Document of
The World Bank

FOR OFFICIAL USE ONLY

Report No: 61652-VN

PROJECT APPRAISAL DOCUMENT

ON A

PROPOSED CREDIT

IN THE AMOUNT OF

SDR 100.91 MILLION (US$160.0 MILLION EQUIVALENT)

TO THE

SOCIALIST REPUBLIC OF VIETNAM

FOR THE

MEKONG DELTA WATER RESOURCES MANAGEMENT FOR RURAL DEVELOPMENT PROJECT

May 11, 2011

Vietnam Sustainable Development Unit
Sustainable Development Department
East Asia and Pacific Region

CURRENCY EQUIVALENTS

(Exchange Rate Effective as of May 1, 2011)

Currency Unit	USD
USD1 =	VND 21,500
SDR 1 =	USD 1.5855

FISCAL YEAR

January 1 – December 31

WEIGHTS AND MEASURES

Metric System

ABBREVIATIONS AND ACRONYMS

ADB	Asian Development Bank
AusAID	Australian Agency for International Development
BVN	Bac Vam Nao (irrigation scheme)
CEP	Code of engineering practices
CF	Conversion Factor
CPMU	Central Project Management Unit
CPO	Central Project Office
CPS	Country Partnership Strategy
CWIP	Commune Clean Water Improvement Plan
DA	Designated account
DARD	(Provincial) Department of Agriculture and Rural Development
DMDP	Dredged material disposal plan
DONRE	Department of Natural Resources and Environment
DPC	District People's Committee
ECOP	Environmental Code of Practices
EMDF	Ethnic Minority Development Framework
EMDP	Ethnic Minority Development Plan
EMP	Environment Management Plan
ERR	Economic Rate of Return
ESMF	Environment and Social Management Framework
FY	Fiscal Year
GDP	Gross Domestic Products
GOVN	Government of Vietnam
ICB	International Competitive Bidding
IDA	International Development Association
IDMC(s)	Irrigation and Drainage Management Companies
IFR	Interim Financial Report
IMC	Irrigation Management Company

IMT	Irrigation Management Transfer
IPM	Integrated Pest Management
IRR	Internal Rate of Return
IS	Implementation Support
IWRM	Integrated Water Resources Management
JBIC	Japan Bank for International Cooperation
JICA	Japan International Cooperation Agency
MARD	Ministry of Agriculture and Rural Development
M&E	Monitoring and Evaluation
MDG	Millennium Development Goal
MDWRD	Mekong Delta Water Resources Development Project
MKD	Mekong Delta
MOF	Ministry of Finance
MONRE	Ministry of Natural Resources and Environment
MPI	Ministry of Planning and Investment
MRC	Mekong River Commission
NCB	National Competitive Bidding
NTP	National Target Program
NPV	Net Present Value
NWRC	National Water Resources Council
O&M	Operations and Maintenance
OMXN	Omon-Xano (irrigation scheme)
ORAF	Operational Risk Assessment Framework
PAP	Project Affected Peoples
PCERWAS(s)	Provincial Center for Rural Water Supply and Sanitation
PDO	Project Development Objective
PISC	Project Implementation Steering Committee
PMF	Pest Management Framework
PMU	Project Management Unit
POM	Project Operation Manual
PPC	Provincial People's Committee
PPMU	Provincial Project Management Unit
QBS	Quality Based Selection
QCBS	Quality and Cost Based Selection
QLPH	Quan Lo-Phuong Hiep
RAP	Resettlement Action Plan
RCC	Respond to Climate Change
REA	Regional Environmental Assessment
RWSS	Rural Water Supply and Sanitation
SBV	State Bank of Vietnam
SCADA	Surveillance, Control, and Data Analysis
SEDP	Social and Economic Development Plan
SIA	Social Impact Assessment

SIL	Specific Investment Loan
SOEs	Statement of Expenses
US$	United States Dollar
VAT	Value-added Tax
VHLSS	Vietnam Household Living Standard Survey
VNMC	Vietnam National Mekong Committee
WSS	Water Supply and Sanitation
WUO(s)	Water User Organization(s)

Regional Vice President	:	James W. Adams
Country Director	:	Victoria Kwakwa
Sector Director	:	John A. Roome
Sector Managers	:	Jennifer J. Sara
		N. Vijay Jagannathan
Task Team Leaders	:	Toru Konishi
		Cuong Hung Pham (co-TTL)

Table of Contents

PAD DATA SHEET

VIETNAM

MEKONG DELTA WATER RESOURCES MANAGEMENT FOR RURAL DEVELOPMENT PROJECT

PROJECT APPRAISAL DOCUMENT

EAST ASIA AND PACIFIC
Vietnam Sustainable Development Unit (EASVS)

Sustainable Development Department

Date: May 11, 2011 Country Director: Victoria Kwakwa Sector Director: John A. Roome Sector Managers: Jennifer Sara, N. Vijay Jagannathan Team Leaders: Toru Konishi, Cuong Hung Pham Project ID: P113949 Lending Instrument: SIL	Sector(s): Agriculture/Natural Resources Theme(s): Water resources (50 percent), agriculture (30 percent), and rural development (20 percent) Environmental Assessment Screening Category: B

Project Financing Data:

Proposed terms:

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

IDA Standard Terms of 35 years of total maturity including 10 years of grace period

Financing Plan (US$m)

Source	Local	Foreign	Total
BORROWER/RECIPIENT	42.62	3.94	46.56
IBRD	0.0	0.0	0.0
IDA	115.46	44.54	160.00
Total Project Cost:	158.08	48.48	206.56

Borrower: Socialist Republic of Vietnam
Responsible Agency: The Ministry of Agriculture and Rural Development
Address: 23 Hang Tre, Hanoi, Vietnam

Estimated Disbursements (Bank FY/US$ m)

FY	2012	2013	2014	2015	2016
Annual	30	35	45	40	15
Cumulative	30	65	105	145	160

Project Implementation Period: Start: September 1, 2011 End: September 30, 2016
Expected effectiveness date: September 1, 2011
Expected closing date: March 31, 2017

Does the project depart from the CAS in content or other significant respects?	○ Yes ● No
If yes, please explain:	
Does the project require any exceptions from Bank policies? Have these been approved by Bank management? Is approval for any policy exception sought from the Board?	○ Yes ● No ● Yes ○ No ○ Yes ● No
If yes, please explain:	
Does the project meet the Regional criteria for readiness for implementation?	● Yes ○ No

Project Development Objective:

The proposed project development objective (PDO) is to protect and enhance the utilization of water resources in the project provinces of the Mekong Delta Region in order to sustain gains in agricultural productivity, provide access to water supply for rural households, and contribute to climate change adaptation.

Project description

The Project consists of the following components: (1) *Water Management Planning and Efficient Utilization*, including measures to strengthen institutional capacities at sub-regional and provincial levels, promote effective operations and maintenance, and promote on-farm water use efficiency through pilot schemes; (2) *Improvement and Rehabilitation of Water Resources Infrastructure*, with emphasis on rehabilitation and minor improvement through canal dredging, and embankment reinforcement, as well as the installation of secondary control sluice gates; (3) *Rural Water Supply and Sanitation*, aiming to extend reliable services to about 60,000 households in the project area; and (4) *Project Management and Implementation Support*, supporting incremental operating costs to implement the project and the monitoring and evaluation of project outcomes and impacts.

Safeguard policies triggered?	
Environmental Assessment (OP/BP 4.01)	● Yes ○ No
Natural Habitats (OP/BP 4.04)	● Yes ○ No
Forests (OP/BP 4.36)	○ Yes ● No
Pest Management (OP 4.09)	● Yes ○ No
Physical Cultural Resources (OP/BP 4.11)	● Yes ○ No
Indigenous Peoples (OP/BP 4.10)	● Yes ○ No
Involuntary Resettlement (OP/BP 4.12)	● Yes ○ No
Safety of Dams (OP/BP 4.37)	○ Yes ● No
Projects on International Waters (OP/BP 7.50)	● Yes ○ No
Projects in Disputed Areas (OP/BP 7.60)	○ Yes ● No

Conditions and Legal Covenants:

Loan/Project Agreement Reference	Description of Covenant	Date Due
Section 4.01	Adoption of the Project Operational Manual (POM) by the recipient	Effectiveness
Sections 4.01 and 4.02	Approval of the Resettlement Policy Framework by the Prime Minister as legally binding upon Recipient in accordance with the respective terms	Effectiveness

Section 4.01	Adoption of the five Resettlement Action Plans by the Recipient	Effectiveness
Schedule 2, Section V.1	Submission of the Phases 2 Subprojects Feasibility Studies and Safeguard Documents for Components 2 and 3	March 1, 2012
Schedule 2, Section V.2	Submission of the Phases 3 Subprojects Feasibility Studies and Safeguard Documents for Components 2 and 3	March 1, 2014
Schedule 2, Section II.C (a)	Undertaking of the mid-term review	November 30, 2014
Schedule 2, Section II.C (b)	Submission of the Mid-term review report	August 31, 2014
Schedule 2, Section I. A. paras. 1-7	Maintenance of PCMU, PPMU, and Project Management Unit No. 10 (PMU10) with adequate qualified staff and sufficient resources	Throughout the project implementation period
Schedule 2, Section I. A. paras. 8-9	Implementation of the project in compliance with the POM, and no amendment, revision, or waiver without the Bank's prior approval	Throughout the project implementation period
Schedule 2, Section I. C, paras. 1-5	(a) Preparation of the RAPs, EMPs and EMDPs according to the RPF, ESMF, and EMDF respectively, and (b) Implementation of the project in compliance with the RAPs, EMPs, and EMDP.	Throughout the project implementation period
Schedule 2, Section I. C, para. 6	Submission of the first Dredging Material Disposal Plan (DMDP) for each subproject involves dredging	Throughout the project implementation period
Schedule 2, Section I. C, para. 7	Compliance with the respective EMPs in executing the subprojects	Throughout the project implementation period
Schedule 2, Section I. C, para. 8	Provision of adequate resources from the counterpart fund to finance land acquisition	Throughout the project implementation period
Schedule 2, Section I. C, para. 9	Provision of information on the status of compliance with the safeguard instruments in details	Throughout the project implementation period

I. Strategic Context

A. Country Context

1. The Mekong Delta (MKD) covers approximately 5.9 million hectares and spans the southern parts of both Cambodia and Vietnam. The Vietnamese territory of the Delta covers approximately 3.9 million hectares, accounting for about 12 percent of the country's land area, yet 27 percent of its designated agricultural land. It is comprised of twelve provinces and one municipality (Can Tho) and has a population of 18.6 million people (i.e., 22 percent of the national total in 2009). Despite recent urbanization trends, some 80 percent of the MKD's population still lives in rural areas and 76 percent of its population derives its primary income from agriculture.

2. The Vietnamese territory of the MKD can be segmented into three sub-regions based on topographical, economic, demographic, and geological characteristics: (a) an eastern part (east from the Tien River up toward Ho Chi Minh City); (b) a central part (between the Tien River and the Hau River); and (c) a western part (west of the Hau River and toward the Gulf of Thailand). The eastern part was previously considered to have low agricultural potential, due to its acid sulphate soils; however, recent advances in technology and agronomic practices have converted this area into a very productive horticulture and rice growing area. The central part, consisting of rich alluvial soils, has emerged as an important area for horticultural production, experiencing relatively rapid urbanization. The western part features diverse conditions and agricultural practices have adapted accordingly. This area is comprised of: (a) an upstream flood plain section (Long Xuyen Quadrangle and Bay Nui Region); (b) a mid-stream section (Trans-Bassac Depression), with relatively better soil, but occasionally experiencing saltwater intrusion (from downstream) and/or flood inundation (from upstream); and (c) a southernmost part (Ca Mau Peninsula) which features persistent shortages of freshwater and the intrusion of saltwater from two directions. The overall topography of the Delta poses considerable challenges for human activity. The region's average elevation is less than three meters above sea level; many important agricultural growing areas lie near or below sea level.

3. The MKD area is a major and growing pillar for Vietnam's agricultural sector, accounting for 40 percent of the country's agricultural GDP, more than half of its expanding agro-food exports, 52 percent of national rice production (and nearly all rice exports), 65 percent of fruit production, and 60 percent of its combined fisheries and aquaculture output. During the past decade, there has been growing industrial investment in the MKD plus gains in tourism development. Long-term gains in agricultural productivity, increased intensity in land use, agricultural diversification, and improvements in connectivity and basic services have been among several factors contributing to the very significant reduction in the incidence of poverty within the MKD. The poverty rate in the MKD is 12.3 percent (2008) - just below the national average of 14.5 percent.

B. Sectoral and Institutional Context

Sectoral Context

4. *Climate and Seasonal Patterns.* The MKD's climate features relatively high and constant temperatures (26-28^{o}C on average), high levels of sunshine, and two very distinct rainy and dry seasons. The rainy season lasts from May to October and accounts for some 90 percent of annual rainfall; the dry season extends from November to April of the following year. The Mekong River features very large fluctuations in water flows between these rainy and dry seasons, with the dry season flow being barely 2 percent of that of the rainy season. The MKD thus experiences both flood inundation and water shortages, at different times of the year. During the rainy season nearly 50 percent of the MKD is flooded, either temporarily or for more extended periods. In the dry season, the flow of the Mekong is insufficient to prevent extensive and sustained saline intrusion.

5. *Evolving Role of MKD*. Over time, the Delta's development has featured multiple phases of water resources management investment to mitigate flooding, salinity intrusion and other natural risks and to facilitate increased agricultural and aquaculture production. (For more details, see Annex 9.) In the future, the role of the MKD as a center for agricultural production would be even more important for the country. In 2009, the Vietnamese government issued the *National Food Security Strategy and Agricultural Land Planning Towards 2020*. In this, the MKD is cast as maintaining a core role in national food security (and rice exports) with some 1.8 million hectares of agricultural land to be reserved for rice production in the region. In addition, ambitious targets have been set under the *Social and Economic Development Plan* (SEDP) and the *Social Economic Development Strategy* for the continued expansion of aquaculture and fruit production within the MKD. The MKD is also expected to play a core role in future agro-industrial development.

6. *Upstream Development.* In the coming decade and beyond, however, a number of factors which will affect the flow regime of the Mekong River and will pose challenges for maintaining the achievements made, let alone raising the region's productivity, competitiveness, and living standards (for details, see Annex 9). The magnitude of the cumulative impacts of the upstream developments is still uncertain, and the Government is coordinating water management investment with riparian countries through the Mekong River Commission (MRC) to mitigate negative impacts on the MKD.

7. *Climate Change*. In the medium to long term, climate change could also significantly affect the water regime in the MKD in terms of the flow from upstream and salinity intrusion. During the wet season, the flow from upstream is expected to increase by about 15 percent over the 2010 to 2038 period as compared with the average flow between 1961 and 1990. During the dry season, the flow from upstream is expected to decline by a similar proportion. Different models project sea level increases of between 30 and 70 centimeters by 2050. These dual impacts (changes to seasonal flows and sea level rise) would affect up to one-fifth of the area currently either double- or tripled-cropped for rice. And, decreased dry season flow would also make shrimp cultivation (particularly integrated rice-shrimp cultivation) more difficult in some areas.

8. *Conflict Over Land and Water Use*. There have already been reported cases of local conflicts over land and water use among those practicing aquaculture (requiring brackish water) and those undertaking rice cultivation (requiring fresh water) in the southwestern part of the MKD. In addition, the competition between upstream and downstream water users would emerge as freshwater would be more scarce in the future. In order to reduce the risk of conflicts regarding water use, the following initiatives would be critical: (a) further investments in sluice gates and tertiary canals; (b) establishment and strengthening of water user organizations (WUOs); and (c) coordination of water management at the inter-provincial level.

9. *Greater Need for Rural Water Supply and Sanitation Support.* Nearly one-fourth of the MKD's population does not have access to clean piped water, relying instead upon drawing water from canals and rivers. About half of the current rural water supply system reportedly does not meet the Ministry of Health's microbiological and chemical standards. In the face of increased pollution from expanding urban areas and salinity intrusion, the Government has accelerated investment in improved rural water and sanitation in the MKD, aiming at increasing the coverage to 80 percent. (For more background on the rural water and sanitation sector in Vietnam, see Annex 8.)

Institutional Context

10. Organizations involved in water resources management include: the Ministry of Natural Resources and Environment (MONRE), the Ministry of Agriculture and Rural Development (MARD) and the National Water Resources Council (NWRC) at the national level and the (provincial) Department of Natural Resources and Environment (DONRE) and the (provincial) Department of Agriculture and Rural Development (DARD) at the local level (for more details, see Figure 1 in Annex 9). The Directorate of Water Resources: the Directorate of Fisheries Aquaculture; the Department of Science, Technology and Environment, and the National Center for Rural Water Supply and Environmental Sanitation are also relevant to water resources management. MARD is also responsible for management of water-related sectors such as agriculture, forestry, aquaculture, salt production, irrigation systems, rural water supply, dike management and disaster management.

11. Under the guidance of the respective Provincial People's Committees (PPCs), provincial DARDs are responsible for planning and implementation of agriculture and rural development measures. Provincial Irrigation Divisions and/or Irrigation and Drainage Management Companies (IDMC) under the DARDs are responsible for operations and maintenance (O&M) of irrigation and flood control systems within their respective provinces. At the on-farm level, while the Government adopted a policy to promote participatory irrigation management through establishment and strengthening of the WUOs, implementation of this policy in the MKD has progressed slowly. Provincial Centers for Water Supply and Sanitation (PCERWASS) under the auspices of DARD are responsible for the rural water supply.

12. While the Irrigation Divisions, IDMCs and the DARDs have basic technical and administrative capacity to operate the water management infrastructure at the provincial or lower level, their capacity and the current institutional setting have to be upgraded to enable them to effectively address expected climate change impacts and the diversified needs of the various

water users. The current system for water management is narrowly segmented along provincial lines and there is an evident need to develop a sub-regional analytical and planning framework for improved planning, monitoring, and coordination - especially to address water use conflicts/competition and manage large irrigation and/or flood control systems which span more than one province.

13. There is also a need to intensify the communication between the IDMCs and DARDs and the end users of water. The water resources authorities are making infrastructure planning and management decisions based upon the *1994 Delta Master Plan* and static land use considerations. Yet, water users are making strategic and dynamic decisions based on given opportunities (e.g., markets) and prevailing climate conditions. These differences could create conflicts between the water authorities and water users, and it is necessary for the provincial and district water resources authorities to communicate with the water users, providing information and forecasts about the availability of fresh water and patterns of salinity intrusion to facilitate their decision making, while the provincial and district water resources authorities need to consider inter-provincial flows and diversions of fresh water.

14. Establishing WUOs is also urgently needed to enable community water-related decision-making and improve on-farm water use efficiency. Diversified agriculture and aquaculture have already raised the risks for potential conflicts over water use (saline water vs. brackish water) within the same irrigation schemes. While the Government has adopted a policy on irrigation management transfer (IMT) and adopted a decree to transfer the responsibilities for managing the tertiary and quaternary irrigation facilities to WUOs, implementation has been slow. In the Mekong Delta, with the support of AusAID, 24 groups akin to WUOs have been established in An Giang Province on a pilot basis. The DARDs and IDMCs need to implement IMT to enable farmers to make collective decisions on water use, mitigate possible conflicts, and contribute to the overall management of the irrigation schemes. Further, attention also needs to be given to improving on-farm water productivity, especially in the context of scarce dry season fresh water availability.

15. *Operations and Maintenance (O&M) for Water Management Infrastructure.* As per the Decree 115 issued in 2008, which essentially abolished irrigation fees for farmers, the Government is currently providing budget support for the IDMCs and the irrigation division of DARDs to carry out necessary O&M of the primary and secondary canals of the irrigation schemes in the MKD. This decision is particularly understandable for the MKD, where: (a) farmers can access water in many places as irrigation schemes are 'open'; (b) the irrigation canal systems in the MKD also serve as important inland waterways for transporting passengers and goods; and (c) major dredging is needed every 5 to 10 years due to the large amount of the sediment deposited in the canal system[1].

16. In the short to medium-terms, the Government will continue to finance a large part of the maintenance costs for irrigation systems from central and provincial budgets. In order to move toward a path of sustainability, there are a range of options including: (a) development of clear business plans to cover the financial, operational, and technical aspects of Irrigation

[1] An estimate suggests that the annual deposit of sediment in the Mekong Delta is roughly 140 million ton on average.

Divisions/IDMCs or other management institution operations; (b) monitoring, at the national/regional level, of the performance of Irrigation Divisions/IDMCs based on a set of benchmarks; (c) investment in Irrigation Divisions/IDMCs' logistics and systems to reduce operational costs; and (d) formulation of WUOs at the local level to manage lower system (tertiary and below) system level irrigation, and be counterparts to the Irrigation Divisions/IDMCs to monitor the Irrigation Divisions/IDMCs' performance. In the context of the MKD, development of WUOs is also considered to be effective for water management as they would be involved in management of secondary and tertiary sluice gates and ensure timely control of the water management regime regarding fresh and brackish water.

17. *Cost Recovery for Rural Water Supply and Sanitation.* Under the current National Target Program (NTP) (2006 - 2010), in order to verify the demand from households, rural water supply capital contributions were designed to involve 20 percent upfront contributions from the beneficiary households, while the balance of the investment would be funded by the central and provincial governments as well as external funding. The forthcoming NTP (2011-2015) would more or less follow this approach; however, the reality in the MKD is that few of the provinces were able to collect households' contribution, as households are either poor or do not wish to make large cash payment as water - albeit of low quality - is available from open sources. In practice, some provinces had to sell off assets (including public land) to meet the requirement of the NTP. The tariffs set under the NTP are typically below the average water supply production costs, jeopardizing the financial sustainability of the rural water supply systems. Clearly, there is a need to revise the current capital cost sharing mechanism and the tariff structure in order to balance the financial viability of the investments and affordability for poor households.

18. *Financing Household Sanitation* is also an issue. Under the current NTP, a block grant has been provided to households without proper training. This has led to rapid installation of household latrines, but constructed latrines are often not properly used. In addition, many household latrines reportedly do not meet the technical standards, as construction of the latrines was often carried out by respective households. In order to effectively promote sanitation, there is a need to provide training to households, suppliers, and contractors in proper installation and use of the latrines (sanitation marketing). Considering the affordability issue, an option to adopt an approach of community-based revolving funds should also be explored.

A Way Forward

19. Water management in the MKD has evolved in the past to support agricultural production. Over the next several decades, the region's agriculture is expected to undergo major structural changes, including land consolidation, mechanization, and further diversification of land uses. Major driving forces will include changing domestic market demand, price trends and consumer preferences in international food markets, rural to urban migration, increased non-agricultural use of land and water, technological change, and changes in the water regime due to upstream developments and climate change. This section sets out elements of future water management in the MKD in the context of these broader structural changes.

20. *Infrastructure Investment.* There is a continued need for investing in the Delta's water management infrastructure, particularly investment in the sluice gates at the secondary and

tertiary levels to enable more responsive and flexible support to diversifying farmers' needs on water delivery. Further, major dredging works in the primary and secondary canals are also critical to fulfill their design conveyance capacity or to cope with new demands. An estimate suggests that the current conveyance is between 50 to 70 percent of the design capacity. The dyke systems also have to be reinforced to protect against salinity intrusion in the lower part of the Delta and mitigate flood risks. The current design of the dykes also has to be upgraded to allow the passage of vehicles and agricultural machinery. The use of the latter is increasing in response to rising labor costs and the need to raise product quality and reduce physical product losses associated with traditional manual practices.

21. In the face of projected climate change impacts, MARD is considering a series of new major infrastructure investments, including several long coastal and river dykes and larger sluice gates at the major river mouth. In the process of planning such large scale infrastructure it is critical for the MARD to consider pertinent economic, environmental, and social aspects and to explore alternative strategies, including the introduction of adaptive agriculture and/or other adjustments in land use.

22. *Increasing Water Productivity*. As fresh water during the dry season (and, to a lesser extent, during wet season) would be unreliable and scarce, the risks of conflict over water would also increase in the future. As land available for agriculture will be a constraint and future yield gains are unlikely to match the past results, one focus shall be to increase water productivity (i.e. the value of agricultural product per unit water used). Support could include both: (a) on-farm investments (such as land leveling, water distribution channels) as well as agronomic support services, and (b) off-farm investments (e.g., installation of Surveillance, Control, and Data Analysis (SCADA) systems).

23. *Updating the Mekong Delta Master Plan.* The Mekong Delta Master Plan was prepared in 1994. Since that time, there have been tremendous changes in the Mekong Delta including the structure and scale of economic activities, changes in water use by different sectors, and the development of varied infrastructure related to water resources. Additionally, many factors external to Vietnam have arisen including constructed and planned upstream dams and irrigation systems, pollution, and awareness of climate change. In updating the master plan, a pragmatic approach would be to target particular dimensions, such as infrastructure and water use by sector, and examine the 'robustness' of plan modifications in the context of various scenarios. This would subject the plan to various 'stress tests', identifying potentially vulnerable areas where agriculture could be adversely affected. Revisions to the plan could then initially focus on addressing those identified vulnerabilities.

24. *Rural Water Supply and Sanitation.* Vietnam has made significant progress in developing its rural water supply and sanitation services. However, rural water supply coverage is still lacking in many areas, and sanitation services are often neglected. Other traditional practices (drawing water from canals or wells) are becoming increasingly risky due to surface water pollution and groundwater salinization. Lack of access to clean water could also constrain the development of rural-based food processing and beverage companies within the MKD which would otherwise be able to take advantage of the wide availability of agricultural raw materials. Interventions could entail (a) establishment and/or expansion of rural water supply networks, and

the construction of low-cost treatment facilities, (b) improved business planning of water supply utilities; (c) introduction and education of onsite sanitation services (e.g. homes, schools); and (d) improved tariff structures to improve cost recovery while also considering customers' ability to pay.

