rice crops per year) and increased water use also threaten the water resources quality and quantity. Construction of protection dikes for intensive rice farming in recent years also reduced the water retention capacity in the upper part of the delta, resulting in more serious seasonal flooding for downstream provinces.

5. Climate change impacts are impeding the Mekong Delta's inclusive growth and poverty reduction efforts as poor and marginalized groups will incur the greatest burden. With these uncertainties, the government will be challenged to ensure that growth is environmentally sustainable and inclusive. Investment planning and management in the water, agriculture, and climate adaptation realm will have profound impacts, both positive and negative, on the development trajectory of Vietnam.

B. Sectoral and Institutional Context

6. **Development success of the Mekong Delta can be attributed to two important factors.** First, the natural supply of freshwater and nutrient-laden sediments from the Mekong River annually transform the delta, providing the vital ingredients for productivity. Large amount of sediments are transported downstream with the floods into the Mekong Delta, some of which are deposited on the delta's floodplains and the remainder transported into the marine environment. This annual deposition of sediment in the delta and along the coastline contributes to important delta-building processes. The annual flood pulse also drives the high levels of aquatic and terrestrial biodiversity and system productivity that is a defining feature of the delta.

7. **Second, the government of Vietnam (GoV) has, since the late 1960s, supported ambitious master planning efforts with the guiding mandate being the control of the delta's freshwater hydrology to enable multiple rice crops each year.** These planning initiatives, which emphasized the role of water control infrastructure, began to take effect in the 1980s and accelerated in the post *Doi Moi* era of the 1990s. They had a tremendous impact on increasing rice production in the Mekong Delta but adverse effects on the delta's ecological connectivity and on the wide array of fresh, brackish, and marine habitats which had previously covered the delta and which were responsible for the delta's former high biodiversity. Today some 75 percent of the Vietnamese Mekong Delta is agriculture land (mainly multiple rice cropping paddies), and at least 13,000 km of dikes and 42,000 km of primary and secondary canals have been constructed.

8. Lessons have pointed to an urgent need for cross-sectoral, integrated spatial planning for infrastructure development. While the *Doi Moi* reforms directly contributed to the development of the Mekong Delta, over the past 20 years, the implications of a single-focus development agenda have become better understood as lessons point to the need to break from business-as-usual development planning and move toward cross-sectoral, integrated spatial planning and investments. The lessons include the following:

- Highly controlled multi-crop farming systems have depleted soil fertility and cut off agricultural areas from the natural fertilization processes of the Mekong River. The widespread isolation of Mekong's freshwater floodplain from fluvial processes, to open up opportunities for triple- and double-crop rice farming, has resulted in reduced fertility and reduced productivity of triple-cropped areas. In An Giang Province, the total yield from some triple-cropped areas is actually lower than the yield from neighboring double-crop areas which are still partially connected to the annual flood cycles.

- The shrinking Mekong floodplain area has exacerbated flooding in unprotected areas. The loss of floodplain has increased flood levels in unprotected areas and concentrated flood discharge in the Mekong River channels and distributaries. The worsened flood conditions have also lead to transboundary issues between Vietnam and Cambodia and channelized flood flows have led to increasing issues of riverbank and coastal erosion.

- Draining of wetland depressions in the delta for agricultural expansion has led to increasing acidification of surface water environments with knock-on effects for ecosystems (especially fisheries) and water supply. Deterioration of these

provisioning services has disproportionately affected poor communities of the delta who rely on these services for their livelihood.

- Dry season agriculture is shifting the delta's balance between fresh and marine environments. Increased freshwater demand to support dry season agriculture has depleted groundwater sources and strengthened the penetration of saline intrusion, thereby increasing the salinity of water sources and accelerating the rates of land subsidence in the delta.

- Centralized water control initiatives such as the saline control structures in the coastal areas of the delta often limit the livelihood and economic opportunities for farmers seeking to take advantage of market-driven opportunities. The market-driven conflict between shrimp and rice farming in the early 2000s revealed the inflexibility and low levels of adaptive capacity of an infrastructure-driven approach to controlling the delta environment and conflict between government targets for rice production and individual farmers wanting to optimize the economic returns for their farming effort.

9. **Growing investments within the delta are placing development pressures on the resources and resulting in implications on floods, salinity, and tidal influxes.** From an environmental perspective, the Mekong Delta and its wetlands play an important role in water regulation (hydrological flows) and groundwater recharge/discharge. It also allows dispersion of sediments and nutrients over a very wide area contributing to the fertility and agricultural productivity. Temporary storage of floodwaters in floodplains and wetlands provides significant regulation of floodwaters, protection against high floods, and strong local influence on the basin's climate. Dry season exposure of in-channel wetland areas provides increased primary productivity and sink capacity for greenhouse gas (GHG) emissions. Changes in the hydrological cycles due to increased and fragmented infrastructure investments pose risks to the existing ecological functions.

10. In addition, from an economic perspective, it is important to note that there is currently an excess supply of rice in Vietnam, with an estimated 6–7 million tons exported per year. Furthermore, rice farmers are facing greater difficulties in marketing their low-quality rice, with resulting declines in profits (that is, rice farmers with less than 1 ha of land cannot make their living on rice income). In addition, rice cropping requires a lot of freshwater, and production declines are occurring in areas which are increasingly affected by saline intrusion. Given these new development pressures, the Mekong Delta needs to explore a more diversified agriculture away from rice.

11. **Upstream developments in the Mekong Basin are affecting water resources, as well as sediment flows and fish migration.** Hydropower development in the mainstream and tributaries upstream of the delta provide additional water storage, which should on average increase dry season flows. These reservoirs, however, may capture and store sediments reducing the flow of nutrient-rich sediments to the Mekong Delta and into coastal water and potentially increase riverbank and coastal erosion. Hydropower development, particularly in the mainstream, may also block important fish migratory routes, resulting in decreased capture fisheries and loss of biodiversity. Upstream irrigation projects may also reduce dry season flows into the delta.

12. **The Mekong Delta has been identified as one of the most vulnerable deltas to the impacts of climate change.** Agriculture and aquaculture are increasingly affected by changes

in freshwater supply due to salinity intrusion, flooding, increasing tropical cyclone intensity, and increasing temperatures. Domestic freshwater supply is expected to become less reliable due to erratic rainfall and salinity intrusion into groundwater resources. Marine fisheries, particularly coral reef fisheries, are expected to be affected by sea-level rise, warmer oceans, and ocean acidification associated with rising atmospheric and ocean CO_2 concentrations. Coastal infrastructures are exposed to increased tropical storm intensity, long-term sea-level rise, and sudden-onset fluvial and coastal flooding.

13. **Already, Vietnam is experiencing wetter wet seasons, drier dry seasons, higher intensity rainfall, flash flooding, and increased frequency of tropical cyclones.** The average annual temperatures and wet season precipitations are expected to increase significantly. Increases in wet precipitation will be coupled with increased peak daily precipitation events, drier dry seasons, and compounding water availability issues. Rice yields in the Mekong Delta are also expected to decline from 6 percent–12 percent due to the resulting inundation and salinity intrusion, while aquaculture production will also be affected.

14. **The GoV recognizes the threats and has started to develop a more holistic and spatially integrated vision to manage the current and future risks and opportunities in the Delta.** In 2013, a Mekong Delta Plan (MDP) was developed, with the support of the Netherlands government, which evaluated a number of different development strategies, including considerations of climate change. Delta-level scientific databases and climate change impact assessments are also ongoing; however, to date these projects remain at a theoretical level and are not integrated into the planning process. The impacts of alternate development options on various sectors in a highly complex delta environment and the efficacy of different investments in the face of climate change and dynamic upstream development remain poorly understood.

15. **The complexity of issues in the Mekong Delta covers a range of sectors (for example, agriculture, urban, energy, and environment); temporal scales (for example, from daily operations to long-term climate change concerns); and divergent institutional and policy landscapes.** Delta planners and decision makers need to continue making important strategic decisions, across sectors, on the future direction and nature of development amidst an uncertain future which partly lies outside their control. At present no tools or frameworks exist, which allow delta planners to systematically assess the resilience of their investment decisions against the breadth of potential change. Integrated information platforms would help contribute to evidence-based resilient planning and management of the highly vulnerable Mekong Delta.

C. Institutional Context

16. The current institutional landscape in the Mekong Delta is complicated, with planning and sectoral implementation roles spread across several ministries and agencies, which make it challenging to effectively plan for and build resiliency in the Delta's development plans. The Ministry of Agriculture and Rural Development (MARD) is responsible for overseeing and providing policy guidance on the agriculture and rural development in Vietnam. In addition, MARD is responsible for overseeing the development of water resource infrastructure including irrigation, flood control, and coastal defenses. The Ministry of Natural Resources and Environment (MONRE) is responsible for managing the nation's land, air, and water resources, and is also Vietnam's lead ministry for climate change policy. The Ministry of Planning and Investment (MPI) oversees the overall national, regional, planning processes, and promotes and guides infrastructure investments.

17. The government is facing huge coordination challenges relating to the activities, investments, plans, and programs of different sectoral agencies. Furthermore, the South-West Steering Committee— a key regional political institution in Vietnam—is limited in its mandate from taking a stronger coordination role, especially with regard to the implementation of policies and investments. All this makes it difficult for inter-ministerial and interprovincial coordination and multisectoral planning required for adaptive delta management.

18. Several decentralization programs have been deployed and several state agencies have been established to incorporate the perspectives and concerns of various stakeholders. The integrated principles for land and water use embedded in several existing policies are not applied in practice; spatial and policy planning continues to target sectors separately. Compounding these challenges is the fragmentation of data, information, and analysis across various research agencies (often affiliated with key sectoral ministries), with no protocols for data sharing and very limited collaboration.

19. Sectorally, there are institutional barriers and tight controls on agricultural production (notably rice), which hamper the progress in agricultural productivity and profitability. In the Mekong Delta, water resources management has traditionally focused on flood control and on the provision of freshwater, mainly for agriculture. Protection of water resources was long disregarded despite growing demand and increasing water pollution. Legislation relating to water and land use remains complicated.

D. Higher Level Objectives to which the Project Contributes

20. **Twin goals and the Country Partnership Strategy.** The project is aligned with the Vietnam Country Partnership Strategy for 2012 to 2016 (Report 85986-VN) which was approved on December 15, 2011, and directly contributes to the "Sustainability" pillar relating to climate resilience. The project is also consistent with the World Bank Group's 'twin goals' of eliminating extreme poverty and boosting shared prosperity through economic growth among the bottom two quintiles. With regard to poverty headcount basis, the Mekong Delta stands out as having the largest number of poor, with most provinces having poverty rates ranging from 16 percent–28 percent. These poorer communities are likely to face economic displacement as their livelihoods are affected by sea-level rise, salinity, and scarce freshwater resources. The proposed project is expected to contribute to the poverty agenda as the majority of the targeted communities in the delta provinces lie in close vicinity (above or below) to Vietnam's poverty line, yet are not among the extreme poor. Equally, by helping build climate resilience in agriculture and aquaculture —the key livelihoods in the delta—the project can help boost shared prosperity among the bottom 40 percent.

21. **Vietnam Socioeconomic Development Plans (SEDPs).** The planning process in Vietnam follows a five year planning cycle and includes the Mekong Delta SEDP, as well as sectoral master plans (for irrigation, forestry, water resources, and so on), provincial SEDPs, and land-use plans. The project is designed to foster coordination between ministries and sectors as well as to enhance tools for climate-smart analysis that will inform the various planning processes.

II. PROJECT DEVELOPMENT OBJECTIVES

A. PDO

22. The project development objectives (PDO) are to enhance tools for climate-smart planning and improve climate resilience of land and water management practices in selected provinces of the Mekong Delta in Vietnam. The objectives would be achieved through the provision of capital investments (especially in water management infrastructures), technical assistance (related to agricultural and aquaculture livelihoods) and capacity building for farmers in selected Mekong Delta provinces and government institutions at national and sub-national levels.

Project Beneficiaries

23. The proposed project would target three vulnerable sub-regions in the Mekong Delta, covering 9 of the 13 provinces. These include An Giang and Dong Thap in the upper delta; Ben Tre, Tra Vinh, Vinh Long, and Soc Trang in the delta estuary; and Ca Mau, Bac Lieu, and Kien Giang in the coastal peninsula. Project activities are estimated to directly benefit over 1.2 million people living in these provinces. These include farmers (especially rice) in the upper delta provinces and aquaculture farm and fisher folk households along the coastal provinces, whose livelihoods are affected by climate change, salinity intrusion, coastal erosion, and flooding. Ethnic minorities, including the Khmer living in Soc Trang and Tra Vinh Provinces, are also expected to benefit. An indeterminate number of rural and urban households and agribusiness located in areas upstream and downstream of subproject sites also directly or indirectly benefit from the project interventions.

PDO Level Results Indicators

24. At the project level, the PDO indicators for the proposed project include the following:

- Adoption of Mekong Climate Resilience Assessment by MONRE
- Area with climate-resilient land and water management practices supported by the project
- Project-supported farm households who have adopted climate-resilient land and water management practices
- Direct project beneficiaries, (percent of which are female)
- Citizens in selected provinces who participated in consultations on formulation of district land-use plans

III. PROJECT DESCRIPTION

A. Project Components

25. **The project is a critical part of the World Bank's long-term engagement in the Mekong Delta to strengthen integrated climate-resilient management and development across different sectors and institutional levels.** More specifically, it will support information systems, institutional arrangements, and the road map for building provincial and district-level planning capacity for sustainable delta-wide development. In parallel, the project will also seek opportunities for 'low-regret' investments and scope out longer-term development options to be financed under future phases. The project would comprise a

combination of structural and nonstructural investments and has been informed by the Bank-financed Building Resilience in the Mekong Delta TA (P149017).The project is proposed to span a period of six years, with the financing of US$387 million (US$310 million from IDA; US$77 million from the GoV). The project is seeking additional resources from the Global Environment Facility (GEF) to finance research and innovation activities relating to climate-resilient solutions for the Mekong Delta. If the GEF grant funds are obtained during project implementation, they would finance activities which are complementary to the project and will be processed separately ('partially blended').

26. **The project concept and approach builds up from the vision articulated in the MDP, developed by a team financed by a grant from the Government of the Netherlands, whereby the delta was viewed as different hydro-ecological zones cutting across provinces and sectors (see Figure 1).** Taking into account the climate change and development uncertainties, the MDP helped identify and prioritize 'no-regret' and 'priority' measures in different hydro-ecological sub-regions. In the upper delta, it prioritized attention to agricultural land-use planning and modernization of flood-based agricultural production systems (floodwater retention, diversification of fish and vegetables). In coastal areas, including the estuary and peninsula, it prioritized freshwater management to reduce groundwater abstraction for agriculture and aquaculture; modernization and increased sustainability of aquaculture by adopting polyculture-based systems; and mangrove regeneration along the outer coastline as reinforcement of the seashore.

Figure 1. Hydro-ecological Zones

27. This proposed project is designed to help operationalize the visioning and strategy of the MDP articulated for the different sub-regions. The project is two pronged—Component 1 works to improve monitoring systems, decision support tools, and information systems to enhance the knowledge base and inform planning and decision making into the future. In parallel, Components 2, 3, and 4 work to scale up smaller successful pilots (e.g. cropping, aquaculture models) designed to be climate resilient and demonstrate how multisectoral solutions can be implemented. During the scoping of the proposed project, the task team placed heavy emphasis on coordination with other Bank projects, those of other development partners to learn lessons, build on successful pilots, and capture synergies (see Annex 6).

28. The five components proposed under the project are described in the following paragraphs.

Component 1: Enhancing Monitoring, Analytics, and Information Systems (Estimated US$61.3 million, of which US$56.4 million will be financed by IDA)

29. Putting the Mekong Delta on a more sustainable and resilient trajectory in the face of climate change, upstream Mekong Basin development, and environmentally damaging practices within the Delta itself, will require investments in both infrastructure and the enhanced capacity to monitor, plan, and manage the Delta's land and water resources. Component 1 provides the framework for ensuring the capacity to undertake 'smart investments' and cope with anticipated wide-scale environmental changes.

Subcomponent 1.1. Monitoring Systems to Enhance Mekong Delta Knowledge Base

30. This subcomponent upgrades and expands MONRE's monitoring systems for groundwater and surface water and enhances its remote sensing capacity. MONRE will also undertake studies on specialized topics, including river and coastal morphology and groundwater management. MARD will develop a computer-based operations system for hydraulic infrastructure, which will improve the operation of the complex network of gates and canals in the delta. MARD will also undertake an inventory of sea dikes and mangrove belts along the 700 km delta coastline.

Subcomponent 1.2. Infrastructure and Information Systems for Enhanced Decisions

31. This subcomponent finances the establishment of the Mekong Delta Center, which will serve as a hub for delta-wide information, including water, land use, environmental and climate change information, education, and outreach. A Mekong Center business plan will be developed, which examines options for sustainable funding and possible expansion. The foundation of the center will be a 'knowledge management platform' (KMP) which will be a Geographic Information System (GIS)-based computer system providing MONRE and other stakeholders with the capability to integrate various databases and models to help investigate the environmental and socioeconomic impacts of climate change and basin developments. A Mekong Delta Climate Resilience Assessment will also be formulated, which will provide a set of recommendations to help guide planning at the regional, provincial, and sectoral levels.

Subcomponent 1.3. Mainstreaming Climate Resilience into Planning Processes

32. This subcomponent will provide the linkages between the data and information systems with Vietnam's planning processes in the Mekong Delta. Led by the MPI, this subcomponent will seek to collaborate with line ministries (primarily MARD and MONRE), sectors, and provinces to draft regulations on pilot regional coordination for climate change adaptation and climate-resilient solutions in the Mekong Delta. It will also finance reports to advise on land-use planning, spatial and territorial development, and identifying of priority 'low-regret' and climate-resilient investments. Using the Mekong Climate Resilience Assessment, the subcomponent will seek to update the Mekong Delta Socioeconomic Master Plan, relevant sectoral master plans, and provincial SEDPs.

Component 2: Managing Floods in the Upper Delta (Estimated US$101 million, of which US$79.2 million will be financed by IDA)

33. The upper delta area is characterized by natural occurring deep floods in the wet season. The development of an extensive agricultural flood control system has shifted the floodwaters to other areas in the Delta and also reduced the beneficial effects of flooding, including replenishing soil fertility, groundwater recharge, and sustaining aquatic ecosystems.

34. The primary objective of this component is to protect and/or reclaim the benefits of controlled flooding (flood retention) measures while increasing rural incomes and protecting high-value assets in An Giang, Kien Giang, and Dong Thap Provinces. This will potentially consist of (a) modifying water and agricultural infrastructure to allow for more beneficial flooding (expanding flood retention capacity) in rural areas and offer new agricultural/aquaculture cropping alternatives; (b) providing livelihoods support measures to farmers so they have alternatives to the wet season rice crop, including aquaculture; (c) constructing/upgrading infrastructures for protecting select high-value assets; (d) developing flood diversion channels to lower peak flows in the middle delta; and (e) facilitating agricultural water use efficiency in the dry season.

35. Subprojects selected to be financed under this component include infrastructure schemes aimed at increasing flood retention capacity, irrigation and upgrading of reservoirs, livelihoods improvement (such as demonstration and agriculture extension support for transition from triple-rice to alternative cropping), and ecosystem restoration. Details are provided in Annex 2.

Component 3: Adapting to Salinity Transitions in the Delta Estuary (Estimated US$108.7 million, of which US$81.6 million will be financed by IDA)

36. The Mekong River divides into nine distributaries which flow into the East Sea through the estuary zone. This area is naturally characterized by low flows during the dry season which allow saline water to extend far inland. Over the past 20 years, closed freshwater systems designed for rice production have been developed in this area, consisting of large polders ringed by dikes and with sluice gates to control saline water intrusion. The long-term sustainability of this strategy is questionable due to reduced dry season water availability and sea level rise. In addition, farmers are rapidly converting from other cropping to more profitable shrimp farms along the coast, often accompanied by destruction of mangrove forests.

37. This component aims to address the challenges related to salinity intrusion, coastal erosion, sustainable aquaculture, and improved livelihoods for communities living in the coastal areas of Ben Tre, Tra Vinh, and Soc Trang Provinces. This will potentially consist of (a) construction of coastal defenses consisting of combinations of compacted earth embankments and coastal mangrove belts; (b) modification of water and agricultural infrastructure along the coastal zone to allow flexibility for sustainable aquaculture activities and adapt to changing salinity levels; (c) supporting farmers to transition (where suitable) to more sustainable brackish-water activities such as mangrove-shrimp, rice-shrimp, and other aquaculture activities; and (d) supporting climate-smart agriculture by facilitating water use efficiency in the dry season.

38. Subprojects to be financed under this component will include restoration of mangroves along the provincial coastline; construction/upgrades of river and coastal embankments; sluice

gates to improve water quality, efficiency, and sustainability of aquaculture in the brackish-water zone; and support for a gradual transition from rice and other freshwater crops in the saline intruded zone to a brackish-water economy, including aquaculture through demonstration and aquaculture extension together with necessary adjustments to land-use plans in the longer term. Details are presented in Annex 2.

Component 4: Protecting Coastal Areas in the Delta Peninsula (Estimated US$101.1 million, of which US$81.9 million will be financed by IDA)

39. In contrast to the adjacent estuary zone, there are no distributaries of the Mekong River flowing through the peninsula. Historically, the peninsula was covered by dense mangroves sustained by localized rainfall. In recent decades, there has been an explosion of shrimp farming along the coast which relies heavily on groundwater abstraction to maintain the proper salinity level. The over-abstraction of groundwater has resulted in land subsidence. The natural mangrove forest has been significantly reduced, although there are still some protected mangrove zones. An extensive canal network has been developed to bring freshwater from the Mekong River into the peninsula to allow rice production.

40. This component aims to address the challenges related to coastal erosion, groundwater management, sustainable aquaculture, and improved livelihoods for communities living in the coastal areas of Ca Mau, Bac Lieu, and Kien Giang Provinces. This will potentially consist of (a) restoration of coastal mangroves and/or rehabilitation of coastal dikes in erosion areas; (b) modification of water control infrastructure along the coastal zone to allow flexibility for sustainable aquaculture activities; (c) control of groundwater abstraction for agricultural/ aquaculture and enhancing of freshwater supplies for domestic use; (d) support to farmers to practice more sustainable brackish livelihoods such as mangrove shrimp; and (e) support to climate-smart agriculture through water use efficiency.

41. Subprojects to be financed under this subcomponent include restoration of mangroves to enhance coastal defense, transition of shrimp farming into integrated mangrove shrimp, construction/upgrades of river and coastal embankments, and sluice gates to manage water conditions and demonstration and aquaculture extension to improve efficiency and sustainability of brackish-water aquaculture. Details are presented in Annex 2.

Component 5: Project Management and Implementation Support (Estimated US$14.5 million, of which US$10.9 million will be financed by IDA)

42. This component supports project management and capacity building for MARD, MONRE, and the MPI to implement the project. This component is expected to provide incremental operating costs and consultant and advisory services for overall project management, financial management (FM), procurement, safeguards, and monitoring and evaluation (M&E).

B. Project Financing

43. **Lending instrument**. The total cost estimate for the project is US$387 million, of which IDA would finance up to US$310 million. Provision of IDA financing is proposed via the Investment Project Financing instrument. Part of the Bank proceeds will be on lent to provinces, in cases where the subproject is entirely located within the province. For the subprojects covering more than one province, the Bank's financing will be fully on-granted to MARD. See summary of the project costs in Table 1.

Project Cost and Financing

Table 1. Summary of Project Costs (US$, millions)

Project Components	Project Cost	IDA Financing	% IDA Financing
1. Enhancing Monitoring, Analytics, and Information Systems	61.3	56.4	92.0%
2. Managing Floods in the Upper Delta	101.0	79.2	78.4%
3. Adapting to Salinity Transitions in the Delta Estuary	108.7	81.6	75.1%
4. Protecting Coastal Areas in the Delta Peninsula	101.1	81.9	81.0%
5. Project Management and Implementation Support	14.5	10.9	75.2%
Total Costs	**387.0**	**310.0**	80.2%

C. Lessons Learned and Reflected in the Project Design

44. **The Bank Group has extensive global experience in supporting projects that use an integrated management approach in river basins and deltas**, specifically combining prioritized investment programs with long-term institutional development and financing mechanisms. The project formulation draws on lessons learned from a number of related Bank-financed projects, including similar river basin programs in the Mekong River Basin, Myanmar, Bangladesh, Lao, and several African countries, as well as previous Mekong Delta projects in Vietnam in the topics of integrated water resources management, agriculture, coastal protection, dam safety, and fisheries. The key lesson learned is that a multisectoral, participatory approach based on sound science is necessary for making informed evidenced-based decisions.

45. **The Mekong Delta is a dynamic landscape with rapid economic development and associated changes in land use and uncertainties related to climate change and upstream development.** Experience with other recent projects have shown that while timely implementation requires the detailed preparation of many core investments, a certain degree of flexibility has been included in the design to reflect new and improved understanding of emerging dynamics. This project focuses on the detailed preparation of 'low-regret' investments while retaining flexibility in the design of other infrastructural measures and livelihood models. This allows for further alterations/changes during implementation to reflect new and improved understanding of emerging dynamics, possible changes in the external environment, especially those associated with climate change (such as sea-level rise, salinity intrusion, increased flooding and drought, and so on).

46. **The Bank Group has been a long-standing partner in Vietnam and the project draws on the lessons from previous support when setting up institutional arrangements to ensure successful and efficient implementation of the project.** Specifically, the project draws on the experience of previous support to MARD and MONRE through a series of Bank-financed projects (in agriculture, water resources, and climate change) focusing on the Mekong Delta region. Implementation arrangements as well as capacity building at various levels of the government is appropriately targeted from lessons learned in other previous projects. Working across ministries is often complex; this project design requires MARD, MONRE, and the MPI to work collaboratively. During project preparation, detailed discussions on responsibilities, including fiduciary, have been agreed and assigned clearly.

47. **Transitioning livelihood models and practices as an adaptation strategy requires collective and joint actions and close cooperation with local communities.** Recent projects on livelihoods, agriculture, and aquaculture have highlighted that relationships within farmer

groups or cooperatives, as well as between these groups/cooperatives and companies take time to evolve. In this project, well-functioning existing farmer cooperatives with prior experience of working with agribusinesses are targeted and prioritized. Furthermore, the project works with successful pilots of climate-resilient livelihood models and scales them up to demonstration projects. This approach enhances the farmers' confidence and trust and strengthens the capacity of the local communities—with a potential for further scale-up over time.

48. **Addressing climate change requires multisectoral stakeholders and development partners to come together and agree on a jointly accepted vision for the Mekong Delta's development.** Given the current context where various initiatives and programs have been undertaken by different development partners (such as German Agency for International Cooperation [*Deutsche Gesellschaft für Internationale Zusammenarbeit*, GIZ], Japan International Cooperation Agency [JICA], International Union for Conservation of Nature (IUCN), the Netherlands government, U.S. Agency for International Development, and the Australian Government Department of Foreign Affairs and Trade [DFAT]) to support the Vietnamese government to respond to climate change in the region, under this project, regular donor coordination meetings have been hosted by the Bank to help identify a clear space for the Bank's engagement and identify synergies and complementarities with other development partners' activities.

IV. IMPLEMENTATION

A. Institutional and Implementation Arrangements

49. **Overview of the implementation arrangements.** MARD plays the role of executing agency and will work in close collaboration with MONRE and the MPI to jointly implement the project. A Project Steering Committee (PSC)—comprising representatives from MONRE, MARD, Provincial People's Committees (PPCs), the Ministry of Finance (MOF), MPI, Office of the Government (OOG), and the State Bank of Vietnam—would be established to monitor overall implementation and provide policy and technical advice. The PSC will be chaired by a MARD vice minister and will include representatives from MARD's technical departments, and the participating provinces.

50. **Project implementation arrangements.** At the central level, the MARD Central Project Office (CPO) Irrigation will be responsible for overall implementation and management of the project and will oversee implementation of Components 2, 3, and 4 and parts of Components 1 and 5. For these components, the MARD CPO will use existing resources to establish a central project management unit (CPMU) for project management and supervision. The implementation of noncomplex (and single-province) subprojects of these components shall be delegated to the provincial subproject implementing agencies (IAs).

51. The CPMU will be supported by a technical team formulated by MARD, which will include specialists from various technical departments, including agriculture, forestry, aquaculture, climate change, water, and environment, as needed, to effectively provide technical support to the provinces when required. Each province involved in the project will set up its own project management unit (PMU) (called 'PPMUs') using existing resources which will be responsible for the noncomplex subprojects within their jurisdictions.

52. **MONRE is responsible for Component 1 and has assigned the current MONRE PMU as the entity responsible for coordinating, implementing, and overall management.** This PMU will have its capacity strengthened to undertake project management, procurement, FM, and safeguards compliance activities. One subcomponent will be led by MPI, with an assigned department (Planning Management Department) responsible for implementation. The detailed working relationship between MARD, MONRE, and MPI for implementation of this component is detailed in the Project Operations Manual (POM). Proposed activities under Component 1 may be allocated to a wide variety of contractors.

B. Results Monitoring and Evaluation

53. In this project, Component 1 is specifically designed to provide monitoring equipment and accompanying analyses and decision support needs to better manage and contribute to climate-resilient investments for the delta. In addition to this broader monitoring, a dedicated M&E system will be established for tracking project inputs, activities, outputs, and impacts across all components in all project provinces. Consistent with the project's Results Monitoring Framework, the M&E system includes data fields to systematically record, aggregate, and generate information and reports for all levels including subproject sites, districts, and provinces. Furthermore, qualitative and quantitative surveys related to the project's outcome and intermediary outcome indicators, implementation progress, and performance will be carried out. The M&E system will have capability to analyze these data to evaluate results, track implementation progress, identify bottlenecks for quick resolution, and monitor process quality.

54. The overall M&E system will be implemented and managed by the MARD CPMU. The CPMU will work with MONRE, the MPI, and project provinces to collect data and report the indicators in the Results Monitoring Framework provided in Annex 1. The MARD CPMU will appoint a specialized M&E consulting firm to compile information from the participating provinces to monitor progress of the project and update the monitoring indicators. Periodical progress reports would be sent to the Bank summarizing the outcome of the physical progress, financial and procurement information, and updated indicators. Before the midterm review (MTR), the CPMU will send a report containing a summary of progress, updated results indicators (as stated in Annex 1), updated project estimated cost, and plans for completion.

55. The MARD CPMU and MONRE along with the Bank will jointly conduct a semiannual implementation support mission to validate the M&E reports to assess their realism. Furthermore, surveys and in-depth assessments will be carried out by independent consultants during the MTR at the end of the third year of project implementation and at the end-of-project evaluation. These assessments and evaluation will be reviewed by the MARD CPMU, MONRE, and the Bank.

56. Reporting formats, including operational and fiduciary, have been discussed during project preparation and will be further refined as necessary during the early stages of implementation to ensure that the information gathered is relevant for the MARD CPMU, MONRE, and the Bank to assess project implementation progress and results monitoring.

57. In addition, the CPMU will prepare and update the monitoring of the environmental and social safeguards implementation report. The report would contain progress in the implementation of the overall safeguard requirements such as (a) land appropriation; (b) other social mitigation measures (including livelihoods improvement activities as needed); (c) update on project affected persons; (d) monitoring of contractor performance; (e)

implementation of environmental management plans, including the Integrated Pest Management (IPM) program for subprojects; (f) identification of emerging social and environmental issues; and (g) updated plan for social and environmental safeguards.

58. **GHG monitoring.** One of the key features of the project is to support the provinces in reducing areas currently under rice cultivation. In Dong Thap and An Giang in the upper delta region, subprojects will aim at preventing further development of the third rice crop by introducing alternative livelihoods in the flooding season such as freshwater aquaculture and cash crops. In saline intruded areas in the estuary and peninsular regions, the project will support a gradual transition from rice to brackish-water aquaculture or improved rice-farming practices (using less fertilizers) in rotation with aquaculture. In addition, the project would also support mangrove replanting along the coast and inside shrimp ponds. By reducing rice plantations, use of fertilizers, and planting more mangroves, it is expected that the project would contribute significantly to GHG emission reduction. To estimate and monitor the quantity of GHG reduction under the project, the Ex-Ante Carbon-balance Tool developed by the Food and Agriculture Organization (FAO) will be used during implementation to provide estimates of the impact of applicable projects on the carbon balance.

C. Sustainability

59. **Overall sustainability.** The overall sustainability of the project will depend on the government's commitment to adaptation measures in the Mekong Delta. This includes its commitment to promote integrated regional planning and management, which is a major challenge as the Vietnamese administration system is based on provinces and sectors. Superimposing a regional approach will be a major challenge. However, the government and the residents of the Mekong Delta are fully aware of the predicted climate-related changes and are in the initial stages of modifying land-use plans and agricultural practices to better address flood risk and saline intrusion. The key line ministries (MARD, MONRE, and MPI) have shown their explicit support of the new approach envisioned within the MDP.

60. **Technical sustainability.** Vietnam has a long history of constructing and managing rural water infrastructure. Engineering and construction quality is generally adequate. However, there is a general trend to underinvest in maintenance and rehabilitation, which leads to the long-term deterioration of the infrastructure. With regard to agricultural/ aquacultural technologies, Vietnam generally is doing well in production. Its agricultural research and extension systems are strong and Vietnamese farmers are hardworking and skillful. However, Vietnam tends to have more problems when it comes to marketing due to inadequacies in marketing strategy and quality control.

61. **Financial sustainability.** The financial sustainability of the project in the short term depends on helping farmers find profitable alternatives to unsustainable land uses, such as triple-rice cropping in potential water retention areas, intensive shrimp farming in mangrove forest zones, and/or growing rice in water-scarce or salinized areas. For instance, past research and local experience show that incomes from wild fish and/or aquaculture are several times higher than from the third rice crop, although when aquaculture is developed in a bigger area, it should have better market research and market strategy. Over the long term farmers will be forced to make these shifts due to environmental factors anyway. Therefore, introduction and adoption of climate change resilience and adaptability in agricultural farming is expected to give farmers a better chance to maintain their incomes.

D. Readiness

62. The project's readiness for implementation has been assessed to be adequate. In particular, the borrower has completed the following actions: (a) preliminary technical design for the first 18-month subprojects under the Components 1, 2, 3, and 4; (b) preparation of the POM, including the detailed safeguards manual; and (c) key environmental and social safeguards instruments. Furthermore, the climate change and disaster risk screening of the first year sub-projects was included to assess current and future risks relating to floods, salinity intrusion, coastal erosion etc. to inform the design of the first year sub-projects.

V. KEY RISKS AND MITIGATION MEASURES

63. The overall risk is considered Substantial, given the support for 'low-regret' climate change adaptation investments; the complex multisectoral institutional arrangements involving MARD, MONRE, MPI, and the project provinces; and the potential adverse environmental impacts because of proposed investments.

64. **Political, macroeconomic and governance risks.** Vietnam has a stable political system with well-established and functioning institutions. The Bank forecasts steady near-term GDP growth in Vietnam combined with subdued inflation, continued current account surpluses, and further fiscal consolidation and debt reduction. The overall political and governance and macroeconomic risks are therefore considered Moderate.

65. **Sector strategies and policy risks.** The climate-related policy issues in the Mekong Delta are complex as they cover a range of sectors, including agriculture, urban, energy, environment, transport, and water, with a host of institutional and policy regimes at different levels. Often, these institutional mandates and policies create conflicting programs leading to confusion and inefficiency. The project design incorporates activities to strengthen institutional capacity and coordination, primarily through establishment of the Mekong Delta Center and the formulation of the Mekong Delta Climate Resilience Assessment. The overall sector strategy and policy risk rating is nevertheless considered Substantial.

66. **Technical design risks.** The technical design of the infrastructure supported by the project is straightforward and poses little risk. The main technical challenge is the farmer livelihood transitions that are enabled by the infrastructure. Although the viability of the different sustainable livelihood models that will be promoted have been demonstrated at the pilot level, the project will significantly scale up these livelihood models to unprecedented levels. The overall technical risk is therefore considered Substantial.

67. **Institutional capacity risk.** The institutional capacity risk is rated as Substantial. Although MARD, MONRE, MPI, and the project provinces have demonstrated experience in implementing projects, including those financed by the Bank, this project will require a high level of cross-sectoral cooperation for an integrated approach to improving resiliency in the Mekong Delta. Adopting a cross-sectoral and regional approach within the relatively rigid administrative systems in Vietnam will be a challenge. Mitigation measures include oversight from the MPI and the Prime Minister's office to facilitate cross-ministerial cooperation and interprovincial coordination in the delta.

68. **Fiduciary risks.** The project-level fiduciary rating is considered Substantial due to decentralization in the project design, which requires greater capacity and accountability on the

part of the provinces for FM and procurement responsibilities. Mitigation measures are outlined in the financial and management sections of the PAD and are described in Annex 3.

69. **Stakeholder risks.** Given the overall positive impacts from the project, key project stakeholders expressed support for project objectives at consultations held during project preparation. A regional social assessment highlighted that the shift to more climate-resilient cropping models is expected to diversify production and increase incomes of farmers. However, some households may be more reluctant to change (for example elderly, ethnic minority households, poor and landless or land poor households). The stakeholder risks are therefore assessed to be Moderate. To mitigate these risks, the project includes livelihood support measures to help households adapt. Consultation with project affected people, beneficiaries, and other stakeholders will continue during implementation.

VI. APPRAISAL SUMMARY

A. Economic and Financial Analysis

70. **Project benefits.** In the longer run, the improved planning, coordination, and monitoring of the delta's ecosystems funded under Component 1 will result in large benefits from increased resilience to climate change. Expected direct benefits are difficult to estimate because of the high degree of uncertainty on the extent of climate change and because of the uncertainty and path dependence of decisions made because of the availability of better planning tools and better monitoring. As a result, no attempt is made here to estimate the benefits of these investments in planning, coordination, and monitoring. However, it can be said that very small positive changes in the long-term growth path of the delta because of better planning, coordination, and monitoring will cover the relatively small costs of this investment under the project.

71. The project's main medium-term benefits will come from Components 2, 3, and 4 financing climate-resilient infrastructures and supporting livelihoods of local communities where agriculture/aquaculture production systems are affected by flooding, saline intrusion, and coastal erosion. Benefits from Component 2 will result from maintaining flood retention in the upper delta to help avoid floods downstream and from the adoption of more profitable alternative livelihoods in the flood retention areas. Benefits from Component 3 will result from the protection of existing high-value fruit trees against salinity intrusion and from the utilization of the naturally occurring saline water to develop profitable and sustainable aquaculture systems based on shrimp and other fish that naturally thrive in a saline water environment. Finally, under Components 3 and 4, benefits will accrue from reduced flood hazards and exposure as a result of structural and nonstructural coastal defenses that will combat increased storm intensities and rising sea levels.

72. At appraisal, four of the proposed ten subprojects had been defined in detail. These subprojects will begin implementation during the first year of the project. Ex ante financial and economic benefit/cost, analyses have been carried out for each of these four subprojects.

73. **Scenarios.** For each subproject, two scenarios were defined: (a) A baseline/without-project scenario, which describes the current situation and assumes that no interventions will be made by the government to solve the problems and (b) a with-project scenario. Where applicable, a business–as-usual scenario (what would happen in the normal course of development, but in the absence of the project) was defined and assessed against the baseline.

74. **Analyses.** Financial analyses of the alternative livelihoods demonstrated by the project were carried out at the farm level and based on typical/average crop budget models. The economic analysis took into account shadow-priced benefits to farmers as well as benefits that will accrue to society, such as flood risk reduction and ecological benefits due to the retention of floodplains in the upper delta. Additionally, the economic viability of individual infrastructure investments under the with-project scenario was examined.

75. **Summary indicators.** Estimations using conservative assumptions indicate that all four subprojects are economically viable, albeit at varying levels (table 2). In An Phu, the internal rate of return (IRR) is sensitive to project costs and assumptions made regarding the values of prawn price and yield. The infrastructure investments are also justified, again at varying degrees and greatly depending on the scale of the benefits they will provide.

Table 2. Summary of Subproject Economic Analyses

	IRR (%)	NPV (US$, millions)	Benefits/Costs
An Phu, An Giang	10.0	2.4	1.1
Ba Tri, Ben Tre	19.5	20.1	2.5
Tra Vinh	36.4	80.4	4.1
Kien Giang	12.4	8.4	1.3

Note: NPV = Net Present Value.

B. Technical

76. **Adapting water control infrastructures in the Mekong Delta.** Over the last two decades, Vietnam has constructed an extensive system of agricultural water control infrastructure to maximize rice production. This agricultural water control system consists of canals, dikes, and gates to provide freshwater, drain floodwaters, and protect agricultural land in the wet season for a third rice crop and in the dry season for salinity control. This agricultural water management strategy will become increasingly less viable in the upper floodplains due to the need to maintain flood retention areas and in the estuary sub-region due to sea-level rise. The project proposes to upgrade the existing agricultural water control system to allow for better and more flexible water control but more importantly to modify the operating strategy to allow for more controlled flooding (flood retention) and expanding saline-brackish production models.

77. **Selecting coastal defenses.** The traditional approach to protecting the coastline in Vietnam consists of constructing sea dikes, many of them armed with rocks and/or concrete. The project supports a more integrated approach consisting of a mangrove belt outside of the sea dike to serve as the first line of defense, followed by sea dikes (where appropriate), and then a more extensive mangrove belt inside of the sea dike. The coastline along the Mekong Delta is constantly and naturally shifting, with stretches of erosion (along southern part) and accretion (western part of the Delta along Ca Mau). The specific coastal dynamics will be taken into account when designing coastal protection measures.

78. **Piloting agriculture cropping/aquaculture models.** In freshwater areas, the most common farming models include a rice crop in rotation with other cash crops such as maize, vegetables, fish, and prawn while in brackish-water areas, there are mangrove-shrimp; rice-shrimp; and extensive, semi, and intensive shrimp. The project will promote good agriculture practices in the targeted areas. These practices have been piloted extensively in Vietnam in recent years, including in project provinces, and successful local experiences are available for scaling up. During project preparation, the project design was built on lessons

learned from ongoing Bank-financed projects, including Vietnam Coastal Resources for Sustainable Development (CRSD) and Vietnam Sustainable Agriculture Transformation (VnSAT) Project, which are being implemented in Ca Mau, Soc Trang, An Giang, Dong Thap, and Kien Giang. During implementation, the project will continue working closely with the CRSD and VnSAT to ensure that proven agricultural technologies are introduced to farmers.

79. **Institutional coordination and planning support.** Currently, data and information on the Mekong Delta is collected by numerous agencies and institutions across different ministries, with no mechanism for sharing or standardization. The project will finance the physical and institutional development of the Mekong Delta Center, including establishing data sharing protocols and formulating a business plan that will help ensure the long-term sustainability of the Center. Water and land-use planning in the delta is undertaken in a fragmented manner and does not fully take climate change considerations into account. The project-financed Mekong Delta Climate Resilience Assessment will promote cross-sectoral planning by providing a comprehensive analysis of delta-wide land and water issues within the context of climate change. It will also propose delta-wide and sub-regional resiliency strategies related to land use, coastal vulnerability, transitioning to brackish economy, and flood risk management. This assessment will help mainstream climate change issues into the next round of formal planning (2021–2025) at the regional, sectoral, and provincial levels.

C. Financial Management

80. An FM Assessment for the project IAs (that is, MARD, MONRE, MPI and project provinces) concluded that the project FM risk is Substantial. The following key risks were identified: (a) MONRE, MPI and project provinces may not be familiar with Bank FM and disbursement requirements, especially when a fully decentralized fund flow mechanism is applied; (b) the project design adopts full decentralization and autonomy to the project provinces, which would require greater capacity and accountability on the part of the provinces in monitoring fund flows and in meeting the financial reporting requirements; and (c) successful project implementation requires strong linkages among project components and good management and coordination between MARD, MONRE, MPI, and the Departments of Agriculture and Rural Development (DARDs).

81. The principal risk mitigation measures include (a) acceptable FM staffing to be appointed at all IAs (priority should be given to the staff who have experience in FM from Bank-financed projects) and provided with training on Bank FM requirements and disbursement procedures; (b) a project FM Manual developed as part of the POM, describing in detail the roles and responsibilities of the concerned parties, as well as specifying the project FM procedures and regulations; (c) an upgraded accounting software to be installed for the project and training to be provided to all accounting staff; and (d) an internal audit team to be established with the Terms of Reference (TOR) acceptable to the Bank to build the capacity of internal audit for the project. FM action (b) has been completed by Negotiation while remaining actions (a), (c) and (d) shall be completed before Project starts. More details of FM arrangements, including the flows of funds, designate accounts, and disbursement, are provided in Annex 3.

D. Procurement

82. Procurement of the Bank-financed activities under the proposed project shall be carried out in accordance with the Bank's 'Guidelines: Procurement of Goods, Works, and Non-Consulting Services under IBRD Loans and IDA Credits and Grants by World Bank

Borrowers', dated January 2011 and revised July 2014 (the Procurement Guidelines); 'Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits and Grants by World Bank Borrowers', dated January 2011 and revised July 2014 (the Consultant Guidelines); and the specific provisions stipulated in the Financing Agreement. The Procurement Plan for the first 18 months of the project as well as the procurement arrangements (procedures, responsibilities, and Bank review requirements) are discussed and presented in Annex 3.

83. Responsibility of procurement implementation and contract management under the proposed project will be highly decentralized to specific implementing agencies at central and provincial levels. The following agencies play the role of investment owner of their related components/subprojects: MARD CPO and ICMB10, DARDs, MONRE PMU and MPI's Department of Planning Management. Each investment owner has its project implementing unit in charge of daily project implementation activities including procurement (e.g. CPMU of CPO, PMU of ICMB10, PPMUs of DARDs/PPCs, Project Implementing Division of MONRE PMU, and Implementing Agency under MPI's Department of Planning Management). The project activities calling for the participation of local communities would apply Community Participation in Procurement procedures.

84. Specifically, for components 1(a), 2, 3, 4 and a part of 5, MARD has assigned the CPO Irrigation as the investment owner/procuring entity of their respective procurement activities including packages using international bidding methods (ICB and QCBS), and the packages of general scope impacting the whole project (e.g. T/A consulting services on Project Implementation Support, Monitoring and Evaluation, Monitoring environmental and social safeguards etc.). The CPMU established under CPO using their existing resources will assist CPO in implementing those procurement activities. Regarding the (non-ICB) inter-provincial civil works, MARD has authorized ICMB10 as the investment owner who will handle all related procurement and contract management functions through its existing PMU.

85. Regarding the subprojects locating within a single province under Components 2, 3, 4 and a part of 5 , MARD decentralizes the implementation responsibility to the concerned Provincial People's Committee, who in turn assigns the provincial DARD as the subproject owner. The existing PPMU under each DARD/PPC will conduct the procurement activities of its related subprojects using national bidding methods. For international bidding, CPMU will handle as mentioned in the above paragraph, with involvement of the PPMUs (and ICMB10 in case of inter-provincial international bidding packages) in Bidding Document/RFP preparation, Bid/Proposal evaluation and contract award/management process.

86. MONRE is assigned the investment ownership and implementation responsibilities of Component 1(a), 1(b) and a part of Component 5 to the existing MONRE PMU, for implementing the authorized activities under their respective components.

87. MPI through its Department of Planning Management is responsible for carrying out procurement activities under their respective components (1(c) and a part of 5).

88. The Bank carried out a Procurement Capacity and Risk Assessment (PCRA) of MARD (CPO and ICMB10), MONRE (PMU), MPI (Department of Planning Management) and DARDs (PPMUs) of the participating provinces, rating the procurement risk as Substantial. The key risks and the corresponding mitigation measures are discussed in Annex 3. With the control measures being implemented, the procurement risk would be reduced to Moderate.

E. Environment and Social (including Safeguards)

89. **Applicable environmental and social safeguard policies.** The following Bank safeguard policies are triggered for the project: (a) Environmental Assessment (OP 4.01); (b) Natural Habitat (OP 4.04); (c) Pest Management (OP 4.09); (d) Physical Cultural Resources (OP 4.11); (e) Indigenous Peoples (OP 4.10); (f) Involuntary Resettlement (OP 4.12); (g) Forests (OP 4.36); (h) Safety of Dams (OP 4.37); and (i) Projects on International Waters (OP 7.50).

Environment

90. The project is proposed as Category A for environmental assessment, given the potential construction and operation of a water reservoir for water supply and fire prevention (in the Ca Mau subproject scheduled for the second phase), which would be located adjacent to U Minh Ha National Park in Ca Mau Province and thus may have significant impacts on natural habitats and biodiversity of the national park. The complexity of water resources issues and the significant impacts of land acquisition due to project activities are also anticipated, as well as potential future induced impacts when pilots are scaled up.

91. The project would mainly involve the following physical investments: (a) construction of the primary and secondary sluice gates, (b) construction of new sea dikes and repair of the existing dikes; (c) maintenance and rehabilitation works for existing irrigation canals; (d) mangrove restoration; and (e) provision of sustainable livelihood models. The overall environmental impacts from the proposed activities are expected to be largely positive for the Mekong Delta region and include (a) enhanced capacity of the region to adjust to climate change impacts from the implementation of sustainable climate resilience livelihoods models; (b) increase in agricultural productivity and thus contributing to poverty reduction and economic development due to optimum freshwater-salinity intrusion regulation and flood control; (c) improvement of water quality due to reduced use of fertilizers, pesticides, and aquaculture chemicals; and (d) increased mangrove cover for enhancing ecological restoration and reducing coastal erosion. Given the types and locations of the proposed subprojects and the nature of social conditions and water resources management in the lower part of the Mekong Delta, assessments were carried out at two levels.

92. At the regional level, a Regional Environmental Assessment (REA) was conducted to provide strategic recommendations to guide the project design. The REA found most of the regional impacts of the project to be beneficial and no major adverse regional negative impacts resulting from the proposed project. The negative impacts include changes in landform, loss of vegetation covers, agricultural land, and habitats, contamination of land and water due to disposal of dredged materials, surface water quality impairment due to conversion to freshwater and brackish-water shrimp farming, conflict of water use, and barrier to fish migration and ecosystem connectivity. The REA, however, confirmed that these impacts are likely to be only local or sub-regional and can be managed through subproject safeguard instruments and the Environment and Social Management Plan (ESMP). To enhance government capacity for taking regional impacts into account, Component 1 has specifically included activities to improve monitoring systems, strengthen planning tools for mainstreaming climate resilience, and create decision support systems and a Mekong Delta Climate Resilience Assessment to feed into provincial and delta-wide plans and investments. Additionally, the 2013 Mekong Delta Plan, prepared by a team through support from the Netherlands government, will serve as the analysis of cumulative impacts in the Mekong Delta.

93. At the project-level, the main adverse impacts are those related to construction of sluice gates, reinforcement of low flood retention dikes, dredging of irrigation canals, and implementation of the livelihoods models. The impacts during construction would include increase in air pollution, noise, vibration, water pollution, waste generation, land and waterway transport, safety risks, potential disturbance to local residents, and other social impacts related to concentration of workers. Key specific issues include (a) interference with local agricultural and aquaculture activities; (b) sedimentation and water pollution to agricultural land and aquaculture ponds; (c) exposure of acid sulfate soil from excavation; (d) wastes from construction activities and from workers in construction sites; (e) interruption in irrigation and/or domestic water supply because of construction of sluice gates, bridges, embankments, canals and river dredging, and so on; (f) risks to health and safety of local people and construction workers; and (g) disturbance of local traffic during construction. The main adverse impacts during operation phase include (a) impacts of waterway traffic interruption due to operation of the sluice gates; (b) impacts on water quality and aquatic life as a result of increasing use of agrochemical due to provision of more freshwater for rice irrigation; (c) impacts of solid waste generation from production such as sludge from shrimp farming; (d) increase of water use conflict between rice farming and brackish-water aquaculture due to improper sluice gate system management; (e) potential environmental risks such as epidemic of fish or shrimp disease; and (f) temporary blockage of fish passages to the in-field rivers and canals due to temporary closure of the sluice gates. However, these impacts would be small to moderate, localized, temporal, and could be mitigated and/or reduced.

94. **Induced impacts.** The Environmental and Social Impact Assessments (ESIAs) also determined that during project implementation a limited number of sustainable livelihood models will be piloted, with no significant negative impacts on the environments would be anticipated. In the long term, the scaling up of these models needs to be properly managed at the planning level. This would help mitigate risks from cumulative changes in land use that may significantly affect the environment and biodiversity in the region.

95. **Long-term negative impacts.** The construction of proposed works will have long-term impacts on current livelihood models which may have to change to adapt to the impacts of the proposed investments (such as dike reinforcement, sluice gates, and so on). Some households may be more reluctant to change (for example, elderly, ethnic minority households, poor and landless or land poor households) and will need specific support for them to change their livelihood. All farmers will receive support such as training and transfer of knowledge from pilot livelihood demonstrations models or by using farmer cooperatives or collective groups to implement livelihood adaptation models to reduce the risks for farmers.

96. To assess the overall environmental impacts of the proposed investment, ESIAs associated with ESMPs for the four first-year subprojects have been prepared. Since not all subprojects were identified during project preparation, an Environmental and Social Management Framework (ESMF) has also been developed. The ESMF establishes the requirements for subproject safeguard screening, impact assessment and development of mitigation measures, and an Environmental Code of Practice (ECOP) for construction activities. It also includes guidance on safeguard documentation preparation and clearance, safeguard implementation, supervision, monitoring, and reporting. These environmental safeguards instruments have been reviewed by the Bank and found to be satisfactory. The ESMPs will be included in the bidding and contract documents and will be closely monitored by supervision engineers. The subproject environmental safeguards instruments during

implementation will be prepared following the ESMF guidelines, reviewed, and cleared by the Bank before implementation.

Social

97. The project would generally have positive social impacts as it contributes directly in improving the resilience of people's livelihoods and assets to climate change in selected vulnerable sub-regions. The project proposes livelihood adaptation models (that is, flood-related adaptation models for Component 2 or brackish-water aquaculture model for Components 3 and 4) that are assumed to be more sustainable by profiting from the benefits of the floods (Component 2) or to be more resilient to increasing salinity levels (Component 3) and/or better able to protect coastal areas from climate change impacts (Component 4). Its associated social impacts/risks include (a) the acquisition of land and non-land assets due to the physical investments (for example, sluice gates, sea dikes, maintenance and rehabilitation works for the existing irrigation canals, sanitation, electric system, local transportation roads, and so on); and (b) the presence of ethnic minority people (mainly Khmer) in the project area (they represent up to 30 percent of the total population in Tra Vinh and Soc Trang Provinces); Khmers make up a large proportion of the poor and landless; (c) the need to develop mechanisms to support farmers to switch to the new proposed adaptation models (such as use farmer cooperative groups, start-up capital, pilot livelihood demonstration, and so on); and (d) the resistance or the non-readiness of some groups in changing their livelihood models especially the vulnerable groups (such as elderly, ethnic minority households, poor and landless or land poor households).

98. At the project level, MARD had undertaken a Regional Social Assessment (RSA) and two frameworks, namely Resettlement Policy Framework (RPF) and Ethnic Minority Planning Framework (EMPF). The RSA focuses on regional analysis at the project level with its overall objective to better understand the affected communities to improve community engagement in the long-term delta investment planning processes, enabling long-term sustainability and client ownership. The findings suggest that the construction of proposed works might cause long-term impacts on current livelihood models, which may have to change to adapt to the impacts of the proposed investments (such as dike reinforcement, sluice gates, and so on), to the new environmental situation and to the impacts of climate change. With the shift to new adaptation models, it is expected that farmers will diversify their production and increase their income. These new livelihoods will also be more sustainable and farmers will reduce their vulnerabilities to climate change and environment. Some households may be more reluctant to change (such as elderly, ethnic minority households, poor and landless or land poor households) and will need specific support for them to adapt their livelihood. Change in the institutional arrangement in agriculture in the Mekong Delta is expected by using farmer cooperatives or collective groups to implement the livelihood adaptations. Two frameworks (RPF, EMPF) have been prepared in accordance to the Bank's policies and guidelines for implementation of subprojects identified in project implementation.

99. At the subprojects level, MARD has prepared three Resettlement Action Plans (RAPs) and two Ethnic Minority Development Plans (EMDPs) for the four first-year subprojects. Each instrument included a dedicated section on grievance redress mechanisms to guide those who are interested in the project activities on how their concern/feedbacks will be documented, addressed, and reported. On the RAPs' side, in the first-year subprojects, total permanent land acquisition is estimated at 1,249,974 m^2 (especially 132,240, 1,100,00, and 17,734 in the Kien Giang, An Giang, and Tra Vinh/Vinh Long subprojects), affecting 823 households, of which 70 households will be relocated. The total estimated cost for the implementation of the

first-year RAPs is VND 304.6 billion (equivalent to US$13.6 million). Second, on the EMDP side, of the four subprojects selected for the first-year implementation, two (Kien Giang and Tra Vinh/Vinh Long) have ethnic minority peoples present in the subproject areas. Most of the ethnic minority households are Khmers and a few are Hoa and Cham. The Khmer, the poorest and most vulnerable group, owing particularly to landlessness, often work as hired laborers. Based on the RSA findings and other social analysis, EMDPs have been prepared, aiming to offer development opportunities for ethnic minority peoples, including (a) training to raise awareness of the community on animal husbandry and agricultural production; (b) training to raise awareness of the community on climate change and adaption to changes in water resources, ecology, and social conditions; (c) livelihood training; and (d) development of livelihood models. Livelihood-related activities in areas having the presence of ethnic minority will be designed to ensure equitable access to the programs for vulnerable groups (especially ethnic minority and women). The estimated budget for these development activities (EMDP) is approximately VND 4.38 billion (equivalent to US$197,800).