C. Higher Level Objectives to which the Project Contributes

25. *Consistency with Country Partnership Strategy.* The World Bank Vietnam Country Partnership Strategy (CPS) for 2007 to 2011 is based on the four pillars of: (a) Business Development; (b) Strengthening Social Inclusion; (c) More Sustainable Management of Natural Resources and Reduced Environmental Degradation; and (d) Strengthened Governance Systems. The 2009 CPS Progress Report identified the proposed project in FY 12 under the pillar (c) above, to support the implementation of the National Target Program on Climate Change and support water resources management in the Mekong Delta. The proposed project was advanced to FY 11 in response to the Government's request to accelerate the preparation. The proposed investment in priority rural water supply services also contributes to the objective of strengthening social inclusion, as that component will provide an important basic service to poorer and more remote communities within the MKD.

26. *Government Strategy.* The Government has recently adopted two major strategies pertinent to the proposed project. These are: a National Targeted Program (2008) to respond to climate change, issued by MONRE and a Water Resources Development Strategy to 2020, issued by MARD. Both of these strategies mainly focus on the MKD, as it is considered to be the country's most vulnerable area. Still, the Government is determined that the Mekong Delta will remain a major national center for crop and aquaculture production even in the face of the array of risks and uncertainties outlined above. Given the centrality of rice in national food consumption, the Delta will continue to play a major role in ensuring national food security. The government recognizes the roles which further water resources investment and improved water use efficiency will play in stabilizing, if not increasing, agricultural production in the Delta. Increased emphasis is now being placed on enhancing the agricultural sector's preparedness and resilience against risks, especially those emanating from near and longer term climate change. The Government also plans to secure access to safe potable water for Delta's entire population by 2015 as a part of its commitment to achieve the pertinent MDG Goal.

27. The proposed project is also consistent with the National Target Program to Respond to Climate Change (NTP RCC). The NTP RCC presents a project (Project No. 29) chaired by MARD to (i) integrate climate change into the agricultural plans and projects, including water resources management; and (ii) carry out some pilot projects to support adaptation to climate change. The proposed infrastructure investments (subprojects) have been selected as high priorities within the respective provinces' water management plans.

II. Project Development Objectives

A. PDO

28. *Project Development Objective(s).* The proposed project development objective (PDO) is to protect and enhance the utilization of water resources in the project provinces of the

Mekong Delta Region in order to sustain gains in agricultural productivity, provide access to water supply for rural households, and contribute to climate change adaptation.

29. The expected specific outcomes of the project would be measured by the following indicators (with target values specified in parentheses). Details are provided in Annex 1.

- Number of areas where agricultural production has increased (50,000 hectares);
- Number of areas where agricultural production has been maintained through prevention of future salinity intrusion and flood risks (50,000 hectares);
- Provision of sustainable and safe potable water supply to rural populations (60,000 households);
- Increased water productivity in pilot areas (25 percent);
- Area transferred to water user organizations (WUOs) (25,000 hectares); and
- Number of households served by improved sanitation (10,000 households).

30. *Primary Target Area.* The proposed project would target the western part of the MKD including the following six provinces: An Giang, Ca Mau, Hau Giang, Soc Trang, Bac Lieu, and Kien Giang and the Municipality of Can Tho[2]. Water resources management is considered to be especially challenging in the western part of the MKD as a result of salinity intrusion risk from both East China Sea and the Gulf of Thailand, other pressures from (expected) sea level increases and the strategic choices associated with the trade-offs between rice and aquaculture cultivation. A parallel project is being developed for the eastern part of the MKD with the assistance of the Asian Development Bank (ADB).

31. *Project Benefits.* The following are the primary benefits resulting from the proposed project. The first is to at least stabilize the agricultural productivity of an estimated 300,000 households by mitigating risks posed by flood inundation, erosion, salinity intrusion and seasonal shortages of freshwater. The second benefit is to extend access to safe potable water to about 60,000 households and contribute to the improvement of their health and livelihood. Thirdly, *support for pilot activities to increase water productivity* under the Component 1 would help the Government establish a framework model to increase water productivity that can be replicated and scaled up throughout the MKD region.

32. Secondary benefits include: (a) increased efficiency in the operations and management of the irrigation schemes; and (b) increased efficiency in transportation and reduction in the cost for reconstructing bridges in the future (in part due to the need for dredging) through the construction of access bridges with a new design over the canals.

B. Project Components

33. The project would be comprised of the following four components. For more details, see Annex 2.

[2] Hereafter the term 'seven provinces' is used.

Component 1*: Water Management Planning and Efficient Utilization* (Base Cost: US$10.33 million). The main objectives of this component are to strengthen the water resources management planning capacity at the sub-regional (i.e. western part of the MKD) and provincial levels and increase efficiency in the utilization of water. The component would include the following activities:

a. Water Management Monitoring and Investment Planning in the Western Mekong Delta, aiming at adjustment of the existing provincial water management plans prepared based on the Mekong Delta Master Plan and incorporating potential impacts from upstream development and climate change. The output of this subcomponent would include: (a) development of the revised provincial water management and investment plans; and (b) development of a regional water analysis framework based on information from the concerned provinces.

b. Water Productivity, Operations and Maintenance: promoting the efficient use of the water through demonstration of good practices of on-farm water and agriculture management to increase water productivity, and increased efficiency in the O&M of the irrigation schemes supported by Component 2. This subcomponent would comprise the following activities: a) Pilot On-farm Management for Improved Water Productivity in (i) An Giang (extensive rice cultivation); (ii) Can Tho Municipality (rice cultivation and fruit trees); (iii) Hau Giang (rice cultivation and fresh-water aquaculture); and (iv) Bac Lieu/Ca Mau (combined rice cultivation and saline or brackish-water aquaculture), and b) Support for Operations and Maintenance aiming at support for (i) the seven (7) IDMCs in the project provinces (designing for Surveillance, Control and Data Analysis (SCADA) system, preparation of business plans and logistical support); and (ii) WUOs (establishment of about 75 WUOs, initial training and on-farm support) mainly within the irrigation schemes under Component 2 subprojects would be carried out with priority focus on the phase 1 subprojects as pilot.

Component 2*: Improvement and Rehabilitation of Water Resources Infrastructure* (Base Cost: US$128.93 million). This component would support the improvement and rehabilitation of water resources in selected water management schemes. The works would include: (a) major maintenance of existing under-performing infrastructure (e.g., canal dredging, re-sectioning and lining repairs, and rehabilitation of dykes); (b) construction and/or minor upgrading of existing infrastructure (construction of secondary and tertiary sluices gates, construction of small canal bridges, upgrading canal dykes); (c) rehabilitation of the tertiary and quaternary irrigation facilities in conjunction with the activities to establish WUOs under Component 1; and (d) installation of the SCADA system in conjunction with the support provided to IDMCs under Component 1. This component will be implemented through a three phases subproject approach. During project preparation, the five first phase sub-projects (with investments totaling approximately US$63.0 million) have been identified as first year subprojects and fully prepared with detailed designs and safeguards. Other subprojects have been identified yet more detailed design work would be completed during the period of project implementation itself.

This component would include facilities to support civil works such as: (i) feasibility studies and safeguard documents; (ii) detailed design; (iii) environmental and safeguard monitoring; (iv) support for implementing integrated pest management; and (v) land appropriation or other safeguard works if required. The cost for land appropriation, estimated at US$20.2 million, would be exclusively financed by the Government. Second and third phase subprojects would be implemented starting March 2012 and March 2014, respectively. Prior to commencement of the second and third phase subprojects, feasibility studies and safeguard documents would be sent to the Bank for review and approval.

Component 3: *Rural Water Supply and Sanitation* (Base Cost: US$32.98 million). Activities will include upgrading and construction of small piped rural water supply systems in the seven project provinces/municipalities benefitting about 60,000 households. This Component would include the following subcomponents: (a) support for rural water supply infrastructure; (b) institutional strengthening program for the PCERWASS; and (c) provision of sanitation facilities to households and public schools and hygiene promotion. Similar to Component 2, this component would also be implemented through a three phase subproject approach, and two subprojects have been fully designed for the first phase. Timing of the second and third phases would be the same as for Component 2 and prior to commencement of second and third phase subprojects, feasibility studies and safeguard documents would be sent to the Bank for review and approval.

Component 4: *Project Management and Implementation Support* (Base Cost: US$7.07 million). This component would support the incremental operating costs and logistical support for the Central Project Management Unit (CPMU), Project Management Unit No. 10 (PMU10), Provincial Project Management Units (PPMUs), and Provincial Center for Rural Water Supply and Sanitation (PCERWASS). The Government will finance: (a) project staff and associated *per diems*, (b) office space, (c) fuel and (d) utilities, whereas the Bank's funds would be used to finance: (a) office furniture, (b) logistical support (vehicles), (c) office supplies, (d) communications and logistic maintenance, and (e) training and workshop.

C. Project Financing

34. *Lending Instrument.* The project is proposed as a SIL (Specific Investment Loan). While it is very likely that the Bank would continue its engagement in the MKD region - through a broader program to support agriculture and rural development - future Bank support may not be dedicated to water resources management. While the proposed project would identify a broader set of investment needs, under Component 1, further Bank support for water resources may be reviewed and decided in the future.

35. *Project Financing*. Total project financing requirements are estimated at approximately US$ 206.56 million, inclusive of price and physical contingencies, taxes, interest during construction, and the front-end fee. The Government will finance approximately US$46.56 million for land acquisition, counterpart funds for financing project management and administration. The remaining costs of US$160.0 million for goods, works, technical assistance, and contingencies will be funded by IDA. Detailed information on costs and financing sources is provided in Tables 1 and 2 below.

Table 1: Project Costs by Component and Use of Financing

Project Cost By Component and/or Activity	Local $ million	Foreign $ million	Total $ million
1. Water Management Planning and Efficient Utilization	**6.58**	**3.75**	**10.33**
1-1 *Water Management Monitoring and Investment Planning in the Western Mekong Delta*	0.61	0.33	0.94
1-2: *Water Productivity, Operations and Maintenance*	5.97	3.42	9.39
2. Improvement and Rehabilitation of Water Resources	**101.03**	**27.90**	**128.93**
3. Rural Water Supply and Sanitation	**23.77**	**9.21**	**32.98**
4. Project Management and Administration	**6.05**	**1.02**	**7.07**
Total Baseline Cost	**137.43**	**41.88**	**179.31**
Contingency			
Physical	7.79	2.07	9.86
Price	12.84	4.55	17.39
Total Project Costs	158.06	48.50	206.56
Total Financing Required	**158.06**	**48.50**	**206.56**

Table 2: Project Costs by Component and Source of Financing

Project Cost By Component and/or Activity	GOV $ million	IDA $ million	Total $ million
1. Water Management Planning and Efficient Utilization	0.00	10.72	10.72
1-1: *Water Management Monitoring and Investment Planning in the Western Mekong Delta*	0.00	0.95	0.95
1-2: *Water Productivity, Operations and maintenance*	0.00	9.77	9.77
2. Water Management Infrastructure	32.17	115.15	147.32
3. Rural Water Supply and Sanitation	11.10	29.96	41.06
4. Project Administration and Management	3.29	4.17	7.46
Subtotal	46.56	160.00	206.56

Note: Costs are at March 2011 price level.

D. Lessons Learned and Reflected in the Project Design

36. The project has been designed incorporating lessons learned from other irrigation and water resources management projects in the region, particularly, the experience from the Mekong Delta Water Resources Project (IDA-31980) (closed on December 31, 2007), and from other similar projects financed by the Bank and the ADB. These include the following:

- *Overall Project Design.* Past projects in water management have been engineering projects focusing on physical infrastructure investment; in designing the proposed project, lessons have been drawn to provide comprehensive support all levels - from the regional to the community levels; (a) address the acute short-term needs of urgent investment for water management and rural water, (b) implement a series of activities to strengthen institutions managing water management infrastructure from the province to the on-farm level, and (c) help develop a long-term investment plan for water management infrastructure.

- *Engagement of the Local Communities.* Farmers' engagement is considered to be essential for success in irrigation and water resources management. On-farm water management is also important for efficient water use. While the irrigation schemes in the MKD are relatively unique and different from conventional irrigation schemes, and the proposed rehabilitation and improvement works are mainly for the off-farm structures (i.e. main and secondary canals), the project aims to engage local communities through a series of pilot programs proposed under Component 1 to: support the organization of water user groups, advocate for the importance of increasing efficiency in water, and build consensus about water use patterns.

- *Use of the Pilot Approach to Address On-Farm Water Management.* The proposed project would support an initiative to improve water productivity at the on-farm level. Traditionally, on-farm management has been the responsibility of individual farmers, and the Government has not intervened. The project would aim to introduce the following aspects which have been found to be effective in other countries: (i) on-farm and minor water networks (tertiary and quaternary levels); (ii) low head pumping options; and (iii) improved agronomic practices.

- *Synergies with Other Projects.* Irrigation is only one input to agriculture. Increased agricultural productivity and farm incomes would not be fully materialized by irrigation improvement alone. While the project would mainly focus on water management, close coordination would be carried out with other Bank-funded projects such as the Agricultural Competitiveness Project to support other inputs, market organization, and post-harvest loss reduction measures to boost the project's benefits.

- *Specific Mekong Delta Issues.* The MKD is a dynamic region with rapid economic development and associated changes in land use. In addition, the Delta's future development will face challenges associated both with climate change and upstream development impacts. 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 and possible changes in the external environment.

- *Resettlement Cost.* Resettlement and land acquisition is considered one of the major challenges during project implementation. Resettlement costs are to be funded by the counterpart funds. During the previous project, the timely release of counterpart funds for resettlement and land acquisition posed a constraint. During the preparation of the proposed project, a detailed review has been carried out for the five first-year subprojects and a resettlement action plan has been prepared with the initial estimate of the resettlement costs for these subprojects. During the appraisal, the estimated cost would be finalized and commitments for providing counterpart funds during the first year will be confirmed.

- *Institutional Arrangement.* Under the previous project, implementation was delayed, as the CPO, located in Hanoi, was not able to monitor the progress in implementing subprojects implemented by the province level and provide timely technical guidance. Physical remoteness has also make financial and procurement management more difficult and time consuming. These lessons have been incorporated in designing the implementation arrangement for the proposed project; while the CPO continues to be responsible for the project, it would open a branch office in Can Tho to closely monitor the implementation of the subprojects at the provincial level. The procurement responsibilities would be delegated to respective provinces. The financial management would be substantially facilitated as the designated account would be opened in Can Tho. Detailed description is set out in Section III A below.

III. Implementation

A. Institutional and Implementation Arrangements

37. *Overview of the Implementation Arrangements.* The Ministry of Agriculture and Rural Development (MARD) has been designated as the primary executing agency for the proposed project. MARD has established a central project management unit (CPMU) in Can Tho to manage the project. The MARD's Central Project Office (CPO), which has adequate experience on managing donor funded projects, and technical and communications capacity, will provide the CPMU with project director, technical, safeguards and financial staff. The CPMU is a legal entity, and would be fully authorized for managing the project implementation including fiduciary, procurement, financial accounting and payments and disbursement

38. A project implementation steering committee (PISC) would be established to monitor overall implementation, and provide policy and technical advice. The PISC would be chaired by MARD senior official and with representatives from MARD's technical departments, and the participating provinces. Representatives from other ministries would also be included. The PISC will organize meetings as needed.

39. *Detailed Project Implementation Arrangements.* The main tasks of the CPMU for the project implementation are: (a) responsibility for overall project implementation for all

components, including procurement, financial management, and safeguards; (b) managing the project Designated Account to be opened in Can Tho and responsible for payment transactions at the request of PMU10, PPMUs and PCERWASS; (c) monitoring the implementation of all components including Component 1 activities (in coordination with the PPMUs and DARDs); (d) facilitating the implementation at the provincial/municipality level through technical guidance and coordination with various authorities; (e) compiling technical and financial reports based on the inputs from the provinces/municipality; (f) carrying out M&E activities, and (g) undertaking the technical audit.

40. To facilitate the implementation of Components 2 (Water Resources Infrastructure) and 3 (Rural water supply and sanitation) the following arrangements would be made at the provincial level:

- Subprojects under Component 2 would be implemented by the existing provincial project management units (PPMUs) in the respective provinces. For those subprojects which would involve more than one province (e.g., OMXN), the PMU10, which has been established in Can Tho under MARD, will be in charge in order to ensure the coordination among the concerned provinces. PPMUs and PMU10 would be responsible for all aspects of these components, including: (a) developing detailed design, preparation of the tender documents, and tendering for civil works; (b) carrying out supervision of contractors; (c) verification and interim and final payment to the contractors; and (d) implementation of safeguards actions, particularly those related to resettlement and land acquisition.

- Provincial Centers for Rural Water Supply and Sanitation (PCERWASS) are responsible for implementation of respective subprojects under Component 3 including technical, procurement, financial and safeguard aspects. During implementation, PCERWASS would closely work with communes to make a plan for the phases 2 and 3 investments, prepare feasibility studies and safeguard documents (through engagement of consulting firms), and agree with communes on O&M arrangements. Once approval is granted, the PCERWASS will engage national consulting firms to carry out detailed design and procure civil works. While PCERWASS will also engage supervision consultants, they would be responsible for verifying invoices, and requesting the CPMU for processing.

- In order to control the quality of the feasibility studies, safeguard documents and detailed design, international experts would be recruited under the CPMU. The experts would review the progress and outputs from the PPMUs and PCERWASS and provide technical guidance.

41. *Flow of Funds.* A designated account (DA) would be opened and managed at the CPMU based in Can Tho. CPMU would be in charge of major expenditures including payment to the contractors and suppliers. In order to facilitate day-to-day management, however, an imprest account would be established at the PPMUs, the PCERWASS and the PMU10 to finance operational costs. The PPMUs, the PCERWASS, and the PMU10 will submit monthly financial statements to the CPMU, which would prepare a consolidated financial statement and submit it to the State Bank of Vietnam (SBV) as well as to the Bank.

B. Results Monitoring and Evaluation

42. The CPMU will be responsible for monitoring and evaluation of the implementation progress and the final outcomes of the Project following the Project Results and Monitoring Framework provided in Annex 1. The CPMU would recruit a dedicated staff to monitor overall 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, as well as updated indicators. Prior to the mid-term review, the CPMU would send a report by November 30, 2014, containing a summary of progress, updated results indicators (as stated in Annex 1), updated project estimated cost, and plans for completion.

43. In addition to the semi-annual report stated in paragraph 43, the CPMU would prepare the monitoring of the environmental and social safeguards implementation report. The report would contain: progress in implementation of the overall safeguard requirements such as: (i) land appropriation; (ii) other social mitigation measures (including income restoration activities as needed); (iii) update on project affected persons; (iv) monitoring of contractor performance; (v) implementation of IPM program; (vi) identification of emerging social and environmental issues; and (vii) updated plan for social and environmental safeguards.

C. Sustainability

44. Sustainability of the outputs/outcome of the investments under Components 2 and 3 will depend mainly on proper O&M of the infrastructure supported under the project. However, for the investments under Component 2, it is also clear that major dredging for the primary and secondary canals, which are considered to be medium term maintenance (every 5-7 years), has to be largely funded by the state budget because of their public goods nature and the large amount of sedimentation deposited in the canals. As a measure to support sustainability, the proposed project would: (a) strengthen the Irrigation Divisions and IDMCs, which manage the primary and the secondary irrigation canals, to increase their operational efficiency and monitor their performance; and (b) establish WUOs within the project area to manage tertiary and on-farm irrigation facilities.

45. Sustainability of the rural water supply investments under Component 3 depends on the policy on recovery of capital costs and the tariff structure. The current NTP sets out a policy for relatively high connection fee (up to 20 percent of the capital investment cost) and low tariff (less than the production cost), which may lead to both low subscriptions and low revenues in relation to the full operation cost; however, the Government is fully aware of the issue and plans to closely collaborate with the Bank under a separate program to explore the path to balance affordability and financial sustainability.

D. Readiness

46. It has been found that the readiness for implementation is adequate. In particular, the borrower has completed the following actions: (a) establishment of the CPMU; (b) preparation of

the project implementation manual, including the detailed safeguard manual; and (c) preliminary technical design for the first phase subprojects under the Components 2 and 3.

IV. Key Risks

47. The overall rating for the proposed project before mitigation measures is estimated to be "M-I" (Medium driven by impact). The following is a summary of the perceived risks rated as "high" and respective mitigation measures (see Annex 4 for details):

- *Implementation Arrangements and Capacity.* The proposed implementation arrangements would involve multiple implementation units - some of which may not be fully familiar with the Bank's financial management and procurement procedures. This gives rise to various possible project implementation issues such as: delay, non-compliance with the agreed procedures, problems with monitoring of the agreed indicators, and sub-optimal use of project funds at the provincial level. To help mitigate these risks, the Hanoi-based CPO will establish a CPMU in Can Tho (which is within the project areas) to closely monitor implementation progress and facilitate the provinces' implementation of subprojects. Furthermore, national and international consultants would be recruited to provide technical guidance to the provinces and ensure adequate technical quality. Also, internal auditing would be undertaken at the provincial level to minimize the risk of misuse of project funds. Finally, training would be provided on financial management and procurement at the start of project implementation.

- *Decentralized Approach.* Considering the complex institutional implementation arrangements noted above, the decentralized design of the project poses risks in terms of coordination, monitoring and oversight. To mitigate these risks, coordination of decentralized locations/activities will be undertaken through an adequately staffed CPMU that is located in the project area and that is established under the existing Central Project Office (which has adequate experience in implementing donor-funded projects as well as technical and communications capacity). The CPMU would be a legal entity, and would be fully authorized to manage project implementation - including fiduciary, procurement, financial accounting and payment and disbursement. The CPMU will have adequate resources and staffing to carry out its mandate.

V. Appraisal Summary

A. Economic and Financial Analysis

48. An *ex ante* economic and financial analysis was conducted to verify the feasibility of the proposed investments under Components 2 and 3 (for details see Annex 7). The analysis covered: (i) the five Phase 1 subprojects (water management investment) under Component 2 (*Improvement and Rehabilitation of Water Resources Infrastructure)* including several water management structures in O Mon - Xa No, Bac Vam Nao, Dong Nang Ren, and several bridges in Bac Lieu and Soc Trang Provinces; and (ii) two representative water supply schemes to be financed under Component 3 *(Rural Water Supply and Sanitation)*: one for the extension of an existing system, and the second, for the construction of a new system.

49. *Improvement and Rehabilitation of Water Resources Infrastructure (Component 2).* The main economic benefit for the water investments proposed under this component is an increase in yields and irrigation areas compared with the without project scenario through restoration of access to irrigation and more reliable and timely supply of fresh and brackish water. Without the investment, yields for various crops such as rice and fruit may decrease due mainly to unreliable supply of fresh water. Conservative assumptions have been made in carrying out the economic analysis, such that the yields would remain at current levels under the 'without project' scenario, and therefore diverge from the historical trend of incremental productivity gains.

50. As a first step, thirty seven (37) crop and activity budgets were prepared for the analysis representing the main production activities in the three project areas. The expected productivity gains and values shown in crop budgets are averages for each of the areas and are the basis for estimating the financial and economic benefits of the proposed interventions. The proposed investment would increase the current yields in some areas by 4–26 percent, and net incomes per crop/activity would increase by 20 percent on average as a result of the combined effects of increased production and reduction in production costs (e.g., reduced inputs, labor and/or energy costs). Annex 7 shows the details of the expected changes in yields, income and costs for the main crops and aquaculture activities in the three scheme areas.

51. Farm budgets representing the typical rural household systems were also modeled. Primary sources of income, production costs, off-farm employment, and other relevant parameters were used to estimate the expected impact of improvements to flood control and irrigation and drainage systems and from production support activities on the family income of farmers. Farm models representative of the three areas confirm the financial feasibility of the proposed interventions and the positive impact on beneficiaries' family incomes even maintaining the prevailing cropping patterns with the marginal addition of vegetable production. The project's improvements would allow not only water-use efficiency gains, but also more than 20 percent increases in household income.

52. The economic analysis considered costs and benefits from a societal point of view estimated using economic prices and opportunity costs for discounting the project net cash-flow. Conversion Factors (CFs) for shadow pricing were applied for prices of labor, main products and inputs, and for investment costs for the economic analysis. CFs for traded inputs and outputs were derived from the estimated import or export parity prices using recent forecasts of commodity prices prepared by the Bank. Physical contingencies for the project investments were taken into account for the economic analysis but not the price contingencies. Other related costs such as: (a) agricultural extension services; and (b) water resources planning and capacity buildings were also included. Agricultural extension services costs for the three schemes considered the provision of technical support to farmers in (i) new cultivation technologies; (ii) promotion of new crops especially vegetables; (iii) advanced farming system in rice-fresh fish/shrimp combinations for improving family income; and (iv) introduction of harvesting machines to reduce post-harvest losses. The aggregation of the costs of the project's three main subproject areas, and the expected results after all improvements and other support activities using CFs, allowed for the assessment of the three schemes' results. The economic rate of return

(ERR) would be 24.5 percent for Bac Vam Nao (BVN) irrigation scheme, 14.5 percent for the Dong Nang Ren scheme, and 15.4 percent for the O Mon - Xa No (OXNO) scheme.