100. All IAs (MARD, CPO, PPMUs), through their dedicated social staff/unit, will be responsible for implementing, monitoring, and reporting the social safeguard instruments (RPF, EMPF, EMDPs, RAPs). The implementation of social safeguard instruments will be internally monitored by the IAs in close coordination with the respective Peoples' Committees at different administrative levels and externally supervised by independent monitoring agencies. IAs must ensure that activities related to social safeguards will be properly tracked, reported, and documented. Independent monitoring will start around the same time as implementation of activities and will continue until the end of the project/subproject. The performance and compliance to social safeguard instruments will also be subject to regular supervision from the Bank task team. Details on safeguard implementation arrangement have been described in every safeguard instrument (RPF, EMPF, RAP, and EMDP) and will be reflected in the Financing Agreement of the project. During the project implementation, appropriate trainings will be provided to the CPO, PPMUs, consultants, and local community representatives on the safeguard instruments to be applied to the project.

101. **Citizen engagement.** As part of the project design, a consultative process was carried out to get inputs from government; nongovernmental organizations, including civil society and community organizations; academic and research institutions; and communities. During the RSA, focus group discussions were held—with both socioeconomic groups (poor and better-off) so that data collected on climate change adaptive capacity could be differentiated. Further differentiation based on gender was also conducted during the focus groups. The consultative process will continue to be a key feature during project implementation, reaching out to stakeholders and citizens at large through targeted communication tools, consultative processes such as workshops and focus group discussions, and feedback mechanism to build ownership of project interventions and enhance sustainability of outcomes. The details of citizen engagement will be presented in the POM. Monitoring and evaluation includes specific indicators to monitor continued citizen engagement for further guidance in adopting better citizen engagement practices in subsequent project years.

102. **Safeguard implementation, monitoring, and training.** MARD, as an IA and with support from the CPO, is responsible for the preparation and supervision of ESMF implementation. During project implementation, the PPMUs will be responsible for preparing and ensuring the effective implementation of environmental safeguard measures (such as ESMPs, ECOP, and so on) and regular liaison with local authorities and communities. There will be regular reporting on safeguard implementation. The PPMUs, contractors, construction

supervision consultants, and local community representatives will receive training on the safeguard instruments to be applied to the project.

103. **Public consultation and information disclosure.** Two rounds of public consultation were conducted by the borrower. The affected people and communities and other relevant stakeholders were consulted on the project REA, RSA, ESMF, RPF, EMPF, first-phase subproject ESIAs, RAPs, and EMDPs. The feedback from the consultations were incorporated into the project design and the final drafts of the REA, RSA, ESMF, RPF, EMPF, subproject ESIAs, RAPs, and EMDPs. By appraisal, the final draft environmental and social safeguards instruments were disclosed both locally at MARD, the PPMUs, and subproject areas and through the InfoShop in Washington, DC on January 26 and January 27, 2016, respectively. The final environmental and social safeguards instruments were disclosed locally and at the InfoShop, on April 14, 2016 and May 16, 2016, respectively. The Appraisal Stage Integrated Safeguards Data Sheet of the project has also been disclosed at the InfoShop.

104. **Other applicable Safeguard Policies.** The Bank's policy regarding Projects on International Waterways (OP/BP 7.50) is triggered as the Vietnam part of the Mekong Delta is located within the Mekong River Basin, which is an international river basin that includes China, Myanmar, Lao PDR, Thailand, Cambodia, and Vietnam. The Bank has determined that the project deals with existing schemes and (a) will not produce any adverse impacts on upstream countries nor (b) be affected by actions of other riparian countries. On this basis, no riparian notification is required under paragraph 7(a) of OP 7.50. The memorandum for approval for riparian notification exception was signed by the regional vice president on March 23, 2016. In the spirit of promoting transboundary water management, the Bank has sent copies of the publically disclosed executive summary of the project's environmental and social impact assessment to the Cambodian National Mekong Committee.

F. World Bank Grievance Redress

105. Communities and individuals who believe that they are adversely affected by a Bank supported project may submit complaints to existing project-level grievance redress mechanisms or the Bank's Grievance Redress Service (GRS). The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project-affected communities and individuals may submit their complaint to the Bank's independent Inspection Panel which determines whether harm occurred, or could occur, as a result of Bank noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention and Bank management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank Inspection Panel, visit www.inspectionpanel.org.

G. Mainstreaming Gender and Governance

106. **Gender.** Vietnam has made substantial progress on gender equality; however, important challenges remain across livelihoods sectors, including agriculture and aquaculture. A gender analysis was conducted as part of the project's RSA, and found that lower levels of employment opportunities and literacy (especially in rural and remote area) among women across the Mekong Delta result in (a) limited access to credit (that is, man often holds the title of land-use rights); (b) limited access to training because of male-dominated groups and absence of childcare arrangements; and (c) gender-specific roles in the household that leave

men to dominate decision making. To address these constraints, the project has proposed actions to address these gender gaps including in the first-year subprojects, including training and awareness-raising activities. With the M&E framework, an outcome-level indicator has been included to monitor gender-mainstreaming activities during implementation and ensure that project benefits reach women.

107. **Governance.** The project has given priority to governance issues in its component design, such as participatory processes in project planning and implementation. Special efforts have been made during project preparation to be consultative and inclusive, including through community engagement and focus group discussions under the RSA. Such consultations will be continued and maintained throughout the implementation period.

H. Role of Partners

108. The project has made considerable efforts to coordinate with relevant development partners and stakeholders throughout the preparation of this project at both the delta-wide level and national level (see summary in Annex 6). At the national level, the project is helping strengthen coordination and communication across key ministries of MARD, MONRE and the MPI. At the provincial level, this has involved bringing provincial authorities from selected delta provinces to engage in dialogues on identifying investments, building knowledge of the integrated approach, and planning for long-term resilience.

109. Internally, the project is well aligned with other ongoing and upcoming related sectoral Bank-financed investments (for example, in the water, agriculture, and urban portfolio) in the Mekong Delta (for details see Annex 6). Externally, the Bank helped establish a Mekong Delta Working Group (which it co-chairs with GIZ) of all development partners working in the Mekong Delta to share information; capture synergies; and align programs, TA, and investments—which has helped with inputs into project design. Additionally, the project gratefully acknowledges technical and financial support from the Netherlands Embassy, GIZ, IUCN, and DFAT as a demonstration of this partnership. Such collaboration and technical support is expected to continue through the implementation of the project.

Annex 1: Results Framework and Monitoring

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project (P153544)

Project Development Objectives (PDO): To enhance tools for climate-smart planning, and improve climate resilience of land and water management practices in selected provinces of the Mekong Delta in Vietnam.

PDO Level Results Indicators	Core	Unit of Measure	Baseline	Target Values						Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description
				2016	2017	2018	2019	2020	2021				
PDO Indicator One: Adoption of Mekong Climate Resilience Assessment by MONRE	☐	Score (0-4)	0	0	1	2	3	4	4	Annual	Review of tools and their adoption based on the scoring	MONRE M&E function	See Definition 1
PDO Indicator Two: Area with climate resilient land and water management practices supported by the project	☐	Ha	0	0	0	30,000	100,000	170,000	200,000	Annual	Field survey in project areas	MARD M&E function	See Definition 2
PDO Indicator Three: Project supported farm households who have adopted climate resilient land and water management practices	☐	%	0	0	0	10	25	50	75	Annual	Reports / Field survey in project areas	MARD M&E function	See Definition 3
PDO Indicator Four: Direct project beneficiaries, (percent of which female)	☒	Number (%)	0	0.02 M (40%)	0.1 M (40%)	0.4 M (40%)	0.7 M (40%)	0.9 M (40%)	1.2 M (40%)	Annual	Field survey in project areas	MARD M&E function	See Definition 4.
PDO Indicator Five: Citizens in selected provinces who participated in consultations on formulation of district land use plans	☐	Number	0	0	0	15,000	25,000	35,000	35,000	Annual	Review of report of consultations	MARD M&E function	See Definition 5

Intermediate Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values						Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description
				2016	2017	2018	2019	2020	2021				
Component 1: Enhancing Monitoring, Analytics, and Information Systems													
Intermediate Results Indicator 1.1: Mekong Delta Center established and operational	☐	Yes/No	No	No	No	Yes	Yes	Yes	Yes	Annual	Review of legal documents; Direct observation	MONRE M&E function	See Definition 1.1; Annual target
Intermediate Results Indicator 1.2: Specialized Studies to facilitate climate resilient decision making supported by the project	☐	Number	0	0	0	0	1	3	4	Annual	Review and quality assessment of specialized studies	MONRE M&E function	See Definition 1.2; Annual target
Intermediate Results Indicator 1.3: Monitoring stations established or upgraded through project support, and fully operational	☐	Number	0	0	0	10	30	50	50	Annual	Review of weekly data from monitoring stations and count of stations operational	MONRE M&E function	See Definition 1.3; Cumulative target
Component 2: Managing Floods in the Upper Delta													
Intermediate Results Indicator 2.1: Project supported farm households in selected provinces transitioned to third rice crop alternatives	☐	%	0	0	0	20	30	50	75	Annual	Field survey of land and water management practices	MARD M&E function	See Definition 2.1; Annual target.
Intermediate Results Indicator 2.2: Flood retention areas with water management infrastructure supported by the project	☐	Ha	15,800	0	0	≥ 15,800	≥ 15,800	≥ 15,800	≥ 15,800	Annual	Field survey of land and water management practices	MARD M&E function	See Definition 2.2; Annual target.
Intermediate Results Indicator 2.3: August dikes rehabilitated and operational supported by the project	☐	Km	0	0	0	15	45	61	61	Annual	Review of technical inspection reports upon completion of works	MARD M&E function	See Definition 2.3; Cumulative target.
Intermediate Results Indicator 2.4: August dike sluice gates constructed and operational supported by the project	☐	Number	0	0	0	5	10	15	15	Annual	Review of technical inspection reports upon completion of works	MARD M&E function	See Definition 2.4; Cumulative target.

Intermediate Results Indicators	Core	Unit of Measure	Baseline	Cumulative Target Values						Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description
				2016	2017	2018	2019	2020	2021				
Component 3: Adapting to Salinity Transitions in the Delta Estuary													
Intermediate Results Indicator 3.1: Farm households in selected provinces who have transitioned to climate resilient alternatives livelihoods supported by the project disaggregated by: • Estuary Provinces; • Peninsula Provinces.	☐	 % %	 0 0	 0 0	 0 0	 20 20	 30 30	 50 50	 75 75	Annual	Field survey of land and water management practices	MARD M&E function	See Definition 3.1; Annual target.
Intermediate Results Indicator 3.2: Brackish water aquaculture area with sustainable and climate resilient infrastructure supported by the project disaggregated by • Estuary Provinces • Peninsula Provinces.	☐	 Ha Ha	 0 0	 0 0	 0 0	 0 0	 10,000 10,000	 30,000 30,000	 45,000 40,000	Annual	Field survey of land and water management practices	MARD M&E function	See Definition 3.2; Annual target.
Intermediate Results Indicator 3.3: River bank and coast line protection supported by the project: • Coastal dike • River bank • Embankment	☐	 Km	 0	 0 0 0	 0 0 0	 15 20 10	 15 40 20	 15 60 40	 15 70 40	Annual	Review of technical inspection reports after completion of works	MARD M&E function	See Definition 3.3 Cumulative target.
Intermediate Results Indicator 3.4: River Bank and coastal sluicegates constructed and operational through project support	☐	Number	0	0	0	3	3	4	6	Annual	Review of technical inspection reports after completion of works	MARD M&E function	See Definition 3.4; Cumulative target.
Component 4: Protecting Coastal Areas in the Delta Peninsula													
Intermediate Results Indicator 4.1: Coastline protection through project support	☐	Km	0	0	0	0	10	10	10	Annual	Review of technical inspection reports after completion of works	MARD M&E function	See Definition 4.1; Cumulative target.

Intermediate Results Indicator 4.2: Coastal sluice gates constructed and operational through project support	☐	Number	0	0	0	0	3	6	9	Annual	Review of technical inspection reports after completion of works	MARD M&E function	See Definition 4.2; Cumulative target.
Intermediate Results Indicator 4.3: River bank and coast line protection supported by the project: • Coastal dike • River bank • Embankment	☐	 Km	 0	 0 0 0	 0 0 0	 10 10 10	 10 20 20	 10 30 30	 20 30 50	Annual	Review of technical inspection reports after completion of works	MARD M&E function	See Definition 4.3 Cumulative target.

PDO Level Results Indicators

1. **Definition 1.** The Mekong Climate Resilience Assessment will be adopted by MONRE. The ministry will develop a set of key environmental and socioeconomic indicators related to Mekong Delta sustainability and then assess the status, trends, and driving factors related to those indicators. The assessment will also identify any data or knowledge gaps and provide a set of recommendations related to the next planning cycle for adaptive management of the delta. This assessment will help mainstream climate issues into the next round of planning (2021–2025), namely (a) the MPI's Mekong Delta Socioeconomic Plan; (b) sectoral master plans; and (c) provincial land-use plan. The indicator will be measured as an index (a score of 0–4) based on stages, that is, data collection, drafting, consultation, finalization, and adoption by MONRE. Therefore, the targets are the following:

- 0 - No action
- 1 - Data for preparing a draft assessment is collected
- 2 - Stakeholder consultation to discuss a draft assessment is carried out
- 3 - Assessment is finalized for submission to MONRE review
- 4 - Assessment is adopted by MONRE

2. **Definition 2.** It is the responsibility of MONRE to prepare and approve (a) the water resources planning for interprovincial river basins and water resources, according to the guidelines described in the Vietnamese Law on Water Resources (updated 2012) and (b) the national land-use planning according to the guidelines described in the Land Law (updated 2013) and through this, promote climate-resilient land and water management practices, including aquaculture/extensive aquaculture, floating vegetables, floating rice, extensive farm fishing (stocking, harvesting), biosecurity shrimp farming, mangrove shrimp, salient tolerant rice, and so on. The project-supported areas where climate-resilient land and water management practices are adopted will be monitored though field surveys during implementation.

3. **Definition 3.** Climate-resilient land and water management practices are defined under Definition 2. Adoption of these practices means that the farm households are using them for all crop cycles in a year.

4. **Definition 4.** The number of households that belong to PDO Indicator 4 (project-supported farm households) will be determined, and the number will be multiplied by an average household size of five people, to estimate the number of people benefitting under the project. The number of beneficiary households will be monitored during implementation.

5. **Definition 5.** Approximately 5,000 citizens per district participate in consultations in the development or update of a district land-use plan.

Component 1: Enhancing Monitoring, Analytics, and Information Systems

6. **Definition 1.1.** The Mekong Delta Center is considered established when the building is constructed, a director is appointed, and there are dedicated staff working in the center. The target for the establishment is year 3 of the project. It is considered operational when a GIS-based knowledge management platform is functional and staff can extract information on land-use, surface water, and groundwater monitoring data. The center's operation will be achieved in year 5 of the project.

7. **Definition 1.2.** Specialized studies shall include the following: (a) MONRE Groundwater Survey; (b) MARD Sea Dike and Mangrove Study; (c) MONRE River and Coastal Morphology Study; and (d) MARD Hydraulic Operations Study.

8. **Definition 1.3.** The number of monitoring stations are calculated as follows: (a) 20 new or upgraded Department of Water Resources water quality monitoring stations measuring water quality and quantity with automatic transmission of data and (b) 30 new or upgraded National Center for Water Resources Planning Investigation (NAWAPI) monitoring sites (which may include multiple observation wells) measuring water quality and level with automatic transmission of data. To be considered functional, there must be reports on data collected.

Component 2: Managing Floods in the Upper Delta

9. **Definition 2.1.** Subprojects to be implemented include introduction of new agricultural/aquaculture cropping alternatives to the wet season third rice crop. Sustainable alternatives for farm households include aquaculture (fish and freshwater prawns); floating vegetables (for example, morning glory); floating gardens (for example, to produce tomatoes); floating rice; extensive farm fishing (stocking and harvesting); and others. The number of farming household transitions will be monitored by field surveys during implementation and reported.

10. **Definition 2.2.** Subprojects to be implemented include water and agricultural infrastructure investments that align with the natural flooding schemes in the Mekong Delta and contribute to maintaining and expanding water retention capacity for controlled flooding in rural areas during the flood season (July–December). The water management infrastructure includes a combination of reinforced low embankments (such as 'August dikes'– as in Definition 2.3) and small-scale sluice gates.

11. **Definition 2.3.** Also, see Definition 2.2. August dikes are defined as low dikes that hold water until the flood season. The height is generally lower than the peak of the annual average flood, but the dikes protect the double-crop rice production from early and late seasonal floods. August dikes facilitate soil fertility through accumulation of sediments during the flood season, which starts in July/August, when water will overflow these

dikes. However, the overtopping of the dikes causes high yearly maintenance costs for farm households, as the dikes are heavily damaged during overflow.

12. **Definition 2.4.** Also, see Definition 2.2. Sluice gates that reduce maintenance costs for the August dikes caused by damage from overtopping, by facilitating a more gradual inflow of water during the flood season.

Component 3: Adapting to Salinity Transitions in the Delta Estuary

13. **Definition 3.1.** This indicator measures progress for activities supported under Components 3 and 4:

- Subprojects to be implemented under Component 3 include support for agriculture-aquaculture alternatives to freshwater-based production models, which adapt to changing salinity levels. Sustainable alternatives for farm households include extensive aquaculture (fish and freshwater prawns), biosecurity shrimp farming, mangrove shrimp, salient tolerance rice varieties, and so on.

- Subprojects to be implemented under Component 4 include support for agriculture-aquaculture alternatives to intensive shrimp farming production models. Alternative livelihoods include mangrove shrimp, aquaculture with carnivorous and herbivorous fish and intensive/extensive shrimp and more saline tolerant crops, and freshwater-based rice or prawn production, including biosecurity measures to protect from entry and spreading of pests and diseases.

14. The number of farming household transitions will be monitored by field surveys during implementation.

15. **Definition 3.2.** This indicator measures progress for activities supported under Components 3 and 4:

- Climate-resilient investments in sustainable (fresh and saline) water management infrastructure supported under Component 3 are those which are designed to consider changing boundary conditions, for example, salinity intrusion, freshwater availability, sea-level rise, storm surges, river floods, and so on through circulation-based irrigation systems for agriculture (rice) and aquaculture with separated water intake and disposal and, where possible, linked to mangrove regeneration.

- Given the freshwater balance and the level of salinity intrusion, it is critical that investments in water management infrastructure are based on principles for sustainable water management and land use and proper zoning into the mangrove belt, brackish-water zone, intermittent zone, and freshwater areas. Investments under Component 4 aim to establish a cascading system for more intensive aquaculture, with no direct discharge into the extensive pond system. For the intermittent zone and the freshwater zone, freshwater needs to be ensured in the long term and in very dry years. The long-term sustainability depends on the strategic positioning of intake and discharge points to minimize pollution risk.

16. **Definition 3.3.** Riverbank, coastline, and embankment investment measures aim to protect the coastline and/or riverbanks from erosion and salinity intrusion in farming areas. These investments can be structural (for example, sea dikes and river embankments) and/or nonstructural (for

example, restoration or expansion of mangrove forest belts or other 'building with nature' type solutions). The investments need to be closely aligned and integrated with investments in water management infrastructure as mentioned under Definition 3.2 to avoid conflicts of interest in (fresh and saline) water supply at compartment levels. Based on the results of the Component 1 MARD Sea Dike and Mangrove Study and the MONRE River and Coastal Morphology Study, subsequent projects for strengthening selected areas will be included.

17. **Definition 3.4.** Investments in coastal sluice gates aim to protect livelihoods for damage resulting from flooding caused by sea-level rise combined with high tides during the dry season (Jan-Apr) and/or storm surges. Initial investments are for the coast of Ben Tre. Investments in Tra Vinh will be implemented only after experiences gained through the MTR. In principle, the operational regime is such that the sluice gates are being kept open year-round to avoid a conflict of interest with proposed transition toward agriculture-aquaculture alternatives, which adapt to changing salinity levels (see Definition 3.1). River sluice gates aim to protect valuable horticulture areas from damage caused by increasing salinity.

Component 4: Protecting Coastal Areas in the Delta Peninsula

18. **Definition 4.1.** See Definition 3.3. Of the 600 km of the total coastline for the Mekong Delta, only 10 km is determined to be strengthened under the first year project for Kien Giang. Based on the results of the Component 1 MARD Sea Dike and Mangrove Study, subsequent projects for strengthening selected coastal areas will be considered at the MTR.

19. **Definition 4.2.** Investments in coastal sluice gates aim to protect livelihoods for damage resulting from flooding caused by sea-level rise combined with high tides during the dry season (January–April) and/or storm surges. In principle, the operational regime is such that the sluices are being kept open year-round to avoid a conflict of interest with the aimed-for transition toward agriculture-aquaculture alternatives to intensive shrimp farming (see Definition 3.1). The location of the sluice gates needs to be aligned with the investments in the cascading water management system, as described in Definition 3.2.

20. **Definition 4.3:** See Definition 3.3

Annex 2: Detailed Project Description

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project

Context

1. The Mekong Delta comprises a vast triangular plain that covers an area of 62,520 km^2, which can be divided into two parts: an inner delta plain that is dominated by fluvial processes, and an outer delta plain that is dominated by marine processes.

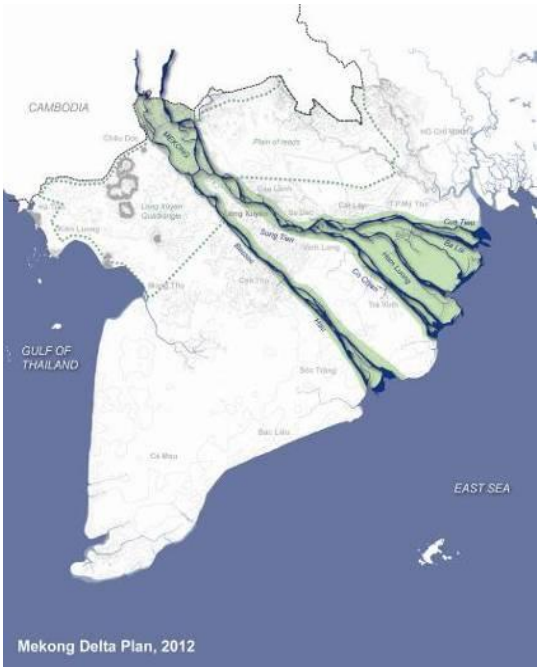


Figure 2.1. Mekong Delta

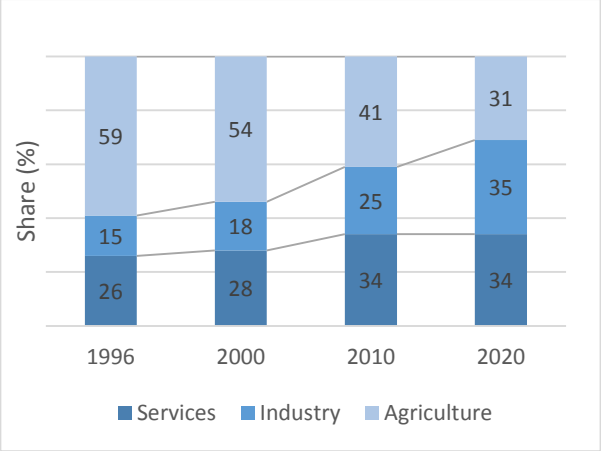
2. The inner delta plain is low lying and close to sea level while the outer delta plain, which is built of coastal plain deposits, is fringed seawards by mangrove swamps, beach ridges, sand dunes, spits, and tidal flats. A diurnal tide is dominant in the Gulf of Thailand, while a semidiurnal tide is dominant in the East Sea. Tidal effects extend throughout the delta area in Vietnam. Toward the end of the rainy season, combined floodwaters from the rivers, local rainfall, and tidal inundation can result in the flooding of 3,400,000 ha in the Vietnamese portion of the delta. Saltwater intrusion lengths into various branches of the Mekong vary from 20–65 km, and about 500,000 ha of land are affected during the dry season. However, due to the large inflow of freshwater from the Mekong River, salinity levels along the eastern coast of the delta are still low, particularly during the flood season.

3. **Development of the agriculture sector, particularly in the Mekong Delta, has contributed significantly to the development of Vietnam.** Due to the rich natural supply of freshwater and nutrient-laden sediments, the primary focus of the region's economy has always been the agricultural sector. In the 1990s, the government introduced a rice production for export

policy in addition to the food security policy. As a result, many farmers shifted from growing one crop of long-growth-duration traditional rice per year to two or even three crops of high-yielding rice varieties per year (rice intensification). This rice-first policy turned Vietnam into one of the leading rice exporters globally. Vietnam's rice exports of US$4 billion now accounts for more than one-fifth of the global total. The Mekong Delta alone contributes 50 percent of Vietnam's rice (90 percent for export), 70 percent of its aquaculture products and one-third of Vietnam's GDP.

4. The economic reform (*Doi Moi*) has also induced a structural change, which was driven by a rapidly growing industrial sector since the mid-1990s. The most important industrial sector in the Mekong Delta is the food-related industry, especially the processing of food, the production of agricultural and aquaculture products, and related industries in equipment and machinery. Besides that, textile industries and other low-technology manufacturing industries emerged. Despite all efforts, the industrial development in the Mekong Delta falls behind expectations formulated in development master plans.

Figure 2.2. GDP Share per Sector in



5. Recognizing the need for further improving rice farmers' incomes and the importance of aquaculture and fruit production for sustainable development of the agricultural sector, in 2000, the Vietnamese government introduced a policy on agricultural diversification. Therefore, driven by salinization and enabled by the *Doi Moi* policy, many farmers have shifted their production from rice monoculture to a more diversified rice-based farming system, which includes aquaculture (catfish and shrimp farming), fruits and/or vegetables and leads to higher income generation possibilities.

6. **The Mekong Delta is among the three-mega deltas in the world that are most likely to be severely affected by climate change.** Average annual temperatures are expected to increase by 3–5^{o}C by mid-century with the average wet season precipitation increasing by 3 percent to 14 percent. Changes in river flow and the periodicity and extent of water-related natural disasters are already occurring. In the inner delta, floods are projected to have a higher magnitude (deeper inundation of the plains) and longer duration, affecting major rainfed rice production areas. In the outer delta (coastal zone), projections indicate that the sea level may rise 30 cm by 2050 and as much as 75 cm by the end of the 21st century. Rises of such a magnitude would aggravate the saltwater intrusion problem and have impacts on agriculture and fisheries. A sea-level rise of 1 m

would increase a 4g per l salinity of 334,000 ha area by 25 percent in relation to the benchmark year of 2004. It is estimated that a sea-level rise of 20–40 cm will lead to significant losses in all rice-cropping seasons and place food security of the nation at risk. Land subsidence due to long-term drainage and groundwater extraction is likely to further exacerbate the sea-level rise. By mid-century, portions of the Mekong Delta is likely to experience 1 m (0.42–1.54 m) of additional inundation hazard due to land subsidence.

7. **Upstream developments in the Mekong Basin are affecting water resources, as well as sediment flows and fish migration.** Rapid expansion of hydropower to increase energy security, as well as large-scale irrigation, urbanization, and land-use changes in the upstream have resulted in pressure on the natural resources of the Mekong Basin. Dams, dikes, and other associated irrigation systems considerably affect the nature of the flood as they can fragment the floodplains and interrupt the natural flow of water, sediments, nutrients, and fisheries. These hard structures, activities associated with urbanization and intensive agricultural practices are also contributing to the decline of water quality (that is, surface water and groundwater) and capture fisheries in the Mekong Delta.

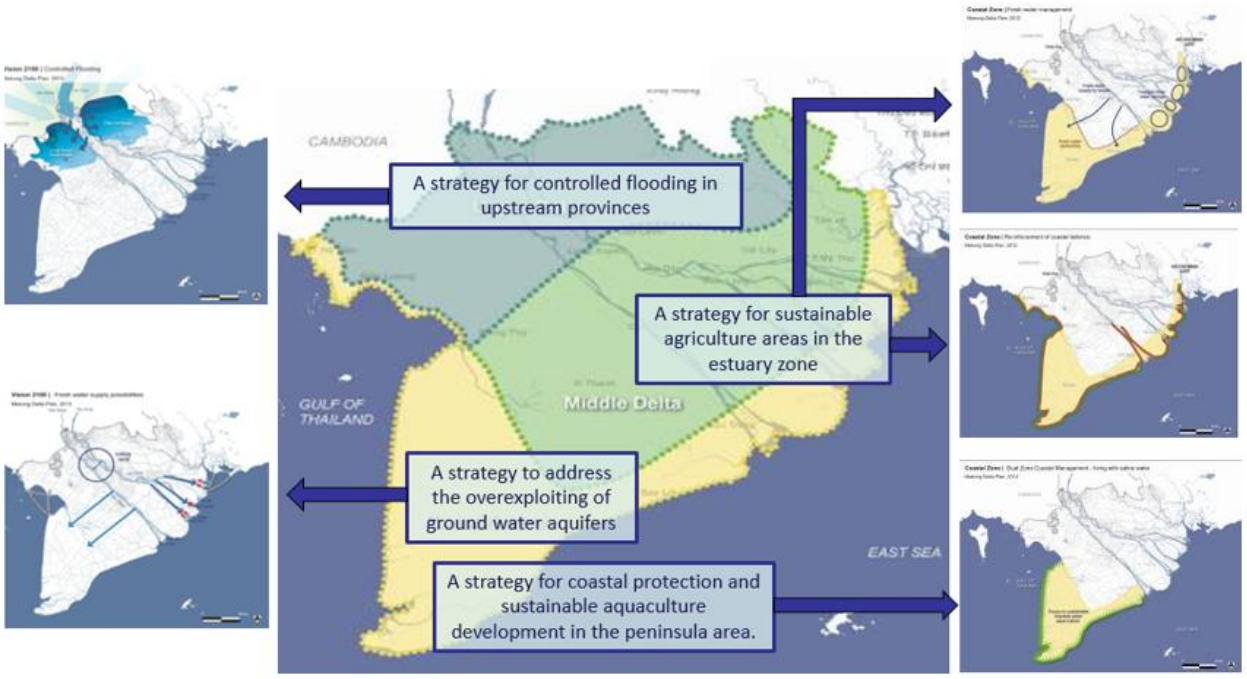
Project Description

8. Activities proposed by the project are envisioned to strengthen integrated climate-resilient management and development, across different sectors and institutional levels in the Mekong Delta. More specifically, it will support information systems, institutional arrangements, and the road map for building regional and provincial-level planning capacity for sustainable delta-wide development.

9. The project concept and approach builds up from the vision articulated in the MDP, which was supported technically and financially by the government of the Netherlands, whereby the delta was viewed as a hydro-ecological zone cutting across provinces and sectors. This requires specific policies and investments for each hydro-ecological zone that fit within the overall context of the delta strategy.

10. Considering the climate change and development uncertainties, the MDP helped identify and prioritize ‘no-regret’ and ‘priority’ measures in different hydro-ecological sub-regions. In the upper delta, it prioritized attention to agricultural land-use planning and modernization of flood-based agricultural production systems (floodwater retention, diversification of fish and vegetables). In the coastal areas, including the estuary and peninsula, it prioritized freshwater management to reduce groundwater abstraction for agriculture and aquaculture; modernization and increased sustainability of aquaculture by adopting polyculture-based systems; and mangrove regeneration along the outer coastline as reinforcement of seashore.

Figure 2.3. Strategies for Delta Hydrological Zones



11. The project is proposed to span a period of six years, with a financing of US$387 million (US$310 million from IDA; US$77 million from the GoV). The project identifies three key sub-regions—the upper delta, the estuary, and the peninsula—which face key challenges from development and climate risks, and identifies integrated solutions.

12. This proposed project is designed to help operationalize the vision and strategy of the MDP articulated for the different sub-regions. The project is two-pronged—Component 1 works to improve monitoring systems, decision support tools, and information systems to enhance the knowledge base and inform planning and decision making into the future. In parallel, Components 2, 3 and 4 work to scale up smaller successful pilots (such as cropping and aquaculture models) designed to be climate resilient, to demonstrate how multisectoral solutions can be implemented. During the scoping of the proposed project, the task team placed heavy emphasis on coordination with other Bank projects, those of other development partners to learn lessons, build on successful pilots, and capture synergies (see Annex 6).

13. The five components proposed under the project are:

Component 1: Enhancing Monitoring, Analytics, and Information Systems (Estimated US$61.3 million, of which US$56.4 million will be financed by IDA).

14. Positioning the Mekong Delta on a more sustainable and resilient trajectory in the face of climate change, upstream Mekong Basin development, and environmentally unsustainable practices within the delta itself, will require investments in both infrastructure and the enhanced capacity to monitor, plan, and manage the delta's land and water resources. Component 1 provides the framework for ensuring that Vietnam has the capacity to undertake 'smart investments' and

cope with anticipated wide-scale environmental changes in the future. Proposed activities/investments under Component 1 are provided in the following paragraphs.

Subcomponent 1.1. Monitoring Systems to Enhance Mekong Delta Knowledge Base

15. Investments in monitoring systems for remote sensing, surface water, groundwater, and other environmental assets are critical for the delta. Remote sensing and image analysis are key tools for tracking a rapidly changing environment, including coastal and river morphology, land use, flooding, and so on. Monitoring surface water quantity and quality is becoming more urgent as upstream development affect flows into the delta, while long-term climate change and sea-level rise will have an impact on freshwater availability in the dry season, the salinity regime in the estuary, and flooding. Groundwater is an important source of water for domestic, industrial, and agriculture users in the delta, but is still poorly understood and appears to be overexploited and inducing ground subsidence along the coast. This component upgrades MONRE and MARD's monitoring systems to produce better tools and information for both planning and management purposes.

16. **Upgrading MONRE's surface water quality monitoring network.** Surface water can be affected by land use, agricultural practices, pollution, and climate change. In the Mekong Delta, agriculture and aquaculture are dependent on water quality, which needs to be monitored for both pollution sources (for example, agricultural runoff and industrial wastewater), and salinity. The quality of surface water in a dynamic delta and with climate change impacts can help determine appropriate land use (for example, type of crops).

17. MONRE's Department of Water Resources Management will be responsible for overseeing this subcomponent. The project will finance civil works and equipment for upgrading (a) six existing hydrological stations; (b) six new hydrological stations; and (c) eight new salinity intrusion-monitoring stations. The stations will monitor both flow and water quality. The proposed stations will complement the existing hydrological monitoring system in the delta, which is composed of 39 hydrological stations (managed by the Department of Water Resources), and 35 salinity intrusion stations (managed by the National Center for Hydro-Meteorological Forecasting). Under an ongoing MONRE hydro-meteorological modernization program, data from all sources will be standardized and transmitted to a central receiving station.

18. **Upgrading MONRE's groundwater monitoring network.** Groundwater from deep phreatic aquifers in the Mekong Delta is a source of water for domestic use, urban water supply, irrigation, aquaculture, and industrial sites. Groundwater levels are continuously falling due to overexploitation and inadequate recharge—contributing to land subsidence. Groundwater quality is also affected by urban, industrial, and rural pollutants, and saltwater intrusion caused by excessive pumping of groundwater reserves.

19. MONRE's NAWAPI will be responsible for implementing this subcomponent. Seven distinct aquifers exist in the delta, ranging in depth from roughly 25 m to 500 m. The project will finance the development of 171 monitoring wells, including (a) rehabilitation of 34 existing wells and (b) 137 new wells. For each monitoring site, there are typically multiple wells to monitor distinct aquifers; in total the project will construct/upgrade around 34 monitoring sites (16 upgrades, and 18 new). The wells will include equipment for monitoring levels and water quality,

as well as transmission equipment to transmit the data to the centralized MONRE center. Since NAWAPI is the only organization in Vietnam licensed to construct groundwater monitoring wells, this activity will be undertaken by NAWAPI on a force account basis.

20. This subcomponent will also finance a 'Groundwater Survey' which is a survey of groundwater users in selected groundwater 'hot spots' and further develop groundwater models to better understand issues such as falling groundwater levels, land subsidence, and groundwater saline intrusion. After the study is completed, an assessment will be undertaken to determine if additional groundwater monitoring wells need to be developed.

21. **Upgrading of MONRE's remote sensing infrastructure and associated studies**. The use of high-resolution satellite imagery can help detect changes (for example, morphology of the rivers, erosion, or accretion in coastal areas) and also record flooded areas in the delta. Land-use changes can also be monitored—which in turn can inform changes in types of use (for example, from rice cultivation to shrimp farms due to shifting salinity gradients). Use of earth observation products can help provide close to real-time estimates of rainfall, soil moisture, evapotranspiration, land cover, and so on; as well as to generate elevation data (refined with techniques such as Light Detection and Ranging or ground surveys).

22. This activity will be led by MONRE's National Remote Sensing Department. The department's existing satellite receiving station in Hanoi will be upgraded to allow it to receive the latest data from *Satellite Pour l'Observation de la Terre* (SPOT) 6 and SPOT 7 satellites. SPOT is a commercial high-resolution optical imaging earth observation satellite system operating from space. The MONRE remote sensing laboratory in Hanoi will also be upgraded with new equipment and analytical tools. The project will also finance the purchase of SPOT images during the period when the receiving station is out-of-operation during the upgrading period.

23. The subcomponent includes specific studies in the use of new remote sensing imagery to monitor environmental conditions in the delta. The first identified study is for M&E of river and coastal morphology; historical images of river and coastal changes will be combined with new and more precise imagery to track shoreline and river changes. Depending on available resources, the project may also finance other studies related to land use, cropping patterns, flooding, and so on, in the delta.

24. **Upgrading MARD's water resource monitoring systems.** MARD has assigned the Southern Institute of Water Resources Research (SIWRR) to carry out the annual prediction of salinity intrusion and flood forecasting in the Mekong Delta. The subcomponent will finance the development of a 'Real-Time Operation System for Hydraulic Infrastructure in the Mekong Delta'. This consists of (a) updating the hydraulic, agricultural, and monitoring databases; (b) upgrading existing delta water resource models; (c) simulating different flood and drought scenarios to develop operational protocols; and (d) enhancing the sharing of information, communication, and warning systems.

25. This component will also finance the development of a 'Database on Mekong Delta Sea Dikes and Mangrove Forests', which will be overseen by the Southern Institute of Water Resources Planning. The sea dike system and mangrove belt in the delta is over 700 km long, yet there is insufficient information with respect to the condition of the sea dikes nor a systematic

assessment and monitoring of mangrove belts. This study will create a database on both sea dikes and mangroves, which will allow for better monitoring, maintenance, and investments for these critical coastal assets.

Subcomponent 1.2. Infrastructure and Information Systems for Enhanced Decisions

26. Monitoring networks and remote sensing systems are critical in gathering the evidence base (data, information, trends) relating to land use, surface and groundwater (quality and quantity), flooding, cropping, and infrastructure impacts. These results need to feed into decision support systems (comprising modelling, tools, scenario analysis, and so on) to contribute to evidence-based decision making. This subcomponent will finance infrastructure and enhance integrated information systems to improve the ability of the government and other stakeholders to access, and analyze information related to the challenges and risks that livelihoods and assets in the Mekong Delta face. It will also significantly enhance policy and planning for greater climate-resilient development in the Mekong Delta.

27. **Mekong Delta Center for Climate Resilience.** Several research institutes and departments are involved in gathering and analyzing data and information on the delta; however, there are no current mandates for data sharing, which will contribute to the integrated and multisectoral solutions that are often needed. The center is envisioned to serve as a hub for delta-wide information, including water, land use, environmental and climate change information, education and outreach, and provide support to specialized studies and research projects that inform decisions and investments in the Mekong Delta.

28. **Constructing and equipping the Mekong Delta Center.** This subcomponent will finance the construction of an advanced modern building (located in Can Tho) including associated equipment and software. The center shall be under the auspices of MONRE but serve multiple stakeholders as a one-stop shop for accessing data on the Mekong Delta. It will also serve as the repository for all real-time monitoring information related to water flows, water quality, salinity, and so on collected from monitoring networks and other sources. A Mekong Center business plan will be developed and will examine options for sustainable funding and possible expansion, including commercial services such as selling of data or analytical products, government budget, donor support, and corporate and individual donations.

29. **System integration and formulation of Mekong Delta Climate Resilience Assessment.** The foundation of the center will be a Knowledge Management Platform (KMP), which will be an advanced computer system providing MONRE and other stakeholders with the capability to investigate the environmental and socioeconomic impacts of climate change and basin developments on the Mekong Delta. A consulting firm will be contracted to design the KMP which, drawing upon the existing Mekong River Commission (MRC) experience, is envisioned to consist of (a) knowledge base—databases containing time series data sets, GIS data sets, models, and other miscellaneous data (for example, reports), and so on; (b) GIS viewer capable of showing a wide range of standard GIS formats as well as the capability to search data by location; and (c) toolbox manager that holds a list of available tools (for example, models) with a description of each tool that allows the user to select and utilize these tools.

30. The consulting firm will also work with MONRE in the formulation of a Mekong Delta Climate Resilience Assessment. The assessment should be completed by 2019 and will help inform planning exercises in the Vietnam government, including the MPI's 'Socio-Economic Development Plan for the Mekong Delta', provincial SEDP and land-use plan, and sector master plans for the next planning cycle (2021–2025). The assessment will develop a set of key environmental and socioeconomic indicators related to Mekong Delta's sustainability, and then assess the status, trends, and driving factors related to those indicators. The assessment will also identify any data or knowledge gaps which need to be addressed for the next assessment process, which ideally should take place every five years. Finally, the assessment will provide a set of recommendations related to the next planning cycle to promote adaptive management of the delta. As many of the inputs to the assessment are expected to flow through the Mekong Delta Center's KMP, one consultancy firm is involved for system integration design and development of the assessment.

31. **Development of databases and models for the Mekong Delta Center.** As described in Subcomponent 1.1, there will be significant expansion of the monitoring systems producing data related to remote sensing, water quality, groundwater, modelling, and so on which will be generated by a wide variety of MONRE and MARD entities as well as other stakeholders. This information will be fed into the Mekong Delta Center's KMP. Although a consultancy firm is expected to design the KMP, the actual work of constructing the KMP and feeding in standardized data and information will be undertaken by specialized institutes and national consultant companies.

32. **Vietnam National Mekong Committee (VNMC) Mekong Basin databases and models.** Approximately 95 percent of the water, which flows through the Vietnam Mekong Delta is generated outside of the Vietnamese part of the delta within the Mekong River Basin which includes land in China, Myanmar, Lao PDR, Thailand, Cambodia, and Vietnam. In 1995, the four lower basin countries signed the Mekong Agreement which established the MRC; China and Myanmar being dialogue partners with the MRC. The VNMC is the government's official representative for interacting with the MRC. The VNMC recently completed a large-scale exercise to develop Vietnam's own Mekong Basin-wide modelling system, which complements the MRC's modelling tools, as well as a model of the delta's coastal zone. This subcomponent will upgrade the VNMC's Mekong Basin modelling package, help address data gaps, and include the integration of the VNMC's databases/models into the Mekong Delta Center's KMP.

Subcomponent 1.3. Mainstreaming Climate Resilience into Planning Processes

33. This subcomponent will provide the linkages between the data and information systems with Vietnam's planning processes in the Mekong Delta. Led by MPI, this subcomponent will seek to collaborate with line ministries (primarily MARD and MONRE), sectors, and provinces to draft regulations on pilot regional coordination for climate change adaptation, and climate-resilient solutions in the Mekong Delta. It will also finance guidance reports to advise on land-use planning, spatial and territorial development, and identifying priority 'low-regret' and climate-resilient investments. Using the Mekong Climate Resilience Assessment, and these guidance reports, the subcomponent will seek to update the Mekong Delta Socioeconomic Master Plan, relevant sectoral master plans, and provincial SEDPs.

Table 2.1. IDA Allocation for Component 1

Subcomponent	US$, millions
Subcomponent 1.1: Investments in Monitoring Systems	**33.7**
MONRE Surface Water Monitoring	**9.5**
MONRE Groundwater Monitoring	**10.0**
• Phase 1 Investments	4.2
• Groundwater Study	1.8
• Phase 2 Investment	4.0
MONRE Remote Sensing/Studies	**11.0**
• Remote Sensing Upgrade	7.5
• Associated Studies	3.5
MARD Delta Monitoring	**3.2**
• Real-time Hydraulic Operations System	2.5
• Management of Sea Dikes/Mangroves	0.7
Subcomponent 1.2. Infrastructure and Integrated Information Systems	**13.8**
MONRE Mekong Delta Center	**12.0**
• Building and Equipment	5.0
• System Integration and Delta Assessment	3.5
• Database and Analysis	3.5
VNMC Mekong Basin Assessment	**1.8**
Subcomponent 1.3. Mainstreaming Climate Resilience into Planning Processes	**8.9**
Total	**56.4**

Component 2: Managing Floods in the Upper Delta (Estimated US$101 million, of which US$79.2 million will be financed by IDA)

34. The upper delta comprises the alluvial terraces, riverine levies, and wetland depressions of Kien Giang, An Giang and Dong Thap Provinces. The upper delta floodplains are dominated by freshwater from the Mekong Basin and the annual overbank flooding of the Tien and Hau river channels and include the focal provinces of An Giang and Dong Thap. During the wet season, floodwater levels regularly exceed 2.0 m. Flooding in the delta is a natural process that maintains productivity and drives the dynamic evolution of the Mekong Delta. The annual flood event is responsible for replenishing the fertile sediments that are vital to agricultural productivity. Rice is the dominant crop accounting for nearly 70 percent of the agricultural production in An Giang and Dong Thap. Most of the area has been converted to agricultural land for rice intensification.

35. The environmental, social, and economic benefits of flooding in the upstream delta area are greater than in any other river basin in the world. The annual flood pulse plays a vital role in the basin's agriculture and fisheries. Floodwaters are stored for use in the dry season, particularly for irrigation. Flood-deposited sediments improve soil fertility across the floodplains. Finally, floods flush and dilute stagnant and polluted waters, recharge groundwater tables, and maintain river morphology. Additionally, the annual flood pulse sustains the world-renowned productivity of Mekong's freshwater fisheries.

36. However, rapid intensification of multiple crop rice farming over the past 20 years through extensive development of water infrastructure (high dikes and their associated irrigation systems) has strongly reduced flood relief capacity, affecting downstream provinces negatively.

Fragmentation of the floodplains and increasing pressures from upstream developments also considerably affect the natural flow of water, sediments, and nutrients, thus contributing to pollution from agricultural fertilizers and pesticides, increasing acidification, and a decline of natural fish habitats within the delta. Climate change induced changes in river flow and the periodicity and extent of water-related natural disasters are already occurring. In the upper delta, floods are projected to have a higher magnitude (deeper inundation) and longer duration.

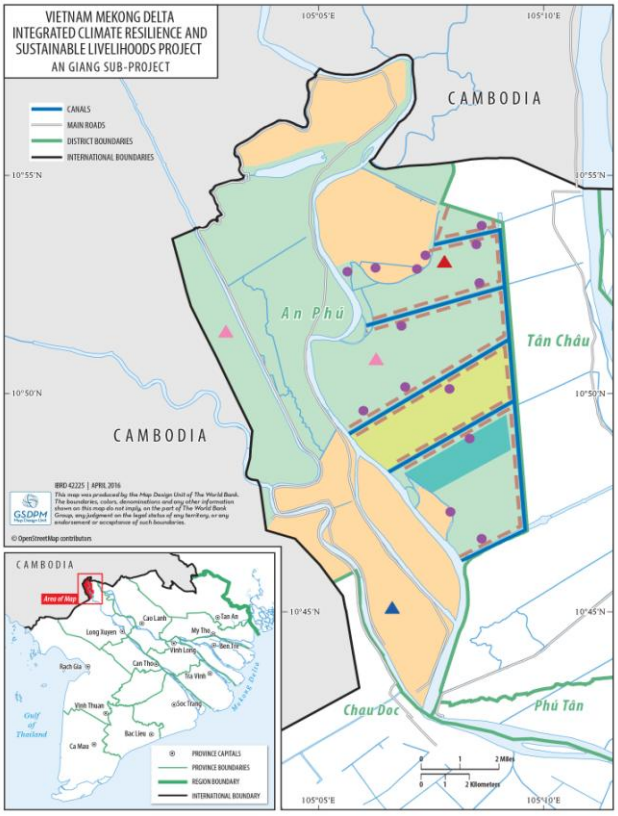
37. The main strategy for this sub-region is to protect and/or reclaim the benefits of controlled flooding (water retention, sediment flushing, groundwater recharge, and so on) measures while increasing rural incomes. Under Component 2, subprojects to be implemented include (a) modifying water and agricultural infrastructure to allow for more beneficial flooding (expanding water retention capacity) in rural areas; (b) new agricultural/aquaculture cropping alternatives to the wet season rice crop; (c) providing livelihoods support measures to farmers; and (d) facilitating agricultural water use efficiency in the dry season.

Box 2.1. Improving Flood Retention Capacity in An Phu, An Giang Province

This subproject in An Phu, An Giang Province aims to improve the ability of farm households to take advantage of the natural characteristics of the floodplains and improve incomes through appropriate alternatives to intensive rice farming. The subproject includes a combination of reinforced low embankments ('August dikes' which are overtopped during the seasonal flooding); sluice gates to reduce maintenance costs from overflow damages, and development of flood-based production models (rice combined with floating vegetables and/or fish breeding).

The subproject covers an area of 22,640 ha consisting of two zones (4a and 4b). Zone 4a is characterized as a two-rice crop area of 15,800 ha and Zone 4b is a three-rice crop area of 6,228 ha. The subproject investments (in Zone 4a) include a combination of 61 km reinforced low embankments (August dikes, which are overtopped during the seasonal flooding); 15 sluice gates to reduce maintenance costs from overflow damages, and development of flood-based production models (rice combined with floating vegetables and/or fish breeding) targeting an area of 1,500 ha and 2,500 households. For Zone 4b, the activities include the development of production models to support the transition from three-rice crop to two-rice crop and also an alternative crop, targeting 1,200 households. By avoiding the conversion of two-rice to three-rice crop areas, and showcasing the higher profitability of two-rice crop plus an alternative, the investments help protect and/or reclaim the benefits of controlled flooding. The subproject's activities also contribute to increasing yield per hectare rural incomes through improved flood-based production models.

Figure 2.4. An Giang: Project Indicators



AN GIANG: Project indicators

	Legend	Baseline	Project target			
			ha	HHs	Model	Coop
A. ZONE 4a: Two rice crop (15,800 ha)			**1,500**	**2,500**	**14**	**5**
1. Alternatives crop in flood season		None	1,500	1,500	10	5
a. WS rice + Prawn		None	1,000	1,000	6	3
b. WS rice + Cash crop + wild fisheries		None	500	500	4	2
2. Model: floating rice + aquaculture+ cash crop		None	NA	500	2	0
3. Model: mushrooms growing in the flood season		None	NA	500	2	0
B. ZONE 4b: Three rice crop (6,228 ha)			**NA**	**1,000**	**2**	**0**
1. Model: Transition from 3 to 2 rice crop		None	NA	1,000	2	0
C. Infrastructure						
a. Upgrading august dike (61 km)		61 km temporary	7,873	7,870	14	5
b. 15 new sluice gates		None				

Component 3: Adapting to Salinity Transitions in the Delta Estuary (Estimated US$108.7 million, of which US$81.6 million will be financed by IDA)

38. The delta estuary includes the riverine levies and alluvial floodplains of Vinh Long, Ben Tre, Tra Vinh, and Soc Trang (Cu Lao Dung island) and consists of sandy ridges with an orientation parallel to the coast, alternating with low-lying land. The intertidal zone is under the mixed influence of upstream hydrology as well as coastal processes such as tidally induced saline intrusion and channel-flow reversal. In the delta estuary under mixed coastal and freshwater influence, rice is still an important crop accounting for 30 percent of provincial area, with brackish aquaculture accounting for a further 11 percent, and fruit trees found on sandy ridges

39. Rapid population growth and intensive agricultural and aquaculture development over the past decades have significantly reduced the natural values in the delta estuary. Salinity intrusion in the delta mouth (which will be further increased with sea-level rise) is reducing agricultural productivity and leading to dry season freshwater shortages. Land use in the estuary zone depends directly (with regard to available freshwater) or indirectly (with regard to salinity intrusion) on river discharge and is therefore subject to large seasonal variations as well as to reduction of available fresh river water and increase in saltwater intrusion. Along the coast, the area has already been converted into brackish aquacultural ponds, extending upstream along the river.

40. The major challenge in this zone is to improve water management for brackish aquaculture, rendering the existing shrimp ponds less vulnerable to disease. The area with rice-shrimp systems needs to be improved as it lacks adequate supply of brackish water in the dry season and receives polluted drainage water from the triple-rice fields.

41. Water control infrastructure (sea dikes) has been constructed in coastal provinces to control salinity intrusion into the estuaries. Saline water is prevented to enter the canals by the construction of sluices that can be closed when the seawater rises with the tide above river water levels. Where sluices exist, this creates conflicts between the freshwater needs of agriculture and the brackish-water needs of aquaculture. A large decline in capture fisheries is also associated with the construction of sea dikes to cut off saltwater flow into mangrove habitats.

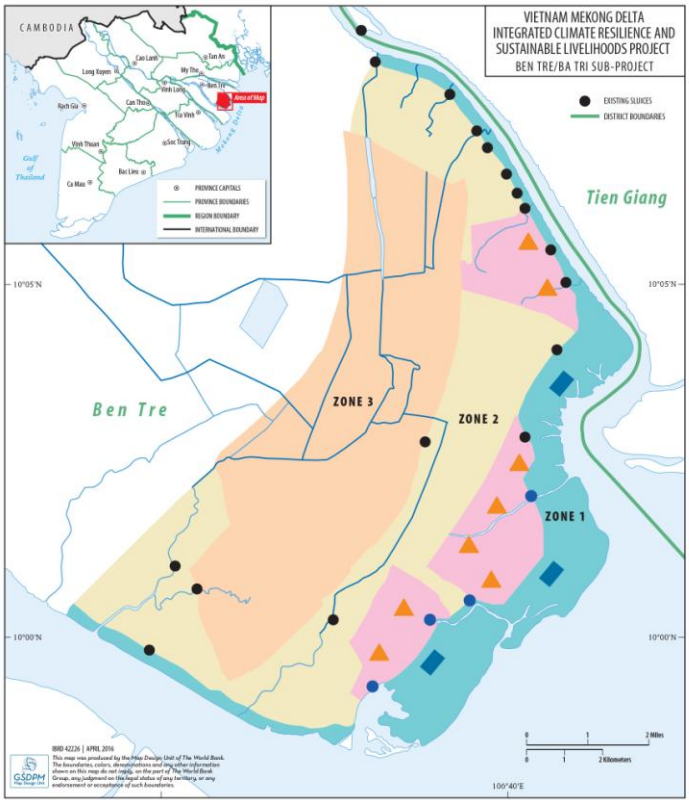
42. The primary objective of this component is to address challenges related to salinity intrusion, coastal erosion, sustainable aquaculture, and improved livelihoods for communities living in the coastal areas of Ben Tre, Tra Vinh, and Soc Trang Provinces. Subprojects selected in this component include those aimed at (a) construction of coastal defenses consisting of combinations of compacted earth embankments and coastal mangrove belts; (b) modification of water and agricultural infrastructure along the coastal zone to allow flexibility for sustainable aquaculture activities and adapt to changing salinity levels; (c) support to farmers to transition (where suitable) to more sustainable brackish-water activities such as mangrove shrimp, rice shrimp and other aquaculture activities; and (d) supporting climate-resilient agriculture by facilitating water use efficiency in the dry season. The first year subprojects are detailed in boxes 2.2 and 2.3.

Box 2.2. Salinity Transitions in Ba Tri, Ben Tre Province

The subproject in Ba Tri, Ben Tre Province aims to enhance coastal protection and improve the ability of livelihoods to take advantage of the changing conditions in the estuaries (sea-level rise, increasing salinity intrusion) through appropriate alternatives for freshwater-based intensive rice farming and unsustainable intensive shrimp farming. The subproject follows a three-zoned coastal management approach and includes a combination of structural (sluice gates, culverts) and nonstructural measures (land-use changes, mangrove-shrimp pilot models, and so on).

This subproject covers an area of 15,529 ha and follows a three-zoned coastal management approach. Zone 1 is a mangrove belt of 2,484 ha, Zone 2 is the brackish-water zone of 7,940 ha, and Zone 3 is the saltwater intrusion zone of 5,105 ha. The investments for Zone 1 include additional mangrove planting targeting an area of 250 ha and eco mangrove-shrimp farming certification targeting an area of 1,000 ha and 300 households. The investments for Zone 2 include a combination of structural (five sluice gates and culverts, dredging 28.7 km of canals) and nonstructural measures (mangrove-shrimp pilot models targeting an area of 2,500 ha and 2,500 households). Improvements will allow for better water resource management (control of salinity level, improvement of water quality), which will contribute to increased productivity and salinity adaptation. The investments for Zone 3 include the rice-prawn pilot models targeting an area of 180 ha and 150 households, and six community action plans.