53. Overall ERR and the Net Present Value (NPV) for the five subprojects was estimated at 17 percent, and the NPV (with 12 percent discount rate) at VND 1.26 trillion (US$63 million). The estimate does not include intangible secondary benefits such as improved inland waterway transportation or improved environmental outcomes. Sensitivity to the present output prices and to the investment costs was estimated: (i) if output prices decreases by 20 percent, the ERR would be reduced to 13.8 percent; and (ii) if investment costs would be 20 percent over the estimates, the ERR would be decreased to 14.8 percent. The joint effect of both events would result in an ERR of 11.8 percent. These results allows a conclusion that the project is strong enough to overcome adverse situations regarding the expected results even in the case of reduced prices for agricultural products and increased costs of project investments.

54. *Rural Water Supply Investment under Component 3.* The assessment of benefits were derived from beneficiaries' time saved in procuring water for their households once the system is connected, savings in buying treated water for drinking, and in some cases, from reduced illness as safe drinking water is made available. The analysis was carried out for two typical water supply schemes as representative of the subprojects under this component: (i) expansion of an existing one in Nhon Ai Commune; and (ii) the construction of a new water supply system in Bin Phoc Xuan. In the first case the ERR was 19.3 percent and in the new system 28.7 percent.

B. Technical

55. *Irrigation Schemes in the Mekong Delta.* The typical design of irrigation schemes in the Mekong Delta involves: (a) irrigation canals (secondary canals and tertiary canals) conveying water from the network of primary canals; (b) surrounding dykes to protect against floods (mainly in the upstream area) and/or salinity intrusion (mainly in the downstream area); and (c) sluice gates to protect against salinity intrusion. The design and construction of the irrigation schemes in the Mekong Delta are generally satisfactory and proven to be effective. Unlike conventional irrigation schemes in the upland areas, where careful topographic survey, design on conveyance capacity and outlet locations are required, irrigation schemes in the MKD require ditches branching off from secondary canals and connecting to farmer fields with appropriate control gate structures. At the field level, for higher-elevated areas, low-lift pumps are commonly used by farmers in the Delta, for higher elevated areas, to control water flow in and out of the field according to the crop needs and flooding pattern. The pump systems for irrigation operate during the dry season when the water level in the canals is lower than the field level, and in some places, for drainage during the rainy season when the tidal drain is inadequate. Construction of the dyke system is not easily dealt with due to the weak soil foundation especially in many of the aquaculture areas. Another concern for the sustainability of the dyke system is the erosion of embankments by heavy navigation traffic in the Delta and, thus far, MARD has not developed an effective technical solution to handle this issue.

56. Dredging is one of the major challenges to maintain the canal networks in the Mekong Delta. The annual volume of the sediment in the Mekong Delta is estimated at between 100 and 150 million cubic meters. While most of these sediments may flow into the sea, substantial

amounts are carried to the irrigation canals. The current custom is to carry out routine dredging for the tertiary canals almost every year and for secondary and primary canals once in each five-to-seven years-period. The dredging of the secondary and primary canals requires large resources because: (a) some bridges have to be destroyed to allow the passage of large dredgers; and (b) land appropriation is needed to dispose of dredged soil. MARD has started a study for the reconstruction of bridges with new designs in which the middle part is detachable to allow passage of dredgers, and the project would support this effort. Another measure for consideration would be to apply a different dredging method which requires different equipment so that demolishing existing canal bridges could be avoided. Dredged materials, in rice land areas, can be converted into fruit-tree land while in the coastal areas this can be turned into agriculture and aquaculture land. This is one positive side of dredging work if appropriate land acquisition and compensation is provided.

57. Sluice gates are located at the inlets of the secondary and tertiary canals to protect against salinity intrusion. Typically, vertical swing gates are regulated automatically by differences in the hydraulic heads at the gates created by each tide. The gates and mechanical structures are made of stainless steel to protect against corrosion from the saline water, and, thus, are essentially maintenance free. The manual operation of the sluices during changes of seasons and at necessary intervals for flushing or transport is relatively simple, while a certain level of knowledge on hydrology and water quality is needed to control upstream water levels and accommodate drainage requirements and flushing needs while minimize potential negative impacts on downstream water users. This is an area where improvement could be achieved through training the operational staff on hydrology and water quality aspects. Monitoring of the operations of gated structures is critical to allow timely decisions to support different water demands at different times. In this regard, the Project will introduce the use of SCADA systems for monitoring the flow rate and water quality. The design of gated sluices under the Project should allow the installation of such a SCADA system. This in turn will facilitate a participatory irrigation management approach (PIM), which will take into account the need for minimizing: (a) potential negative impacts on downstream water users; and (b) the use of pesticides and fertilizers - which can negatively impact water quality.

58. Water availability during the dry season is still a local issue for a short periods of time during in the year, however, in the long run, it is expected that this may become a broader issue if the irrigation facilities are not systematically operated in a coordinated manner. With the introduction of SCADA systems the issue might be partially handled provided that extensive training for operational staff is provided. On a positive note, the dams in the mainstream Mekong/Lanxang and its tributaries would regulate the overall flow and increase dry season flow. However, it is also possible that this increase may be offset by possible developments of large irrigation schemes in Thailand and/or Cambodia. It is also predicted that the dry season precipitation could be significantly reduced due to climate change impacts. While the incremental water use with the project is negligible (due to the rehabilitation nature of the proposed works), the project would also support the initial effort to improve water efficiency and productivity at the on-farm level through a series of pilot programs to involve water users directly.

59. Rural water supply is under the responsibility of MARD at central level, and the construction and O&M at the provincial level is carried out by PCERWASS[3]. While the coverage of rural water service is reportedly about 75 percent, only 50-60 percent of the households would have safe potable rural water supply under the new standard of the Ministry of Health.

60. Without proper rural water systems, most of the rural communities would have to continue to rely on shallow groundwater wells (polluted and contaminated with bacteria for the most part) and rainwater catchment (good but not continuous all year). Rural water supply infrastructure and services in the Mekong Delta are presently provided to the beneficiaries utilizing both groundwater and surface water abstraction as sources. For the four eastern provinces in the project area, groundwater is the primary source of water supply because of salinity levels in the nearby surface water resources. For the other (western) provinces in the project area, a mix of both surface water and groundwater serve as the sources for the investments to be made under the project. The surface water requires treatment and the boreholes are fairly deep, and per capita capital investment is relatively higher (approximately US$100) than in other parts of Vietnam. A typical rural water supply system would cover 1,000 to 1,500 households.

61. Over more than a decade, rural water supply and sanitation investments have been channeled through the two water supply and sanitation (WSS) National Target Programs (NTP I and II). Under NTP I and NTP II the coverage rate has been increased from 30 to 60 percent. However, in hurrying to expand coverage areas, the issues of technical quality and cost recovery of the rural water supply systems (the water tariff is slightly lower than the production cost, and relatively high connection costs have discouraged new subscriptions) have been overlooked. Incorporating lessons learned from the NTP I and II programs, the forthcoming NTP III (starting March 2011) will hopefully address these issues.

62. Sanitation has been the responsibility of individual households and the coverage has been low. As economic activity continues to intensify and population density increases, there is a clear need to accelerate the sanitation coverage. Under the NTP, a subsidization program for household sanitation has been under implementation, but a recent review suggests that a follow up public awareness campaign is needed, including (a) training of latrines / toilets contractors; (b) the promotion of sanitation supply chains through existing local businesses; and (c) promotion of public toilet construction at schools and other public facilities - in order to make the program more effective and sustainable.

C. Financial Management

63. An assessment of the financial management (FM) arrangements for the proposed Project has been conducted based on the guidelines issued by the FM Sector Board with the conclusion that the project meets the minimum Bank FM requirements, as stipulated in BP/OP 10.02.

[3] An exception is in An Giang Province where most of the water supply systems come under the responsibility of the An Giang Electricity and Water Supply Company. It is expected, however, that the responsibilities would be transferred to the PCERWASS in An Giang.

64. The main FM risk perceived for the proposed project is that the proceeds of the Credit will not be used for the purposes intended - stemming from a combination of country, sector, and project-specific risk factors. Taking into account the risk-mitigation measures proposed under the project, a "Substantial" FM risk rating is assigned to the project at the appraisal stage. The main actions required are (a) appointment of qualified personnel for financial management of the Project at all implementing units; (b) training for the FM staff of the implementing units on Bank FM and disbursement requirements and procedures; (c) completion of the Project Implementation Plan, including the financial management manual; (d) assignment of internal auditors to the Project by MARD and the respective Provincial People's Committees of the related provinces; and (e) recruitment of consultants by the CPMU to provide training on Internal Audit to the assigned internal auditors of the Project.

D. Procurement

65. The CPO has experience in managing Bank projects such as the Irrigation Rehabilitation Project (closed in 2002), Vietnam Water Resources Management Project (on-going), and the Mekong Delta Water Resources Management Project (closed 2007). The CPO is also currently managing the Natural Disaster Risk Management Project (on-going). The CPO intends to assign its Deputy Director General, who has experience with implementing these projects, as the Project Director for the proposed project. The PMU10 and the PCERWASS, which would implement the subprojects under Components 2 and 3, are familiar with Bank procurement procedures through implementation of the previous Bank-funded Mekong Delta Water Resources Project. However, the PPMUs, which would implement subprojects under Component 2, do not have adequate knowledge of or experience with the Bank procurement guidelines.

66. The main procurement risks for the proposed project are: (a) delays in procurement actions; and (b) possible non-compliance with Bank procedures (including governance and corruption issues) at the provincial level in light of the decentralized structure of the procurement implementation. Delay could occur at all stages of the procurement phase including planning, preparation of procurement documents, bid evaluation, approval of bid evaluation reports and award recommendation and contract management. Therefore procurement risk is rated 'substantial'. In order to mitigate the risk, intensive capacity building measures would be implemented during the first year of implementation, such as: (a) procurement training for procurement staff at CPMU, PPMU, PMU10, PCERWASS; (b) appointment of qualified government staff as procurement staff at all implementation units; and (c) close supervision and prior review for the first contracts for each implementing unit. Further, the following two measures would be introduced in order to address the governance and anticorruption: (a) establishment of a complaint handling mechanism at the CPMU and the Construction Department of MARD; (b) engagement of an independent agent to verify the completion of the subprojects (technical audit); and (c) development of a database for key expenditure items for civil works (e.g., excavation). Detailed procedures for these two measures are stipulated in the Project Operation Manual (POM).

E. Social

67. *General.* In the last 10 years, Vietnam has made remarkable gains in reducing poverty, including in the Mekong delta. Between 1998 and 2008, the national rural poverty rate decreased from nearly 45 percent to less than 19 percent, while the incidence of poverty in the Mekong Delta has declined from 36.9 percent to 12.3 percent. Among the provinces targeted by the project, Soc Trang has the highest poverty rate (17.9 percent), while Kieng Giang (9.3 percent) and Can Tho (7.0 percent) have the lowest. According to the 2008 Vietnam Household Living Standards Survey (VHLSS), the annual per capita income in the MKD region is estimated at about US$540 equivalent, with agriculture (and/or aquaculture) being the dominant income source for most households. Increased household incomes within the Mekong Delta have been attributable to productivity gains in rice cultivation and, over the past decade, to a substantial diversification of production systems to include shrimp and other species aquaculture, livestock production, and horticultural crop production.

68. *Population of the Mekong Delta*. The population of Vietnam's Mekong River Delta region is about 17.21 million (2009)[4]. The population of the target provinces are as follows (in decreasing order): An Giang (2.14 million); Kien Giang (1.69 million); Soc Trang (1.30 million); Ca Mau (1.21 million), Can Tho Municipality (1.19 million); Bac Lieu (0.86 million); and Hua Giang (0.76 million). Within the region, the average household size is four persons.

69. *Ethnic Minorities in the Region.* Nearly 92 percent of the region's population is of the majority Kinh (Vietnamese) ethnic group. The ethnic minorities in the region are Khmer (Tay), Hoa and Mong. Among these ethnic minorities, the Khmer people are the most prevalent (7.0 percent of the total population), yet also the most economically and socially disadvantaged. Poor Khmer households tend to have little or no land and few opportunities for stable employment. The jobs available to them are mostly low paying menial jobs. They are particularly vulnerable to economic and weather-related shocks due to their limited assets. Poor Khmer also tend to be marginalized from mainstream village organizations, having little contact with commune officials and few opportunities to participate in community decision-making processes.

70. *Expected Social Impacts.* The Social Impact Assessment (SIA), screening conducted during project preparation found that the overall impacts of the proposed project will be positive and would generally benefit local populations including ethnic minorities. The proposed works on water infrastructure would help ensure a reliable supply of fresh water during the dry season and, by controlling salinity intrusion, increase (or stabilize) agricultural production and help prevent the salinization of soil. Proposed investments in rural water supply would provide the local population with safe and reliable access to water supply, reducing health related risks and increasing productivity at home. Furthermore, a series of pilot activities are planned under Component 1 to help local population to better understand the implications of water use outside the communities and increase water use efficiency. However, on the negative side, however, land acquisition and resulting relocation and loss of productive land will occur for the disposal of dredged materials and construction of infrastructure (bridges, sluices, dykes, water treatment,

[4] General Statistics Office of Vietnam, 2009

etc). In addition, concerns were raised regarding the disruption of motor and other traffic on the waterways during dredging.

71. Attention has been given during project preparation to addressing these issues through consultations with local communities and water users. The issue of land acquisition has been addressed in the Resettlement Policy Framework (RPF), and the issue of providing temporary bridges has been addressed stated in the Environmental Code of Practice (ECOP). Additional consultations and a more detailed social assessment will be carried out as needed in course of the selection of the second-phase and the detailed design of subsequent subprojects.

72. *Social Safeguards Triggered by the Project.* The proposed project will involve land acquisition and relocation of households and businesses. The following safeguard policies apply to the proposed project: (a) Indigenous peoples (OP 4.10); and (b) Involuntary resettlement (OP 4.12). Key mitigation measures are summarized below.

73. *Land Acquisition.* It is estimated that the first five subprojects under Component 2 would require acquisition of about 80 hectares of land (including both permanent and temporary), affecting about 4,700 families (see Annex 2, Table 2). Among the affected households, an estimated 0.5 percent would require physical resettlement or lose more than 20 percent of the total agricultural land. It is also expected that the project would affect an additional 2,900 families in implementing Phases 2 and 3 subprojects. To avoid or minimize potential negative impacts due to land acquisition, physical relocation, and/or loss of crops/businesses/houses/ structures, the RPF has been developed in conformity to Bank's OP 4.12 and in close consultation with affected communities and relevant government agencies. This is to ensure that the project affected peoples are adequately compensated and/or supported so that no one will be worse off after the Project. This RPF describes the objectives and policy/regulatory frameworks as well as the principles and processes to be applied during the implementation of the Project. The RPF will be applied to guide preparation of all the RAPs for subprojects and investments to be implemented under the Project. A RAP has prepared for each of the five first year subprojects under Component 2. The RAPs also set out subproject specific income restoration programs for those affected severely and affected vulnerable households (see paragraph 77).

74. The Project may positively and/or negatively affect the ethnic minorities in the project area. To ensure the fair share of project benefits and minimize potential negative impacts on ethnic minority groups, an Ethnic Minorities Development Framework (EMDF) has been developed in consultation with affected and non-affected communities, relevant Government agencies and the Bank. This is to ensure that the affected ethnic minorities (equivalent to the indigenous peoples as defined in OP 4.10) would be sufficiently consulted in a free, prior and informed manner that results in broad community support for the project by the affected ethnic minority peoples. The EMDF forms a basis for project implementation and for monitoring and evaluation. The EMDF has been prepared in accordance with WB's OP 4.10 on Indigenous People and Government regulations. The two Ethnic Minority Development Plans (EMDPs) have been prepared for the two first phase subprojects which would affect the ethnic minority population. An Ethnic Minority Development Plan (EMDP) will be prepared for subprojects wherever applicable to implement the elements of the EMDF.

75. *Relocation of Graves.* During the preparation of the five Phase 1 subprojects, 48 graves located within the properties of individual households have been identified as being affected. Relocation of the graves is expected to be carried out by individual households (as a common practice in Vietnam) with the exception of graves whose owners could not be identified. These will be relocated properly by the local government. Rituals for relocation of graves may be different among Kinh, Khmer and Cham people, as are the associated costs. Affected households will receive compensation payment to conduct the relocation on their own. Grave relocation rituals adopted by different ethnic groups will be documented in respective EMDPs based on the consultations with affected ethnic minority people during project implementation. Where affected graveyards are collectively owned by ethnic minority groups, appropriate consultations with the affected groups will be conducted to work out solutions acceptable to them. The relocation of graves will be carried out prior to the commencement of construction.

76. *Public Consultation Process.* Public consultation undertaken with local authorities and potential beneficiaries and affected population in the project areas found that: (a) target households and communities would support the project in general, as it would increase agricultural and aquaculture productivity; and (b) the upgrading and dredging of canals for both irrigation and waterway transport would yield positive impacts for local communities as it would facilitate transportation of goods and improved traffic safety. However, there are concerns among the affected households as a result of land acquisition (both permanent and temporary) as well as potential losses of livelihood activities, especially for the ethnic minorities. In order to address their concerns, the subproject specific Resettlement Action Plans (RAPs), in addition to addressing compensation, a menu approach is proposed to help restore their livelihood, including: (a) livelihoods training (aquaculture/agriculture) with some demonstrations; (b) provision of tree plantations (e.g., orchards); and (c) vocational training. In addition, to the extent possible, the project would encourage contractors to recruit project affected people in implementing civil works. These activities would be implemented by the PPMUs and the CPMU would monitor the progress bi-annually as part of the social safeguard monitoring.

77. Furthermore, a series of consultation meetings were carried out by the respective provinces and districts in the seven subproject areas for the Phase 1 subprojects under Components 2 and 3. The consultations have been carried out in their respective languages of the ethnic minorities in applicable areas, and parallel consultations have been carried out focusing on the project affected persons. As part of the public consultation, a project description and a summary of the RPF, EMDF, and Environmental and Social Management Framework (ESMF) were disclosed. The public consultations confirmed that there is a broad support for the proposed project. Project affected households' concerns of compensation and livelihood restoration are to be addressed by the respective RAPs and EMDPs where applicable.

78. For the second and third phase subprojects, a social assessment will be conducted during project implementation when physical impacts becomes clearer to allow more tailored consultation of affected communities. Where the social impact assessments finds that ethnic minorities are present at subproject locations, ethnic minorities will be consulted in a free, prior and informed manner that is also culturally appropriate. Where consultations indicate that ethnic minorities face impediments to gaining benefits from the project, or that they would be negatively impacted by the subproject, an EMDP will be prepared to address them.

79. Social Safeguards Implementation and Monitoring. The implementation of the RAPs, and EMDPs would be the responsibilities of the respective PPMUs, PCERWASS, and PMU10. The Government will exclusively finance costs for land acquisition, whereas other measures (e.g., income restoration activities) will be integrated into the project's development activities and are to be funded by the Bank. The CPMU would be responsible for monitoring and facilitating the safeguards implementation and preparing the report (as noted in paragraph 44).

F. Environment

80. *Applicable Environmental Safeguard Policies.* The following World Bank (WB) safeguard policies have been triggered: (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); and (e) Projects on International Waters (OP 7.50).

81. *Proposed Investment and Potential Impacts.* The project would mainly involve the following physical investments: (a) maintenance and rehabilitation works for the existing irrigation canals, (b) repair to the existing river dykes; (c) construction of the secondary sluice gates; and (d) construction and expansion of the rural water supply system. In order to assess the overall environmental impacts of the proposed investment, including the five Phase 1 subprojects and subprojects which may be selected under Phases 2 and 3, a Regional Environmental Assessment (REA) has been carried out to assess environmental impacts of the proposed project as a whole including the five Phase 1 subprojects and possible subprojects which may be selected as Phase 2 and 3 Subprojects. In general, the REA found no major cumulative negative impacts resulting from the proposed project, as the planned investments are either long-term maintenance, rehabilitation, or completion of the existing irrigation/flood protection schemes, and therefore do not expand irrigation areas, increase the amount of water intake, or affect the current flow regime. While more water would be used for irrigation as irrigation infrastructure would be rehabilitated and dredged, the overall amount of use would not exceed the design intakes as there will be no expansion from the original irrigation areas. Also, the REA concluded that the proposed investments in dredging, repair to the dykes and completion sluice gates are considered to be critical to make the current water investment robust to the impacts caused by the external factors such as upstream development and climate change.

82. OP 4.04 (Natural Habitats) is triggered as a precautionary measure because some of the subprojects may include dredging in Camau Province. It has been confirmed that the first five Phase 1 subprojects do not trigger OP 4.04. It is unlikely that the dredging works would take place near the natural habitats such as mangrove forests or rivers. The dredge works would take place exclusively in existing, man-made irrigation canals – which are not considered to be important habitats or migration routes for fish. The EMSF has set out criteria to consider the potential impacts on the natural habitats in selecting the subprojects.

83. The proposed investment for rural water supply is also considered to be of small scale, and it is expected that the environmental impacts, such as increase in waste water would be mitigated through investment in collector drainage. The rural population in the MKD region

already has access to water through canals and other water bodies and provision of rural water may increase the overall usage of water, although only marginally.

84. The proposed project would also support construction of bridges across the irrigation canals. These bridges are exclusively secondary and tertiary bridges to facilitate the passage of local traffic and to ensure farm access (less than 4 meters wide), and it is not anticipated that these bridges would induce traffic from outside of the subproject areas, creating nuisance such as pollution and noise for the local residents.

85. The project's main environmental impacts are: (a) impact from disposal of dredged materials; (b) noise, vibration, and other disturbances during implementation of the contracts; and (c) potential contamination of water resulting from increased use of agrochemicals. The following paragraphs explain the possible environmental impacts and proposed mitigation plan.

86. *Impacts from the Disposal of Dredged Materials.* The main possible impacts on the local environment during maintenance dredging and/or construction of secondary and/or tertiary sluices would be: (a) contamination of the lands and water resulting from the disposal of dredged materials; (b) contamination of the roads and lands resulting from the transportation of the dredged materials; and (c) an increase in suspended solids in water due to disturbances of bottom sediment. A sampling survey suggested that dredged materials are mainly silt and clay with high organic content with the content of the heavy metals and residual pesticides being below the national thresholds. Therefore, the risk of contamination to the disposal land and ground water is small.

87. Under the project, the total amount of dredged material would amount to 4 million m3. In the MKD, it is a customary that dredged materials is stored on the land next to the canal for drying for one or two years and then would be used as a basis for roads or dykes. However, it should be noted that the dredging would take place over extensive areas and over the whole project implementation period. Important information such as estimated quantity and likely quality of the sediments, availability of lands for disposal is at the detailed design stage. In this context, it is appropriate to develop a detailed plan for the disposal of the dredged materials at the detailed design stage.

88. The Environmental and Social Management Framework (ESMF) prepared for the project includes Section C of the ECOP, which stipulates the need to prepare a dredge disposal management plan (DDMP) for each dredging contract under the subproject. The DDMP would cover the following aspects: (a) identification of the water users may be affected; (b) identification of the nearby natural habitats; (c) assessment of the quality of the sediments; (d) identification of available land for temporary and permanent disposal areas; (e) transportation plan, if applicable; (f) management of disposal areas, including drainage; (g) identification of the disturbances to local businesses and transportation; (h) identification of the infrastructure to utilize the dredged material; and (i) a monitoring plan (including final quality assessment at the completion of the contract). The first DMDP will be reviewed by the Bank in the process of reviewing tender document for approval.

89. The Environmental Management Plans (EMPs) prepared for the Phase 1 subprojects include ECOP Section C. DDMPs would be prepared during the detailed design of the subprojects according to the ECOP. The same procedures will apply to the future subprojects which involve dredging. The implementation of the DDMP would mitigate the anticipated impacts.

90. *Noises, Vibration, and Other Disturbances During Construction.* The civil works carried out in the process of implementing the subprojects under the project would generally increase the level of air, noise, vibration, and water pollution and traffic congestion they would also raise the potential for accidents and risks to public safety as well as disturbances to local residents. However, these impacts would be localized and temporary and could be mitigated by (a) ensuring that contractors apply good construction practices and initiate/maintain close consultation with local authorities and communities throughout the construction period and (b) close supervision of field engineers and/or environmental officer. An Environmental Code of Practices (ECOP) has been prepared with the following four sections: (a) general provisions; (b) managing construction; (c) dredging; and (d) construction of very small works. ECOP is part of the subproject EMPs, and appropriate parts of the ECOP will be included in the bidding and contract documents and be closely monitored by supervision engineers.

91. *Impact from Increased Use of Agriculture Chemicals.* The more reliable irrigation water would induce increased irrigated agricultural activities which may involve in the use of agriculutral chemicals. In order to mitigate these environmental impacts, an integrated pest management plan (IPM) program will be implemented for each applicable subproject as a part of the EMP. Pest Management Framework (PMF) has been developed 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 IPM.

92. *Environmental Impacts from Aquaculture.* The proposed project would not aim to change or convert the aquaculture activities in the project area. The project areas do not include coastal areas where exclusive shrimp aquaculture is carried out. The five Phase 1 subprojects are located inland, and prevailing aquaculture activities are mainly integrated rice-shrimp aquaculture. This integrated rice-shrimp aquaculture is widely adopted throughout the saline affected areas in the Mekong Delta. The integrated rice-shrimp aquaculture in the Mekong Delta is considered to be one of the more ecologically sustainable approaches to shrimp aquaculture. Most of the aquaculture farms are of small scale (typically up to 100-300 m2) and run by families. The typical annual crop cycle is one (or two) shrimp crops and one rice crop. While in the early 2000s, some farmers raised domesticated shrimp, using hatchery to raise post larvae of *P. monodon* is becoming a common practice as the quality of the post larvae has improved. The rice-shrimp aquaculture has been carried out through modifications of the existing rice field. Therefore, there is no impingement on mangrove forests. The intensity of this aquaculture is quite low (300-400 kg per ha on average) and feed input is also relatively low. The freshwater rice crop provides a buffer between the brackish-water shrimp crops. Therefore inundation of saline water during the dry season apparently does not lead to the salinization of the soil. Residual organic materials from shrimp aquaculture appear to be used as fertilizer for rice farming.

93. Nevertheless, there are some environmental concerns relating to the current rice-shrimp farming systems. First, the current shrimp farming method is based on high water exchange, which would result in high accumulation of sediment in the rice farms in the long-term. Many farmers reportedly dispose of accumulated sediment back into the canals or nearby river, which would induce negative environmental impacts. Furthermore, recent introduction of exotic species and introduction of more intensive shrimp aquaculture may also lead to more pollution in the effluent of the waste water from the shrimp farming. In this context, the Project would support a study contributing to the improvement of current water management practices for shrimp aquaculture. In particular, the study would cover the following aspects: (a) developing a categorized inventory of the current farms; (b) analyzing the current use of fertilizers and antibiotics; (c) identifying areas with acute environmental issues; and (d) establishing and disseminating best practices.

94. During project preparation, it was found that some graves would be relocated[5] according to the land appropriation needs, and therefore, Bank policy OP 4.11: *Physical Cultural Property* has been triggered (see paragraph 76). The ECOP includes a clause on "Chance Find" describing the procedures to deal with the physical cultural properties, graves, and archaeological sites incidentally encountered during the project implementation.

95. *Documentation.* In order to delineate the above-mentioned mitigation measures, the following documents have been prepared:

- Environmental and Social Management Framework (ESMF), which provides the framework for applying social and environmental safeguards. The ESMF includes the following documents:

    - Environmental Code Of Practices (ECOP) to mitigate the short term negative impacts during construction activities covering the following issues: (a) dredging/dyking and construction of secondary sluices; (b) construction of rural roads, bridges, and water supply; and (c) construction of very small works. An appropriate ECOP will be included in the bidding and contract documents and closely monitored by supervision engineers.

    - Pest Management Framework (PMF), which has been developed to provide guidance for the preparation of the IPM programs.

    - Environmental Management Plan (EMP), which has been prepared for the five Phase 1 subprojects under Component 2 and the two Phase 1 subprojects under Component 3 describes the anticipated environmental impacts and concrete actions to mitigate these impacts. The EMPs are subject to the Bank's review and approval.

96. These documents have been disclosed both locally (at the project level, the Vietnam Development Information Center, the Central Project Office of the Ministry of Agriculture and Rural Development, and at the Department of Agriculture and Rural Development in the concerned provinces in the country) and through the InfoShop.

[5] Forty eight (48) graves would be relocated under the Phase 1 subprojects.

97. The project areas are within the basin of the Mekong River, which is considered to be an international waterway in the context of the OP 7.50: International Waterways. The Government of Vietnam is a member of the Mekong River Commission (MRC). Under the MRC procedures, the proposed investments are not considered to be significant; hence, they do not require notification of other riparians through the MRC. Furthermore, the Government of Vietnam does not have any arrangement with China and Myanmar to notify them of the proposed investment.

98. However, in compliance with OP. 7.50, notification to the riparian countries, including China, Myanmar, Lao PDR, Cambodia, and Thailand was carried out by the Bank on behalf of the Government on February 15, 2011. None of these countries have yet responded to the notification, either positively or negatively.

99. In the Bank team's assessment, the proposed project would not cause any appreciable harm to other riparian countries, and the project would not be appreciably harmed by other riparian countries' possible water use. The proposed investments under the project mainly fall into the categories of maintenance, rehabilitation, or completion of the existing irrigation schemes, and the project areas are located mostly downstream of the other riparian countries.

100. *Safeguard Implementation, Monitoring, and Training.* The CPMU would be responsible for overall implementation of the project, including the safeguard aspects. However, preparation and implementation of the subproject-specific safeguard documents (e.g., EMPs, RAPs, EMDPs) would be delegated to the respective PPMUs and the PCERWASS, which would manage the implementation of the subprojects. The CPMU would carry out the following tasks regarding safeguards: (a) review and approve the subproject-specific safeguard documents and submit them for the Bank's review and clearance; (b) monitor on implementation of the EMPs, EMDPs, and RAPs; and (c) secure adequate resources from the counterpart and manage the overall budget for the safeguard related activities. In support of preparation of the safeguard documents and implementation and monitoring of the safeguard measures (including implementation of the IPM program), safeguard training (both environment and social) will be carried out for the PPMU and PMU10 with a budget of US$100,000 over the project implementation period.

101. Special Note for the Environmental and Social Safeguards Category of the Project. The project was categorized as a Category "A" at the time of the Concept Review but has been re-categorized as a Category "B" at appraisal stage. This is primarily because major infrastructure investments originally expected to be part of the project (particularly primary sluice structures, new canals, and major dykes including sea dykes) were subsequently removed from the project design by the Government. As determined in the environmental and social impact assessments carried out as part of preparation, the investments now included in the project will have small-scale impacts and these can be mitigated through the safeguard instruments and investments included under the project.

Annex 1: Results Framework and Monitoring
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

Project Development Objective (PDO): to protect and enhance the utilization of water resources in the project provinces of the Mekong Delta Region in order to sustain gains in agricultural productivity, provide access to water supply for rural households, and contribute to climate change adaptation.

PDO Level Results Indicators*	Core	Unit of Measure	Baseline (2011)	Cumulative Target Values**						Frequency	Data Source/ Methodology	Responsibility for Data Collection	Description (indicator definition etc.)
				2011	2012	2013	2014	2015	2016				
1a. Number of areas where agricultural production has increased	X	Hectares	0		0	7,500	20,000	35,000	50,000	Twice, at mid- term and end of project.	Evaluation report by CPMU	PPMU /PMU10 (Collection), CPMU (Compilation and Reporting)	
1b. Number of areas where agricultural production has been maintained through prevention of future salinity intrusion and flood risks.		Hectares	0		0	5,000	20,000	35,000	50,000		Evaluation report by CPMU	PPMU /PMU10 (Collection), CPMU (Compilation and Reporting)	
2. Provision of sustainable and safe potable water supply to rural population	X	Number of households	0	-	10,000	20,000	40,000	50,000	60,000		Progress report	PCERWASS (Collection). CPMU (Compilation and Reporting)	
3. Increased water productivity in the pilot areas.		% of baseline		-	5	10	15	20	20		Evaluation report by CPMU	PPMU /PMU10 (Collection), CPMU (Compilation and Reporting)	
4. Area transferred to WUOs for managing tertiary and quaternary irrigation facilities	X	Hectares	0	0	2,000	5,000	10,000	20,000	40,000		Evaluation by CPMU	PPMU /PMU10 (Collection), CPMU (Compilation and Reporting)	
5. Number of rural households served by improved sanitation	X	Households	10,000	0	1,000	3,000	5,000	7,500	10,000		Evaluation by CPMU	PPMU /PMU10 (Collection), CPMU (Compilation and Reporting)	

	INTERMEDIATE RESULTS											
	Intermediate Result (Component 1): Water Resources Planning and Efficient Utilization.											
1-1: Number of provinces having water resources management plans considering the impacts on the upstream development and climate change and improve the current operations and maintenance practices		Province	0	-	1	2	4	6	7	Twice, at mid-term and end of project.	Progress report	CPMU	
1-2: Number of pilot programs on improved irrigation and advanced high productivity agriculture practices implemented		Programs	0	-	-	3	4	5	6		Progress report	CPMU	
1-3: Number of provinces implementing programs which would bring improvement in water resources operations and maintenance		Number of provinces	0	0	0	1	2	4	7	-	Progress report	CPMU	
	Intermediate Result (Component 2: Improvement and Rehabilitation of Water Resources Infrastructure											
Number of subprojects successfully prepared with satisfactory safeguard plans		subproject	5	5	7	7	9	9	9		Report by independent M/E	CPMU	
Number of the subprojects constructed		subproject	0	5	5	7	7	9	9		Progress report	CPMU	
Number of the subprojects environmental and social safeguard implemented		subprojects	0	5	5	7	7	9	9			CPMU	

Intermediate Result (Component 3: Rural Water Supply and Sanitation.													
Number of the rural water supply systems constructed/expanded		Number of subprojects	0	2	2	25	45	60	60	Twice, at mid-term and end of project	Progress report	CPMU, PCERWASS	
Intermediate Result (Component 4: Project Management and Implementation)													
Timely submission of annual progress report and audit reports		Report	0		1	2	3	4	5	Once every year	Annual report and Audit report	CPMU	
***Please indicate whether the indicator is a Core Sector Indicator (see further http://coreindicators);** ****Target values should be entered for the years data will be available, not necessarily annually**													

2

Annex 2: Detailed Project Description
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

Project Components

The Project activities will be implemented through the following four components:

Component 1: Water Management Planning and Efficient Utilization (Estimated Base Cost: US$10.33 million). The main objectives of Component 1 are to: (a) strengthen the capacity for the water resources management at the regional and the provincial levels; (b) support the improved operations and maintenance of the existing water infrastructure; and (c) demonstrate a series of good practices of water management promoting water use efficiency. Outcomes from this component would contribute to institutional capacity building enabling accelerated climate change adaptation. The component would have the following two subcomponents.

Subcomponent 1-1 (US$0.95 million). Water Management Monitoring and Investment Planning in the Western Mekong Delta. This subcomponent is to support adjustment of the existing provincial water management plan based on the Mekong Delta Master Plan, incorporating potential impacts from upstream development and climate change. Climate change impacts on salinity intrusion have been well analyzed. However, impacts of salinity intrusion on land use and agricultural activities have to be examined to assess the overall impacts on livelihoods in the western Mekong Delta. This subcomponent also aims at forging an interdisciplinary team consisting of local experts covering water resources, environment, agriculture, and social aspects. In particular, the subcomponent would finance technical assistance, goods (equipment) and training, aiming at:

- The preparation of the provincial level water management and investment plans. This activity would support the revision of the provincial level water management infrastructure plan considering the climate change and upstream development factors. This will involve:

    - Assessing the potential impacts from climate change and upstream developments (using a series of development scenarios and possible operational patterns of the upstream dams) on current land use and agricultural patterns;

    - Identifying the critical areas (districts and villages), where the impacts are substantial; estimating the impacts on livelihood and poverty; for these area, developing a plan of high priority interventions (both structural and non structural measures) to increase resilience and flexibility of water management;

    - For coastal provinces (Bac Lieu, Soc Trang, Kien Giang and Ca Mau), where the conflict in land and water use is expected, reviewing the relevance of the current water management zoning and recommending adjustments in water management zoning where there are possible conflicts in water use; and

- Updating the current Provincial Water Management and Investment Plans consistent with the outputs mentioned above;

- Support for developing a regional water management analysis framework. This activity would support the data collection, analysis, and forecast at the regional level. At this moment, the data collection on water flow and salinity are carried out by the provinces, with little coordination among the provinces. This activity would main support: (a) data collection at the provincial level and integration at the regional level for analysis; (b) training on hydraulic modelling capacity at the provincial level (software); and (c) periodical technical analysis by a specialized institution (funded by the Government), and outcome of this activity would be used for provinces to take proactive actions for water control.

Subcomponent 1-2 (US$ 9.39 million). Water Productivity, Operations and Maintenance. The main objective of this subcomponent is to promote the efficient use of the water through: (a) demonstrating good practices of on-farm water management to increase water productivity; and (b) increase efficiency in operations and maintenance of the irrigation canals in the Mekong Delta. This subcomponent would support the following two activities.

- *Pilot On-farm Management for Improved Water Productivity* (Estimated Cost: US$6.0 million). The demonstration would target a few areas of distinctive soil, climate, agronomic, and water resources such as: (a) An Giang (rice cultivation); (b) Can Tho Municipality (for rice cultivation and fruit trees); (c) Hau Giang (rice cultivation); and (d) Bac Lieu/Ca Mau (for rice and aquaculture). Six (6) specific sites have been selected based on selection criteria including: existing issues on water management, willingness and commitment of the communities and extension services. Each demonstration area would cover 300-500 hectares located within the subprojects supported under Component B. The pilot activities would support: (i) structural measures (laser land levelling, community pumps, improved tertiary, and quaternary on-farm water distribution network) and non structural measures (advanced farming practices, integrated pest management, crop diversification), and institutional support (WUO organizations, value chain support, and extension support). Approximately 1,600 households would participate in this activity.

- *Support for Operations and Maintenance* (Estimated Cost: US$3.39 million). This subcomponent would help the provinces and MARD to increase efficiency in operations and maintenance of the irrigation canals in the western MKD. In particular, the subcomponent has been designed to support: (a) institutional strengthening for the seven irrigation management division companies (IDMCs) and/or irrigation divisions of the DARDs which manage the primary and secondary irrigation facilities; (b) preparation of surveillance, control, and data analysis (SCADA) systems for the irrigation schemes supported under Component 2; and (c) establishing water user organizations (WUOs) in the subproject areas, which would manage the tertiary to on-farm levels. Key goals of this activity are: (i) establishment of clear benchmarks to measure performance of the IDMCs and irrigation divisions, (ii) installation of sound O&M at the tertiary and on-farm management through engagement of WUOs (Key Result Indicator), and (iii)

initiation on a performance-based contracting system between WUOs and IDMCs/irrigation divisions. The activity's main focus is the above-mentioned three irrigation schemes, but during implementation, other areas may be identified. The current management structure of the three irrigation schemes are summarized below:

- *O Mon - Xa No Irrigation System.* The OMXN Irrigation system is an interprovincial system covering parts of two provinces and Can Tho municipality. The provincial-level irrigation management institution is the Irrigation Division under DARD. Secondary support would be provided to the interprovincial Steering Committee. Existing farmer groups currently provide some of the functions that a full WUO would provide. Farmer groups will be targeted first as appropriate bodies for establishment of WUOs in the system.

- *Bac Vam Nao Irrigation System.* The BVN Irrigation System lies entirely within An Giang Province. The top-level irrigation management agency is Management Board under DARD that contracts with the An Giang IDMC to provide irrigation services. A significant amount of IMT has occurred and many sluice and pumps are now owned and operated by farmer groups. The BVN system is currently divided into 24 subzone areas, and 23 of 24 subzones have established subzone management units. The subzone management units will receive technical and logistical assistance to become fully functioning WUOs.

- *QLPH.* The QLPH Irrigation System is an interprovincial irrigation system covering parts of two provinces. Technical support will be provided to the two provincial level irrigation management agencies to develop business and operation plans. The QLPH Irrigation System covers a large area and will require significantly more effort to establish WUOs. Estimates for the number of potential WUOs range from about 200.

The following activities are planned under this subcomponent;

- For the IDMCs and the Irrigation Divisions, technical assistance would be provided to: (a) review the current activities (organization structure, financial management, monitoring system, and planning and evaluation); and (b) developing business plans (asset management plans, budgets, and performance benchmarks). In addition, the activity would support minor office renovation and purchase of critical office equipment and vehicles. A team of international and national experts would be recruited in the CPMU to facilitate the implementation of this activity.

- Technical assistance to prepare detailed plans for installation of the SCADA system mainly for the BVN, QPLH, and OMXN, including: (a) analysis of the critical area for water management; (b) preparing engineering concepts for the monitoring and control system; (c) preparing designs for the structures and technical specifications for the monitoring equipment; and (d) preparation of the detailed tender document. The construction of the SCADA system would be supported as Phase 2 and Phase 3 subprojects under Component 2. In addition, post-installation training would be provided to the IDMCs/irrigation division upon installation of SCADA system.

- This subcomponent would also support the establishment of about 75 WUOs covering about 40,000 hectares mainly in the above-mentioned three irrigation schemes where the investment would be carried out under Component 2. In particular, the activity would involve: (a) an awareness campaign among farmers; (b) farmer mobilization and organization; (c) registration at the communes; (d) business planning and administration for the WUOs; (e) facilitating the handover of the tertiary and on-farm irrigation facilities; and (f) revising and standardizing the current WUO establishment procedures. This subcomponent would also finance office renovation and critical office equipment for the established WUOs. This activity would be implemented with the assistance of a team of dedicated national experts and periodical inputs of international experts. In order to support the WUO establishment, repair works for tertiary canals in OMXN, QPLH, and BVN would be carried out as part of Phase 2 and/or 3 subprojects under Component 2.

Component 2: Improvement and Rehabilitation of Water Resources Infrastructure (Estimated Cost: US$128.93 million). This component aims at contributing to the project objective to sustain and/or further gains in agricultural productivity through supporting high priority water management infrastructure. The typical investments are: (a) dredging of the existing secondary canals to increase water conveyance and storage capacity, particularly during dry season; (b) reinforcement of the existing river dikes, including construction of secondary sluice gates to achieve design capacity for controlling salinity intrusion; (c) construction of small bridges over existing canals to facilitate accessibility; and (d) rehabilitation and minor improvement of the tertiary and quaternary irrigation facilities with support to organize water user organizations (WUOs).

This component would be implemented through a subproject approach. Implementation of these subprojects will be made in three phases (Phase 1: 2011-2012, Phase 2: 2012-13, and Phase 3: 2014-2015). The five subprojects have been proposed as the first phase subprojects and feasibility studies and safeguard documents have been developed for each subproject. It should be noted that the Subprojects No. 4 and 5 are for the same irrigation scheme (Quan Lo Phung Hiep (QLPH)). Detailed Description of the first three subprojects is summarized below:

- *O Mon - Xa No (OMXN) Irrigation Scheme***.** The irrigation scheme, located above the saline water intrusion border in the Delta region, provides fresh water all-year-round. The previous Bank funded project, the Mekong Delta Water Resources Project (2000-2007) invested in critical structures such as the 3 primary sluices, 55 secondary sluices and 81 kilometers of river dyke supporting agriculture and fresh-water aquaculture for an area of about 45,000 hectares covering the provinces of Hau Giang and Kien Giang, and the municipality of Can Tho. The secondary and tertiary canal system has been fully developed in this area but seriously silted due to annual sedimentation in the Delta. The reduced capacity of canal conveyance has led to the shortage of fresh water in some of the command areas and created poor drainage leading to annual floods in the command area. The secondary gate structures were not completed due to limited resources, and there are some areas with salinity control problems. The main objective of the proposed investment under Phase 1 is to restore the design capacity for flood control and supply stable fresh water supply to promote agri-aquaculture. In particular, the proposed

investment would include construction of: (a) additional 99 gated secondary sluices, (b) minor repairs to 16 kilometers of the Xa No dyke from erosion due to heavy navigation transport traffic and (c) installation of a SCADA system at critical points for monitoring the performance of the irrigation system. The estimated base cost for this project is US$35 million (not including the land appropriation cost).

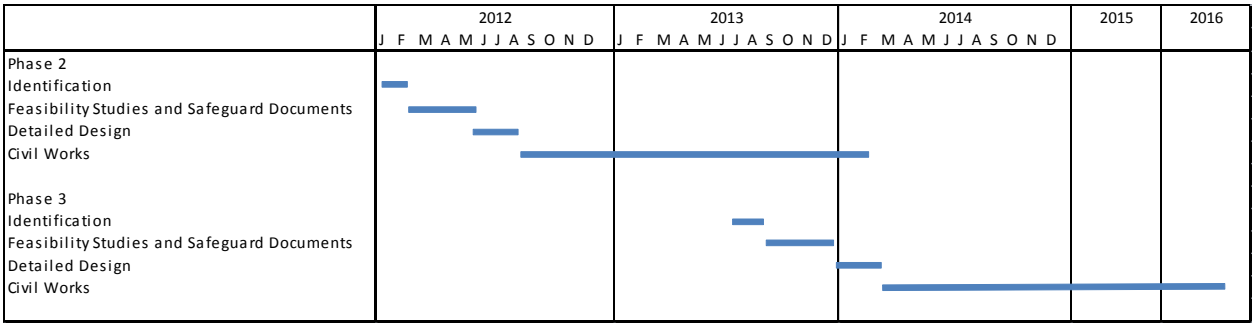
- *Dong Nang Ren Irrigation Scheme* is a part of the Quan Lo-Phung Hiep (QLPH) irrigation scheme. The QLPH project is considered as one of the high priority investments in the Mekong Delta Master Plan in 1994. To date many structural investments have been carried out including critical gated sluices built by the Government in the early 1990's and then subsequently by the Bank-funded Mekong Delta Water Resources Project, which financed the 26 main gated sluices, dredging and new construction of 227 kilometers of the primary canal system, construction of the 54 secondary sluices, rehabilitation of 8 secondary existing sluices, construction of 45 kilometers of river dyke, construction of 37 secondary bridges and dredging of 400 kilometers of secondary canals. The main objectives of the QLPH project were to do salinity intrusion control for the provinces of Bac Lieu and part of Soc Trang, and these investments have collectively enabled agriculture and aquaculture production for an area of about 179,000 hectares. It also helped provide more fresh water to support agriculture in Soc Trang and the northern part of Bac Lieu province. The proposed investments planned under Phase 1 investment include: (a) dredging of the secondary canals, (b) reinforcement of 9.7 kilometers of existing Nang Ren canal dyke by dredging the Ranh canal which partially borders with Soc Tran province, (c) rehabilitation of 7 new secondary canal and (d) new 7 rural bridges spanning over the secondary canals. It also will provide dredging for a number of secondary canals within the subproject command area. The estimated base cost for this project is US$9 million (not including the land appropriation costs).

- *Bac Vam Nao (BVN) Irrigation Scheme***.** The scheme is located in An Giang province. The province has been affected by annual floods from the Mekong main stream. The magnitude of annual flood ranges from 2.8 meters to 5.0 meters and the majority of agriculture land were often inundated. The soil is fertile and agriculture potential is very high. The BVN scheme has been developed to optimize the utilization of available water while protecting crop production from annual floods. Part of the investment has been supported by funding from Australia in early 2000s. The proposed investment under the project would include: (a) dredging of about 20 secondary canals with a total length of 72.0 kilometers; (b) rehabilitation of 15 secondary canals with total length of about 58.0 kilometers; (c) restoration and upgrading of 132 secondary sluices; and (d) construction of about 20 rural bridges to facilitate rural transportation within the command area. The estimated base cost for this subproject is US$9 million (not including the land appropriation cost).

The fourth and fifth subprojects are construction of: bridges over secondary canals in the Quan Lo-Phung Hiep (QLPH) including (a) 13 bridges in Bac Lieu Province; and (b) 49 Bridges in Soc Trang Province.

The Phases 2 and 3 subprojects, approximately 12 and 10 subprojects respectively, will be processed according to the schedule described in Table 1 below.

Table 1: Proposed Schedule for the Phases 2 and 3 Subprojects



The estimated cost for the Phase 2 and 3 subprojects are US$23.4 and 25.8 million respectively. It is planned that the Phase 3 subprojects would include: (a) installation of the SCADA system; and (b) improvement of tertiary canals to be identified through implementation of Component 1.2 (*Water Productivity and Operations and Maintenance*).

Prior to the commencement of the civil works for the Phase 2 and 3, the CPMU would submit a set of feasibility studies and safeguard documents (EMP, EMDP, and RAP) for the review and approval of the Bank according to the following targeted schedule: (a) Submission of the Phase 2 Feasibility Studies and Safeguard Documents - May 1, 2012; and (b) Submission of the Phase 3 Feasibility Studies and Safeguard Documents - March 1, 2014. Satisfactory preparation of the Phases 2 and 3 feasibility studies and safeguard documents are conditions for the disbursement for Phase 2 and 3 Subprojects.

In order to support the preparation and implementation of the subprojects, this component would also include the following;

- Feasibility Studies and Safeguard Documents for Phase 2 and 3 Subprojects. Approximately US$800,000 (or about1.5 percent of the estimated civil works cost) is assigned to support the preparation of detailed feasibility studies (including economic analysis) and safeguard document preparation (EAP, EMP, and EMDP) for Phases 2 and 3 Subprojects. The PPMUs/PMU10 will carry out the feasibility studies and safeguard documents preparation with the assistance of national consulting firms/institutions financed by the counterpart, whereas the CPMU will review and carry out quality control with the assistance of international experts funded by the Bank.

- Detailed Design and Supervision. The Government has allocated approximately US$2.3 million to finance the preparation of the detailed design for Phases 2 and 3 subprojects and carry out technical supervision for the civil works. The funds would support the recruitment of national consulting firms which will assist the PPMUs/PMU10 in carry out the detailed designs.

- Environment Monitoring (US$300,000) will be supported to monitor the impacts possibly resulting from the proposed investment under the project. The detailed scope and frequency of the monitoring is described in the EMP prepared for each subproject. The monitoring would be carried out by a team of independent experts recruited by MARD. The monitoring would mainly comprise: (a) water quality (BOD, agricultural chemicals, salinity pH); and (b) dredged materials. A report would be prepared by the CPMU with the assistance of national consultants financed by the Bank for each subproject every year.

- Social Safeguard Monitoring (US$370,000) will be supported to ensure the implementation of the social safeguards measures, namely RAP and EMDP. The monitoring would be carried out by a team of independent experts recruited by MARD. The monitoring report would be prepared for each subproject every year.