Figure 2.5. Ben Tre- Ba Tri Project Indicators



BEN TRE-BA TRI: Project indicators

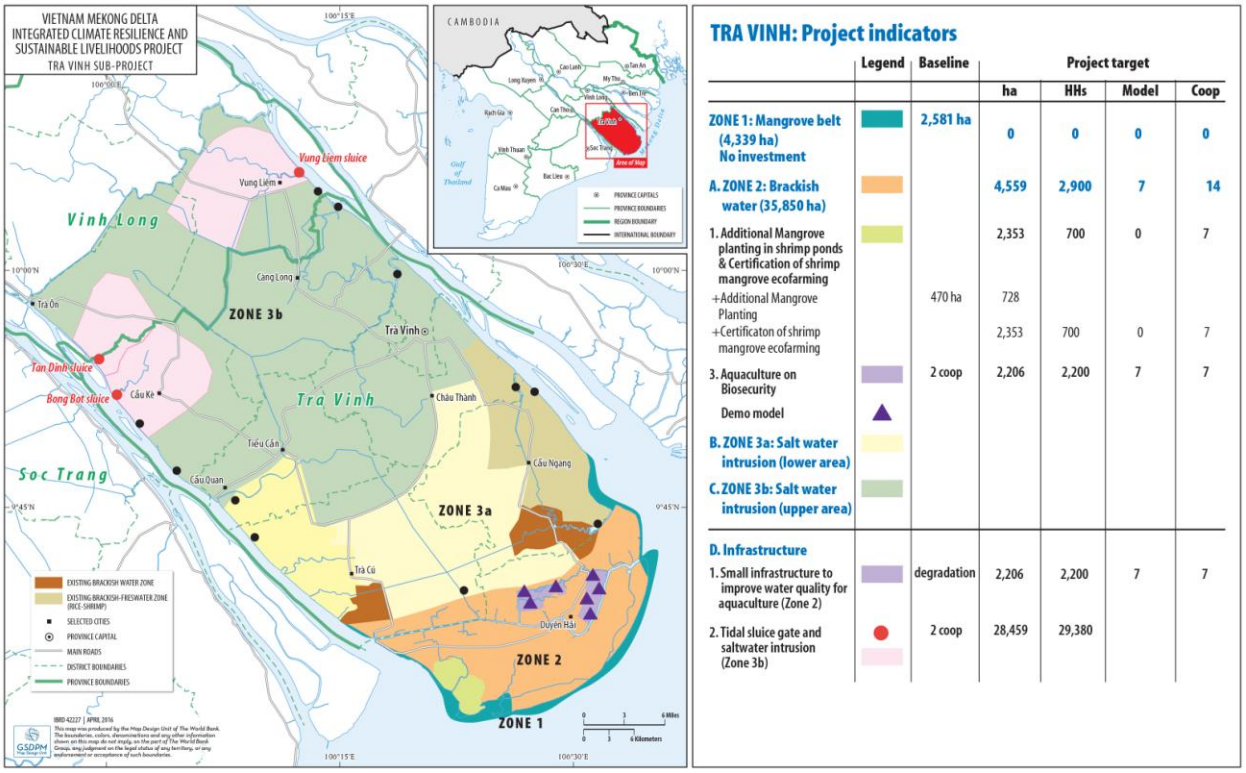
	Legend	Baseline	Project target			
			ha	HHs	Model	Coop
A. ZONE 1: Mangrove belt (2,484 ha; 450 hhs)			**1,000**	**300**	**3**	**3**
1. Additional mangrove planting in shrimp ponds		250 ha	250			
2. Certification of shrimp mangrove ecofarming		None	1,000	300	3	3
B. ZONE 2: Brackish water (7,940 ha; 7,850 hhs)			**2,500**	**2,500**	**8**	**8**
1. Biosecurity of shrimp culture Demo model		None	2,500	2,500	8	8
C. ZONE 3: Salt water intrusion (5,105 ha; 11,300 hhs)						
1. Community action plans		6 community action plans, 2,000 farmers, 60 FFS models, 6 farmer organizations				
D. Infrastructure (Zone 2)						
1. 5 new sluice gates		None				
2. Dredging canals (28.7 km)		28.7 km degradation	2,500	2,500	8	8

Box 2.3. Salinity Transitions in Tra Vinh and Vinh Long Provinces

This subproject aims to improve the ability of livelihoods to take advantage of the changing conditions in the estuary (sea-level rise, increasing salinity intrusion) through appropriate alternatives for freshwater-based intensive rice farming and unsustainable intensive shrimp farming. Valuable horticulture areas will initially be protected to avoid high economic losses. The subproject follows a three-zoned coastal management approach and includes a combination of structural (sluice gates, culverts) and nonstructural measures (land-use changes, mangrove-shrimp pilot models, and so on).

This subproject covers an area of 265,931 ha follows the three-zoned coastal management approach. Zone 1 is a mangrove belt of 4,339 ha, Zone 2 is the brackish-water zone of 35,850 ha, and Zone 3 is the saltwater intrusion zone. The investments for Zone 2 include additional mangrove planting and eco mangrove-shrimp farming certification targeting an area of 2,353 ha and 700 households, and aquaculture on biosecurity pilot models targeting an area of 2,206 ha and 2,200 households. The investment for Zone 3 includes the construction of three sluice gates (Tan Dinh, Bong Bot, and Vung Liem). These structural investments will complete the system that protects freshwater area for valuable horticulture to avoid high economic losses. The system being completed is also expected to allow for better water resource management (control of salinity level, improvement of water quality) which contribute to increased productivity and salinity adaptation in Zones 2 and 3.

Figure 2.6. Tra Vinh: Project Indicators



TRA VINH: Project indicators

	Legend	Baseline	Project target			
			ha	HHs	Model	Coop
ZONE 1: Mangrove belt (4,339 ha) No investment		2,581 ha	0	0	0	0
A. ZONE 2: Brackish water (35,850 ha)			4,559	2,900	7	14
1. Additional Mangrove planting in shrimp ponds & Certification of shrimp mangrove ecofarming			2,353	700	0	7
+Additional Mangrove Planting		470 ha	728			
+Certificaton of shrimp mangrove ecofarming			2,353	700	0	7
3. Aquaculture on Biosecurity		2 coop	2,206	2,200	7	7
Demo model	▲					
B. ZONE 3a: Salt water intrusion (lower area)						
C. ZONE 3b: Salt water intrusion (upper area)						
D. Infrastructure						
1. Small infrastructure to improve water quality for aquaculture (Zone 2)		degradation	2,206	2,200	7	7
2. Tidal sluice gate and saltwater intrusion (Zone 3b)	●	2 coop	28,459	29,380		

Component 4: Protecting Coastal Areas in the Delta Peninsula (Estimated US$101.1 million, of which US$81.9 million will be financed by IDA)

43. The delta peninsula consisting of Bac Lieu, Ca Mau, and Kien Giang is extremely vulnerable to the impacts of coastal erosion. Under a 2050 scenario with high climate change and high hydropower expansion, all of the coastal provinces along the East Sea will experience rates of erosion between 34 to 44 m/year, double of that experienced over the past 40 years. In this sub-region, the mangroves play an important role in ecosystem productivity and protecting

coastal communities from storm surges and coastal erosion. However, the area of mangroves has rapidly declined over time mainly due to unplanned shrimp farming, urban development and the limited regulations and institutions in relation to integrated coastal management. Increased fragmentation of mangroves has reduced capacity to withstand coastal processes, such as wave actions, coastal currents, and wind at exposed and semi-exposed coastline locations.

44. Furthermore, the delta peninsula remains hydrologically isolated from the surface water processes of the Mekong River and its distributaries. This means that the provinces of Ca Mau, Bac Lieu, parts of Soc Trang and the southern parts of Kien Giang experience dramatic changes in seasonal freshwater available as surface waters in the dry season are almost exclusively dominated by tidal forces, and the main source of freshwater replenishment to the surface water system is direct rainfall with the monsoon rains. The timing and magnitude of wet season rainfall can have significant impacts on farming systems and groundwater dependency of the peninsula. Intensification of groundwater exploitation has increased dramatically over the last decade, and groundwater levels are continuously falling due to overuse. In the dry season, water levels already drop to 15–20 m below the surface. The sustained long-term groundwater extraction has resulted in land subsidence of 0.5–3.3 cm per year, most dramatically in the Ca Mau Province.

45. Given these conditions, appropriate principles for sustainable water management and land use remain critical. These include proper zoning in the mangrove belt, brackish-water zone, intermittent and freshwater zone, given estimated sea-level rise and salt intrusion. This involves ensuring good water quality, interaction with the sea, and a cascading system for more intensive forms of aquaculture, with no direct discharge into the extensive pond system. For the intermittent zone and freshwater zone, freshwater needs to be ensured in the long term and in very dry years. The long-term sustainability of the different zones depends on the positioning of intake and discharge points to minimize pollution risk. Urban areas are mostly situated on canals, which serve as transportation, adding further challenges for transition into brackish aquaculture.

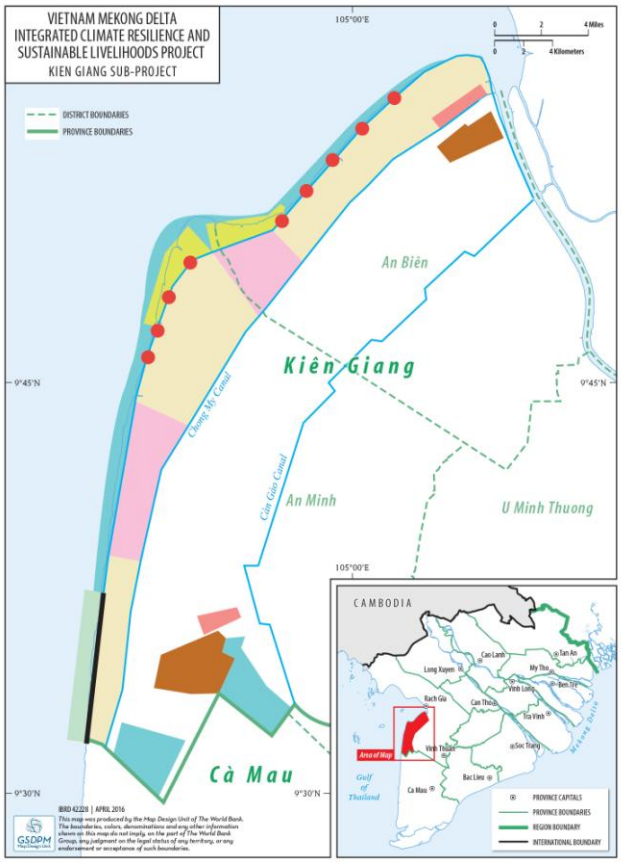
46. The primary objective of this component is to address the challenges related to coastal erosion, groundwater management, sustainable aquaculture, and improved livelihoods for communities living in the coastal and river mouth areas of Kien Giang, Ca Mau, Bac Lieu, and parts of Soc Trang. Subprojects include those aimed at (a) construction/rehabilitation of coastal defenses consisting of combinations of compacted earth embankments and coastal mangrove belts; (b) modification of water control infrastructure along the coastal zone to allow flexibility for sustainable aquaculture activities; (c) control of groundwater abstraction for agricultural/aquaculture and development of freshwater supplies for domestic use; (d) support to farmers to practice more sustainable brackish-water activities such as mangrove-shrimp farming; and (e) supporting climate-smart agriculture by facilitating water use efficiency. Subprojects in Ca Mau and Kien Giang (and possibly Bac Lieu) include mangrove-shrimp models, expansions of rice-aquaculture, mangrove restoration, and infrastructure relating to aquaculture, with accompanying adjustments to land-use plans. The first year subproject is fully designed and explained in Box 2.4.

Box 2.4. Coastal Protection in An Minh-An Bien District, Kien Giang Province

This subproject aims to enhance coastal protection (erosion and extreme weather events) and improve the ability of livelihoods to take advantage of the changing conditions (sea-level rise, increasing salinity, and limited freshwater availability) through tide-based brackish-water aquaculture as an appropriate alternative for rainfed rice and extensive shrimp farming outside the wet season. The subproject follows a three-zoned coastal management approach and includes a combination of structural (sluice gates, culverts, and wave breakers) and nonstructural measures (dredging canals to increase rainwater storage, land-use changes, mangrove rehabilitation, and so on).

This subproject covers an area of 60,800 ha and follows a three-zoned coastal management approach. Zone 1 is a mangrove belt of 6,669 ha, Zone 2 is the brackish-water zone of 54,131 ha, and Zone 3 is the saltwater intrusion zone. The investments for Zone 1 include a combination of structural (10 km of coastal dikes/wave breakers) and nonstructural measures (mangrove planting along the coastline targeting an area of 250 ha). The investments for Zone 2 include a combination of structural (nine sluice gates) and nonstructural measures (eco-shrimp and rice-shrimp pilot models targeting an area of 7,500 ha and 6,500 households). The investments will contribute to enhance coastal protection for the area, and support a transition to more sustainable and appropriate livelihood models in the changing conditions (sea-level rise, increasing salinity, and limited freshwater availability) associated with climate change.

Figure 2.7.Kien Giang: Project Indicators



KIEN GIANG: Project indicators

	Legend	Baseline	Project target			
			ha	HHs	Model	Coop
A. ZONE 1: Mangrove belt (6,669 ha)			**400**	**100**	**2**	**1**
1. Mangrove planting along coast line		200 ha	150	0	0	0
2. Mangrove planting (250 ha) in blood cockle system		50 ha	250	100	2	1
B. ZONE 2: Brackish water (54,131 ha)			**7,500**	**6,500**	**30**	**15**
1. Biosecurity of aquaculture		20 ha	5,000	5,000	20	10
3. Rice-shrimp		None	2,000	1,000	8	4
4. Rice-shrimp-prawn		None	500	500	2	1
C. Infrastructure						
Upgrade of 10 km coastal dike to prevent coastal erosion		None	350	70	0	0
Sluice gates: Construct 9 additional sluice gates to prevent high tide		None	23,083	8,465	30	16

47. The summary of costs associated with the subprojects under Components 2, 3, and 4 can be found in table 2.2.

Table 2.2. IDA Allocation for Subprojects under Components 2, 3, and 4

IDA Allocation by Component	US$, millions
Component 2: Managing Floods in the Upper Delta	**79.2**
• Subproject in An Giang (first year)	24.3
• Other subprojects	54.9
Component 3: Adapting to Salinity Transitions in the Estuary	**81.6**
• Subproject in Ben Tre (Ba Tri) (first year)	12.4
• Subproject in Tra Vinh – Vinh Long (first year)	27.7
• Other subprojects	41.5
Component 4: Protecting Coastal Areas in the Delta Peninsula	**81.9**
• Subproject in Kien Giang (first year)	27.9
• Other subprojects	54.0

Component 5: Project Management Support (Estimated US$14.5 million, of which IDA US$10.9 million will be financed by IDA)

48. This component will provide support for project management activities for MARD, MONRE, and the MPI relating to technical supervision, procurement, and FM, implementation of the safeguard measures, and project M&E including establishment of an M&E system for the project, and carrying out of independent technical audits. The main outputs of the component will be prompt subprojects preparation and implementation, and project M&E reports.

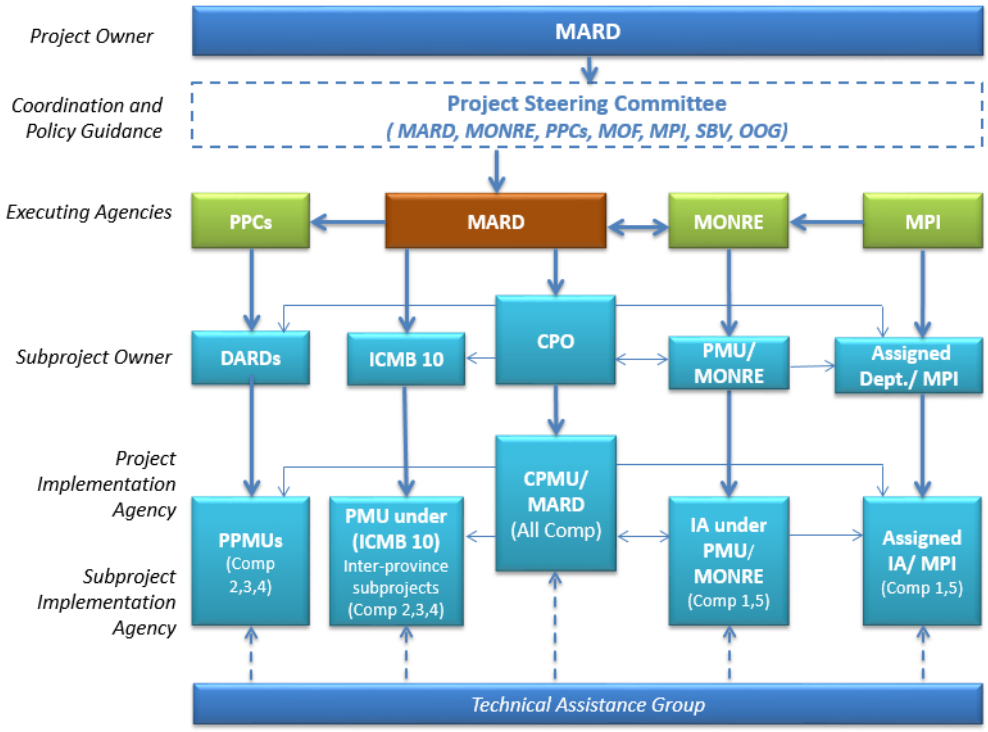
Annex 3: Implementation Arrangements

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project

Project Institutional and Implementation Arrangements

1. MARD will be the primary executing agency for the project. MARD has extensive experience in executing IDA-financed projects since 1995. MARD will work in close collaboration with MONRE and the MPI to implement the project. Project implementation will be guided by a PSC who will be responsible for facilitating coordination among the three ministries, and other stakeholders, providing guidance, and ensuring alignment with the national policy framework.

Figure 3.1. Project Implementation Arrangements



2. **MARD has been assigned by the government as the project owner and will be responsible for overall implementation, management, and coordination of the project.** The ministry has experience implementing various Bank-financed projects, along with those financed by other partners including the Asian Development Bank and JICA), and so is familiar with Bank procedures and policies. MARD has assigned the CPO for irrigation projects (MARD CPO) in Hanoi to be responsible for overall implementation and management of the project, and will be the project owner of Components 2, 3, 4, 5 and part of Component 1. For these components, MARD will use existing resources to establish a CPMU under the CPO and create a Technical Working Group comprising irrigation, agriculture, forestry, and aquaculture specialists from technical departments, and related research institutes.

3. The CPMU, assisted by the Technical Working Group, is responsible for implementing the components in accordance with the framework documents for determining the eligibility, prioritization, and readiness of subproject investments, as well as in compliance with the safeguards framework, and the subproject assessments. In addition, the CPMU will be responsible for the overall project level administration, including oversight procurement, FM, M&E, and communications.

4. **Provincial level.** Subprojects under Components 2, 3, 4, and 5 will be implemented by PPMUs in the respective provinces. The PPC will appoint existing PPMUs under DARD to be the IA. Subprojects involving more than one province will be implemented by the Investment Construction Management Board No. 10 (ICMB10) under the direct management of MARD.

5. The main tasks of the PPMU and ICMB10 will be to be in charge of day-to-day implementation activities including (a) preparation and processing of subproject investments; (b) preparation of detailed technical engineering design, safeguards mitigation documents, implementation, and Procurement Plans; (c) implementation of fiduciary (procurement and FM) and safeguards activities at the subproject level; (d) operation and maintenance of the project account; and, (e) M&E of subproject implementation. Each of the PPMUs and ICMB10 will be fully staffed with qualified and experienced staff in all areas particularly on fiduciary and safeguards aspects.

6. **MONRE is the executing agency for Component 1 and part of Component 5 of the project.** MONRE has appointed the existing PMU under the Vietnam Administration for Seas and Islands (VASI) to be responsible for management of contracts, and capacity will be scaled up to a serve as a MONRE PMU to be responsible for implementation. MONRE PMU will coordinate with other technical departments and research institutes of MONRE according to their mandates to implement the planned activities under Component 1. Coordination with MARD will be in the form of information sharing, activity alignment, and report consolidation.

7. **The MPI is responsible for one subcomponent under Component 1 and part of Component 5 of the project.** The MPI has appointed the Planning Management Department to be responsible for management of contracts. This assigned department will coordinate with other technical departments and research institutes of MPI according to their mandates to implement the planned activities under Subcomponent 1.3. Coordination with MARD and MONRE will be in the form of information sharing, activity alignment, and report consolidation.

8. **Project oversight.** A PSC will be established and comprise representatives from MONRE, MARD, MPI, PPCs, MOF, OOG, and the State Bank of Vietnam. The PSC will organize meetings to review the project implementation, provide policy guidance, and assist in coordination on a need basis.

9. **Technical oversight.** MARD CPMU will (a) provide technical inputs for preparing/reviewing complex or interprovincial projects, which will be managed by the ICMB10 and (b) extend TA to DARDs, when required, to support implementation of non-complex subprojects, which are decentralized to the project provinces. The CPMU will include technical specialists from various technical departments including agriculture, forestry, aquaculture, climate change, water, and environment, as needed.

10. **Component 5 will provide necessary support to project implementation.** The CPMU under MARD is responsible for overall implementation and coordination. In addition to ensuring that the project is implemented in compliance with the technical and safeguard frameworks, the CPMU will be responsible for overall project level administration, including procurement, FM, M&E, and communications. The CPMU will include a director and will be supported by, at a minimum, the following specialists in: (a) engineering; (b) environment; (c) social; (d) procurement; (e) FM; (f) M&E; and (g) communications. The PMU under MONRE is responsible for the implementation and coordination for Component 1. MONRE PMU and MPI-assigned departments will coordinate with MARD CPMU to share information, align activities, and contribute to the overall project reporting where needed.

11. **M&E.** The MARD CPMU will be responsible for carrying out M&E of the project, and will recruit dedicated M&E staff. The M&E staff will be responsible for preparing the following reports in coordination with MONRE PMU, MPI-assigned departments and the PPMUs:

- A semiannual progress report will be submitted to the Bank for review by January 31 and July 31 of each year, and contain results of M&E activities performed pursuant to the above date as well as a section on compliance with environment and social safeguards

- The MTR report, containing the summary of the progress, updated result indicators (as stated in Annex 1), updated project estimated cost, and plan for completion

- Annual environment and social safeguard monitoring reports will be submitted to the Bank for review by January 31 each year. The report should contain progress in (a) preparation of the safeguard documents for subsequent year subprojects; (b) implementation status of social and environmental safeguard actions; (c) status of land acquisition; (d) grievance applications; (e) any other updated information on the emerging safeguard issues; and (f) planning. This report shall be prepared with assistance of the national consultants recruited by the CPMU.

Financial Management, Disbursements, and Procurement

Financial Management

12. An FM assessment has been conducted for the project IAs (that is, MARD, MONRE, MPI, and project provinces). The following key risks were identified: (a) MONRE, MPI and project provinces may not be familiar with Bank FM and disbursement requirements, especially when a fully decentralized fund flow mechanism is applied; (b) project design adopts full decentralization and autonomy to the project provinces, which will require greater capacity and accountability on the part of the provinces in monitoring fund flow and in meeting the financial reporting requirements; and (c) successful project implementation requires strong linkages among project components and good management and coordination between MARD, MONRE, MPI and DARDs. The FM risk is rated ‘Substantial’.

13. The principal risk mitigation measures include (a) acceptable FM staffing to be appointed at all IAs (priority should be given to staff who have experience in FM from previous and ongoing

Bank-financed projects) and provided with training on Bank FM requirements and disbursement procedures; (b) a project FM Manual to be developed as part of the POM, describing in detail the roles and responsibilities of the concerned parties, as well as specifying the project FM procedures and regulations; (c) an upgraded accounting software to be installed for the project and training to be provided to all accounting staff; and (d) an internal audit team to be established with the TOR acceptable to the Bank to build the capacity of internal audit for the project.

14. **Budgeting and counterpart funding arrangement.** Through approved PDO, the government has committed the counterpart funding to be allocated for the entire Project life. In addition, central and provincial levels will provide annual commitments through approved annual budget allocation to the Project, which include the Bank fund and counterpart fund. The Bank will closely monitor the budget planning and budget allocation process through Project progress reports and Bank implementation support missions to ensure government commitments are met. The counterpart funds will be made available for the IAs through the State Treasury system. Budgeting procedures, including the roles and responsibilities of each concerned party within MARD, MONRE, MPI, and DARD will be described in the FM Manual.

15. **Accounting system.** A consistent accounting system, based on the accounting policies and procedures under the Accounting System for Investment Owner (Decision 195 of the MOF) will be applied. The chart of account will be modified when necessary to meet Bank FM requirements. Accounting records will be maintained in a computerized accounting system.

16. **Accounting software.** The CPMU will evaluate and select the most suitable computerized accounting software that is being used by other agricultural projects under the CPO Irrigation to modify (or upgrade) and use for the project. It is suggested that the same software be installed at all IAs followed by FM staff training to ensure consistency in project accounting and reporting, and allow the CPMU to consolidate the project's financial reports more easily.

17. **Financial reporting.** The CPMU will consolidate the semiannual Interim Financial Reports (IFRs) prepared by the CPMU in MARD, MONRE, MPI and DARDs for monitoring of financial performance of the project in a format agreed between the representative of the GoV and the Bank. IFRs will be based on the Aligned Monitoring Tool, which is regulated under MPI Decision, and will be sent to the Bank within 45 days of the end of the semester. The CPMU will prepare consolidated annual financial statements covering all project components and activities.

18. **Internal controls and internal auditing.** Internal control procedures will be established in the project FM Manual, which will be reviewed and updated regularly to consider changes in procedures. An internal audit function will be established under the CPO Irrigation and an internal audit team will be formed to be trained and developed capacity for conducting internal audit following the TOR acceptable to the Bank. Internal audit reports will be prepared on a semiannual basis and submitted to the Bank twice a year, by March 31 and September 30 of each year.

19. **External audit.** The CPMU will appoint independent auditors acceptable to the Bank. The project financial statements will be audited annually in accordance with international standards on auditing and TOR acceptable to the Bank. The auditors' reports will be made available to the Bank within six months of the close of each fiscal year. The project's audited financial statements will be made available to the public according to the Bank's information disclosure policy.

20. **Measures to address fraud and corruption**. The IAs will implement strict contract management to avoid overpayment/overrunning contract budgetary allocations. The contract management will be part of the IFRs. The following will be carried out to mitigate the risks of fraud and corruption: (a) clear FM responsibilities in the FM Manual; (b) internal and external audits; and (c) enhanced disclosure and transparency of financial information.

Disbursements

21. **Designated accounts (DAs).** These include 11 segregated DAs—1 for MARD CPO and CPMU, 1 for MARD ICMB10, 1 for MONRE PMU, 1 for MPI Department of Planning Management, and seven (07) for An Giang, Dong Thap, Ben Tre, Soc Trang, Bac Lieu, Ca Mau and Kien Giang will be opened in US Dollars (US$) at commercial banks under terms and conditions satisfactory to IDA. The Designated Accounts will have variable ceilings following approved forecast of 3 months financial plan. Tra Vinh will open a secondary Sub-Project Account in USD to receive advance from MARD CPMU based on its respective approved forecast of 3 months financial plan.

22. **Funds flow arrangements.** The project will use the following disbursement methods as stipulated in the Disbursement Letter: advance, reimbursement, special commitment, and direct payment. MARD, MONRE, MPI, and DARDs will report to the Bank on the operation of the DAs on a quarterly basis. Reporting on the use of advances and requests for reimbursements will be documented based on the Statements of Expenditures and a list of payments against contracts that are subject to the Bank's prior review, together with records. Replenishment applications will be submitted quarterly. The minimum application size for reimbursement, special commitment, and direct payments will be specified in the Disbursement Letter.

23. The project will have a disbursement deadline date (final date on which the Bank will accept applications for withdrawal from the borrower or documentation on the use of credit proceeds already advanced by the Bank) four months after the closing date. This 'grace period' is granted to permit the orderly project completion and closure of the credit account through the submission of applications and supporting documentation for expenditures incurred on or before the closing date. Expenditures incurred between the closing date and the disbursement deadline date are not eligible for disbursement.