- Integrated Pest Management (IPM) Program Support (US$3.0 million) will strengthen the implementation of the IPM program for subprojects. This activity has been designed based on the existing knowledge and experience on the IPM in the project areas and will mainly support: (a) farmer adoption of good IPM practices and safe use of pesticides; (b) adoption of non-chemical uses and farmer outreach; (c) special assistance to the poor and vulnerable; and (d) strengthen regulatory measures.

- Land Appropriation. Approximately US$19.8 million (or about 15 percent of the total estimated cost of civil works under Component 2) has been allocated to be used for the appropriation of the land necessary to implement the civil works for the subprojects. These relatively high costs are due to the high land price in the MKD. The costs for the land appropriation would be exclusively financed by the Government, and this amount would be adjusted when the RAP is prepared for each subproject. Table 2 below describes the summary of the estimated total land appropriation for the five Phase 1 subprojects. The total estimated cost for the land appropriation for the 5 Phase 1 subproject is approximately US$7.2 million.

Table 2: Estimated Land Appropriation for Phase 1 Subprojects

Subproject	PAHs	Land Acquisition (ha)	Permanent (ha)	Temporary (ha)
1. OMon-Xano	2,189	22.071	8.679	13.392
2. Bac Vam Nao (An Giang)	1,456	26.945	21.152	5.793
3. Quan Lo-Phung Hiep Soc Trang	133	3.911	1.457	2.454
4. Dong Nang Ren	867	26.156	17.165	8.991
5. Quan Lo – Phung Hiep Bac Lieu	42	0.668	0.088	0.580
Total	4,687	79.752	48.542	31.210

Component 3: Rural Water Supply and Sanitation (Base Cost: US$32.98 million). As a follow up to earlier activities under the Mekong Delta Water Resources Development Project, this component would support investments and initial operation of rural water supply systems in currently underserved areas so as to secure access to safe potable water. The component would be comprised the two subcomponents: (a) support for rural water supply in six project provinces

and Can Tho Municipality of the western MKD providing water supply to roughly 60,000 households; and (b) provision of household sanitation to approximately 2,000 families, including sanitation marketing (i.e. training on technical specifications for contractors, sanitation education for households).

Subcomponent 3-1. Support for Rural Water Supply. The component would support the upgrading/installation of water supply systems with two primary sources of water, namely, deep boreholes and surface water extraction. The average size of the 60 or so communities to be provided with these reticulated systems is 1,000 households. Upon completion of the investment, water supplies will be operated on a commercial basis such that the costs of operations and maintenance will require no subsidies from the government, but would rather be financed by the collection of water tariffs from the users. All systems would be 100% metered, and households will be billed monthly based on their consumption. Table 3 provides some relevant technical information for the 48 systems for which feasibility studies have been carried out thus far by the provinces.

Table 3: List of proposed subprojects for Component 3 –feasibility studies stage

Province	Number of Systems Proposed	People Served	Pipeline		Land Required	Benefitting Households	Estimated Construction Cost		
							Total funds		Per Capita
			Length (m)	Length (m) / connection	m2		(Million VND)	(USD)	(USD/person)
Kien Giang Province TOTALS	5	18,785	69,187	18	45,047	3,757	62,328	3,040,390	162
Bac Lieu Province TOTALS	11	25,865	153,250	30	5,779	5,173	75,900	3,755,445	143
An Giang Province TOTALS	8	47,475	124,727	19	4,392	9,495	77,681	4,088,474	104
Ca Mau Province TOTALS	5	29,250	114,664	20		5,850	72,218	3,522,829	120
Soc Trang Province TOTALS	4	28,245	116,098	21	2,000	5,649	70,403	3,434,314	113
Can Tho City TOTALS	10	37,005	92,098	0	3,300	7,401	70,502	3,493,357	88
Hau Giang Province TOTALS	5	67,350	55,820	4		13,470	75,827	3,990,895	55
ALL PROVINCES TOTALS	48	253,975	725,844	14		50,795	504,859	25,325,704	
Sub-Total New Construction	46	110,415	711,532			47,052	488,601	24,469,981	USD 101
Average New Construction			15,468	15		1,023	10,622	509,791	
Sub-Total Upgrading / Expansion	2	0	14,312			3,743	16,259	855,724	USD 46
Average Upgrading / Expansion			7,156	4		1,872	8,129	427,862	

The above-mentioned possible subprojects have been identified by the Provincial Centers for Rural Water Supply and Sanitation (PCERWASS) with endorsement by respective province/municipality people's party committee (PPCs) using criteria such as: (a) the most urgent need for water supply, often based on increased pollution and salinity impacts for certain communities; (b) poverty levels; (c) the need to address the demand for better services from ethnic minorities; (d) geographical spread to districts within the provinces; and (e) per household construction cost.

Similar to Component 2, the implementation of this component would also be implemented through a three phase subprojects approach. Implementation of these subprojects will be developed and managed in three phases (Phase 1: 2011-2013, Phase 2: 2012-14, and Phase 3: 2014-16). The following Two Phase 1 subprojects have been appraised with the feasibility studies and safeguard assessments.

The respective provinces would contribute 15 percent of the cost of the civil works for rural water supply, including household contributions equivalent to 10 percent of the civil works.

Table 4: Summary of the two Phase 1 Subprojects

Subprojects	Scope of activities	Remarks
1. Binh Phuc Xuan in An Giang Province	The subproject will rehabilitate an existing water supply to serve an additional 1,820 households.	Estimated construction cost of USD 460,000. Construction period, 15 months.
2. Nhon Ai Commune in Can Tho Province	This subproject will construct a new water supply with groundwater as the source to serve approximately 1,200 households.	Estimated construction cost of USD 740,000. Construction period, 18 months.
Note: Can Tho and An Giang to provide funding for the preparation of detailed designs and bidding documents for these two subprojects in order to advance the procurement and contracts signing.		

Prior to the commencement of the civil works for Phases 2 and 3, the CPMU will coordinate with PCERWASS to assemble and submit a set of feasibility studies and safeguard documents (EMP, EMDP, and RAP) for the review and approval of the Bank together with Component 2 subprojects according to the following targeted schedule (a) Submission of the Phase 2 safeguard documents: March 2012; and (b) Submission of the Phase 3 safeguard documents: March 2014.
In order to support the preparation and implementation of the subprojects, this component would also include the following facilities:

- Preparation of Feasibility Studies and Safeguard Documents. About 1.5 percent of the estimated civil works cost (approximately US$500,000) is assigned to finance consultants to facilitate the PCERWASS to prepare safeguard document preparation (EAP, EMP, and EMDP) for Phases 2 and 3 subprojects. Counterpart funds would be used to engage national consultants, while the Bank funds would support the recruitment of a team of international experts to provide technical guidance and ensure adequate quality of the documentation.

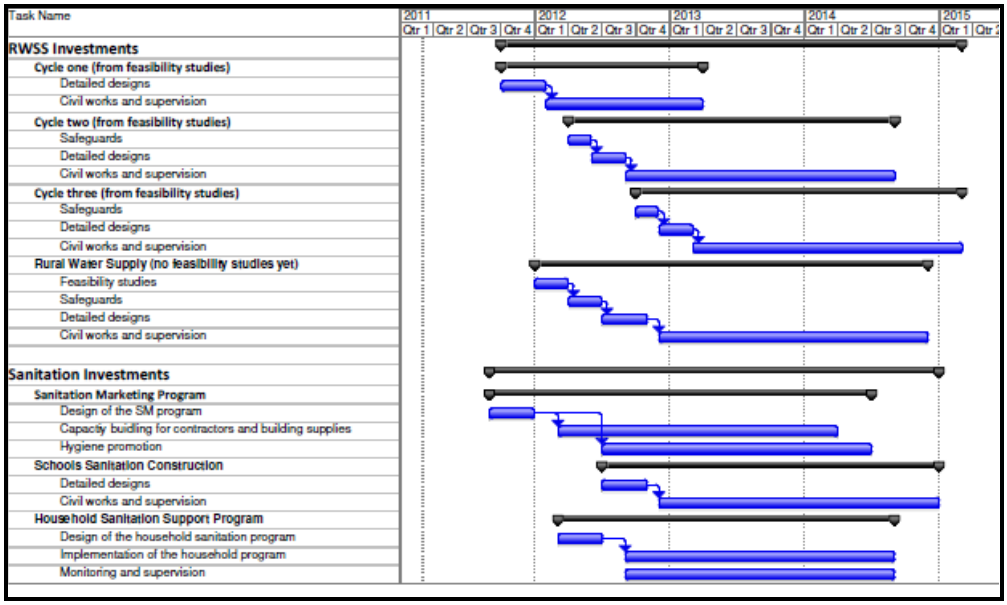
- Detailed Design and Supervision. About 8 percent of the estimated civil works cost (approximately US$2.8 million) is attributed to support the preparation of the detailed design for Phases 2 and 3 subprojects and carry out technical supervision for the civil works. CPMU will recruit international consultants to review the tender documents for the Phase 1 subprojects and representatives of Phase 2 subprojects to ensure the quality of detailed design and mitigate the large discrepancy of per capita unit costs among the provinces/municipalities.

- Environment and Social Safeguard Monitoring (approximately US$184,000) will support the monitoring the implementation of the social safeguards, namely RAP and EMDP for Component 3. The monitoring would be carried out by a team of independent experts

recruited by MARD. The outcome of the monitoring would be summarized into the annual environmental and social monitoring report (para. 48 of the main text).

- Land Appropriation. About 10 percent of the total estimated cost of civil works under Component 3 is allocated for the appropriation of the land necessary to implement the civil works for the subprojects, while major land appropriation is not expected under this component. The relatively high cost of the land appropriation is due to the high land price in the MKD. The cost for the land appropriation is financed 100 percent by the Government, and this amount would be adjusted when the RAP is prepared for each subproject.

Table 5: Proposed Implementation Schedule for the Rural Water Supply and Sanitation Component



Subcomponent 3-2. Institutional Strengthening for PCERWASS. This subcomponent would help increase technical capacity of the PCERWASS and would include the following activities: (a) review of the current operation (inventory of the systems, organization structure, financial analysis, and management analysis), (b) developing business plans (including asset management plan), (c) installation of financial management systems, and (d) provision of critical office renovation and equipment. Prior to the implementation of this subcomponent, a team of international and national experts would be recruited in the CPMU to facilitate the implementation of this subcomponent.

Subcomponent 3-3. Household Sanitation. This subcomponent aims to provide: (a) improved sanitation facilities for approximately 10,000 households, (b) construction of school toilets for about 35 schools, and (c) a sanitation marketing approach program to increase capacity building for private contractors and suppliers, including public education program to advocate the virtues

of sanitation. The program will be administered by the respective PCERWASS with the assistance of international and national experts. The program would also include:

- **Support for Household Sanitation.** This activity would support the provision of household sanitation in the 7 project provinces. During the first two year of the implementation, this activity would support provision of household sanitation for about 10,000 households, including 5,000 low income households through community-based contract approach. Provision of toilets and latrines at schools and other public gathering points. This activity would provide about 35 schools and other public facilities, including hand-washing stations. While the number of the schools are relatively small, this activity would lead to improvement of the school construction designs to include sanitation facilities for the provinces to replicate.
- **Support for implementing the sanitation marketing approach.** This activity would mainly support the private sector and households to understand the importance of sanitation and strengthen the technical and supply capacity. Global experience in the effort to improve sanitation indicates that when it comes to these private goods (household facilities) that have public health impacts, the involvement of the private sector in providing the sanitation solutions and products is the most efficient approach. In particular, this activity would support: (a) strengthening technical capacity of contractors and suppliers to understand technical standards, (b) strengthening the sanitation goods inputs supply chain through analysis and promotion, and (c) promoting hygiene among communities. During the first year, a consulting firm/NGO would carry out a baseline survey and design the program based on this information. In the implementation of the program, collaboration with the Vietnam Women's Association, the Bank administered Water and Sanitation Program (with Gates Foundation funding) would be undertaken.

Component 4: Project Management and Implementation Support (Base Cost: US$6.0 million.) This component would provide support to project management carried out by the CPU, PMU10, PPMU and the PCERWASS to perform overall project management, including technical supervision, procurement, financial management, implementation of the safeguard actions, and monitoring & evaluation (M&E). The main outputs of the component would be timely project preparation and implementation, and objective M&E reports. The cost includes an in-kind contribution made by the Government, such as assignment of government staff, office spaces, and utilities. The Bank financing would be used to support incremental operating cost, technical assistance, training, workshops, external audit, goods, and civil works (office renovation).

Annex 3: Implementation Arrangements
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

A. Institutional Framework

1. The Ministry of Agriculture and Rural Development (MARD) will be the primary executing agency for the Project. MARD has extensive experience in executing IDA-financed projects since 1995. MARD has established a central project office (CPO) in Hanoi in managing the water management infrastructure and established 10 project management units (PMUs) throughout the country to implement water management investment. The PMU No.10 (PMU10) located in Can Tho manages investments in the western part of the MKD. At the provincial level, under the provincial Department of Agriculture and Rural Development (DARD), there is a Provincial Project Management unit (PPMU) and a Provincial Center for Water Supply and Sanitation (PCERWASS) implementing investments for water management (irrigation and flood protection), and rural water and sanitation respectively. The implementation of the project would, in principle, utilize this existing structure.

2. In order to facilitate the monitoring and coordination, MARD has established a Central PMU (CPMU) in Can Tho to manage the project. The CPMU would be fully authorized for managing the implementation of the project including fiduciary, procurement, environmental and social safeguards, financial accounting and payment and disbursement. CPO will assign about 15 staff experienced with technical, financial, procurement, environmental, social, and administrative aspects. A Deputy Director General of the CPO would be assigned in Can Tho as the head of the CPMU and as the project director.

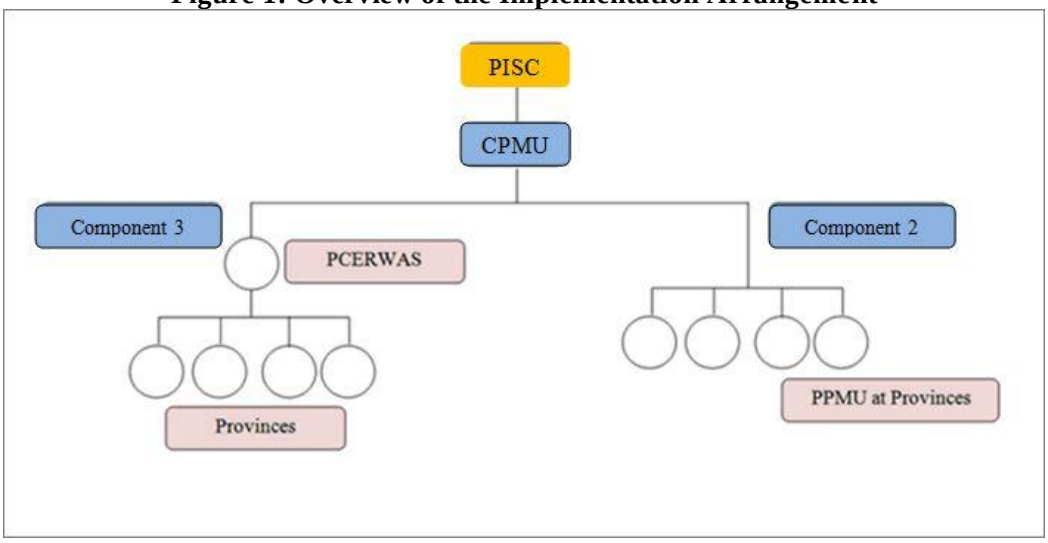
3. Implementation of the subprojects under Components 1.2, 2 and 3 would be delegated to the provincial and regional level. In particular, the PPMU would be responsible for implementing subprojects under Components 1.2 and 2, and PCERWASS would be responsible for implementing subprojects under Component 3. Further the PMU10 would be responsible for subprojects under Component 2 which would involve more than one province (e.g., OMXN).

4. Project Oversight. A Project Implementation Steering Committee (PISC) would be established. The PISC would be chaired by senior management of MARD and comprise representatives of various technical department of the MARD as well as representatives of the 6 participating provinces and Can Tho Municipality. Representatives from other ministries such as the Ministry of Planning and Investment, the Ministry of Natural Resources and Environment would be engaged in the PISC. The PISC would organize meetings to review the project implementation and provide policy guidance as needed basis. The overall implementation structure is illustrated in Figure 1 below.

5. Technical Oversight. In order to provide technical guidance and facilitate the implementation of the project, the existing technical working group based in Ho Chi Minh comprising representatives of the Water Resources Authority (known as Water Resources

Directorate), the Department of Construction Management based in HCMC, the Department of Construction Management, and Department of Plant Protection would be engaged by MARD to assist the implementation. The technical working group would review and comment on the annual work plan, budgeting, procurement plan and tender documents of large ICB contracts. The group would also monitor the outcome of the various activities under Component 1.

Figure 1: Overview of the Implementation Arrangement



6. CPMU. The CPMU would be responsible for the following aspects:

(a) Monitoring the implementation of the all components, including Components 1.2, 2 and 3 implemented by the PPMUs, the PCERWASS and PMU10;

(b) Implementation of Component 1-1, including procurement;

(c) Procurement of the office equipment, furniture, and vehicles under Component 4;

(d) Overall financial management for the project, including: (i) management of financial transactions at the designated accounts at the CPMU; (ii) supervision of the imprest accounts at the PPMUs and PCERWASS; (iii) compilation of the consolidated financial statement to be submitted to SBV and the Bank; (iv) arrangement of the external audits; and (iv) liaison with the Bank's financial management staff for the financial transaction reviews, and

(e) Carrying out Monitoring and Evaluation (M&E) activities, including preparation of the annual implementation reports and plans.

7. Provincial Project Management Unit (PPMUs) and Project Management Unit No.10. Subprojects under Component 2 would be implemented by provincial project management units (PPMUs) in the respective provinces. Subprojects involving more than one province (e.g., OMXN) would be implemented by Project Management Unit No.10 under the direct

management of MARD. The PPMU would be established at the Department of Agriculture and Rural Development (DARD) in each of the 7 project provinces while PMU10 will be assigned by MARD. The main tasks of the PPMU and PMU10 would be: (a) preparing subproject annual implementation plans including procurement and budgeting; (b) carrying out detailed designs; (c) preparing tender documents and carrying out procurement of civil works, goods and consultancy service contracts for subprojects that they are responsible for; (d) supervising all concerned contracts; (e) verifying and processing the invoices from the contractors and vendors; and (f) implementing environmental and social safeguards actions, particularly those related to resettlement, land acquisition and ethnic minority.

8. The PPMU and PMU10 would have the following three sections: (i) water management, environmental and social safeguards; (ii) procurement and finance; and (iii) construction supervision and quality control. The Manager of the PPMU and the heads of the above-mentioned sections would be appointed by the respective DARDs. Part of Component 4 would also support incremental operating costs for the PPMU, including recruitment of the assistants, and technical and administrative project staff.

9. Provincial Centers for Rural Water Supply and Sanitation (PCERWASS) in 7 participating provinces would be responsible for implementation of respective subprojects under Component 3 including technical, financial, procurement and safeguards compliances. The main tasks of PCERWASS are similar to PPMUs as mentioned above. Most of PCERWASS are familiar with Bank-financed project activities as they were involved with the implementation of rural water supply and sanitation component under the previous Bank-funded project.

10. Monitoring and Evaluation (M&E). The CPMU would be responsible for carrying out the M&E of the project, and would recruit a dedicated staff. The M&E staff would be responsible for preparing for the following report in coordination with the PCERWASS and PPMUs;

- Semi-annual Progress Report would be submitted to the Bank for review by January 31 and July 31 of each year, beginning with January 31, 2012, and contain results of monitoring and evaluation activities performed pursuant to above date beginning January 15, 2012 as well as a section on compliance with environment and social safeguards;

- Mid-Term Review report by November 30, 2014, containing the summary of the progress, updated result indicators (as stated in Annex 1), updated project estimated cost, and plan for completion; and

- Annual Environment and Social Safeguard Monitoring Reports would be submitted to the Bank for review by January 31 each year, beginning January 31, 2012. The report should contain: a) progress in: (i) preparation of the safeguard documents for Phase 2 and 3 Subprojects; (ii) implementation status of social and environmental safeguard actions; (iii) status of land acquisition; (iv) grievance applications; (v) any other updated information on the emerging safeguard issues; and (vi) planning. This report shall be prepared with assistance of the national consultants recruited by the CPMU.

A3.1. Financial Management, Disbursement and Procurement

A.3.1.1 Financial Management and Disbursement

11. The CPO will establish the CPMU in Can Tho, who would be responsible for overall financial management. The CPO has some experience with the Bank financed projects such as Irrigation Rehabilitation Project (closed in 2002), Vietnam Water Resources Management Project (on-going), and Mekong Delta Water Resources Management Project (closed in 2007), and is familiar with the Bank requirement on the financial management. Senior staff on financial management and accounting shall be seconded to the CPMU to manage the project financing.

12. The PPMUs, PCERWASS and PMU10 will be responsible for implementing subprojects in their respective provinces under Components 2 and 3, including financial management. Financial management capacity assessment have been undertaken with respect to personnel, internal controls, accounting and reporting system, planning and budgeting for these units. The review has found that the PCERWASS and PMU10 have minimum financial management capacity with prior experience implementing the Bank funded project. However, the PPMUs have no prior experience with Bank financed project, while implementing investments funded by the national and/or provincial budget. Nevertheless, it was confirmed that the financial management the implementing agencies are well established and adequately staffed. The internal control procedures are in place and effectively maintained. The current accounting and reporting systems are assessed as adequate for accounting and reporting on the receipt and use of funds from the Bank. Those implementing entities need to assign adequate financial management personnel to the Project.

13. There will be only one Designated Account (DA) established in the CPMU. The CPMU will manage the DA and fund flow of the Project, consolidate interim financial reports and annual financial statements from provincial implementing agencies, and appoint independent auditor for the Project. The DA would be used to pay contractors and suppliers, and provide advances to provincial implementing agencies for their incremental operating costs. The DA would be opened in US dollars at a commercial bank with terms and conditions acceptable to the Bank. Traditional disbursement methods (with reporting method using SOE/ Summary Sheet) will be applied. Each of 7 PPMUs, 7 PCERWASS and PMU10 will open a sub-account to receive fund advanced from CPMU and pay for the incremental operating cost incurred by it for the Project. The ceiling of the DA and subaccounts will be specified in the Disbursement Letter based on disbursement forecast prepared by each management unit.

14. Submission of quarterly Interim Financial Reports (IFRs) would be required. The CPMU will be responsible for preparing the report through compiling information furnished by the PPMUs, PCERWASS and PMU10 within 45 days of the end of the quarter. The IFRs, which are unaudited, will cover all project activities, including the following forms: (a) Sources and Uses of Funds; (b) Disbursement by component, sub-component and implementing agency; and (c) Statements of Designated Accounts Reconciliation.

15. In addition, preparation of the annual audited financial statements would be required for the project. Project financial statements will be prepared by each of implementing units on an annual basis for their own components and sub-components, and then submit to CPMU for consolidation and audit. CPMU is responsible for overall preparation of Project consolidated financial statements. The project's annual financial statements will be audited in accordance with international auditing standards and in compliance with the independent auditing regulations of Vietnam. CPMU will be responsible for appointment of an auditor for the whole Project in accordance with the Bank's guidelines.

16. The external auditor will be required to express an audit opinion covering the project financial statements, use of funds, SOEs and Designated Accounts, which are prepared in accordance with International Public Sector Accounting Standards. A management letter addressing internal control weaknesses will also be provided by the auditor together with the audit report on the project financial statements.

17. In addition, internal auditors will be assigned by MARD for the CPMU and the PMU10, and Provincial People's Committees for PPMU and the PCERWASS, to perform internal audit function of the Project. The preparation of the TORs and assignment of the internal auditors will be approved by the Bank by project negotiations.

18. Most of the financial management personnel of PPMUs and the PCERWASS do not have adequate experience with IDA funded projects, in particular, with disbursement procedures and IDA reporting requirements. Training on these will be delivered to those involved in the project financial management by the Bank Financial Management Specialist and Disbursement Specialist before negotiation of the Project, followed by intensive training on the FM matters during the first year of implementation. .

19. Supervision of project financial management will be performed twice a year. The supervision will review the project's financial management system, including but not limited to operation of DA, SOEs, internal controls, reporting and follow up of audit findings and mission's findings, and site visits. Financial management supervision will be conducted by the Bank's financial management specialists in integration with task team.

20. Governance and Anti-corruption. To continue to strengthen the financial management arrangements for the project and to help further reduce the risk of fraud and corruption, particular emphasis needs to be given in the following areas: (a) clear FM responsibilities with avoidance of gaps and overlaps and maintenance of segregation of duties included in the FM manual; (b) enhanced disclosure and transparency of financial information by publishing project and entity financial statements; (c) internal audit function; inspection by MARD and Provincial People's Committees for components implemented in their local areas (country system); (d) authorisation of Expenditures Verification Agencies (State Treasury and Vietnam Development Bank) is to be obtained before any payment made (country system).

Actions	**To be completed by**	**Responsibility**
Completion and adoption of the Project Operations Manual, including the Financial Management Manual.	Effectiveness	CPMU, PMU10, PPMUs, PCERWASS

21. Disbursement. Disbursement to be made against project component is summarized in the table below. It is expected that the proceeds of the credit will be disbursed over a period of six years from October 1, 2011 to March 31, 2017.

Category	Amount of the Financing Allocated (expressed in SDR)	Percentage of Expenditures to be Financed (inclusive of Taxes)
(1) Eligible Expenditure under Part 1 of the Project	6,760,000	95% of works; and 100% of other Eligible Expenditure
(2) Eligible Expenditure under Part 2 of the Project	72,620,000	95% of works; and 100% of other Eligible Expenditure
(3) Eligible Expenditure under Part 3 of the Project	18,900,000	81% of works; and 100% of other Eligible Expenditure
(4) Eligible Expenditure under Part 4 of the Project	2,630,000	95% of works; and 100% of other Eligible Expenditure
TOTAL AMOUNT	**100,910,000**	

22. Eligible expenditures. Eligible expenditures are as follows:

- **Component 1, 2 and 3*:*** (i) works; (ii) goods; (iii) consulting services
- **Component 4*:*** (i) works, (ii) goods; (iii) incremental operating cost; and (iv) consulting services

A3.1.2 Procurement

23. Procurement for the proposed Project would be carried out in accordance with the Bank's Guidelines: *Procurement under IBRD Loans and IDA Credits,* dated May 2004, revised October 2006 and May 2010; and *Guidelines: Section and Employment of Consultants by World Bank Borrowers,* dated May 2004, revised October 2006 and May 2010, and the provisions stipulated in the Financing Agreement.

24. The project procurement includes a large number of small-value civil works contracts estimated to cost about $194 million in total to be procured by 11 decentralized provincial implementing agencies (PPMUs, PCERWASS, and PMU 10). Given that these civil works

contracts range in estimated value from $50,000 to US$1.9 million and that the infrastructure works are geographically scattered over the project areas, these contracts are unlikely to attract foreign competition. Grouping them into larger contracts is made impractical by the geographically scattered nature of the works and by the fact that they will be procured by 11 different provinces. The estimated values of all civil works contracts fall below the Bank's threshold for National Competitive Bidding in Vietnam, which is US$3.0 million. Consulting service contracts estimated to cost about $13 million in total would consist of some major contracts to be procured using QCBS procedure and the rest would be procured using CQS procedure. The following method and review thresholds would be used:

Procurement Methods and Prior Review Thresholds, US$

Procurement Method		**Thresholds of Procurement Methods**	**The Bank Prior Review Thresholds**
Works	Shopping	Below $100,000	
	NCB	$100,000 or above	First contract for each method by each implementing agency regardless of value; all subsequent contracts of US$300,000 or above.
	ICB	$3,000,000 or above	
Goods	ICB	$300,000 or above	All contracts
	NCB	$50,000 or above	First contract by each agency regardless of value; all subsequent contracts of US$100,000 or above
	Shopping	Below $50,000	First contract by each agency regardless of value.
Consulting services	QCBS/QBS	$200,000 or above	All contracts
	CQS	<$200,000	All contracts above $100,000
	Single Source Selection of firms	Assignments meeting requirements set out in paragraphs 3.9 – 3.13 of the Consultant Guidelines	All contracts
	IC	Assignments meeting requirements set out in paragraphs 5.1 and 5.4 of the Consultant Guidelines	All contracts above $50,000 and all sole source selections

25. The CPMU would be established in Can Tho by the CPO of MARD prior to the project effectiveness. The CPMU's responsibilities on procurement include: (a) guidance for all sub-implementing units on procurement; (b) quality control of their procurement actions to ensure

compliance with the Financing Agreement; and (c) communicating with the Bank on all procurement related matters including obtaining the Bank's no objections for all contracts that subject to the Bank prior review. The CPMU will be staffed with at least 3 qualified procurement specialists with adequate experience in Bank-funded procurement. The CPMU would also engage national consultants on a part-time basis in carrying out procurement process for larger and complex civil works.

26. The CPO has experience in managing the Bank projects such as the Irrigation Rehabilitation Project (closed in 2002), Vietnam Water Resources Management Project (on-going), and the Mekong Delta Water Resources Management Project (closed in 2007). The CPO is preparing for the Natural Disaster Management Project (FY 2012). The performance of the CPO in implementing these projects has been generally satisfactory. The CPO intends to assign its Deputy Director General, who has experience on implementing these projects as the Project Director for the proposed project. The PMU10 and PCERWASS, which would implement the subprojects under Components 2 and 3, are familiar with the Bank procurement procedures through implementation of the previous Bank-funded Mekong Delta Water Resources Project. However, the PPMUs, which would implement subprojects under Component 2, does not have adequate knowledge or experience on the Bank procurement rules. The CPMU to be established under the CPO in Can Tho would monitor and facilitate the overall implementation at the provinces, particularly subprojects implemented by the PPMUs.

27. The main procurement risks for the proposed project are: (a) delays in procurement actions; and (b) possible non-compliance with Bank procedures (including governance and corruption issues) at the provincial level in light of the decentralized structure of the procurement implementation. Procurement delay could occur at all stages of the procurement cycle including planning, preparation of procurement documents, bid evaluation, approval of bid evaluation reports and award recommendation and contract management, and (b) possible governance and corruption at the provincial level in light of the decentralized structure of the procurement implementation. Therefore procurement risk is rated 'substantial'. In order to mitigate the risk, intensive capacity building measures would be implemented during the first year of implementation, such as: (a) procurement training for procurement staff at CPMU, PPMU, PMU10, PCERWASS; (b) appointment of qualified government staff as procurement staff at all implementation units; and (c) close supervision and prior review for the first contracts for each implementing unit.

28. A procurement capacity assessment of the implementing agencies has been conducted during project preparation. Based on the outcome of the assessment, the following main capacity strengthening actions shave been discussed and agreed with the Borrower:

- CPO shall establish CPMU in Can Tho which shall be staffed with at least three qualified procurement specialists with adequate experience on the World Bank-funded procurement prior to the project effectiveness.
- CPMU shall issue the project implementation plan, including procurement manual prior to the project effectiveness.
- CPMU, PCERWASS, PMU10, and PPMU, shall be staffed with at least two qualified procurement specialists by the project effectiveness.

29. Governance and Anti Corruption. In order to mitigate the risks of possible fraud and corruption, particularly those associated with the civil works, the following measures have been included: (a) establishment of a complaint handling mechanism at the CPMU and the Construction Department of MARD; (b) engagement of independent agent to verify the completion of subprojects (technical audit); and (c) development of benchmarks for key items in the bill of quantity (e.g., excavation) to detect possible collusion. Detailed procedures for these measures would be stipulated in the POM.

A3.2. Environmental and Social Safeguards

A 3.2.1 Project Types, Locations and Impact Assessments

30. Bank's safeguard requirements: The following five Bank safeguard policies are triggered: i.e., EA (OP 4.01), natural habitat (OP 4.04), pest management (OP 4.09), resettlement (OP 4.10), physical cultural property (OP 4.11), indigenous peoples (OP 4.12), and international waterways (OP7.50). To comply with these policies, the following safeguard instruments have been prepared: (a) a Regional Environmental Assessment (REA) covering the whole project; (b) Social Impact Assessment (SIA); (c) Environmental and Management Framework (ESMF) including Pest Management Framework (PMF), and Environmental code of practices (ECOPs); (c) Subproject-specific Environmental Management Development Plans (EMPs) including Integrated Pest Management (IPM) program; (d) an Ethnic Minority Development Framework (EMDF); (e) Subproject-specific Ethnic Minority Development Plans (EMDPs); (f) a Resettlement Policy Framework (RPF); and (g) Subproject-specific Resettlement Actions Plans (RAPs). These safeguard activities were carried out by three groups of qualified national consultants with technical supports from international consultants (one on environment and one on social) during November 2010 to March 2011.

31. Documentation. The following documents have been prepared to delineate the proposed mitigation measures:

- *Environmental Safeguard Documents*. An ESMF, which provides the framework for applying social and environmental safeguards, has been developed and includes: (i) an Environmental code of practices (ECOP); (ii) a Pest Management Framework (PMF); and (iii) an Environmental Management Plan (EMP) for the five Phase 1 subprojects under Component 2 and the two Phase 1 subprojects under Component 3.
- *Social Safeguards Documents.* To avoid or minimize potential negative impacts due to land acquisition, physical relocation, and/or loss of crops/businesses/houses/ structures, , an RPF has been developed (in conformity to the Bank's OP 4.12 and in close consultation with affected communities and relevant government agencies) to ensure that the project affected people are adequately compensated and/or supported so that no one will be worse off after the Project. In addition, RAPs have prepared for each of the five first-year subprojects under Component 2. Since the Project may positively and/or negatively affect the ethnic minorities in the project area, an EMDF has also been developed to ensure fair sharing of project benefits and to minimize potential negative

impacts on ethnic minority groups. Furthermore, an EMDP has been prepared for each of the two Phase 1 subprojects which would affect the ethnic minority population.

32. These safeguards documents have been disclosed both locally (at the project level, the Vietnam Development Information Center, the Central Project Office of the Ministry of Agriculture and Rural Development, and at the Department of Agriculture and Rural Development in the concerned provinces in the country) and through the InfoShop.

33. Government's EIA requirements. EIA regulations require preparation and approval of EIA or mitigation measures for investment projects depending on types, locations, and nature of the activities. Projects with large and complex activities and/or with significant impacts, the EIA will be reviewed and approved by the Ministry of Natural Resources and Environment (MONRE), while projects with small impacts and/or located in the province the EIA and/or environmental commitment can be approved by respective Provincial People's Committee (PPC) at provincial or district levels with recommendation by the Provincial Department of Natural Resources and Environment (DOSTE). Currently, the MARD has been preparing and obtained the approval from the MONRE and PPCs for the identified Phase 1 subprojects.

34. Types and locations. Project activities can be divided into four types as follows: (a) technical assistance and institutional support (Component 1); (b) rehabilitation and upgrading of water resources infrastructure in existing irrigation/flood control areas (Component 2); (c) upgrading and new construction of rural water supply (Component 3); and project management (Component 4). All the activities will be carried out in the seven provinces in the western part of the MKD which is a large tidal flat area and agriculture is the major land use. Description of the activities and locations is summarized below:

- Component 1 aims to provide (a) institutional support to the provinces on water resources planning and monitoring of water resources investment; and (b) capacity building on operations and maintenance and demonstration on improved water productivity in the following target areas - Can Tho/An Giang for modern rice cultivation and fruit trees, Kien Giang/Soc Trang for mainly rice cultivation; and (c) Bac Lieu/Ca Mau for rice cultivation and aquaculture. Main activities will include hiring of consultants, procurement of equipment and vehicles, and small renovations of offices.

- Components 2 activities (subprojects) will involve dredging, cabal dyke rehabilitation, and construction of secondary sluices and bridges in existing irrigation/flood control areas. At present five Phase 1 subprojects have been identified. The location and description of these five Phase 1 subprojects are summarized in Annex 2. Activities will include implementation of IPM program and environmental monitoring as well as preparation of safeguard documents for the second and third subproject phases.

- Component 3 activities will involve upgrading and construction of new small and medium size rural water supply systems (capacity from 7-50 m3/hr) in the western part of the Mekong Delta. Two subprojects have been proposed as Phase 1 subprojects (one in An Giang and another in Can Tho City). The location and description of these two Phase 1 subprojects are summarized in Annex 2. Activities will include implementation of IPM

program and environmental monitoring as well as preparation of safeguard documents for the second and third subproject phases.

- Component 4 activities will support the project management to be carried out by the CPMU, PERWASs, PMU10 and the PPMU of each province to perform overall project management, including technical supervision, procurement, financial management, safeguard training of staff and information disclosure, and monitoring & evaluation (M&E).

35. Anticipated Environmental Impacts. The project's main environmental impacts are: (a) impact from disposal of dredged materials, (b) noise, vibration, and other disturbances during construction, and (c) potential contamination of water resulting from increased use of agrochemicals. Detailed descriptions of the anticipated environmental impacts and proposed mitigation measures are summarized in paragraphs 83-93 in the main text of the PAD.

36. Anticipated Social Impacts. The proposed project will involve land acquisition and relocation of households and businesses. Potential negative impacts on the ethnic minority people are also anticipated for some subprojects. Detailed descriptions of the anticipated environmental impacts and proposed mitigation measures are summarized in paragraphs 80-93 in the main text of the PAD.

A.3.2.2 Key Measures to be taken by the Borrower to Address Safeguards Policy Issues

37. Guiding Safeguard Documents. The following safeguard documents have been prepared and approved:

- *Regional Environmental Assessment.* A regional environmental assessment (REA), including social impact assessment, was carried out in the subproject areas. The REA has assessed the potential cumulative impacts as well as identified major impacts at the subproject levels, and associated mitigation measures.

- *Environmental and Social Management Framework (ESMF).* An environmental and social management framework (ESMF) has been developed based on the REA to set out a framework to prepare for subproject specific environmental management plan (EMPs) and deal with the environmental and social safeguard management for the project. The ESMF has set out the four steps from identification, technical screening, safeguard documentation, and implementation. The ESMF also incorporates an ECOP mentioned above. Chance Found Procedures have been included in the ECOP Section A to deal with any physical cultural resources that might be found unexpectedly during project implementation.

- *Pest Management Framework (PMF):* Implementation of integrated pest management (IPM) program for each subproject would be prepared for mitigating potential negative impacts of the project due to the potential increase in use of fertilizers and pesticides. The IPM program is a part of the subproject specific EMP. As a framework to prepare for an IPM program for subproject, a pest management framework (PMF) has been

developed to provide policy and technical guidance for the preparation and implementation of the IPM programs. The PMF identifies four priorities for project support: (a) Strengthening capacity of the IPM farmer groups; (b) Promoting non-chemical options; (c) Strengthening regulatory measures; and (d) assisting poor farmers and vulnerable groups.

- *Resettlement Policy Framework (RPF).* The RPF has been prepared to set out a framework for involuntary resettlement issues such as land acquisition related impacts/displacement in connection to the activities under the project**.** This would provide guidance in the compensation, assistance, resettlement and restoration of people's livelihoods during project implementation for project-affected persons (PAPs). The RPF will be used as a basis for preparation of a subproject specific Resettlement Action Plan (RAP) for the subprojects. RAPs also include income restoration programs for severely affected households and affected vulnerable households (including ethnic minority households) wherever applicable.

- *Ethnic Minority Development Framework.* An Ethnic Minority Development Framework (EMDF) has been prepared in a free, prior, and informed consultation with ethnic minority communities to ensure that the affected ethnic minorities have an equal opportunity to share the project benefits and that their broad-based community access and support are established for the project and that any potential negative impacts are properly mitigated.

- *Subproject Specific Safeguard Plans (Environmental Management Plans (EMPs), Resettlement Actions Plans (RAPs), and Ethnic Minority Development Plans (EMDPs):* In consistency with the above-mentioned framework documents, the following subproject specific safeguard plans are prepared for the first Phase Subprojects: (a) seven EMPs (five for Component 2, and two for Component 3); (b) five RAPs (for five subprojects under Component 2); and (c) two EMDPs (for the subprojects in Soc Trang and Bac Lieu).

38. Safeguard Related Activities. During implementation of the Project, the implementing agencies (CPMU, PMU10, PPMUs and PCERWASS) will undertake the following safeguard actions:

- *Safeguard Training.* Within the first three months after project effectiveness, CPMU will provide training to the implementing agencies at least for the Phase one subprojects. Other training will be timely provided to facilitate effective preparation of safeguard documents and implementation of Phases two and three subprojects. A budget of US$100,000 has been allocated for the training under Component 4.

- *RAPs and EMDPs:* (a) implement the RAP and EMDP for the Phase 1 subprojects under Components 2 and 3; (b) prepare RAPs and EMDPs for all the Phase 2 and 3 subprojects in consistent with the RPF and EMDF; (c) disclose information on RAPs and EMDPs for Phases 2 and 3 subprojects; and (d) prepare an annual monitoring report on

implementation of the RAPs and EMDPs. Budget for the implementation of RAPs will be provided by the Government, whereas the monitoring would be funded by the Bank.

- *EMPs.* (a) Implement EMPs, including IPM program and ECOPs as appropriate, for the Phase 1 subprojects that have been approved by WB and (b) timely prepare site-specific EMPs for all the Phases 2 and 3 subprojects in line with ESMF, including IPM and ECOPs. Information disclosure and WB clearance of the EMPs for Phases 2 and 3 subprojects will be required. A budget of US$3 million has been allocated for the implementation of IPM programs. A budget has also been provided for monitoring of the EMP implementation.

- *Bidding and Implementation.* During the preparation of bidding document for the civil works for Components 2 and 3, include appropriate ECOPs into bidding and contract documents. During the bidding process, ensure that the contractors are aware and commit to comply with the safeguard requirements. During execution of civil works, monitor the contractor performance and keep proper records for possible review by the Bank.

- Prepare Environmental Impact Assessment (EIA) and secure its approval according to the Government's EIA regulations for all the Phases 2 and 3 subprojects. English executive summary of the report and the approval conditions will be made available in the project file for review by the Bank.

39. Implementation Arrangement. Preparation of the subproject specific safeguard plans, and implementation of the safeguards related activities would be responsibility of the respective PPMUs, PMU10 and PCERWASS. CPMU will be responsible for: (a) providing adequate funds to PPMUs, PMU10, and PCERWASS, (b) monitoring and supervision of all the safeguard measures and ensuring full compliance with Bank's safeguard policies, (c) preparing the overall safeguard reports, (d) facilitating possible external audit for RAPs and (e) responding to public comments and/or PAP's complaints/requests.

A3.3. Reporting

40. The project report would be the responsibility of the CPMU. In addition to the following report mentioned in para. 11 of this annex: (a) Semi-annual Progress Report; (b) Mid-Term Review report; and (c) Annual Environment and Social Safeguard Monitoring Report, the CPMU would issue the following two reports during implementation:

- Quarterly unaudited Financial Statement; and

- Annual Work Plan. The plan shall be submitted to the Bank for review by January 31 each year to set out the key implementation activities and required financing sources.

A3.4 Monitoring and Evaluation

41. The information on the project outcomes would be obtained by the respective PPMUs and the PCERWASS and complied by the CPMU. The indicators are straightforward, and the

each PPMU and the PCERWASS would have adequate capacity to obtain information, particularly for the intermediate indicators.

42. During first two years of the project implementation, monitoring effort will focus on progress of procurement activities against the agreed procurement plan, implementation of the agreed safeguard measures, and construction progress on sub-projects. The outcome of the M&E would be shared with the PISC to identify the key delays in implementation and possible remedial actions. Starting the third year, the M&E would focus on collecting information for the following three key result indicators listed below. At the mid-term review (planned for the end of the third year), the outcome for the M&E would be shared with the PISC as well as the Bank to reassess likelihood of the overall achievement of the project development objective and help readjust the project implementation plan, if necessary.

- *Increased agriculture and/or aquaculture production attributable to improved efficiency and availability of the water.* The information would be obtained by the respective PPMU for each of the subprojects identified. The data would be obtained through: (a) overall monitoring of the land use to capture the areas benefitted from the project; and (b) monitoring on the yields through crop cutting in controlled areas.

- *Increased access to water supply of rural population.* This data would be obtained by each DARD responsible for rural water supply.

- *Increased water productivity.* The data would be obtained by the respective PPMUs at each of the pilot areas. The data collection and analysis would be planned as part of the pilot activities.

43. The capacity of the CPMU, PPMU PCERWASS and the PMU10 on the M&E is limited, and in order to reinforce the capacity, a national M&E staff would be assigned at the CPMU and an international consultant to conduct a baseline survey and prepare for the detailed M&E procedures as a form of the Monitoring and Evaluation Plan during the first year of the implementation. The incremental cost for carrying out monitoring and evaluation is estimated at US$304,000 (including contingencies, excluding the in-kind contribution made by the Government (e.g., staffing) over the 6 year period of project implementation, and this cost would be financed under the Bank.

Annex 4: Operational Risk Assessment Framework (ORAF)
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

Project Development Objective(s)		
Protect and enhance the utilization of water resources in the project provinces of the Mekong Delta Region in order to sustain gains in agricultural productivity, provide access to water supply for rural households, and contribute to the climate change adaptation.		
PDO Level Results Indicators:	1. Number of areas where agricultural production has increased	1
	2. Number of areas where agricultural production has been maintained through prevention of future salinity intrusion and flood risks.	
	3. Provision of sustainable and safe potable water supply to rural population	2
	4. Increased water productivity in the pilot areas.	
	5. Area transferred to WUOs for managing tertiary and quaternary irrigation facilities	
	6. Number of rural households served by improved sanitation	

Risk Category	Risk Rating	Risk Description	Proposed Mitigation Measures
Project Stakeholder Risks	M-L	The Borrower, NGOs, residents in the project area, downstream water users, and/or donors may object to the proposed investments (subprojects) proposed under the project.	During preparation, technical reviews have been carefully undertaken – and the first phase of sub-projects focuses on works and activities that would avoid negative impacts resulting from substantial changes in the salinity regime of affected water bodies. After consultation at the subproject sites, the subprojects have been approved by the respective provinces and the central government. A similar approach would be adopted for future sub-project cycles.

Implementing Agency Risks	H	The perceived risks resulting from decentralized implementation arrangement include: (a) delays in implementation; (b) non-compliance with the Bank procurement rules; (c) suboptimal use of the project funds at the provincial level, and (d) possible corruption, including collusion among contractors.	The agreed mitigation measures include: (a) establishment of the Central Project Management Unit (CPMU) in Can Tho to closely monitor the progress and facilitate the provinces in implementing subprojects; (b) recruitment of national and international consultants to provide technical guidance to the provinces and carry out technical audit to ensure adequate technical quality; (c) engagement of internal audit at the provincial level to minimize the risk of misuse in the funds; (d) provision of training on financial management and procurement at the initial stage of the project implementation; and (e) establishment of a complaint handling mechanism at the MARD.
Project Risks			
• Design	H	Decentralized approach - with sub-projects in seven provinces – and fairly complex institutional implementation arrangements.	Coordination of decentralized locations/activities will be undertaken through an adequately staffed central project management unit (CPMU) that is located in the project area and that is established under the existing Central Project Office (which has adequate experience in implementing donor-funded projects as well as technical and communications capacity). The CPMU would be a legal entity, and would be fully authorized to manage project implementation - including fiduciary, procurement, financial accounting and payment and disbursement. The CPMU will have adequate resources and staffing to carry out its mandate.
• Social & Environmental	M-I	(a) Land acquisition process could experience delays and/or difficulties, and (b) Sub-optimal contractor performance could negatively affect mitigation of environmental impacts from the disposal of the dredged materials.	(a) The Government has prepared Resettlement Action Plan (RAP) for the five first Phase subprojects that is satisfactory to the Bank and also has prepared initial estimates of the required counterpart funds. Safeguard training would be provided. Qualified national consultants would be

			recruited to help respective provinces monitor overall progress, including on safeguards. (b) An environmental code of practices (ECOP) has been prepared for mitigation of potential negative impacts, covering dredging. The ECOP will be included in the bidding and contract documents and implementation will be closely monitored by PPMUs and PMU10.
• Program & Donor	L	This is a stand-alone project and is not dependent on other donors' activities.	
• Delivery Quality	M-I	Perceived risks would include: (a) substandard quality in technical designs, particularly for SCADA system (Component 2) and new rural water supply systems (Component 3); (b) low maintenance on the infrastructure invested under the project; and (c) low quality of works due to weak contract management and quality monitoring at the provincial level.	Agreed mitigation measures include: (a) recruitment of national consultants for design and supervision by the CPMU to make the design and quality of construction satisfactory; and (b) recruitment of international and national consultants to help design the effective SCADA system.

Risk Rating at Preparation	Overall Risk Rating during Implementation	Comments
M-I	M-I	

Annex 5: Implementation Support Plan
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

1. An implementation support plan (ISP) has been prepared for the proposed project. The main objective of the proposed project is to: protect and enhance the utilization of water resources in the Mekong Delta region in an integrated manner in order to sustain gains in agricultural productivity, raise living standards, and accelerate climate change adaptation measures. To achieve this objective, the proposed project would have the following four distinct components: (a) Water Management Planning and Efficient Utilization; (b) : Improvement and Rehabilitation of Water Resources Infrastructure; (c) Rural Water and Sanitation; and (d) Project Management and Implementation Support. The total project cost is estimated at about US$206.6 million, of which the Bank would finance up to US$160.0 million.

2. In preparing for the ISP, the following aspects have been considered:

- Type of contracts, scale, and scope. The proposed project would have relatively large number of the large civil contracts implemented independently by the respective provinces. The civil works procurement would be carried out by both international competitive bidding and national competitive bidding. The capacity of the provinces in document preparation, selection of the contractors, and supervision of the contractors are the major concerns.

- Level of decentralization of project management and implementation. The implementation arrangement envisages the project management and coordination at the regional level whereas the day-to-day project management, including procurement (mainly contract management) and financial management, would be decentralized to the respective provinces.

- Degree of flexibility in design and appropriate levels of review process. The Component B of the proposed project adopts a subproject approach where subprojects for the second year onwards would be identified during the project implementation. While this approach gives flexibility to respond to the emerging demands, it also requires the Bank to review the preparation of the necessary documents (feasibility studies and safeguard documents) as well as adequate consultations.

- General Risk for Fraud and Corruption. The risks for the fraud and corruption for civil works, including collusion among contractors are generally high in Vietnam. In addition, the decentralized arrangement for implementation at the provincial level requires close monitoring during project implementation.

- Previous experience with the implementing agency. Both the regional project management unit (PMU10) and a coordination unit (CPO) have been engaged to implement the previous Mekong Delta Water Management Project and have essential technical and fiduciary management skills; however, there have been some issues for land acquisition and resettlement aspects.