24. Bank financing for the project will be at 100 percent, inclusive of taxes, for eligible expenditures including goods, works, consulting services, non-consulting services, incremental operating costs, and training and workshops. Government counterpart funds of US$77 million (including contributions in kind or cash from farmers) will be used to finance items such as salaries, salary allowances, or supplements for civil servants working on the project. Under Component 1, counterpart funds will be used for financing activities related to surface and groundwater monitoring (for example, surveys, feasibility studies, and supervision; appraisal, verification, and finalization cost); compensation and resettlement; and for real-time operation of hydraulic systems. Under Components 2, 3, and 4, counterpart funds will be used for preparation of feasibility study and safeguards documents; for quality assurance, and developing cost norms; for unexploded ordnance clearance; and for government management support for civil works and PMU for each of the subprojects, and so on.

25. Retroactive financing up to $1 million equivalent will be provided for eligible expenditures to be incurred from May 1, 2016; provided that relevant Bank's procurement procedures are followed.

Procurement

26. **Procurement Capacity and Risk Assessment (PCRA).** The Bank has carried out a PCRA of MARD, MONRE, MPI and the participating provinces as well as several PCRA updates during project preparation process (from September 2015 to April 2016). This assessment has resulted in the following findings:

- MONRE (assigned as the owner of Component 1(a), 1(b), and part of Component 5) decided to delegate investment ownership and project implementation responsibilities to the existing PMU of MONRE which was established on February 26, 2016 using the human resources from the previous PMU of Vietnam Administration of Seas and Islands.
    - MONRE PMU is directly under MONRE's management. Before being restructured to MONRE PMU, this PMU was under VASI's management, established in April 2012. As of the appraisal date, the PMU had 35 staff and four main divisions: Financial, Planning, Technical and Project Implementation. There are 4 officers having Procurement certificates granted by the Government that have received training on the Government procurement regulations.
    - The PMU had experience in managing Government funded projects. They have conducted procurement of goods, civil works and consultancy following the Government procurement regulations. The most commonly used procurement method is NCB.
    - The PMU did not have any procurement experience in the projects financed by international development partners. However some contracted staff had work experience in the World Bank projects/programs in the capacity of technical experts, not procurement officers.
    - Procurement activities under Component 1 would include international bidding for specialized equipment, IT goods/equipment and consultancy services which potentially represent big challenges for the PMU.
- MARD CPO (managing Components 1(a), 2, 3, 4 and a part of Component 5) has accumulated significant experience in managing large projects financed by WB, ADB and JICA. The WB projects include the Irrigation Rehabilitation Project (completed in 2002), the Mekong Delta Water Resources Management Project (completed in 2007), Vietnam Water Resources Assistance Project (completed in 2012), the Natural Disaster Risk Management Project (completed in 2012), and the three on-going projects: Managing Natural Hazards, Mekong Delta Water Resources Management for Rural Development and Vietnam Dam Rehabilitation and Safety Improvement. CPO is familiar with WB's NCB works and ICB goods procurement procedures, as well as CQS and QCBS for consultant selection. CPO had certain experience in coordinating PPMUs, providing procurement guidance and training to PPMUs.
- MARD ICMB10 has been responsible for procurement of the inter-provincial NCB civil works of the on-going Mekong Delta Water Resources Management for Rural Development Project. ICMB10 also had experience in CQS consultancy selection.
- At provincial level, except Tra Vinh PPMU, the remaining PPMUs have experience in the WB's NCB and Shopping procedures thanks to the implementation of several WB financed

projects (e.g. Natural Disaster Risk Management and/or Vietnam Managing Natural Hazards and/or Mekong Delta Water Resources Management for Rural Development, or Vietnam Mekong Delta Water Resources). Of those provinces, An Giang, Bac Lieu, Ca Mau and Soc Trang had experience in CQS consultancy selection**.** An Giang, Bac Lieu, Ca Mau, Soc Trang and Kien Giang are implementing the on-going Mekong Delta Water Resources Management for Rural Development Project.

- As for MPI's sub-components under Component 1(c) and Component 5, MPI delegates the investment ownership and project implementation responsibility to the Department of Planning Management (hereinafter referred to as MPI Department). A PMU under the Department is established for management of daily project operations. The Department has participated in implementation of the WB financed PPTAF project (MPI's component) and a Technical Assistance funded by Belgium Development Agency (BTC), in the capacity of a beneficiary. The Department has never played the role of a procuring entity or contractual party. In the PPTAF project, the Department provided technical support and inputs to MPI PCU for the Procurement Plan preparation/updates and during the selection and management of consultancy contracts (reviewed TORs and consultants' outputs, supported PCU in management of technical aspects of the consulting services as well as in acceptance/approval of consultants' outputs). The BTC's TA is a donor executed grant, where the Department contributed technical inputs to the draft TOR, and cooperated with the consultant (selected by the donor) in execution of the assignment. The Department therefore has certain experience in TOR drafting and in management of technical aspects of consultancy contracts. Some staff of the Department had past experience with the public procurement following Vietnamese regulations and attended the procurement training delivered by the Public Procurement Agency of MPI. Nevertheless, the Department is not familiar with public procurement or WB procurement procedures. Contract management is also a challenge to them.

27. *Procurement risks:* The above assessment rated the overall procurement risk as **Substantial**, given the multi-sectoral procurement scope and involvement of various project/sub-project implementing agencies with different capacity levels. The main risks include:

(a) Lack of sufficient capacity and prior experience by MONRE PMU and MPI Department in carrying out procurement in compliance with the Bank's procedures;

(b) Delay in procurement review and decision-making process, especially in MONRE due to lack of decentralization of approval authority, leading to significant delays in the approval process.

(c) Lack and uneven level of knowledge and experience in Bank's procurement rules and procedures by PMUs/PPMUs;

(d) Inadequate personnel resources and capacity of procurement planning, implementation and contract management by all implementing agencies at both ministerial and provincial levels. In particular, lack of staff resources and capacity at MARD CPO/CPMU, MONRE PMU and MPI Department would probably affect the agency's ability to efficiently manage their in-charge procurement activities and to provide procurement and contract management support/guidance to the other implementing entities;

(e) Delays in the procurement processing from planning & designing procurement packages, preparation of TOR/technical specifications and request for proposals/bidding documents, proposal/bid evaluation to contract award and signing.

(f) Non-compliance with Bank procedures (including governance and corruption issues), which may occur at different levels during project implementation

28. *Procurement Risk Control Measures:* To control the risks identified, several major measures have been agreed with MARD, MONRE, MPI and the participating provinces, as indicated in the following table. Lessons learnt from the other WB financed projects, especially the two on-going Mekong Delta Water Resources Management for Rural Development (MARD) and Mekong Integrated Water Resources Management Phase 2 (MONRE) have been taken into account during the discussions. Other relevant measures in the WB's Strategic Action Plan to Address Fraud and Corruption Risks in Vietnam will be incorporated into the Project Operations Manual and implemented as appropriate. It is expected that, after these measures are implemented, the residual risk will become **Moderate**.

Table A3.3. Procurement Risk Control Measures

#	Actions	Responsible	Expected Date of Completion
1	Responsibility and accountability for clearance and approval of procurement decisions will be fully delegated to the Investment Owner level. In case the Investment Owner is the ministry/provincial PC, the approval authority will be assigned to departmental or Implementing Agency level. Only the Procurement Plan and its updates are subject to approval by the concerned ministries and provincial PCs (to address risk ii).	MARD, MONRE, MPI, Provincial PCs	By Appraisal
2	The Bank team recommended the ministries and provinces to utilize their existing project implementing units/personnel resources who have experience in ODA and/or WB projects, so that to enhance the project preparation and implementation capacity (to address risks i, iii, iv, v).	MARD, MONRE, MPI, Provincial PCs/ DARDs	As soon as possible
3	MARD CPO will coordinate with MONRE PMU, MPI Department and DARDs to develop a Project Procurement Strategy for Development for the purpose of: (i) aligning procurement activities with the PDOs; (ii) delivering the best Value for Money; (iii) providing justifications for the package designing and selection methods in the Procurement Plan (to address risks iv, v).	MARD CPO/ ICMB10, MONRE PMU, MPI Department, DARDs/PPMUs	By Negotiations
4	- The PMUs will always be adequately staffed with personnel experienced and qualified in public/ODA procurement and specifically with the Bank's procurement procedures. - Consulting Services (firms /individuals) on procurement and project management support should be maintained through project implementation. (to address risks i, iii, iv, v, vi).	MARD CPO/ ICMB10, MONRE PMU, MPI Department, PPMUs	Throughout project preparation and implementation
5	Advanced procurement actions will be done to enhance the procurement readiness of the 1st year (e.g.: carry out selection of some important consultancy packages on project management and procurement implementation support, detailed designs etc.) (to address risk v)	MARD CPO/ICMB10, MONRE PMU, MPI Department, PPMUs	By end of June 2016
6	Procurement staff of Central PMUs/PPMUs and related agencies will receive intensive training on the Bank's procurement procedures and	MARD CPO/ ICMB10, MONRE	Throughout project

#	Actions	Responsible	Expected Date of Completion
	contract management, including mitigation of fraud and corruption risks (to address risks i, ii, iii, iv, v, vi).	PMU, MPI Department, PPMUs	preparation and implementation
7	MARD CPO plays active coordinating role, provides daily support and guidance to ICMB10 and PPMUs, shares experience with MONRE PMU and MPI Department, monitors procurement performance and contract management by ICMB10 and PPMUs (to address risks i, iii, iv, v, vi).	MARD CPO	Throughout project preparation and implementation
8	Adequate, quality technical expertise (in-house and as external consultants) will be mobilized to prepare TORs and technical specifications as early as possible (to address risks iv, v).	MARD CPO/ ICMB10, MONRE PMU, MPI Department, PPMUs	Throughout project preparation and implementation
9	Bid evaluators will be required to sign and commit to a Code of Conduct Declaration for carrying out their duties (to address risk vi).	MARD CPO/ ICMB10, MONRE PMU, MPI Department, PPMUs	Throughout project procurement implementation
10	The procurement record-keeping system (covering important and valuable procurement documents) will be improved and properly maintained (to address risks i, v, vi).	MARD CPO/ ICMB10, MONRE PMU, MPI Department, PPMUs	Throughout project implementation
11	The Bank team will provide intensive, hands-on support and closely supervise procurement performance through prior and post reviews, implementation support missions, and capacity- building activities (to address risks i, iii, iv, vi).	WB	Throughout project preparation and implementation
12	Other relevant measures in the WB's Strategic Action Plan to Address Fraud and Corruption Risks in Vietnam[1] will be implemented as appropriate (to address risks i, vi)	WB, MARD CPO/ICMB10, MONRE PMU, MPI Department, PPMUs	POM indicates detailed actions.

29. **Procurement Arrangements.** Procurement for the Bank financed contracts under the proposed project will be carried out in accordance with the World Bank's *"Guidelines: Procurement of Goods and Non-consulting Services under IBRD Loans and IDA Credits & Grants by World Bank Borrowers"* dated January 2011, and revised July 2014 ("Procurement Guidelines"), and *"Guidelines: Selection and Employment of Consultants under IBRD Loans and IDA Credits & Grants by World Bank Borrowers"* dated January 2011, and revised July 2014 ("Consultant Guidelines"). For procurement contracts to be financed by the IDA Credit, the procurement methods or consultant selection methods, estimated costs, the Bank's review requirements, and timeframe shall be agreed upon by the ministerial PMUs/PPMUs and the Bank in the Procurement Plan.

30. *The procurement thresholds* applicable to the proposed project are indicated in the table A3.2. These thresholds may be subject to the Bank's review and modification thoroughout project implementation and the Bank will make official notice about such changes in a timely manner to ensure smooth implementation.

[1] The most recently updated Strategic Action Plan was dated October 1, 2015, which may be further updated during its implementation in Vietnam.

31. *A draft Project Procurement Strategy for Development (PPSD)* has been developed, addressing how procurement activities will support the development objectives of the project and deliver the best value for money under a risk-managed approach with consideration of the country and market context. The PPSD provides justifications for the package designing and selection methods in the Procurement Plan and will be updated during project implementation process as needed.

Table 3.1. Summary of Procurement Arrangements

Expenditure Category	Contract Value (US$)	Procurement Method	Bank Prior Review (*)
Goods, information technology systems, nonconsulting services	≥ 3,000,000	ICB	All the ICB contracts
	< 3,000,000	NCB (**)	The first contract of each PMU or PPMU
	< 100,000	Shopping	None
	n.a.	DC	All DC contracts (****)
Works/supply and Installation	≥ 20,000,000	ICB	All the ICB contracts
	< 20,000,000	NCB (**)	The first contract of each PMU or PPMU regardless of value and all contracts ≥ US$15,000,000
	< 200,000	Shopping	None
	n.a.	FA	All FA contracts (****)
	n.a.	DC	All DC contracts (****)
Consultant services (***)	≥ 300,000	QCBS, QBS, LCS	• Firms: All contracts ≥ US$500,000; plus the first contract for each method regardless of value; SSS contract ≥US$100,000 (****), (*****); • Individuals: only in exceptional cases for competitive selection (******); SSS contract ≥ US$50,000 (****).
	< 300,000	CQS	
	n.a.	SSS	
	n.a.	IC	
Community-driven development components	n.a.	Community participation in procurement	The project activities to be procured using community participation in procurement method shall be specified in POM and further elaborated in the Procurement Plan accepted by the Bank.

Note: DC = Direct Contracting; FA = Force Account; LCS = Least-Cost Selection; IC = Individual Consultant; QBS = Quality-Based Selection; SSS = Single Source Selection;

* Contracts below these prior review thresholds shall be subject to post-review on an annual basis by the Ministry of Planning and Investment Inspectorate (MPII) according to the procedures set forth in paragraph 5 of Appendix 1 of the Procurement Guidelines and Consultant Guidelines. The rate of post-review will be initially 20 percent. This rate may be adjusted during project implementation based on the procurement performance of the project.

**Where goods are not commonly available from within Vietnam, the method of procurement will be ICB even if the contract value is less than US$3 million/contract. For works, ICB method should be applied for contracts below US$20 million if justifiable (such as in the case of contractors in Vietnam lacking capacity).

**The NCB procedures shall be those set forth in Vietnam's procurement laws and regulations, but subject to modifications, waivers, and exceptions as set forth in the "NCB Annex" (Annex to Schedule 2) to the Financing Agreement.

*** Shortlists for contracts below US$0.5 million/contract may comprise entirely of national consultants if there is adequate local capacity and sufficient number of qualified local firms. Other methods (QCBS, QBS, and LCS) may also be applied for contracts below US$0.3 million/contract.

**** The Procurement Plan should indicate DC, or FA, or SSS method with justifications.

***** Audit contracts are subject to prior review only if their values are above the threshold; however, the Bank's FMS will

perform a prior technical review of TORs and shortlists, among others, of all audit contracts regardless of value.

****** For Individual Consultant, prior review applies to long-term (project period) and large value contracts (≥ US$200,000 per contract). For legal and procurement work or critical project management consultants, TORs and CVs of selected candidates are subject to the Bank's technical prior review.

32. *Procurement Plan*. MARD, MONRE, MPI and provincial DARDs have prepared the Procurement Plans of their respective components/subcomponents for the first 18 months of the project period, based on the findings and recommendations of the above mentioned PPSD. These Procurement Plans are subject to public disclosure and will be updated annually or as needed by including contracts previously awarded and to be procured. All procurement plans and their updates or modifications shall be subject to the Bank's prior review and no-objection. The Bank shall arrange for the publication of the procurement plans and their updates on the Bank's external website, while the PMUs/PPMUs do the publication on their project owners' websites and on Vietnam National E-procurement System (VNEPS, www.muasamcong.mpi.gov.vn).

33. The project will use STEP (Systematic Tracking of Exchanges in Procurement), the Bank's electronic tool for planning and tracking procurement in IPF projects to monitor the progress of procurement. This tool will also be used to manage the exchange of information (such bidding documents, bid evaluation reports, no objections etc.) between the respective project implementation units (at central and provincial levels) and the Bank.

34. *Specialized institutes from MARD or MONRE* may be considered eligible to participate under the Project in view of their unique nature. However, the Bank will review the eligibility and nature of their potential participation on a case by case basis during implementation. If judged to be advantageous a one-time waiver may be sought to allow such institutes to compete against each other.

35. *To the extent possible, and certainly for all small value contracts* the PMUs and PPMUs will conduct the procurement using the Vietnam National E-procurement System (VNEPS, www.muasamcong.mpi.gov.vn), to enhance procurement transparency, competition and efficiency. To this end MARD, MONRE, MPI and the provinces shall encourage all their suppliers to register on the system. More detailed guidance will be provided in the Project Operation Manual.

36. *Procurement Post Review*. Contracts below the above Prior Review thresholds shall be subject to Post Review on an annual basis by the Ministry of Planning and Investment Inspectorate (MPII) as per procedures set forth in paragraph 5 of Appendix 1 of the Procurement Guidelines and Consultant Guidelines. This arrangement is in line with the agreement between the World Bank Office in Vietnam and the Ministry of Planning and Investment (MPI) to effectively facilitate the use of country system. The MPII will take over the Bank's role in procurement post review during the post review missions rather than their mandate of doing inspection works. The Bank team will work closely with the MPII to ensure the post review done in compliance with the Bank's procedures. The post review reports will be reviewed, finalized and signed by the Bank. Expenditures relating to travelling, accommodation and per diem required for MPII staff to do the assigned Post Review tasks shall be paid from incremental operating costs under Component 5.

37. **Force account method.** With respect to the subproject on investment in upgrading and improving the groundwater resources monitoring system under Component 1, the Procurement Plan for the first 18 months includes a civil work package for the upgrading of old monitoring stations and the construction of new ones. The beneficiary of the related procurement scope is NAWAPI. This agency is assigned by the government with the mandate of well drilling for groundwater for investigation and planning purposes. Private enterprises are not permitted to do the drilling works required for the government's water resources investigation and planning. Currently, the private sector can only be granted licenses to do well drilling for clean water supply to the households. As a result of the specialized mandate, NAWAPI has been equipped with personnel resources and equipment capacity to do the work by themselves. NAWAPI has about 1,000 employees mapped to the head office in Hanoi and regional branch divisions throughout the country. They have accumulated experience in the related construction activities.

38. Given these facts, MONRE proposed that only NAWAPI is eligible and capable to implement the abovementioned civil works. NAWAPI will assign its Southern Division for Water Resources Planning and Investigation (having 300 employees) to be responsible for implementing the related construction works at the government-regulated cost norms. Based on the provided information and justifications during the appraisal, the Bank team considered MONRE's proposal as reasonable and acceptable and advised the FA as the applicable procurement method. The Bank team will review the detailed arrangements and the associated justifications again before the implementation of this procurement scope.

39. Under Component 1, MARD has proposed the development of MARD's Real-Time Operation Center of Hydraulic Systems in the Mekong Delta. For the system design, MARD proposed using the QCBS method with the SIWRR as a nominated sub-consultant based on the following justifications:

- The Real-time Operation Center will be located in the SIWRR, which has been designated as the host for the Operations Center.

- The SIWRR is a MARD-affiliated entity, but financially and legally independent that has received waivers to participate in some Bank-financed contracts.

- The subject consultancy contract involves the design of the system, including monitoring stations and Surveillance, Control, and Data Analysis system, integrating the system into upgraded hydraulic models, and utilizing decision support systems to provide instructions on how to operate hydraulic infrastructure. After the design is completed, MARD will purchase approximately US$0.8 million of goods and small civil works for the center construction under the project.

- The SIWRR has developed, over the course of decades, the hydraulic models used by MARD to understand water flows in the Mekong Delta. The SIWRR has good and adequate engineering and modelling skills to undertake the assignment, and is also uniquely qualified as they are only the entity that has the MARD-approved hydraulic models for the delta and have been designated as the host for the Operations Center.

40. Before the above consultant selection starts, the Bank will review any updates concerning the participation of the SIWRR as well as descriptions about its involvement in the draft TOR/Request for Proposal documents.

Environmental and Social (including safeguards)

41. **Applicable Environmental Safeguard Policies.** The following Bank safeguard policies are triggered for the project: (a) Environmental Assessment (OP 4.01); (b) Natural Habitat (OP 4.04); (c) Pest Management (OP 4.09); (d) Physical Cultural Resources (OP 4.11); (e) Forests (OP 4.36); (f) Safety of Dams (OP 4.37); and (g) Projects on International Waters (OP 7.50). The project is proposed as Category A for environmental assessment, given the potential construction and operation of a water reservoir for water supply and fire prevention (in Ca Mau subproject scheduled for the second phase), which would be located adjacent to U Minh Ha National Park in the Ca Mau Province, and thus may have significant impacts on the natural habitats and biodiversity of the national park. The complexity of water resources issues and the significant impacts of land acquisition due to project activities are also anticipated, as well as potential future induced impacts when pilots are scaled up.

42. The project is expected to bring about significant positive changes to the Mekong Delta region with regard to (a) enhanced capacity of the region to adapt to climate change adaptation due to implementation of sustainable climate resilience livelihood models; (b) increase in agricultural productivity and thus contribute to poverty reduction and economic development due to optimum freshwater-salinity intrusion regulation, and flood control; (c) improvement in water quality due to reduced use of fertilizers, pesticides, and aquaculture chemicals; and (d) increased mangrove cover for enhancing ecological restoration and reducing coastal erosion. Environmental and social impacts have been identified and assessed in detail—both at the regional level as well at the project-specific levels.

Regional Impacts

43. Given the types and locations of the proposed subprojects and the nature of social conditions and water resources management in the lower part of Mekong Delta, a Regional Environmental Assessment (REA) was conducted to provide strategic recommendations to guide the project design. The REA confirmed that rapid population growth and intensive agricultural and aquaculture development over the past decades have significantly reduced the natural values in the delta area and key lessons include following:

(a) Highly controlled multi-crop farming systems have depleted soil fertility and cut off agricultural areas from the natural fertilization processes of the Mekong River

(b) The shrinking Mekong floodplain area has exacerbated flooding in unprotected areas

(c) Draining of wetland depressions in the delta for agricultural expansion

(d) Dry season agriculture is shifting the delta's balance between fresh and marine environments

(e) Centralized water control initiatives such as the saline control structures in the coastal areas of the delta often limit the livelihood and economic opportunities for farmers seeking to take advantage of market-driven opportunities

44. Based on the key basinwide drivers of change (rainfall and temperature, hydropower development, land use, and sea-level rise) it was found that key changes in the Mekong Delta will be an increase in flood magnitude and volume and duration, shortening of transition seasons, and increase in dry season water levels.

45. The REA found most of the regional impacts of the project to be beneficial and no major adverse regional negative impacts resulting from the proposed project. The negative impacts included changes in landform, loss of vegetation covers, agricultural land, and habitats, contamination of land and water due to disposal of dredged materials, surface water quality impairment due to the transition to freshwater and brackish-water shrimp farming, conflict of water use, and barrier to fish migration and ecosystem connectivity. The REA however, confirmed that these impacts are likely to be only local or sub-regional and can be managed through subproject safeguard instruments and the ESMP. To enhance government capacity for taking regional impacts into account, Component 1 has specifically included activities to improve monitoring systems, strengthen planning tools for mainstreaming climate resilience, and creating decision support systems and a Mekong Delta Climate Resilience Assessment to feed into provincial and delta-wide plans and investments. Additionally, the 2013 Mekong Delta Plan, prepared by a team through support from the Netherlands government, will serve as the analysis of cumulative impacts in the Mekong Delta.

Project-Level Impacts

46. The main social impacts/risks due to construction of civil works and implementation of livelihoods models will include (a) loss of crops, trees, livelihoods, and other properties due to permanent and temporary land acquisition and relocation of households; (b) farmers' reluctance/resistance to changes in livelihood models; (c) low preparedness of farmers in implementing the livelihood models; (d) disproportionate impacts/benefits from project activities on the more vulnerable such as poor, elderly, and ethnic groups; and (e) relocation of graves.

47. Typical and site-specific environmental adverse impacts during preconstruction, construction, and preparation of the water infrastructures (including sluice gates) and implementation of livelihoods models include

(a) safety risk due to unexploded ordnance clearances;

(b) increased nuisance from dust and noise;

(c) water and land pollution due to waste generation;

(d) interference with local agricultural and aquaculture activities;

(e) sedimentation and water pollution on agricultural land and in aquaculture ponds;

(f) exposure of acid sulfate soil from excavation activities;

(g) interruption in irrigation and/or domestic water supply;

(h) risks to health and safety of local people and construction workers;

(i) disturbance of local road and waterway traffic;

(j) temporary blockage of fish passes to the rivers and canals; and

(k) water-use conflict among rice farming, aquaculture, and salt production water users.

48. The four ESIAs of the first phase subprojects confirmed these impacts to be moderate, short to medium term, unavoidable, and which could be mitigated through effective consultation and adequate compensation. The project sites do not include physical cultural resources (PCR); however, throughout the implementation of subprojects, a relocation of graves would be necessary. The findings of the ESIAs indicate the main adverse impacts during operation to include the following:

(a) Impacts of waterway traffic interruption due to operation of the sluice gates

(b) Impacts on water quality and aquatic life as a result of the increasing use of agrochemicals due to provision of more freshwater for rice irrigation

(c) Impacts of solid waste and wastewater from a pilot of aquaculture models

(d) Increase of water-use conflict between rice farming and brackish-water aquaculture due to improper sluice gate system management

(e) Potential environmental risks such as an epidemic of fish or shrimp disease

(f) Temporary blockage of fish passes to the in-field rivers and canals due to temporary closure of the sluice gates. However, these adverse impacts were assessed as low to moderate and can be mitigated.

49. **Induced impacts.** The ESIAs also determined that during project implementation, a limited number of sustainable livelihood models will be piloted, and no significant negative impacts on the environments will be anticipated. However, in the long term, scaling up of these models, especially the intensive aquaculture model, if not properly managed at the planning level, may result in changes in land use on a broad scale significantly affecting the environment and biodiversity in the region.

50. **Long-term negative impacts.** The construction of proposed works will have long-term impacts on current livelihood models, which may have to change to adapt to the impacts of the proposed investments (such as dike reinforcement, sluice gates, and so on). Some households may be more reluctant to change (such as elderly, ethnic minority households, poor and landless, or land poor households) and will need specific support for them to change their livelihood. All farmers will receive support such as training and transfer of knowledge from pilot livelihood demonstration models, or by using farmer cooperatives or collective groups to implement livelihood adaptation models to reduce the risks for farmers.

51. **Addressing impacts during preconstruction and construction phase.** Most of the preconstruction and construction-related impacts can be effectively mitigated though application of the Environmental Codes of Practice (ECOPs) by the contractor, enforced, and supervised by the construction supervision consultant. The ECOPs are included in the subproject ESIAs. The ESMPs also included site-specific mitigation measures that cannot be adequately and effectively addressed through implementation of the ECOPs.

52. **Managing dredged materials.** A sampling survey suggested that dredged materials from excavation during construction of sluice gates and dredging of canals are mainly silt and clay with high organic content and low levels of heavy metals. Therefore, the materials could be used for dikes, roads, and construction of houses. However, other areas may contain acid sulfate soil and/or heavy metals and toxic chemicals and could be an issue. During the detailed design, the PPMU will prepare a Dredge Materials Disposal Plan containing (a) a detailed estimate of the nature and quantity of dredged materials; (b) chemical analysis of the dredged materials; (c) indicative lands for disposal; (d) communication plan for local residents informing them about the quality of the dredges and any restriction on the use for housing construction and gardening if the materials are found to be unsuitable; and (e) inventory of planned road and dikes to transport the dredged materials.

53. **Mitigating the impact of water-use conflict.** To reduce potential water-use conflicts, the size of the sluices has been calculated to ensure not only effective management of irrigation system but also balance the water need of different water users. Optimum operation and maintenance (O&M) of sluice gates will be developed considering close communication and consultation with upstream and downstream water users to ensure water need with regard to both quantity and quality of the key water users.

54. **Addressing impacts of increased use of agrochemicals.** The GoV has been promoting a number of IPM practices to reduce the use of pesticides and agrochemicals for rice, fruit, vegetable, and shrimp farming. Promotion of the IPM practices will be continued and the project will support necessary training and scale-up of the activities found to be effective in the Mekong Delta. A Pest Management Framework (PMF) has been prepared and included in the ESMF, and it will be applied for the subprojects and/or activities that may use toxic agrochemical to be implemented under Components 2, 3, and 4.

55. **Managing aquaculture wastes and disease.** The project will adopt biosafety approaches involving responsible practices for managing pollution and disease for rice-fish and forest-shrimp models. For addressing environmental impacts of wastes and disease in extensive and intensive aquaculture models, the project will follow the Vietnam Good Aquaculture Guidelines and the Environmental Health and Safety industry-specific guidelines on aquaculture. Capacity building and water quality monitoring will also be a focus.

56. **Natural Habitats (OP 4.04).** The environmental and social screening and the first phase of subprojects confirmed that natural habitats are present in the project areas. The project will not affect any protected area nor will it affect important/endangered flora or fauna species or biodiversity areas of high value. However, construction and operation of the sluices gates will have small potential impacts on the natural habitats of rivers, canals, and estuaries including loss of small benthic habitats and disturbance of benthic organisms, temporary blockage of fish passage in

the rivers and canals due to operation of the sluice gates. Impacts and mitigation measures were and will be included in the relevant subproject ESIAs to address these impacts.

57. **Forests (OP 4.36).** There are indigo forests in Ca Mau, Kien Giang, An Giang, and Dong Thap. The activities to restore coastal landscapes to enhance resilience of inland farming systems, reduce vulnerability to the impacts of sea-level rise, and coastal erosion including mangrove reforestation in targeted areas may have the potential to have adverse impacts on the rights and welfare of local people and their level of dependence upon natural and plantation forests. Impacts on forests and associated mitigation measures were included in the first year subproject ESIAs and other related subproject ESIAs during implementation. Forest management plans will be prepared for all mangrove reforestation undertaken as part of the project, and for any subproject that may affect the indigo forests.

58. **Pest Management (OP 4.09).** The more reliable irrigation water will induce increased irrigated agricultural activities, which may involve the use of agricultural chemicals. To mitigate these environmental impacts, an IPM program will be implemented for each applicable subproject as a part of the ESMP. A PMF was developed and included in the ESMF as a guideline for preparation of an IPM program. The PMF stipulates prohibition of the use of very toxic chemicals, and provides directions and approach for the IPM.

59. **Physical Cultural Resources (OP 4.11).** It is not expected that the project will necessitate relocation of PCRs such as monuments, temples, churches, religious/spiritual, and cultural sites. Should this be unavoidable, all efforts will be made to limit impacts on such PCRs. In such a case, a PCR management plan will be prepared in consultation with local stakeholders and religious/cultural authorities. The project will involve relocation of graves, which are also considered PCRs. Since the project includes dredging and excavation activities, which may result in chance finds, a chance-finds procedure has been included in the ESMF for application in subproject ESMPs.

60. **Safety of Dams (OP 4.37).** The project may fund the construction of a water reservoir for water supply and fire prevention. No structure will be higher than 10 m, and the dam and reservoir are not anticipated to pose any hazards. In line with OP/BP 4.37, the ESMF has provisions for meeting the requirements of the policy, including ensuring the involvement of qualified engineers.

61. **The Bank's policy on Projects on International Waterways (OP/BP 7.50) is triggered given the broad coverage of the project in the Vietnam Mekong Delta and that Vietnam is a riparian on the International Mekong River Basin, of which it is a downstream riparian.** The proposed investments under the project will involve additions or alterations that will rehabilitate, upgrade, or make changes to existing schemes. No project activities will be implemented on the mainstream of the Mekong, and construction of the sluice gates will be implemented on the primary and secondary infield canals. The four subproject ESIAs prepared for the first year of implementation confirmed that the project will not cause any significant harm to the Mekong flow and water quality. Further, the proposed project area is located most downstream of the Mekong, and hence, the investments will not affect the water quality or flow in the upstream riparian countries. Therefore, it is assessed that the project falls within the riparian notification exception under paragraph 7(a) of OP 7.50, and that no riparian notification is required. The memorandum

for approval of the riparian notification exception was signed by the regional vice president on March 23, 2016.

62. The following safeguard documents have been prepared, reviewed by the Bank, and found to be Satisfactory:

63. **REA.** To assess the overall environmental impacts of the proposed investment, including the four first-year subprojects, and subprojects which may be selected during implementation, a REA has been carried out to assess regional environmental impacts of the proposed project. The key objectives of the REA are to (a) present the overall context and rationale for the REA; (b) collect baseline information regarding the environmental and socioeconomic conditions of the Mekong Delta as well as the subproject areas; (c) examine the environmental issues and impacts associated with particular Mekong Delta development scenarios; and (d) recommend broad measures to strengthen environmental management in the delta region and inform the project investment strategy.

64. **ESMF.** Since all the subprojects are not identified during project preparation, an ESMF has been prepared to ensure that the activities to be financed under the project will not create adverse impacts on the local environment and local communities, and that the residual and/or unavoidable impacts will be adequately mitigated. The ESMF establishes the requirements for subproject safeguard screening, impact assessment, and development of mitigation measures, an ECOP for construction activities, safeguard of documentation preparation and clearance, safeguard implementation, supervision, monitoring, and reporting. The ESMF is expected to be adopted by MARD.

65. **ESIA and ESMP.** Four ESIAs and four ESMPs, as integral parts of the ESIAs, for the four first-year subprojects have been prepared. The ESMPs will be included in the bidding and contract documents, and will be closely monitored by supervision engineers. The subproject environmental safeguards instruments during implementation will be prepared following the ESMF guidelines, reviewed by the Bank, and will need to be found satisfactory.

Social (including Safeguards)

66. **Applicable Social Safeguard Policies.** The following Bank social safeguard policies are triggered: (a) Indigenous People (OP 4.10); (b) Involuntary Resettlement (OP 4.12). The project will generally have positive social impacts as it contributes directly to improving the resilience of people's livelihoods and assets to climate change in selected vulnerable sub-regions. The project proposes livelihood adaptation models (that is, flood-related adaptation models for Component 2 or brackish-water aquaculture model for Components 3 and 4) that are assumed to be more sustainable by profiting from benefits of the floods (Component 2) or to be more resilient to increasing salinity levels (Component 3) and/or better able to protect coastal areas from climate change impacts (Component 4). Its associated social impacts/risks include (a) the acquisition of land and non-land assets due to the physical investments (for example, sluice gates, sea dikes, maintenance and rehabilitation works for the existing irrigation canals, sanitation, electric system, local transportation roads, and so on); and (b) the presence of ethnic minority people (mainly Khmer) in the project area (they represent up to 30 percent of the total population in Tra Vinh and Soc Trang Provinces); Khmers make up a large proportion of the poor and landless; (c) the need to

develop mechanisms to support farmers to switch to the new proposed adaptation models (such as, use farmer cooperative/collective groups, start-up capital, pilot livelihood demonstration, and so on); and (d) the resistance or the non-readiness of some groups in changing their livelihood models especially the vulnerable groups (such as the elderly, ethnic minority households, poor and landless, or land poor households).

67. **Involuntary Resettlement.** Project activities are likely to involve some land acquisition resulting in physical land take and impacts on livelihoods and resources. This may occur in Components 2, 3, and 4. Local communities will need to be compensated for lost homes, immovable assets, and/or lost revenues or livelihoods as a result of any flood control or saline intrusion measures or changes in fishing and farming practices and/or changes in cropping. Additional assistance to farmers who may have changes in their current livelihoods may also be needed, and is being identified through a social analysis.

68. For the four first-year subprojects, total permanent land acquisition is estimated at 1,250,654 m^2 (approximately 132,240 m^2, 1,100,00 m^2, 680 m^2, and 17,734 m^2 in Kien Giang, An Giang, Ben Tre and Tra Vinh/Vinh Long subprojects respectively). Temporary land acquisition, for the purpose of workspace during construction, is estimated at 274,253 m^2. It is estimated that the total number of households affected by these subprojects is 825 (58, 752, 2, and 13 in Kien Giang, An Giang, Ben Tre, and Tra Vinh/Vinh Long subprojects respectively), of which 70 households (respectively 58 and 12 in Kien Giang and Tra Vinh/Vinh Long subprojects) will need to be relocated. Vulnerable groups (poor, women head of households, and disabled head of households) are also present and will receive special assistance. Based on the above, social impacts are significant for the An Giang and Kien Giang subprojects and not significant for subprojects in Ben Tre and Tra Vinh/Vinh Long.

69. **Indigenous People.** The project will entail multiple subprojects in a large geographical area of Mekong Delta region where ethnic minority communities are likely to be present. The distribution of ethnic minorities is uneven across the Mekong Delta Provinces. Within the project provinces, Soc Trang, Tra Vinh, and Kien Giang have by far the largest populations of ethnic minorities. An Giang and Ca Mau have relatively small populations and Ben Tre and Dong Thap have negligible populations.

70. In the Mekong Delta, 93 percent of the population belong to the Kinh mainstream Vietnamese group and 7 percent are ethnic minorities including Chinese, Cham, and Khmer. The Khmer in the delta is the largest ethnic group with a total population of 1.26 million). The Khmer group lives along the coast and border areas in Kien Giang, An Giang, Tra Vinh, Bac Lieu, Soc Trang, and Ca Mau. Livelihoods of the Khmer in the delta are agriculture, animal husbandry, handicraft making, and fishing. The Chinese, totaling about 300,000, live mainly in provincial urban areas and engage in trade. The Cham group, with a total population of about 13,000, live mainly in the border areas in An Giang Province. Their livelihoods comprise agriculture and handicraft making, especially producing fabrics and silks.

71. Of the four subprojects selected for the first year implementation, two (Kien Giang and Tra Vinh/Vinh Long) have ethnic minority peoples (Khmer, Hoa, and Cham) present in the subproject areas. Among the three groups, the Khmer is the poorest and most vulnerable group, followed by the Cham while the Chinese have an equal standing with the Kinh. Khmers make up a large

proportion of the poor and landless, and often work as hired laborers on the rice and aquaculture farms as well as collecting natural aquatic resources to sell to aquaculture farmers as feedstock for shrimp. The following safeguard documents are being prepared and found to be satisfactory:

72. **RSA.** The RSA focuses on regional analysis at the project level with its overall objective to better understand the affected communities to improve community engagement in the long-term delta investment planning processes to ensure long-term sustainability and client ownership of the proposed investments. It was done by engaging with subproject communities to enhance the understanding of current climate change adaptation practices and social impacts that may result from the proposed Bank livelihood adaptation models. The report proposes recommendations to address climate, environmental, and social vulnerabilities of the project.

73. **RPF.** The RPF has been prepared in accordance to the Bank's policies and guidelines governing preparation and implementation of subprojects and/or components. It also lays down the principles and objectives, eligibility criteria of displaced persons, modes of compensation and rehabilitation, potential relocation of these persons, approval procedures, participation features, and grievance procedures. The RPF also includes guidance on screening, policy application implication for potentially linked activities, and for subprojects identified in project implementation.

74. **EMPF.** The EMPF sets out guidelines to (a) ensure that ethnic minorities receive social and economic benefits that are culturally appropriate; (b) avoid potentially adverse effects on the ethnic minority communities; and (c) minimize, mitigate, or compensate for such effects when such adverse impacts cannot be avoided. The EMPF also includes guidance on screening, and policy application implication for subprojects identified in project implementation.

75. **RAP and EMDP.** Four RAPs and two EMDPs for the first year subprojects have been prepared. On the RAP's side, in the first year subprojects, total permanent land acquisition (in Kien Giang, An Giang, Ben Tre, and Tra Vinh/Vinh Long subprojects) is estimated at 1,250,654 m^2, affecting 825 households, of which 70 households will be relocated. The total estimated cost for the implementation of first year RAPs is VND 304.6 billion (equivalent to US$13.6 million). Second, on the EMDP side, of the four subprojects selected for the first year implementation, two (Kien Giang and Tra Vinh/Vinh Long) have ethnic minorities present in the subproject areas. Most of the ethnic minority households are Khmers and some are Hoa and Cham. The Khmer, the poorest and most vulnerable group, owing particularly to landlessness, often work as hired laborers. The EMDPs have been prepared, aiming to offer development opportunities for ethnic minorities, including (a) training to raise awareness of the community on husbandry and agricultural production; (b) training to raise awareness of the community on climate change and adaption to changes in water resources, ecological and social conditions; (c) livelihood development training; and (d) developing livelihood models. Estimated budget for these development activities is approximately VND 4.38 billion (equivalent to US$197,800).

76. **Safeguard implementation, monitoring, and training.** All IAs (MARD, CPO, and PPMUs), through their dedicated environmental and social staff/unit, will be responsible for implementing and monitoring the environmental and social safeguard instruments (RPF, EMPF, EMDP, and RAP). During project implementation, the PPMUs will be responsible for preparing and ensuring effective implementation of safeguard measures (such as ESMPs, ECOP, and so on),

regular liaison with local authorities and communities, and externally supervised by independent monitoring agencies. The performance and compliance with environmental and social safeguard instruments will also be subject to regular supervision from the Bank task team. The PPMUs, contractors, construction supervision consultants, and local community representatives will receive training on the safeguard instruments to be applied to the project.

77. **Public consultation and information disclosure.** Two rounds of public consultation have been conducted by the borrower. The affected people and communities and other relevant stakeholders were consulted on the project REA, RSA, ESMF, RPF, EMPF, first phase subproject ESIAs, RAPs, and EMDPs. The feedback from the consultations were incorporated into the project design, and into the final draft REA, RSA, ESMF, RPF, EMPF, subproject ESIAs, RAPs, and EMDPs. By appraisal, the final draft environmental and social safeguards instruments were disclosed both locally at MARD, the PPMUs, and subproject areas, and through the InfoShop in Washington, DC on January 26, and January 27, 2016, respectively. The final environmental and social safeguards instruments were disclosed locally and at the InfoShop, on April 14, 2016 and May 16, 2016, respectively. The Appraisal Stage Integrated Safeguards Data Sheet of the project will also be disclosed at the InfoShop.

78. **Borrower's capacity on environmental and social safeguards.** MARD has reasonable experience in implementing the environmental management framework of the Bank-funded projects. The existing CPMU, established previously under MARD, will be responsible for project implementation including eligibility, prioritization, and readiness of the subproject investments, as well as compliance with the safeguards frameworks, and subproject assessments.

79. **Grievance redress service.** Communities and individuals who believe that they are adversely affected by a Bank-supported project may submit complaints to existing project-level grievance redress mechanisms or the Bank Group's GRS. The GRS ensures that complaints received are promptly reviewed to address project-related concerns. Project-affected communities and individuals may submit their complaints to the Bank's independent Inspection Panel, which determines whether harm occurred, or could occur, as a result of Bank noncompliance with its policies and procedures. Complaints may be submitted at any time after concerns have been brought directly to the Bank's attention, and the Bank management has been given an opportunity to respond. For information on how to submit complaints to the Bank's corporate GRS, visit http://www.worldbank.org/GRS. For information on how to submit complaints to the Bank Inspection Panel, visit www.inspectionpanel.org.

80. **Gender.** As part of the RSA, a gender analysis was conducted including participatory focus group discussions with women and households questionnaires. The analysis highlighted two main gender issues: employment and education. Women's opportunities for employment in rural Mekong Delta are below the national average. In addition, literacy is a significant issue for women in the Mekong Delta, and even more so in rural and remote areas. Lower literacy in women limits their acquisition of new skills, hinders their access to credit, and affects their capacity to earn higher off-farm income. Consistent with other gender analysis in Vietnam, rural women in general, carry a heavy workload both in domestic and farm work when compared to men.

81. Regarding impacts associated with the proposed adaptation models, no major changes in gender workloads are expected for flood-related adaptation models because the livelihood models

do not significantly change on-farm practice. However, for brackish-water adaptation models, the transition from sugarcane farming to intensive shrimp farming may have a significant negative impact on employment opportunities for both men and women in poverty.

82. Actions have been proposed to address these gender gaps including in the four first tranches of the subprojects. An outcome level indicator has been incorporated in the project design to support monitoring the progress in ensuring that project benefits reach women. Training and awareness-raising activities include gender mainstreaming to ensure that communities in the project areas are aware of gender gaps and are trained to understand the underlying gender issues and take actions to improve gender equality, particularly at the household level. As part of the regular project implementation support mission, the Bank will review the gender mainstreaming activities and provide regular guidance to the project team.

Annex 4: Implementation Support Plan

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project

1. The Implementation Support Plan (ISP) describes how the Bank and other development partners will support the implementation of the risk mitigation measures identified in the risk matrix and provide the necessary technical advice to facilitate the implementation of project activities in achieving the PDO. The ISP also identifies the minimum requirements to meet the Bank's fiduciary obligations.

2. The ISP for the project is developed based on the specific nature of the components, the planned implementation schedule, lessons learned from similar projects in the sector, and specific needs as identified by the respective assessments. The ISP is consistent with the project's implementation arrangement, which is detailed in Annex 3. It is also consistent with the required and expected procedures and activities designed to mitigate risks. The ISP will be regularly reviewed and revised as required.

3. The ISP includes frequent review of implementation performance and progress. The Bank's team will monitor implementation through (a) reporting of key performance indicators as defined in the Results Framework; (b) independent verification of project activities through field visits and documentation review; (c) fiduciary management of all activities carried out by the MARD CPMU; (d) on-site supervision of works; and (e) regular communication with the MARD CPMU, MONRE, and the MPI.

4. Information from various sources will be used to assess and monitor implementation progress. In addition to the data generated through the project's M&E system, the Bank will also review the findings and results of third-party assessments and environmental and social audits as well as the grievance redress mechanism. In addition, and as required, targeted support including short missions by subject matter experts will be carried out.

5. The Bank's procurement, FM, and environmental and social safeguards specialists will also provide timely and effective implementation support. In addition to carrying out an annual ex post review of procurement that falls below the prior review thresholds, the procurement specialist will lead procurement-focused missions depending on the needs and as agreed with the CPMU. The FM specialist will review all FM reports and audits and take necessary follow-up actions according to the Bank procedures. These team members will also help identify capacity-building needs to strengthen procurement and FM capacity. Semiannual inputs from the environmental and social specialists will be required throughout the project. Formal supervision missions and field visits will monitor the implementation of the ESMF and RPF in accordance with the Bank safeguard policies and suggest any corrective measures as necessary.

6. The following ISP reflects the preliminary estimates of the skill, timing, and resource requirements over the implementation period of the project. Keeping in mind the need to maintain flexibility over project activities from year to year, the ISP will be reviewed from time to time to ensure that it continues to meet the implementation support needs of the project.

Implementation Support Plan

Table 4.1. Skills and Resource Requirements

Time	Focus	Skills Needed
First six months	• Establishment of the project M&E system • Rapid implementation of four subprojects • Design and implementation of remaining subprojects • Fiduciary and safeguards capacity building	• Project management, FM, and procurement • Construction engineer • Technical specialists[2] • Safeguards specialists
7–36 months	• Supervision of implementation progress of four subprojects • Design and implementation of remaining subprojects • Systematic training of farmers • Establishment of Mekong Delta Center • Fiduciary and safeguards compliance	• Project management, FM, and procurement • Construction engineer • Technical specialists • Safeguards specialists
37–72 months	• Supervision of implementation progress of subprojects • Systematic training of farmers • Operation of Mekong Delta Center • Updating land-use plans • Fiduciary and safeguards compliance	• Project management, FM, and procurement • Construction engineer • Technical specialists • Safeguards specialists

Collaboration with the FAO and others

7. The Bank team will draw on expertise under the FAO/CP arrangement to supplement the Bank staff in specific areas, including construction engineering, agriculture/rice cropping/aquaculture, irrigation/hydrology, and rural livelihood/development. The last is a particular strategic priority area for FAO collaboration and the FAO institutional specialists will play a leading part in implementation support (as indicated in table 4.2).

8. The key areas in this project where implementation support is particularly required are related to technical, social, and fiduciary support. With regard to technical support, additional support from the Netherlands Embassy and GIZ, in the form of a wide range of experts in hydrology, water management, agriculture, and coastal resources, will be made available to help MARD implement Components 2, 3, and 4 of the project. With regard to social support, an important risk to be mitigated by technical expertise is the resettlement effort, including the development of the resettlement site and payment of resettlement support to beneficiaries. With regard to fiduciary support, consultants will guide the MARD PMU in the development of the financial reports in accordance to Bank guidelines. More importantly, technical expertise in engineering design will be delivered to the PMU throughout the procurement process for the large infrastructure works.

9. In addition, the team will work in taking advantage of opportunities for cross-learning, combining external expertise, and carrying out joint missions with ongoing Bank projects as well as with other development partners.

[2] The detailed list of technical specialists is provided in table 4.2.

Table 4.2. Bank Skills Mix Required

Skills Needed	0–6 months		7–36 months		37–72 months		Comments
	Staff Weeks	No. of Trips	Staff Weeks	No. of Trips	Staff Weeks	No. of Trips	
Task Team leader	12	3	60	8	54	10	Vietnam-based international staff
Administrative and client support	9		30		36		Vietnam-based local staff
Construction engineer	6	1	12.5	8	17.4	6	FAO-CP/international consultant
Procurement specialist	6	1	4.5	5	6	6	Vietnam-based local staff
Financial specialist	2	1	4.5	5	6	6	Vietnam-based local staff
Technical specialists							
• Agriculture economist	3	1	12	6	12	6	FAOCP/international consultant
• Irrigation specialist/hydrology engineer	3	1	12	6	12	6	FAOCP/international consultant
• Aquaculture/fisheries specialist	6	1	18	6	18	6	Vietnam-based local staff
• Rural livelihood specialist	3	1	12	6	18	6	FAOCP/international consultant
• Natural resource management/forestry specialist	3	1	18	6	18	6	Vietnam-based local staff
• Climate change specialist	12	1	36	6	36	6	Vietnam-based local staff
• GIS/information specialist	3	1	18	6	18	6	Vietnam-based local staff
Environmental specialist	2	1	4.5	5	12	6	Vietnam-based local staff
Social development specialist	2	2	12.5	8	12	8	Vietnam-based local staff

Annex 5: Economic and Financial Analysis

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project

Introduction

1. The overarching strategy of the project is to finance 'low-regret' investments that generate positive economic and financial benefits, while at the same time ensuring resiliency in the face of expected long-term climate changes. Four fundamental climate-induced changes are anticipated to gradually occur in the Mekong Delta over the next half-century: (a) increasing wet season flows in the Mekong River exacerbating current flooding problems; (b) decreasing dry season flows in the Mekong River aggravating salinity intrusion and water scarcity issues; (c) increased sea levels that result in salinity intrusion and accelerated coastal erosion; and (d) more frequent and higher intensity coastal storms. The project is specifically designed to promote adaptive management to these long-term trends, and the following paragraphs highlight some of the benefits of this approach.

2. This proposed project is designed to help operationalize the visioning and strategy of the MDP articulated for the different sub-regions. The project is two pronged—Component 1 works to improve monitoring systems, decision support tools, and information systems to enhance the knowledge base and inform planning and decision making into the future. In parallel, Components 2, 3, and 4 work to scale up smaller successful pilots (that is, cropping, aquaculture models) designed to be climate resilient and demonstrate how multisectoral solutions can be implemented.

Project benefits.

3. In the longer run, the improved planning, coordination, and monitoring of the delta's ecosystems funded under Component 1 will result in large benefits from increased resilience to climate change. Expected direct benefits are difficult to estimate because of the high degree of uncertainty on the extent of climate change and because of the uncertainty and path dependence of decisions made because of the availability of better planning tools and better monitoring. As a result, no attempt is made here to estimate the benefits of these investments in planning, coordination, and monitoring. However, it can be said that very small positive changes in the long-term growth path of the delta because of better planning, coordination, and monitoring will cover the relatively small costs of this investment under the project.

4. Under Component 2, the project promotes a flood risk management policy shift in Vietnam by maintaining the current flood retention areas in the upper delta and perhaps increasing the retention areas over time. This will create positive economic benefits by decreasing flood risk both upstream and downstream of the Component 1 provinces (An Giang, Kien Giang, and Dong Thap) which are the most important areas for flood retention. Increased flood retention will also contribute to ecological benefits by increasing the floodplain area available to migratory fish and helping recharge regional groundwater aquifers.

5. Under Component 3, the project promotes a move toward a sustainable brackish economy and away from the current reliance on freshwater rice production in the coastal provinces of Be

Tre, Tra Vinh, Vinh Long, and Soc Trang. As salinity intrusion inevitably moves further inland, the provinces will find it even more challenging to maintain freshwater-based agricultural systems. The project will finance additional water control infrastructure to help protect freshwater agricultural areas producing fruit trees and rice from the increased threat of salinity intrusion until they transition to salinity-resistant aquaculture practices. In addition, in the coastal areas the project will help local farmers use the naturally occurring saline water to develop profitable and sustainable aquaculture systems based on shrimp and other aquatic animals that naturally thrive in a saline water environment.

6. Under Components 3 and 4, the project finances improvements in structural and nonstructural coastal defenses to combat increased storm intensities and rising sea levels. Development of mangrove belts along the shoreline helps dissipate waves that cause coastal erosion and also provides an important ecological habitat for marine animals. The combination of mangrove belts with sea embankments or wave breakers, along with appropriate costal land-use planning, will also help reduce hazards (for example, storm surges) and exposure (for example, people and assets), thus reducing overall risk levels.

7. The project will benefit an estimated 1.2 million people on an estimated 120,000 ha in Vietnam's Mekong River Delta.

8. An ex ante economic and financial analysis was conducted to examine the feasibility of the proposed investments. The analysis covers the four subprojects selected by the government for the first implementation year under Components 2, 3, and 4, which include (a) combinations of water management infrastructure, such as sluice gates, upgrading earthen embankments and (b) demonstration of alternative cropping and farm models to help in the transition from current livelihoods to more climate-resilient and sustainable ones. The proposed subprojects for the first year of implementation are as follows:

(a) An Phu Subproject - Improving the flood retention capacity in the upper Bassac River in the An Phu District, An Giang Province

(b) Ba Tri Subproject - Enabling sustainable coastal livelihoods in the face of salinity intrusion in Ba Tri District, Ben Tre Province

(c) Tra Vinh Subproject - Enabling sustainable coastal livelihoods in the face of salinity intrusion in Tra Vinh Province

(d) Kien Giang Subproject - Sustainable infrastructure for preventing coastal erosion and protecting livelihoods against climate change impacts in An Minh and An Bien Districts, Kien Giang Province

Methodology

9. Ex ante financial and economic benefit/cost analyses were carried out for each of these four subprojects. For each subproject, two scenarios were defined: (a) a baseline/without-project intervention scenario, which describes the current situation and assumes that no interventions will be made by the government to solve the problems and (b) a with-project scenario. Where applicable, a business-as-usual scenario was defined (as what would happen in the normal course

of development, but in the absence of the project) and assessed against the baseline scenario. Additionally, where possible, the economic viability of individual infrastructure investments under the with-project scenario was examined.

10. The analysis included three steps: (a) development of typical crop budget models representing the average production technology, average yields, revenues and costs per ha in the different scenarios considered; (b) estimation of the incremental revenues to the typical farmer from switching to the livelihood promoted, where prices used were, as seen by the farmers, inclusive of any subsidies or taxes, and only costs incurred by the farmers were taken into account; and (c) calculation of the economic impact of the proposed investments in each of the individual subprojects, using approximations of economic shadow values for prices and wages. Some benefits to the society that could not be monetized were described qualitatively with as much quantitative data as available. In evaluating the livelihoods that include shrimp and prawn, whose prices tend to fluctuate significantly, conservative long-term farm gate prices were adopted. It was further assumed that 30 percent of the farmers who receive training under the project on alternative livelihoods will actually convert and among those who do switch, the incremental benefits materialize in a staggered fashion over ten years to account for the various constraints farmers may face regarding credit, time, labor, skills, or market access (table 5.1).

11. The economic viability of each subproject was measured through the standard summary indicators of economic IRR, NPV, and benefit/cost ratio. A sensitivity analysis was carried out to gauge the impact of key assumptions on the economic viability of the subproject.

Table 5.1. Key Assumptions and Data

General		
Project life	50 years	Equal to design life of infrastructure financed
Discount rate	9%	Equals assumed 6%/year long term average GDP growth rate + 3% for elasticity of marginal utility * pure rate of time preference
Exchange rate (VND/$)	22,300	
O&M cost	3%	Of total capital costs, annual
Financial to Economic Value Conversion		
Opportunity cost of labor	80%	
Conversion factor for project costs	90%	
Value added tax	10%	
Alternative livelihoods		
Shrimp price (VND/kg)	150,000	
Prawn price (VND/kg)	180,000	
Rate of conversion	30%	Among project-trained farmers**
Incremental benefits phase-in	10 years	

Note: Source: WDI.

* Vietnam's average annual growth rate between 1985 and 2014 was 6.4 percent.