3. Proposed Approach for Implementation Support. In view of above-mentioned issues, the following approach is proposed for each element to guide the Bank's implementation support:

- *Procurement.* Implementation support will first mainly focus on the capacity building of the staff at the regional and provincial level to familiarize them with the Bank procedures. During implementation, through the prior and post review process, capacity assessment would be carried out to identify the provinces where the capacity is particularly week and extensive monitoring is required. For the large civil works contracts, while the project would engage national and international consultants, the Bank would also engage in the prior review in a proactive manner to ensure satisfactory outcome. In addition, comparison of unit price for key items (e.g. excavation) among provinces would be carried out to identify possible collusion among contractors.

- *Financial management.* Similar to procurement, the implementation support would first mainly focus on the capacity building of the financial management staff and establish a system compiling expenditures at the provincial level into a single report to facilitate overall monitoring of the project finance. During the first year implementation, frequent reviewing of the SOEs and account management at the provincial level to assess the financial management capacity and identify possible mismanagement, including fraud and corruption at each province.

- *Environmental and Social Safeguards.* The implementation support would first provide training for the project staff to understand fully the Bank procedures and agreed safeguard documents. During the first year of implementation, the Bank team would also support the CPMU to secure adequate funding to implement the agreed measures (particularly resettlement and land acquisition). The Bank team would also closely monitor the preparation of the safeguard documents for the second year subprojects afterwards, and ensure that public consultations are made and that the proposed subprojects would not arise any conflict. If necessary, a national independent social development socialist to verify these points.

- *Technical Aspects.* During the implementation, the Bank team would pay particular attention to the progress in Component 1 to ensure integration of the project activities to achieve overall project objectives. The Bank team would also carry policy dialogue on the resources allocation for the operations and maintenance of the irrigation canals in the Mekong Delta with other development partners.

- *Monitoring and Evaluation.* The indicators agreed to measure the project outputs and outcomes are straightforward and the CPMU and the provincial project management unit would have adequate technical capacity, and the Bank team would monitor the outcome throughout periodical regular supervision missions; however, in order to verify the outcome of the monitoring, the Bank team may engage a team of independent experts (e.g. academic institutions) at the mid-term and project completion.

4. Summary of the Implementation Support Plan

- *Technical inputs (Water Resources Management).* Water resources management and/or irrigation engineering, and rural water supply specialists' inputs would be provided to (a) review feasibility study, detailed design, and bid documents of the proposed subprojects to ensure quality and efficiency of the civil works and timely planning and implementation (b) supervise the civil works during construction and site closure to ensure technical contractual obligations are met, and (c) supervise implementation of the activities under Component A, particularly pilot activities to improve water productivity. The project technical team will conduct site visits on a semi-annual basis throughout project implementation.

- *Procurement.* Implementation support will include: (a) providing training to procurement staff at the regional and provincial project management units and related staff in the regional project offices; (b) reviewing procurement documents and providing timely feedback to the implementing agencies; (c) monitoring procurement progress against the detailed Procurement Plan; (d) undertaking *ad-hoc* comparison of unit prices among the project provinces; (e) reviewing the outcome of the technical audit to review the quality and outputs of the project; and (f) review of the effectiveness of the complaint handling system established under the project.

- *Financial Management.* Implementation support will include: (a) reviewing the financial management system of the Project both at the regional and provincial level, including accounting, reporting, and internal controls; (b) reviewing SOEs and contract payment of the sub projects on a random sample basis in collaboration with the procurement staff; and (c) providing training and guidance to the financial management staff.

- *Environmental and Social Safeguards.* Implementation support will include: (a) providing training on RPF, EMDF and ESMF; (b) review the implementation progress of the agreed safeguard measures, including RAPs, EMDPs, and EMPs of the subprojects; and (c) providing guidance to the implementing agencies and its consultants to address any issues.

- *Other Technical Inputs.* Periodical technical inputs would be required to monitor the overall progress in Component A and help refine the planned activities and outputs from viewpoints of climate change. It is also desirable to have periodical inputs (e.g. at the mid-term) from technical specialists in various agronomic aspects (modernization of rice production, diversification of crops, aquaculture development, agronomy, community development specialist, etc.) to review the development of the agriculture during implementation. Such technical specialists would also contribute to the pilot activities.

5. The following is the tentative plan for implementation support for the proposed project:

Time	Focus	Resource Estimate	Partner Role
First twelve months	Technical and procurement review of the bidding documents and outcome of the bidding Procurement training	Water/Irrigation engineer 6 SWs Procurement specialist(s) 4 SWs Rural Water Supply Specialist 6 SWs	NA
	FM training and supervision	FM specialist 3 SWs	
	Land acquisition and resettlement	Social development specialist 4 SWs	
	Environmental training and supervision	Environmental specialist(s) 2 SWs	
	Institutional arrangement and project supervision coordination	Operations officer 8 SWs	
	Team leadership	TTL 4 SWs	
12-60 months	Review of the overall project implementation, including undertaking of technical audit	Water/Irrigation engineer 4 SWs Procurement specialist(s) 4 SWs	NA
	Environment and social monitoring & reporting	Environmental specialist(s) 4 SWs Social specialist 4 SWs	
	Financial management disbursement and reporting	FM specialist 3 SWs Operations officer 8 SWs	
	Task leadership	TTL/Co-TTL 4 SWs	

Note: SW – Staff-Week

5. Skills Mix Required**.** Required staff skill mix is summarized below.

Skills Needed	Number of Staff Weeks	Number of Trips	Comments
Economist/TTL	8 SWs annually	Fields trips as required.	Country office/HQ based
Water/Irrigation Engineer/Co-TTL	6 SWs first year, then 2 SWs annually in the following years	Two	Country office/HQ based
Rural Water and Sanitation Engineer	4 SWs annually	Two	County office based
Procurement	4 SWs annually	Fields trips as required.	Country office based
Social development specialist	3 SWs annually	Fields trips as required.	Country office based
Environment specialist	3 SWs annually	Fields trips as required.	Country office based
Financial management specialist	3 SWs annually	Fields trips as required.	Country office based
Water resources management specialist	2 SWs annually	One	Country office/HQ based

Annex 6: Team Composition
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

Bank staff and consultants who worked on the Project included:

Name	Title	Unit
Toru Konishi	TTL, Senior Economist	EASIN
Cuong Hung Pham	Co-TTL, Water Resources Specialist	EASVS
Steven M. Jaffee	Country Sector Coordinator, Rural	EASVS
Tuan Anh Le	Social Development Specialist	EASVS
Joseph Gadek	Senior Water Supply Specialist	WSP Vietnam
Manida Unkulvasapaul	Environmental Specialist	EASIN
Vic Macasaquit	Resettlement Specialist	EASINt EASFM
Mai Thi Phuong Tran	Financial Management Specialist	EAPCO
Thang Chien Nguyen	Procurement Specialist	
Hisham A. Abdo Kahin	Senior Council	LEGES
Jose Simas	Water Resources Engineer	LCSEN
Hugh Turrel	Water Resources Management Specialist Agriculture Economist	LCSEN
Juan Morelli	Institutional Specialist	MNSSD
Eric Biltonen	Consultant	EASVS
Tam Thi Do	Program Assistant	EASVF
Demilour Reyes Ignacio	Program Assistant	EASIN
Sandra Walston	ET Temporary	EASIN

Annex 7: Economic and Financial Analysis
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

1. The Mekong Delta (MKD) has an enormous agricultural potential that has been expressed in the last decades as hydraulic structural works enhanced water management. In the last decade alone, rice production had an annual growth of about 2.7 percent while diversification towards aquaculture production resulted in an annual growth of more than 22 percent. At the same time, higher value fruit orchards area grew at 2 percent per annum. Still, there are many hydraulic structures and production support services needing further improvement to sustain the on-going development process on which the livelihood of KRD 18 million inhabitants depend. According to the Rice Research Institute in Ho Chi Minh City the average rice productivity could still be increased significantly through better water management, and rice intensification technologies.

2. The proposed project development objective is to protect and enhance the utilization of water resources in the region in an integrated manner in order to sustain gains in agricultural productivity, raise living standards, and accelerate climate change adaptation. The primary benefits expected from the proposed project are: (i) to increase the agricultural productivity of an estimated 120,000 hectares by mitigating risks posed by flood inundation, erosion, salinity intrusion and seasonal shortages of freshwater; (ii) extend access to safe potable water to about 60,000 households and contribute to the improvement of their health and livelihood; and (iii) increase water productivity. The principal outputs of the project will be increases in the production of rice, maize and sugarcane, with possible increases in soybean, peanuts, fruits and vegetables.

3. An ex ante economic and financial analysis was conducted to verify the feasibility of the proposed investments to improve water resources management in the project area. The analysis covered: (i) five schemes selected by the GOV for the first implementation year under Component 2 (Support for Water Management Infrastructure) including several water management structures in O Mon - Xa No, Bac Vam Nao, Dong Nang Ren, and several bridges in Bac Lieu and Soc Trang Provinces; and (ii) two representative water supply schemes to be financed under Component 3 (Water Management Infrastructure): one for the extension of an existing system, and the second, for the construction of a new system.

4. The proposed subprojects under Component 2 for the first implementation year are as follows:

- Completion of the O Mon – Xa No (OMXN) Irrigation Scheme (41,060 hectares), located in the provinces of Hau Giang, Kien Giang as well as part of Can Tho Municipality6.

[6] In the case of Oman Xa No scheme, the GOV proposed investments planned to be completed in three phases of about 2 years each, would reach more than VND 4.7 trillion (US$ 230 million). The project would finance the first phase costing about US$43 million. This first phase will have the highest impact of the three phases as it will allow

- Reinforcement and Rehabilitation for the Dong Nang Ren Irrigation Scheme (40,000 hectares) located in Bac Lieu Province.
- Repairs and completion to the Bac Vam Nao (BVN) Irrigation Scheme (34,000 hectares) located in An Giang Province.
- Improve rural transport infrastructure in Quan Lo-Phung Hiep (QLPH) in Bac Lieu Province through the construction of 13 bridges.
- Improve rural transport in QLPH in Soc Trang Province through the construction of 49 bridges.

5. The O Mon – Xa No scheme land-use shows about 41,000 ha under agricultural and about 48 ha under aquaculture. The annual crop land is almost 32,000 ha, while perennial trees occupy about 9,200 ha including coconut trees 1,500 ha and fruit trees 7,500 ha. Cropping intensity on annual crop land is about 2.5. About two thirds of the annual crop area (19,670 ha) is under triple rice cropping and one third (9,830 ha) under double rice plus some aquaculture. This scheme area has already been funded under the previous Mekong Delta Water Resources Management Project, and its ex-post completion report estimated that the economic rate of return was 15.9 percent. Works proposed to be financed under this project would include: construction of secondary sluices gates and reinforcement of the dyke. These investments would complete the flood control system and irrigation & drainage canals that were built throughout the years since 1980s. As water management will be improved and extension services provided: (i) double cropped areas would go to triple land use; (ii) rice intensification would increase land, water and nutrients productivity; and (iii) diversification to higher value activities will be induced.

6. The North Vam Nao scheme constructed during 2000-2005 includes a ring dyke system and gated sluices around the project area for controlling flood water levels. It facilitated agriculture production including up to 3 crops per year. Its area is 33,766 ha of agricultural land show some limitations to be solved, including: (i) the secondary dyke system around compartment and culverts have high risk of dyke break, being not safe for flood protection and crop cultivation; (ii) the dyke system has a limited function of flood water control, and cannot be independently operated for water regulation; and (iii) on-farm canal and road network are not available limiting the transport of farm machines, inputs and output, resulting in bottlenecks for diversification and for reducing costs of production and post-harvest handling and transport. Proposed investments would reach VND 710 billion (74 km improvement of compartment dyke with concreted top surface; building 20 new bridges; and dredging 71 km of irrigation canal). Improvements will allow for the transportation of harvesting machines to the fields reducing harvesting costs and post-harvesting grain losses which represent up to 10 percent of product, and the diversification towards vegetables. In sum, the proposed works would: (a) enable the application of the 'alternate watering and drying' method for rice irrigation which is part of the technical package being promoted for increasing yields and reducing costs; (b) diversification to the higher value crops (e.g., vegetables); and (c) eased transportation of harvesting machines which would substantially reduce post harvest losses.

---

for the control of floods. The other two phases aiming to upgrade the drainage system would be financed by other sources.

7. The Dong Nam Ren scheme proposed works include: reinforcement of the existing dykes, dredging of existing canals, and construction of secondary sluices and rural bridges. The main benefits of the proposed investment are: (a) preventing salinity intrusion for about 10,000 hectares; (b) securing dry season fresh water for about 8,500 hectares to enable irrigation; and (c) improving the internal drainage for about 500 hectares. Improvements will also facilitate increased productivity, production and diversification to higher value crops.

8. For the bridges to be constructed in QLPH, Bac Lieu and Soc Trang Provinces also under the component 2, the analysis was based on the benefits in time savings for the surrounding households moving from and to the project area, as well as the reduced use of fuel for transport.

9. The evaluation of the first 3 schemes mentioned above included three steps: (i) the preparation of crop and activity budget models representing the average production technology, average yields, revenues and costs per ha cultivated showing both scenarios: the current situation before project, and the expected one after the project completion; (ii) estimation of the financial impact of the project through farm models representing typical beneficiaries, showing the existing and future cropping patterns as well as the annual net family income; and (iii) the economic impact of the proposed investment for each of the three individual schemes, net of taxes and subsidies.

10. The assessment of benefits was based on information available from different stakeholders, including farmers, villagers, government line agencies (NIAPP, RRI, ARI, etc.) and local universities. The main benefits of the proposed investment would be: (a) increasing intensity of rice cultivation; (b) allowing diversion to higher value production (e.g., fruit trees, aquaculture, etc,); (c) increasing yields for rice and other crops compared with 'without project' scenarios. The results of existing local small scale pilot experiences on the application of the "one-must-five reduction technologies" promoted for rice production by the Rice Research Institute and the MARD were also considered.

Financial Analysis

11. The project will allow for the completion of on-going irrigation schemes for irrigation and flood and salinity control; and upgrading of existing irrigation and drainage infrastructure in an area still characterized by high poverty rates. It will facilitate increases in farm productivity and output and provide the basis for higher farm incomes, which will particularly benefit poor households. The financial analysis of the project includes the use of crop budgets and farm models using FARMOD software, quantifying the current and expected crop yields and inputs, cropping patterns and net income results at the level of beneficiaries' of project interventions. The models include both scenarios: before and after the system improvements and the project support activities. Average crop models were prepared for the most important crops being produced in each of the three areas including the three successive rice crop seasons, maize, beans, sugar cane, vegetables and several fruit orchards, as well as for the main aquaculture activities for each area.

12. 2010 market prices for products, inputs and labor at the farm level were used for the different activities in both scenarios, as the analysis was done at constant value prices. Table 1

shows the main results from the modeling. These changes are higher yields, and in some cases, reduced production costs and water pumping and use. Models represent average situations7, for example, in some areas the without project scenario could show decreasing yields because of increased salinity, while in others, the "without project" scenario could show some increase in yields due to the continuous release and farmer uptake of improved varieties that will happen even without the project. As a result of the combination of both opposing trends, it was assumed that without the project, it would result in the constant average crop yields for the three regions.

13. The resulting net income before and after labor costs, provides an estimate of the average incremental net benefit that could be attained for each of the main activities once the water management in the area is improved, and the new technologies are adopted. Main parameters and values are summarized in Table 1.

14. The expected productivity gains and values shown in Table 1 are averages for each of the three subproject's area and are the basis for estimating the financial and economic benefits of the proposed interventions. Yields are expected to increase by 4 - 25 percent, while net incomes per crop/activity would increase by 5 - 67 percent (with an average of about 30 percent) as a result of the combined effects of increased production and reduction in production costs (e.g., reduced inputs, labor and/or energy costs).

Table 1: Average yield and income increases by crop three years after project improvements

Crop/Activity	Crop yields (kg/fed)			Income after labor costs ('000 VND/ha)		
	Without Project	With project	Increase %	Without project	With project	Increase %
NORTH VAM NAO						
Rice Winter-Spring	7,200	7,500	4	12,046	15,892	32
Rice Summer-Autumn	5,500	5,800	5	5,205	8,672	67
Rice Autumn-Winter	5,900	6,200	5	7,075	10,432	47
Maize	7,200	7,600	6	14825	16,245	10
Sesame	1,600	1,800	13	34,345	39,805	16
Soybeans	2,700	3,000	11	19,909	23,899	20
Green Beans	1,650	1,800	9	28,685	32,520	13
Vegetables	22,000	25,000	14	41,565	49,865	20
Shrimp in rice fields	170	200	18	11,710	14,920	27
Shrimp existing ponds	750	850	13	54,260	64,150	18
Fish in rice fields	300	350	17	3,040	4,070	34
Fish Existing Ponds	4,700	5,500	17	57,270	73,970	29
DONG NANG REN						
Rice Winter-Spring	5,600	6,000	7	17,575	19,905	13
Rice Summer-Autumn	4,800	5,400	13	6,892	9,332	35
Sugar cane	65,000	70,000	8	48,860	54,860	12
Vegetables	12,000	15,000	25	14,546	23,446	61
Fish in Ponds	5,200	5,500	6	101,836	107,036	5
Shrimp rotation Rice	355	380	7	27,150	30,150	11
Shrimp in New Ponds	-	380	-	-	109,600	-

[7] Available in the project file.

O MON - XA NO						
RICE SUMMER-AUTUMN	4,500	5,100	13	6,624	9,314	41
RICE AUTUMN-WINTER	4,100	4,440	8	5,690	7,002	23
RICE WINTER-SPRING	6,500	7,160	10	14,590	17,208	18
SOYA BEANS	2,000	2,400	20	10,770	16,020	49
MAIZE	5,200	5,800	12	8,905	11,385	28
SUGAR CANE	71,000	85,000	20	31,940	44,260	39
MANGO EXISTING ORCH.	8,700	10,500	21	37,310	50,460	35
MANGO NEW ORCHARDS	-	15,000	-	-	68,390	-
VEGETABLES	16,000	16,800	5	24,379	26,779	10
CITRUS	13,500	14,800	10	48,530	56,310	16
LOGAN	7.7	8.2	6	19,070	21,030	23
BANANO	14.5	17	17	18,700	24,040	29
COCONUT	5.2	6.2	19	18,360	23,460	28
MIXED GARDEN	6,000	7,000	17	10,740	15,430	44
FISH IN RICE FIELDS	300	350	17	2,900	3930	36
SHRIMP - EXISTING PONDS	700	800	14	50,460	60,650	20
FISH IN PONDS	4,700	5,500	17	57,270	73,970	29
SHRIMP IN RICE FIELDS	218	250	15	17,410	20,470	18

Note: *Yield increases are estimates based on a yield development period of three years after project implementation. For example, an increase of 21 percent would imply an annual yield growth of about 7 percent for the three years after project interventions.*

15. Farm budgets representing typical rural household systems were also modeled. Primary sources of income, production costs, off-farm employment, on-farm consumption and other relevant parameters were used to estimate the expected impact of improvements to the flood control and irrigation and drainage systems and from production support activities on the family income of farmers before labor costs which are usually family labor (Table 2). These models confirm the financial feasibility of the proposed interventions and the positive impact on beneficiaries' family incomes even maintaining the prevailing cropping patterns with marginal addition of vegetable production. As shown in Table 2 (see also Appendix 1, Tables 42, 43 and 44) the project's improvements would allow not only water-use efficiency gains, but also more than 80 percent increases in household income.

Table 2: Farm Models: Estimated Income Increases (in '000 VND/farm)

Typical farm models in Mekong West Delta areas	Farmers net income		Income increase in VND	Income increase in %
	Without project	With project		
Bac Vam Nao Typical Farm	37,166	67,914	30,748	85
Dong Nang Ren Typical Farm	30,935	57,155	26,220	86
Oman Xano Typical Farm	32,940	61,344	28,404	83

Economic Analysis

16. The economic analysis considered costs and benefits from a societal point of view. Costs and benefits were estimated using economic prices and opportunity costs for discounting the project net cash-flow. Market prices were the base for the financial analysis. Conversion Factors (CFs) for shadow pricing were applied for prices of labor, main products and inputs, and for investment costs for the analysis. CFs for traded inputs and outputs were derived from the

estimated import or export parity prices using recent forecasts of commodity prices prepared by the World Bank. The CFs used for the analysis, are detailed in Table 3.

Table 3: Conversion Factors for Selected Items

No	Items	CF
1	Civil works	0.9
2	Compensations & Resettlement	0.265
3	Rice	1.128
4	Fertilizers	0.95
5	Labor	0.8
6	Other agricultural inputs/outputs	0.9

17. CFs for resettlement and compensation costs are based on administratively fixed costs for compensation, resettlement and rehabilitation measures. The new resettlement policy applied in Vietnam, is supporting measures for agricultural land acquisition at 3-4 times the value of the opportunity cost of this production factor. Opportunity cost of land was estimated based on the net present value (NPV) of annual net benefits currently obtained from agricultural production. Details in the calculation of CF for these compensation and resettlement cost in O Mon – Xa No area shows that the market cost for temporary land acquisition is VND 146 million/ha while the average net benefit foregone per year from agricultural land required for the improvements would be VND 48.75 million/ha. Land compensation rate for permanent acquisitions is VND 675 million/ha while the NPV of net benefits derived from agriculture was estimated at VND 492.82 million. These values confirm the huge transfer of payments to land owners through the current policy of land compensations. Correcting for these non-economic costs assumed by the Government, the CF for compensations and resettlement costs was estimated at 0.265 (see Table 4).

Table 4: Estimation of CF for Resettlement in Omon-Xano

Items	Financial Cost (VND Mil)	Land area (ha)	Compensation (VND Mil)	Economic value of land (VND Mil)	CF
Physical Asset	59,199				0.800
Land acquisition					
Temporary	17,577	120	146	48.75	0.333
Permanent	283,094	419	675	492.84	0.730
Supports & rehabilitation	776,732				0
Management cost	56,830				1
Total financial cost	**1,193,432**				
Total economic cost	**316,700**				**0.265**

18. Physical contingencies for the project investments were taken into account for the economic analysis but not the price contingencies. Other related cost such as (i) agricultural extension services; and (ii) water resources planning and capacity building were also included. Agricultural extension services cost for O Mon - Xa No, North Vam Nao, and Dong Nang Ren schemes considered providing technical support to farmers in (i) new cultivation technologies to improve yields and reduce production cost; (ii) promotion of new crops (fruits, vegetables and other non-rice crops); (iii) advanced farming system in rice-fresh fish/shrimp combinations for improving family income; and (iv) introduction of harvesting machines to reduce post-harvest losses. It was assumed that agricultural extension workers could cover about 250ha each. Estimated salary and DSA are VND 100 million/year/worker. Computer, office facilities and pilot experiment would be equivalent to total salary & DSA in the first year of the schemes. Total extension workers would be 120 for O Mon – Xa No, 100 for North Vam Nao, and 30 for Dong Nang Ren. Water resources planning and capacity building would cost VND 325 billion, equally distributed in the first 5 years of the project (VND 65 billion/year). Extension costs are detailed in Table 5.

Table 5: Financial Cost for Extension Services (VND billion at 2010 price)

Sub-projects	Year 1	Year 2	Year 3	Year 4	Year 5
1 O Mon – Xa No	24	12	12	12	12
2 North Vam Nao	20	10	10	10	10
3 Dong Nang Ren	6	3	3	3	3
Sub-Total	**50**	**25**	**25**	**25**	**25**

19. The analysis assumed moderate yield increases as explained before and minimal diversification to higher value crops. The aggregation of the costs of the main project's three areas, and the expected results after all improvement and other support activities using economic CFs, allowed for the assessment of the results for the three schemes'. The economic rate of return (ERR) would be 24.5 percent for Bac Vam Nao scheme, 14.5 percent for the Dung Nang Ren scheme, and 14.7 percent for the O Mon - Xa No scheme (Appendix 1, Tables 45 to 47). In the latter case, total investments for the three phase development scheme (US$291.7 million) were considered even though the project would finance only the first phase (US$43.1 million). With a cost of 15 percent of the total investment, the first phase is expected to have most of the benefits considered for the three phases (about 70 percent) as floods will be completely controlled when the first phase is completed. The remaining benefits (about 30 percent) would arise as the drainage system is rehabilitated and other improvements completed in the following phases. Hence, the first phase project investment would have a higher return than the estimated for the three phases.

20. For the water supply schemes to be financed under the third component, the assessment of benefits were derived from beneficiaries' time saved in procuring water for their households once the system is connected, savings in buying treated water for drinking, and in some cases, from reduced illness related costs as safe drinking water is made available. The analysis was carried out for two typical water supply schemes: (i) expansion of an existing one; and (ii) the construction of a new water supply system. The water supply schemes for Nhon Ai and for Binh

Phuoc Xuan communes were assumed to represent typical schemes to be financed under the third project component (Appendix 1, Tables 40 to 41).

21. The overall project economic analysis including the Economic Rate of Return (ERR) and NPV was then based on the aggregation of the analyzed schemes together with the two schemes involving bridges proposed to be financed under the second component, and the expected results under the water supply projects to be financed under the third components. This sample schemes are a good combination of all investments to be financed under the project. As can be seen in Table 5 below (and Table 48 in the Appendix), the net value of production in the three main areas considered for this analysis would be increased from VND 2.4 trillion to VND 3.6 trillion at project maturity. The resulting ERR for the overall investment was estimated at 16.7 percent and the NPV with 12 percent discount rate at VND 1.17 trillion (US$58.6 billion). These results would be achieved without considering any value to the benefits to be obtained in public goods, including: (i) water use for irrigation being reduced for its reallocation to other sectors or irrigated areas; or (ii) the environmental benefits.