** With the exception of shrimp farmers who commit to converting and then receive mangroves and training.

Table 5.2. Financial Returns on Key Alternative Livelihoods Demonstrated by the Project

Subproject	Livelihood		Incremental Revenue (US$/ha/year)
	From	To	
An Phu, An Giang	Rice + rice	Rice + prawn	2,392
	Rice + rice	Rice + cash crop + wild fishery	1,507
	Rice + rice	Floating rice + aquaculture +cash crop	4,388
Ba Tri, Ben Tre	Shrimp	Certified organic mangrove shrimp	920
	Extensive shrimp	Biosecure intensive shrimp	1,615
	Intensive shrimp	Biosecure intensive shrimp	4,200
Kien Giang	Blood cockle	Blood cockle + mangrove	2,713
	Shrimp	Biosecure shrimp	2,094
	Shrimp + crab	Biosecure shrimp + crab	2,585
	Rice + shrimp	Rice + improved shrimp	1,556
	Rice +shrimp +prawn	Rice + improved shrimp + improved prawn	4,177
Tra Vinh	Shrimp	Certified organic mangrove shrimp	923
	Shrimp	Biosecure shrimp	6,029
	Extensive shrimp	Intensive shrimp	1,615

An Phu Subproject - Improving Flood Retention Capacity in the Upper Bassac River

12. The subproject in An Phu, An Giang Province covers an area of 22,640 ha consisting of two zones (4a and 4b). Zone 4a is characterized as a two-rice crop area of 15,800 ha and Zone 4b is a three-rice crop area of 6,228 ha. The subproject investments in Zone 4a include a combination of 61 km reinforced low embankments (August dikes, which are overtopped during the seasonal flooding); 15 sluice gates to reduce maintenance costs from overflow damages; and development of flood-based production models (rice combined with floating vegetables and/or fish breeding) targeting an area of 1,500 ha and 2,500 households. For Zone 4b, the activities include the development of production models to support the transition from three-rice crop to two-rice crop plus an alternative crop, targeting 1,200 households. By avoiding the two-rice crop areas to be changed into three-rice crop areas and showcasing the profitability of changing from three-rice crop to rice plus aquaculture or cash crops, the investments will help protect and/or reclaim the benefits of controlled flooding. At the same time, the subproject's activities will contribute to increasing yields through improved flood-based production models and protecting high-value assets. The total cost of the subproject investments is about US$28.3 million. The annual O&M costs associated with the August dikes and sluice gates are estimated at US$562,000.

13. **Without-project scenario.** In the two-rice crop zones, incomes are likely to remain depressed due to limited income opportunities during the flooding period. Additionally, farmers face the cost of rebuilding earthen August dikes, estimated at US$29,000/km each year as they get washed away by the floods. Consequently, farmers and the local government wish to build high dikes to enable the third rice crop in the autumn and winter. In fact, in some areas on the western side of the Hua River, such high dikes have been erected in a sporadic manner. With climate change, floods are expected to become more frequent and more severe, thus increasing the damage and cost of repair of the August dikes. In the three-rice crop zones, August dikes have been replaced with high embankments to prevent floodwaters from entering fields and enable the third rice crop during the autumn-winter season. However, these high dikes have

prevented nutrient-rich sediments from being deposited on agricultural fields, reducing their fertility. Furthermore, reduced floodwater retention in these former floodplains has meant increased floods in unprotected areas with ensuing riverbank and coastal erosion further downstream.

14. **Subproject benefits relative to the without-project scenario.** Households switching to alternative cropping models are expected to enjoy larger overall net revenues (Table 2). These benefits would accrue in a staggered manner according to the schedule of concrete dike and sluice gate construction. In addition, all farmers residing in Zone 4a will avoid the annual cost of rebuilding the August dikes. Furthermore, residents of the entire area will benefit from the possibility of using the August dikes for transportation in the dry season. In calculating the net benefits for the entire subproject, it was assumed that the benefits would start to accrue after all water management, infrastructure investments, and livelihood model demonstrations have been completed.

15. **Non-monetized benefits.** The embankment of floodplains in the upper Mekong Delta has meant reduction in flood retention there, which in turn has contributed to the flooding of downstream asset-rich areas, such as the modern, 1.25 million strong Can Tho City. With 95 percent of the land area being less than 1 m above mean sea level, Can Tho is susceptible to flooding caused by Hau River's alluvial overflows as well as high tides and extreme rainfall events. Recent flooding in Can Tho has affected an average of about 69 percent of the total core urban area and more than 200,000 people each year. In addition to the serious damages to assets, flooding also interrupts economic activities in these core urban areas. A recent study estimates direct and indirect annual economic losses due to flooding at some US$130–190 million in damages and losses per year due to flooding.[3] About 10 percent of the damage may be attributed to river flooding. To avoid such damages, the MDP calls for policy change of avoiding and where possible, in the long run, reversing the embankment of the floodplains. While the direct impact of the An Phu subproject on flood damage reduction is going to be too small to quantify and confounded by other factors, it will have an important demonstrational impact on the overall policy direction advocated by the MDP.

16. **Summary indicators and sensitivity analysis.** Taking into account the benefits and costs that could be quantified and using the above conservative assumptions, calculations indicate a subproject economic IRR of 10 percent, an NPV of US$2.4 million, and a benefit/cost ratio of 1.1. The IRR is highly sensitive to variations in subproject costs. A 10 percent increase leads to an IRR of 2.7 percent, while a 10 percent decrease in costs increases the IRR to 23.6 percent. The IRR is also sensitive to the values used for prawn yield and prawn price. A 10 percent decrease in the prawn price yields an IRR of 9 percent.

17. **Economic viability of sluice gates.** Economic analyses were carried out at the level of individual water management compartments in Zone 4a to assess the economic viability of the sluice gates planned there. In the Vinh Loc 2 compartment where the rice plus prawn model will be demonstrated and two sluice gates will be constructed in the concrete August dikes, the IRR was estimated as 15.7 percent. The IRR of the Phu Huu 2 compartment where five new sluice gates will

[3] "Household Economic Losses of Urban Flooding: Case Study of Can Tho City, Vietnam." 10715IIED:. N. p., n. d. Web. 03 Mar. 2015.

be built and the new livelihood model of floating rice plus aquaculture plus cash crop will be demonstrated was found to be 13.7 percent. On the other hand, in the Vinh Loc 1 compartment where no alternative crop model will be demonstrated, the IRR was calculated at 7.8 percent. In other words, the avoided cost of building August dikes each year is not sufficient to cover the cost of building and maintaining concrete low dikes and three sluice gates. The IRR increases to 8.9 percent when only two sluice gates are built. Nevertheless, the economic return on the infrastructure investments will increase in the long run, as farmers adopt livelihoods demonstrated in the other compartments to take advantage of better water circulation provided by the sluice gates.

Business-as-usual Scenario

18. In the two-rice-crop areas, the business-as-usual/traditional approach would be to build high dikes replacing the August dikes to enable the third rice crop. For comparability with the project, it was assumed that the same amount of investment funds would be available. At US$550 per km, this would enable the building of 47.8 km, covering four of the five water management compartments on 5,593 ha in Zone 4a. The high dikes would be constructed over a period of three years and accrual of associated benefits would be staggered accordingly.

19. **Benefits and costs of the business-as-usual scenario**. Farmers would benefit from the ability of growing a third rice crop leading to a total incremental net (financial) revenue of US$490 per ha per year. Additionally, farmers would no longer have to incur the cost of repairing 47.8 km of August dikes, estimated at US$31,000 per km. Farmers would also benefit from the ability to build homes without stilts, orchards, shrimp ponds, and burial grounds in the original floodplains, although no attempt was made to quantify this benefit. Additionally, farmers would enjoy the certainty of no floods and associated predictable planting schedule over the more and more erratic timing and level of floods as a result of climate change. Finally, with high dikes, drainage and irrigation would be organized centrally and more cost-effectively (IUCN, 2015). Key costs would be those of constructing the high dike estimated at US$26.3 million plus US$789,000 in annual O&M costs. The additional economic cost in this scenario would be the damage, including coastal and riverbank erosion, caused by additional flooding in downstream districts in An Giang and provinces notably Can Tho and Vinh Long due to loss of flood retention in An Phu. However, this damage cannot be quantified and monetized as a damage curve linking upstream embankment with downstream flood damage does not exist.

20. **Summary indicators and sensitivity analysis.** The business-as-usual scenario is economically viable with an IRR of 14.6 percent, an NPV of US$11.6 million, and a benefit/cost ratio of 1.4. But is likely not to be environmentally sustainable in the longer run for reasons discussed earlier.

Ba Tri Subproject - Enabling Sustainable Coastal Livelihoods in the Face of Salinity Intrusion

21. The subproject in Ba Tri, Ben Tre Province covers an area of 15,529 ha and follows a three-zone coastal management approach. Zone 1 is a mangrove belt of 2,484 ha, Zone 2 is the brackish-water zone of 7,940 ha, and Zone 3 is the saltwater intrusion zone of 5,105 ha. The investments for Zone 1 include additional mangrove planting targeting an area of 250 ha and eco mangrove-shrimp farming certification targeting an area of 1,000 ha and 300 households. The

investments for Zone 2 include a combination of structural measures (five sluice gates and culverts, dredging of some 29 km of canals) at a total cost of nearly US$9.4 million and nonstructural measures (mangrove-shrimp pilot models targeting an area of 2,500 ha and 2,500 households). In Zone 3, which is a freshwater zone but increasingly affected by saltwater intrusion, the investments will include the rice-prawn pilot models targeting an area of 180 ha and 150 households, and six community action plans. The total cost of the subproject is US$14.5 million. The annual O&M costs of the sluice gates are US$225,000.

22. **Baseline/without-project scenario.** The mangrove belt has been diminishing in density and is thus losing its coastline protective function leading to increasing coastal erosion. Shrimp ponds, whose number has exploded in recent years, are suffering from increasing disease occurrence, lowering yields and hence farmers' incomes. In the brackish-water zone, spring high tides damage aquaculture ponds, houses, and roads. According to the Ben Tre DARD records, these damages totaled US$7.8 million between 2010 and 2015. In the freshwater zone, saline water intrusion in the winter-spring season is leading to lower crop yields, notably rice. This impact was not quantified and nor was there speculation how farmers may respond to increasing saltwater intrusion over time. In other words, the analysis will assume that the current conditions will persist throughout the period of analysis.

23. **Project benefits.** In Zone 1**,** increased density of mangroves as a result of planting will enhance the ecosystem services they provide, including prevention of coastal erosion, protection of young fish, and provision of habitats for diverse birds and aquatic species. Extensive shrimp farmers switching to certified organic mangrove-shrimp farming will enjoy higher net revenues due to a 10 percent price premium and lower production costs (tTable 2). In Zone 2, farmers switching to biosecure intensive shrimp culture will enjoy higher net revenues, even after accounting for higher production costs and initial capital costs, due to yield increases resulting from less mortality. Dredging of canals, will both help prevent floods and allow for improved water circulation, contributing to the health of shrimp.

24. In calculating the net benefits for the subproject, it was assumed that the benefits would start to accrue after all water management infrastructure investments and livelihood model demonstrations have been completed. Furthermore, it was assumed that the canals would have to be drained again every 10 years for the benefits to be sustained. The economic value of the enhancement in the ecosystem services provided by denser mangroves in Zone 1 could not be quantified or monetized.

25. **Summary indicators and sensitivity analysis.** Estimations in the presence of the above assumptions indicate that the subproject would be economically viable with an economic IRR of 19.5 percent, an NPV of US$25.2 million, and a benefit/cost ratio of 2.5. The indicators are robust to reasonable variations in individual factors/assumptions. It would take drastic deviations from assumed values, such as a collapse of the long-term average shrimp price from VND 150,000 to VND 114,000 for the IRR to fall to 8 percent and dramatic and persistent shortfall in the biosecure shrimp yields despite input levels appropriate for the assumed yields.

26. The five proposed sluice gates in Zone 2, whose total cost is estimated at about US$7.5 million, are economically justified, with an IRR of 11.2 percent, by the spring tide-related flood damages they will prevent. The IRR is sensitive to the estimates of avoided cost of damage—a 14

percent decrease in annual avoided damages from the assumed level leads to an 8 percent IRR for the sluice gate investments. On the other hand, the IRR would be higher if the avoidance of indirect costs of floods, namely interruption of economic activities, could be accounted for.

Tra Vinh Subproject - Enabling Sustainable Coastal Livelihoods in the face of Salinity Intrusion

27. Similar to the subproject in Ba Tri, Ben Tre, the subproject in Tra Vinh and Vinh Long Provinces covering an area of 265,931 ha follows the three-zoned coastal management approach. Zone 1 is a mangrove belt of 4,339 ha, Zone 2 is the brackish-water zone of 35,850 ha, and Zone 3 is the saltwater intrusion zone. The investments for Zone 2 include additional mangrove planting and eco mangrove-shrimp farming certification targeting an area of 2,353 ha and 700 households, and aquaculture on biosecurity pilot models targeting an area of 2,206 ha and 2,200 households. The investments for Zone 3 include construction of three sluice gates (Tan Dinh, Bong Bot, and Vung Liem). The total investment cost is US$30.8 million. The annual O&M cost of the sluice gates is US$718,000.

28. **Without-project scenario.** Without the project, in Zone 2, coastal erosion would persist and extensive shrimp farmers would continue to incur high production costs. In Zone 3, salinity intrusion during the spring tide would continue to inflict damage on high-value fruit trees and freshwater prawns as well as rice. The Tra Vinh DARD's records indicate that in the command area of the proposed three sluice gates, the cost of damage to fruit trees increased from US$8.1 million in 2010 to US$10.3 million in 2014, both in constant 2014 prices. In the case of rice, the corresponding change was from US$1.9 million to US$2.7 million. These represent average annual real increases of 6 percent and 9 percent, respectively, in real terms. Tra Vinh DARD also reported that damage to freshwater prawn infrastructure and yields due to a combination of tidal flooding and salinity aquaculture, increased from US$1.0 million in 2010 to US$1.3 million in 2014, in constant 2014 prices. Furthermore, the spring tide causes floods that damage roads, embankments, and houses. Tra Vinh DARD records show that in 2015 such floods damaged 10.5 km of roads, 19.31 km of embankments, and five houses, leading to repair costs of US$312,000.

29. **Subproject benefits.** The benefits of planting mangroves, conversion from conventional mangrove farming to certified mangrove-shrimp and biosecure shrimp cultivation in Zone 2 are the same as in the Ba Tri subproject. The main benefit of the three sluice gates in Zone 3 is the protection of valuable fruit trees against salinity intrusion during the remaining economic life of the existing stock. In the long run, the government strategy for adopting increased salinity intrusion is to encourage conversion to saline aquaculture gradually as the economic life of different parts of the stock come to an end at different times; however, in the short run, it intends to avoid severe economic and social dislocation resulting from the loss of valuable fruit trees and the difficulty to finance large up-front public and private investments needed to convert horticultural areas to aquaculture. Even after all orchards are converted to aquaculture, the sluice gates will continue to perform a useful economic function by protecting ponds as well as roads, houses, and embankments against flooding associated with spring high tides.

30. In estimating the subproject benefits relative to the without-project scenario, it was assumed that in the latter scenario, annual saltwater damage on fruit trees would stay at the 2015 value of US$11.6 million. This is likely an underestimate given the increase in salinity intrusion, which was also documented between 2010 and 2014. It assumed that these benefits will start

accruing when the sluice gates are completed in year 5 of the project and terminate after year 15 (2030), which should exhaust the economic life of the existing fruit tree stock. This is a conservative estimate since some farmers may invest in a new stock of fruit trees, rather than venture into the new business of saline-resistant aquaculture, which carried high up-front capital costs. It is also assumed that rice growers will continue with this crop until 2040 before switching to saline-resistant aquaculture and would avert annual losses of US$3.2 million owing to the sluice gates. Damage to prawn aquaculture is also assumed to continue at the reported 2015 level of US$1.5 million until 2040. With regard to flood damage to roads, embankments, and houses, conservative estimates prepared by DARD, totaling US$449,000 per year, applied.

31. **Summary indicators and sensitivity analysis.** Under the assumptions made above, the IRR, NPV, and benefit/cost ratio for the subproject are 36.4 percent, US$80.4 million, and 4.1, respectively. The indicators are robust to large changes in the avoided damage costs and project costs. The economic viability of the three sluice gates was also evaluated. The IRR, NPV, and benefit/cost ratio are 37 percent, US$64.7 million, and 3.7, respectively.

Kien Giang Subproject - Sustainable Infrastructure for Preventing Coastal Erosion and Protecting Livelihoods against Climate Change Impacts

32. The subproject in An Minh-An Bien District, Kien Giang Province covers an area of 60,800 ha and also follows a three-zoned coastal management approach. Zone 1 is a mangrove belt of 6,669 ha, Zone 2 combines a saline production zone and a brackish-water zone of 54,131 ha, and Zone 3 is the saltwater intrusion zone. The investments for Zone 1 include a combination of structural (10 km of coastal wave breakers) and nonstructural measures (mangrove planting along the coastline targeting an area of 250 ha) costing US$7 million and US$1.7 million, respectively. The investments for Zone 2 include a combination of structural measures (nine sluice gates) costing US$17.1 million (including land acquisition) and nonstructural measures (biosecure aquaculture, eco-shrimp, and rice-shrimp pilot models targeting an area of 7,500 ha and 6,500 households). The investments will contribute to enhanced coastal protection for the area and support transition saline-brackish production models as an appropriate alternative for rain-fed rice and extensive shrimp farming outside the wet season, through a tide-based system of canal cascades with separate water intake and outflow. The total cost of the subproject is US$32.9 million. The annual O&M costs of the nine sluice gates are US$510,000.

33. **Baseline/without-project scenario.** In the without-project scenario, in Zone 1, coastal degradation would continue and coastal aquaculture farmers would not avail of the protective benefits of mangroves ecosystems. In Zone 2, farmers would continue to grow low yield shrimp and other aquaculture species or combine rice and extensive shrimp incurring damage from a combination of increased salinity and limited freshwater availability. In Zone 3, aquaculture yields would continue to be depressed mainly due to diseases and poor water quality.

34. **Subproject benefits.** Wave breakers and mangrove plantations will help reduce coastal erosion. Mangrove forests will also provide biodiversity protection services. In all three zones, farmers participating in the alternative livelihood models demonstrated by the subproject will enjoy larger net revenues due to higher yields and lower production costs (table 5.3).

35. **Summary indicators of economic viability and sensitivity analysis.** The subproject is economically viable with an estimated IRR of 12.4 percent, an NPV of US$8.4 million, and a benefit/cost ratio of 1.3. These indicators would be higher if benefits due to coastal erosion preventions could be quantified and monetized. The IRR is sensitive to the rate of farmer adoption of the model livelihoods; a drop from the assumed 30 percent to 21 percent would reduce the IRR to percent.

Table 5.3. Summary Table of Indicators

	IRR (%)	NPV (US$, millions)	Benefits/Cost
An Phu, An Giang	10.0	2.4	1.1
Ba Tri, Ben Tre	19.5	20.1	2.5
Tra Vinh	36.4	80.4	4.1
Kien Giang	12.4	8.4	1.3

Financial Sustainability of Project Investments

36. In each subproject province, the PPC will be responsible for the O&M of the water management structures established by the project. This will be done through the PPC's

Provincial Irrigation Management Company (IMC) if it exists or through its Water Resources Division within DARD. The IMC or DARD revenue generation was severely restricted when the irrigation fee paid by farmers was abolished in 2009. Since then the IMC or DARD has relied on annual budget allocations provided by the MOF. However, such budget allocations cover only about 80 percent of the O&M costs and are not always provided promptly. Furthermore, the majority of the allocated budget is spent on operations, leaving maintenance underfunded. A key shortcoming in maintenance is dredging of irrigation and drainage canals. While the current project will not invest in any new canals, delayed dredging of such canals will affect the efficiency of the operations of some project structures, such as sluice gates, or cause early depreciation of others.

Annex 6: Internal and External Coordination

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project

1. This annex summarizes the internal and external coordination being undertaken during the preparation of this project with other ongoing and upcoming projects and TA in Vietnam's Mekong Delta. This exercise was carried out to ensure synergies with other activities, avoid duplication, and complement the objectives of other Bank projects and development partner activities in the Mekong Delta region.

2. **Coordination among the Bank's projects and other development partners' projects in the region.** Over the last few years, a number of Bank and development partners' activities (comprising investment projects, TAs, and studies) of different sectors have focused on the Mekong Delta region. During preparation of this project, communications and discussions were held with other projects to exchange information and experiences, which contributed to strengthening the design and provided valuable technical inputs and lessons for the project.

3. For the overall project design, the TA on 'Building Resilience in the Mekong Delta' directly provides inputs through the development of the Decision Support Framework, accompanying interactive tools, GIS tools and maps, as well as provides baseline information for the project. This builds on existing past databases and integrated information systems (such as the WISDOM Project—a joint Vietnamese-German partnership), which bring together the fields of hydrology, sociology, information technology, and earth observation to provide policymakers with a tool for regional/ provincial planning. Knowledge generated from the 'Review of the Study on the Impacts of Mainstream Hydropower on the Mekong River' has been used to inform the design of Decision Support Framework and 'low-regret' investment screening.

4. **Flood management in the upper delta.** Under this project, the upper delta (Component 2) seeks to protect and reclaim the benefits of controlled flooding in the Long Xuyen Quadrangle (An Giang/Kien Giang) and the Plain of Reeds (Dong Thap) as well as increasing yield per hectare rural incomes through improved flood-based production models. Internally, this subprojects align well with the following World Bank-funded projects:

- **VnSAT Project.** In An Giang and Dong Thap Provinces, while VnSAT focuses on the areas of high-value, high-yield triple-crop rice production, this project looks at the surrounding areas to provide agricultural/aquaculture cropping alternatives to the wet season rice crop and livelihoods support measures to farmers.

- **Mekong IWRM Project-Phase 2 Project.** Proposes an Integrated Water Resources Information System for the Mekong Delta to ensure that the data and modelling work proposed to be carried out under the development of the Mekong Delta Decision Support Framework complements previous/ongoing activities.

- **Can Tho Urban Resilience Project.** This project looks beyond synergies in overlapping provinces area but also coordinates with other investments in downstream areas (such as the flood risk management investments under the Can

Tho Urban Resilience Project)—which may be directly affected by flood management activities in the upper delta area.

5. Externally, this project has benefitted from GIZ's Integrated Coastal Management Program —a TA activity which supports the Vietnamese authorities in strengthening the coastal areas, as well as piloting new and innovative techniques in climate-resilient measures (for example, bamboo T-fences for coastal erosion) and in alternative sustainable livelihood models (for example, floating rice in upper delta and so on). It also builds on the DFAT Mekong Water Resources Program, which aims to strengthen water governance across the Mekong region.

6. **Salinity transitions in the estuary region.** Under Component 3, this proposed project seeks to address the challenges related to salinity intrusion, flooding, sustainable aquaculture, and improved livelihoods for communities in the estuary areas. Internally the project aligns with the following World Bank-funded projects:

- **Mekong Transport Infrastructure Development Project.** This project focuses on improving the logistics and connectivity of the poor and helps inform livelihoods support and market connection activities designed for Ben Tre Province (as well as other project provinces in the upper delta area—An Giang/Dong Thap and peninsula area—Ca Mau).

- **CRSD Project.** This project builds on the CRSD, which focuses on sustainable fisheries management and good practices in sustainable aquaculture for climate change resilience in the Soc Trang (and Ca Mau's) brackish economy.

7. Externally, JICA's proposed investment in sluice gates in the upper section of Ben Tre Province to maintain freshwater zones complements by focusing on investments to build the brackish zone. The project also builds on the International Fund for Agricultural Development's Adaptation to Climate Change in the Mekong Delta Project in Ben Tre and Tra Vinh—which strengthens the adaptive capacity of rural communities and invests in salinity monitoring stations.

8. **Coastal protection in the delta peninsula.** This component seeks to address the challenges related to coastal erosion, groundwater management, sustainable aquaculture, and improved livelihoods for communities living in the peninsula area. It aligns with the following World Bank-funded projects:

- **Mekong Water Resources for Rural Development Project.** This project's component on water management planning and efficient utilization (with the aim to support climate change adaptation) provides technical input to strengthen the design of activities to improve water resources management and planning capacity in Bac Lieu and Ca Mau (as well as An Giang in the upper delta). In addition, the lessons learned are used to guide identification of 'low-regret' investments of the proposed project.

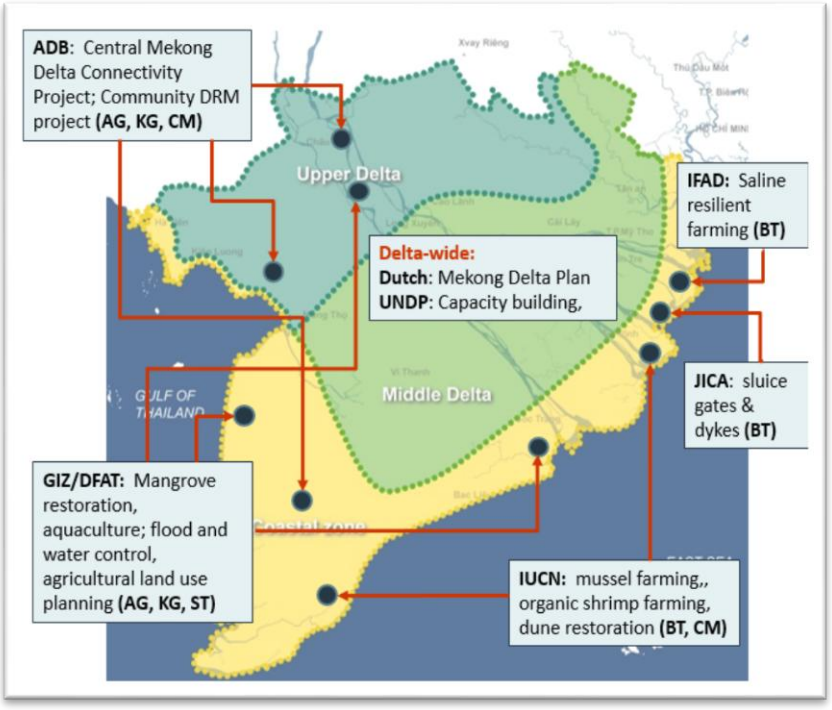
- **The CRSD Project.** The CRSD Project has informed this project's activities (including those relating to integrated spatial planning) designed for Ca Mau to improve climate resilience in the southern province's brackish economy.

- **Vietnam Mekong Delta Urban Upgrading Project.** The proposed project design also taps into the technical knowledge from the Vietnam Mekong Delta Urban Upgrading, specifically on formulation of climate change adaptation strategies for coastal cities (Ca Mau) in the Mekong Delta.

9. This project is exploring a scale-up of successful pilots in sustainable and climate-resilient livelihoods pilots being carried out by other development partners. One is the pilot certified organic mangrove-shrimp program, in which the IUCN and SNV Netherlands Development Organization are working with Ca Mau DARD, the Nhung Mien Forest Management Board, and Minh Phu, one of the world's largest seafood exporters, to support farmer participation and help reverse mangrove losses. Another is GIZ's work with provincial DARDs, FPDs, and PPCs of the Bac Lieu Province on afforestation and diversifying the coastal protective forest (including use of bamboo T-fences), to increase its resilience to climate change and reduce coastal erosion. The third, is cooperation with the International Rice Research Institute, to support local farmers for introducing adaptive agricultural production methods.

10. **Strategic and technical support during project preparation.** This project has been developed in close coordination—both at strategic and technical levels—with several key development partners working in the Mekong Delta.

Figure 6.1. Development Partner Activities in the Mekong Delta



11. At the strategic level, a Mekong Delta Working Group has been established (co-chaired by the Bank and GIZ) with regular meetings organized to discuss programs and activities in the Mekong Delta and seek synergies. Several joint development partner statements have been issued to the GOV to highlight the need for (a) institutional coordination; (b) dedicated financing mechanism; and (c) identifying of 'low-regret' investments that support delta resilience in the

longer term. An innovative and interactive Mekong Delta Forum was held on February 2 and February 3, 2015, jointly organized by several development partners (led by the Bank in terms of content and delivery)—to discuss challenges and solutions for climate-related challenges facing provinces in the Mekong Delta.

12. At the technical level, several development partners have jointly participated in the Bank project preparation missions and aligned their ongoing/upcoming TA to align with the needs and objectives of the Bank loan. Representatives from DFAT, GIZ, and IUCN—all of whom have investments and activities in the Mekong Delta—have joined technical missions and field visits. DFAT has provided critical TA funding for consultations, technical inputs, and community vulnerability assessments—results of which have informed the design of this project. A Dutch TA team has provided high-level technical advice to improve the design of the proposed first-year subprojects, while GIZ technical experts have shared lessons from past TA and specific investments to improve coastal protection. GIZ also aligned their upcoming TA to support MARD in the feasibility studies of subprojects in phase 2 of the project (on agriculture, coastal protection, and water management). The IUCN was contracted to carry out community vulnerability assessments of project sites to inform the social analysis and livelihood support measures being considered.

ANNEX 7: MAP

VIETNAM: Mekong Delta Integrated Climate Resilience and Sustainable Livelihoods Project