Sensitivity Analysis

22. Sensitivity to the variations on current output prices and/or to investment costs was estimated as follows: (i) if output prices were decreased by 20 percent, the ERR would be reduced to 13.5 percent; and (ii) if investment costs would be 20 percent over the estimated budgets, the ERR would be decreased to 14.5 percent. The joint effect of both events would result in an ERR of 11.5 percent. Sensitivity to implementation delays of about two years would also result in a reduction of the ERR to 14.5 percent. In case the three adverse events mentioned above would jointly happen, then the ERR for the overall project would drop to 9.9 percent. These results allows to conclude that the project is strong enough to overcome adverse situations even in case of reduced price for agricultural products, increased costs of project investments and up to two years implementation delays.

Project Summary

Table 6

ECONOMIC BUDGET (AGGREGATED) (In VND Billion)	Without Project	With Project							
	1 to 20	1	2	3	4	5	6	10	16 to 20
Main Production									
Shrimps	9	9	9	10	13	18	24	33	33
Fish	60	60	60	64	71	79	102	147	147
Rice	4,053	4,053	4,053	4,089	4,112	4,169	4,255	4,405	4,405
Rice (Tai Nguyen)	244	244	244	244	246	250	257	262	262
Sugar Cane	212	212	212	206	196	188	188	192	192
Green beans	0	0	0	1	1	2	2	3	3
Soya beans	21	21	21	24	27	36	42	52	52
Maize	41	41	41	43	46	55	67	106	106
Sesame	2	2	2	2	2	2	3	8	8
Vegetables	112	112	112	130	162	223	301	475	475
Vegetables	-	-	-	9	22	43	47	50	50
Citrus	281	281	281	281	282	284	287	308	308
Mango	94	94	94	94	95	97	100	148	297
Coconut	46	46	46	46	46	47	48	54	54
Longan	68	68	68	60	57	54	50	44	44
Banana	22	22	22	22	22	22	23	26	26
Sub-total Main Production	5,266	5,266	5,266	5,324	5,398	5,567	5,798	6,312	6,461
Production Cost									
Investment									
Purchased Inputs	-	-	-	3	7	12	21	4	-
Labor	-	-	-	1	2	4	7	3	-
Sub-total Investment Costs	-	-	-	4	9	16	28	7	-
Operating									
Purchased Inputs									
Fertilizers	639	639	639	644	644	643	638	630	659
Agrochemicals	319	319	319	322	322	320	316	301	301
Planting Materials	166	166	166	169	168	166	165	156	156
Hired Machinery & Other	597	863	929	604	612	632	656	709	711
Aquaculture Inputs	21	21	21	22	23	24	27	34	34
Sub-Total Purchased Inputs	1,749	2,015	2,080	1,765	1,772	1,788	1,805	1,831	1,863
Labor									
Labor	1,126	1,126	1,112	1,096	1,069	1,040	1,013	1,013	1,023
Sub-total Operating Costs	2,875	3,140	3,192	2,861	2,842	2,828	2,818	2,844	2,886
Sub-Total Production Cost	2,875	3,140	3,192	2,865	2,851	2,844	2,847	2,851	2,886
Other Costs									
Other Costs	-	41	41	40	40	40	-	-	-
Water Resource Planning & Capacity Building	-	59	59	59	59	59	-	-	-
Design & Support Costs	-	54	-	32	-	7	-	-	-
Resettlement & Compensations	-	20	20	190	190	190	190	-	-
Civil Works	-	321	321	147	147	38	38	-	-
Equipment	-	-	9	-	-	-	-	-	-
Other Investments	-	14	14	1	1	1	1	-	-
Sub-Project Management	-	4	4	2	2	1	1	-	-
Contingencies	-	45	45	67	67	75	75	-	-
Extension Costs	-	45	23	23	23	23	-	-	-
Water Supply Investments	-	55	110	147	183	128	-	-	-
Sub-Total Other Costs	-	659	647	706	711	561	304	-	-
OUTFLOWS	2,875	3,799	3,839	3,571	3,562	3,405	3,151	2,851	2,886
Cash Flow	2,391	1,467	1,427	1,754	1,837	2,162	2,647	3,461	3,575

IRR = 16.7%, NPV = 1,172.87

Annex 8: Background on the Rural Water Supply and Sanitation Sector
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

Sector Policy and Programs

1. The Prime Minister's Decree No. 117/2007/ND-CP of July 11, 2007 on Clean Water Production, Supply, and Consumption together with the National Strategy on Rural Clean Water Supply and Hygiene up to Year 2020 (August 25, 2000), and the Rural Water Supply and Sanitation element of the National Target Programs guide the government and its partners in planning and implementing RWSS projects and programs. Lead responsibility for coordinating the rural water supply sector lies with the Ministry of Agriculture and Rural Development while the lead responsibility for implementation of RWSS programs lies with the provincial governments. At the provincial level the implementation and oversight of the operations and maintenance of rural water supply systems is increasingly becoming the responsibility of the PCERWASS. The provincial CERWASS staff is also responsible to facilitate the improvements of rural sanitation in the provinces. The provincial Departments of Health and the Vietnam Women's Union have historically been assisting with the provision of rural sanitation and hygiene promotion.

2. All three of these instruments have clear objectives aimed at improving the delivery of rural water supply infrastructure and services to the people of Vietnam. This has been acknowledged by the government sector policy makers and implementers. Fortunately, there is a review currently underway of the National Strategy on Rural Clean Water Supply and Hygiene up to Year 2020 (hereafter referred to as the Strategy) and the National Target Program (NTP) will soon be updated and revised. Currently the Strategy is being updated by the Ministry of Agriculture and Rural Development with financing under the World Bank financed Red River Delta Rural Water Supply and Sanitation Project. The Strategy is ten years old now and will certainly benefit from a review of the realities on the ground and updating of what is practical and affordable.

3. The rural water supply and sanitation component of the NTP is also currently being reviewed and revised. The first phase of NTP was implemented over the period of 1999 – 2005, the second phase from 2006 – 2010. The latest phase - which is still under discussion and redesign - will be implemented from 2011 to 2015. It is opportune that the timing of the Strategy update and the revision of the next phase of NTP are in synch. The financing of these mandates has some issues which should be discussed and resolved in order to utilize limited resources more efficiently. A national workshop to discuss the Strategy update is planned before mid-2011 and this would involve discussions with the provincial rural water supply implementers and owners.

Coverage and Issues

4. Over the past decade the implementation of the Strategy and the NTP for RWSS have dramatically improved the levels of water supply and sanitation services in the provinces. The RWSS annex to the Mekong Delta Water Resources Project (Project Appraisal Document,

March 15, 1999) estimated that the coverage of rural water supply services in Vietnam was between 15 percent and 30 percent . The coverage situation today is much improved, in a recent workshop highlighting the accomplishments of NTP, it was stated that 80 percent of rural Vietnam now has water supply services. The reality appears to be (from a variety of other sources and antidotal information) that rural water supply coverage is in the range of 70 percent (measuring improved sources) and that the coverage of what is defined by the Ministry of Health as "safe" water supply in rural Vietnam is somewhere between 50 percent and 60 percent. These figures are impressive when compared to the situation 10 years ago. What is clear is that more work and investment need to be dedicated improving the collection of these coverage statistics. Under this project, in these 7 provinces, improvements in the management capacity of the PCERWASS will be targeted.

5. In terms of sanitation coverage, improved rural sanitation to be less than 50 percent, on average, for the seven provinces. Some of the confusion related to the collection of data for both rural water supply and sanitation is rooted in the definitions of what exactly constitutes coverage. In this regard, with respect to water supply, the investment in improved water supply services is a good objective but to add the extra initial investment to deliver what would be assessed to be an improved and safe water supply might be the most economically efficient investment scenario. This would be based on the added health and other trickle down benefits to the communities to be served under the investments.

6. The issue of sharing the financial costs of investing in improved and safe water supply is a major concern and needs to be addressed in practical terms before the NTP (2011 – 2015) design is finally approved. The following table outlines the details of the most recently implemented NTP phase and those as proposed for the new 2011 – 2015 phase.

Table 1: National Target Program Details (2006 – 2015)

		NTP (2006 – 2010) As Designed		**NTP (2011 – 2015) Proposed**	
	Financing Source	**Total VND billion**	**Ratio %**	**Total VND billion**	**Ratio %**
1.	Central Budget	2,464	12	6,765	16
2.	Local Budget	2,416	12	4,651	11
3.	Households' Contribution	4,051	20	7,610	18
4.	Donor's Funding	3,232	16	6,342	15
5.	Credit	8,139	40	16,913	40
	TOTAL	20,302	100	42,283	100

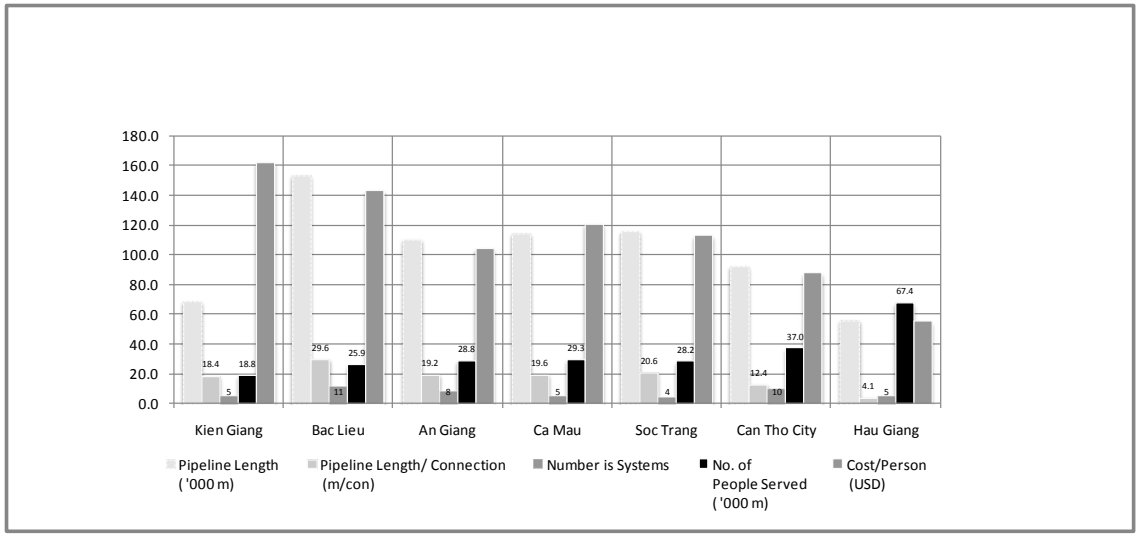
7. The feasibility studies for the investments under Component 3 of the proposed project indicate an average capital investment cost of USD101/capita for the seven beneficiary provinces. This translates to a total household investment of USD500. The household contribution as prescribed by the NTP would therefore be USD100. While this is an admirable longer term goal, it does not appear to be a goal that is realistic at this time with the incomes of the region. The negative impact of the application of this financing principle is that once the investment is made and the funds expended, the connection rates could be very low for an extended periods of the life of the assets. Low connection rates jeopardize the health impacts (justification of the component) and suppress the revenues generated from customers payments

of tariffs thereby jeopardizing the sustainability of the investment due to a lack of funds available for operations and maintenance inputs.

8. Under this component, the financing arrangements call for about 32 percent contribution from the provinces and households (9 percent contribution from the households) and the balance of 68 percent from the IDA credit funds. In comparison, the Red River Delta Rural Water Supply and Sanitation Project is structured as follows in terms of financing: (a) 60 percent grants for the investment costs; and (b) 40 percent cost recovery comprised of direct cash upfront payments from the households and longer term recovery through the tariff structure. In reality, the upfront cash contributions have been lower than originally expected, again, to insure reasonable connection numbers. During the final review and adoption of the updated Strategy and revised RWSS NTP design, the realities of these prescribed contributions should be clearly recognized and considered in finalizing both documents.

9. The other major issue related to water supply which has arisen during the preparation of this project component is the high variation of per capita investment costs per province. The chart below provides a summary of the basis data from the seven project provinces covering 48 proposed systems for which feasibility studies have been completed and endorsed by the Provincial People's Committees.

Chart 1 – Basic Data from Seven Province Feasibility Studies



10. As can be seen, Kien Giang has the highest per capita cost of USD160 with the Hau Giang per capita investment cost of USD56. Of course this means that Hau Giang can provide water supply services to three times the number of people than Kien Giang given the same investment cost per province. It has been agreed with the MARD in moving into the detailed design stage of the investments that this issue will be more properly investigated and rationalized. Given that the largest portion of the RWSS funding is on a grant basis, there is not a great incentive for the provinces to economize on the designs. This aspect of economic efficiency will need to be better addressed from the central levels to ensure that the provincial specifications are reasonable.

Annex 9: Water Resources Management in the Mekong Delta
VIETNAM: Mekong Delta Water Resources Management for Rural Development Project

History

1. History of the Water Resources Development in the MKD. The history of the Delta's development has featured multiple phases of water resources management investment to mitigate flooding, salinity intrusion and other natural risks and to facilitate increased agricultural and aquaculture production. The core of this investment has been the construction of canal networks and associated gate structures. Major construction of the canal system, mainly targeted for irrigation, started in the 1880s under the French occupation with the invention of steam-powered dredgers. By 1930s, the total cultivation area reached 2.0 million hectares. Comparatively little development took place between 1945 and 1975 (due to wars and regional instability), yet major investments to rehabilitate and expand the Delta's water systems began again under the unified Vietnamese Government after 1975.

2. Between 1975 and 1990, water resources investments have carried out mainly to pursue "rice-first policy for subsistence". Primary and secondary irrigation canals and salinity-control structures were developed to expand rice cultivation areas in floodplains and areas with acidic and/or saline soils. During this period, irrigated area increased by approximately 900,000 hectares. During the 1990s, the thrust of the investment shifted to support commercialization of rice cultivation, and accordingly, investment focused on development of the tertiary canal networks and construction of low dikes for prevention of the early floods in August, enabling a third rice crop in the summer. During this period, large irrigation schemes such as Quan Lo-Phung Hiep (QLPH, Soc Trang and Bac Lieu Provinces), the O Mon - Xa No (OMXN, Can Tho, Hau Giang and Kien Giang Provinces), the Ba Rinh-Ta Liem (Hau Giang and Soc Trang), and the Tiep Nhat (Soc Trang). These irrigation schemes contributed to the significant increase in rice production during the 1990s (approximately 15.0 million tons in 2000 compared with 9.0 million tons in 1990) mainly through increases in yields.

3. Since 2000, agriculture has diversified in the Mekong Delta, resulting in significant changes in land use and water resources requirements. The Government issued a policy on agricultural diversification and sustainability in June 2000, and subsequently, farmers started to convert from rice farming into other crops in response to the prevailing market opportunities. While farmers continue to intensity the rice cultivation in the upper part of the MKD, in the central part, conversion to orchards and vegetable production has started. In the lower part of the MKD, shrimp culture (Penaeus monodon) has expanded considerably, utilizing brackish water. More recently (particularly since 2005), shrimp culture has also evolved from monoculture to rice-shrimp cultivation (shrimp during dry season and rice during wet season) to mitigate the risk of disease and pollution from feeds and chemicals used for shrimp culture. During this period, water management infrastructure investments have been mainly for the tertiary canals and sluice gates to support the farmers' diversification. For example, the South Mang Thit Irrigation Scheme, which was originally designed to control salinity for rice production, has been adjusted to adaptive salinity management for shrimp farming during the dry season and rice production in areas close to estuaries during the wet season. Similar examples can be found for the QLPH Subprojects in Bac Lieu. The summary of the agricultural land use is described in Table 1 below.

Table 1: Summary of the agricultural land use in the MKD (1975-2009)

	1975	1990	2000	2009
Crop patterns (ha)				
Rice land	2,040,000	2,080,000	2,070,000	1,920,000
Traditional (One) Crop	1,860,000	470,000	545,300	414,000
Double Crop Rice	180,000	963,000	1,724,000	1,963,000
Triple Crop Rice	-	140,000	158,000	430,000
Orchards and Vegetable	-	145,000	537,000	750,000
Aquaculture	-	241,000	357,800	737,600
Coastal shrimp	-	110,000	338,000	703,000
Rice and Shrimp	-	-	40,000	130,000
Rice Production (ton)	6,000,000	9,400,000	16,520,000	20,483,000
Aquaculture production (ton)	-	126,400	365,200	1,869,500
Shrimp production			68,700	309,800
Average rice Yields (ton per hectare)	2.00	3.30	4.19	5.30

Going forward

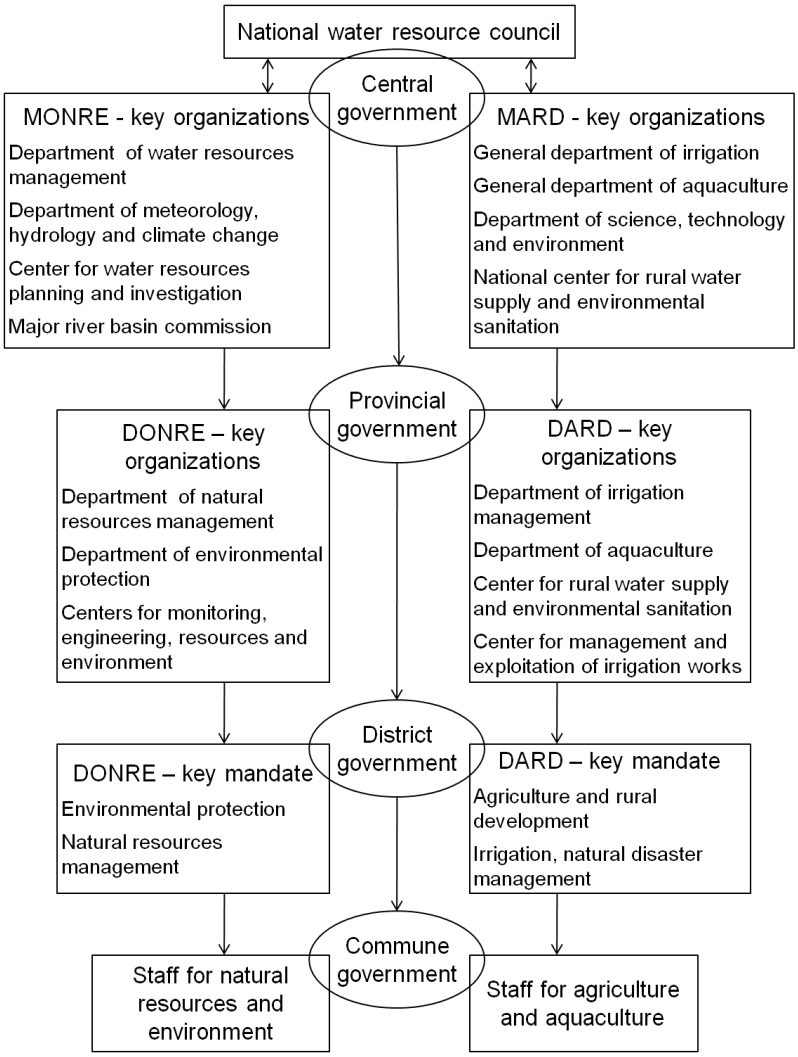
4. In the future, the role of the MKD as a center for agricultural production would be even more important for the country. In 2009, the Vietnamese government issued the National Food Security Strategy and Agricultural Land Planning towards 2020. In this, the MKD is cast as maintaining a core role in national food security (and rice exports) with some 1.8 million hectares of agricultural land to be reserved for rice production in the region. In addition, ambitious targets have been set under the Social and Economic Development Plan (SEDP) and the Social Economic Development Strategy for the continued expansion of aquaculture and fruit production within the MKD. The MKD is also expected to play a core role in future agro-industrial development.

5. Upstream Development. In the short term, the Mekong River is going through major water resources development upstream from the MKD. There are six mainstream dams already operating or near operation in the upper Mekong (Lanxang) in China (all 6 dams will be in full operation in 2015). These dams will cumulatively modify the flow regime of the Mekong River as well as significantly reduce sediments. Overall impacts on the MKD could be positive through increased dry season flow and reduced wet season flow, but overall impacts depend on the operation of these dams. However, there may possibly be negative impacts at the local level (e.g. decreased salinity intrusion may affect shrimp cultivation). Further, in the lower Mekong Basin, there are 12 dams planned in the mainstream, in addition to as many as forty hydropower stations in the tributaries of the Mekong River. Cambodia also intends to develop several large-scale irrigation schemes in its own section of the MKD. The magnitude of the cumulative impacts of these upstream developments is still uncertain, and the Government is coordinating water management investment with riparian countries through the Mekong River Commission (MRC) to mitigate negative impacts on the MKD.

Institutional Arrangements for Water Resources Management in the Mekong Delta

6. At the national level, the NWRC has been established to advise the government on water resources management and solve the conflicts between ministries and also between ministries and provinces on water resources. MONRE is mainly responsible for land administration, environmental protection, hydro-meteorological services and the oversight for mineral resources, water resources, coastal resources and offshore islands. For water-related sectors, key organizations are the Department of Water Resources Management, the Department of Hydro-meteorology and Climate Change, the Center for Water Resources Planning and Investigation, and the River Basin Commission. MONRE through its Vietnam National Mekong Committee (VNMC) serves as the national focal point for the Mekong River Commission (MRC), which is an intergovernmental organization to manage overall water resources in the mainstream of the lower Mekong Basin.

Figure 1: Summary of the organizational structure



7. Under the guidance of the respective Provincial People's Committees (PPCs), Provincial Departments of Agriculture and Rural Developments (DARDs) are responsible for planning and implementation of agriculture and rural development measures. Provincial Irrigation Divisions and/or Irrigation and Drainage Management Companies (IDMC) under the DARDs are responsible for Operations and Maintenance (O&M) of irrigation and flood control systems within their respective provinces. At the on-farm level, while the Government adopted a policy to promote participatory irrigation management through establishment and strengthening of the Water User Organizations (WUOs), the implementation of this policy in the MKD has not been fully started. For the rural water supply, Provincial Centers for Water Supply and Sanitation (PCERWASS) under the auspices of DARD are responsible.

8. While the Irrigation Divisions, IDMCs and the DARDs have basic technical and administrative capacity to operate the water management infrastructure at the provincial or lower level, their capacity and the current institutional setting has to be upgraded to be able to effectively address expected climate change impacts and the diversified needs from various water users. The current system for water management is narrowly segmented along provincial lines and there is an evident need to develop a sub-regional analytical and planning framework for improved planning, monitoring, and coordination - especially to address water use conflicts/competition and manage large irrigation and/or flood control systems which span more than one province.

9. There is also a need to intensify the communication between the IDMCs and DARDs and the end water users. The water resources authorities are making infrastructure planning and management decisions based upon the 1994 Delta Master Plan and static land use considerations. Yet, water users are making strategic and dynamic decisions based on given opportunities (e.g., markets) and prevailing climate conditions. These differences could create conflicts between the water authorities and water users, and it is necessary for the provincial and district water resources authorities to communicate with the water users, providing information and forecasts about the availability of fresh water and patterns of salinity intrusion to facilitate their decision making, while the provincial and district water resources authorities need to consider inter-provincial flows and diversions of fresh water.

10. Establishing WUOs is also urgently needed to enable community water-related decision-making and improve on-farm water use efficiency. Diversified agriculture and aquaculture have already raised the risks for potential conflicts over water use (saline water vs. blackish water) within the same irrigation schemes. While the Government has adopted a policy on irrigation management transfer (IMT) and adopted a decree to transfer the responsibilities for managing the tertiary and quaternary irrigation facilities to water user organizations (WUOs), implementation has been slow. In the Mekong Delta, with the support of AusAID, 24 groups akin to water user organizations (WUOs) have been established in An Giang Province on a pilot basis. The DARDs and IDMCs need to implement IMT to enable farmers to make collective decisions on water use, mitigate possible conflicts, and contribute to the overall management of the irrigation schemes. Further, attention also needs to be given to improving on-farm water productivity, especially in the context of scarce dry season fresh water availability.

11. Operations and Maintenance (O&M) for Water Management Infrastructure. As per the Decree 115 issued in 2008, which essentially abolished irrigation fees from farmers, the Government is currently providing budget support for the IDMC and the irrigation division of the DARD to carry out necessary operations and maintenance of the primary and secondary canals of the irrigation schemes in the MKD through the public funding. This decision is particularly understandable for the MKD, where: (a) farmers can access water in many places as irrigation schemes are 'open'; (b) the irrigation canal systems in the MKD also serve important inland waterways for transporting passengers and goods; and (c) major dredging is needed every 5 to 10 years due to the large amount of the sediment deposited in the canal system8.

12. In the short to medium terms, the Government will continue to finance a large part of the large maintenance costs for irrigation systems from central and provincial budgets. Under such circumstances, in order to move toward a path of sustainability, there are a range of options including: (a) development of clear business plans to cover the financial, operational, and technical aspects of Irrigation Divisions/IDMCs or other management institution operations; (b) monitoring at the national/regional level the performance of Irrigation Divisions/IDMCs based on a set of benchmarks; (c) investment in Irrigation Divisions/IDMCs' logistics and systems to reduce operational costs; and (d) formulation of WUOs at the local level to manage lower system (tertiary and below) level irrigation, and be counterparts to the Irrigation Divisions/IDMCs to monitor the Irrigation Divisions/IDMCs' performance.

13. Cost Recovery for Rural Water Supply and Sanitation. Under the current National Target Program (NTP) (2006 - 2010), in order to verify the demand from households, rural water supply capital contributions were designed to involve 20 percent upfront contributions from the beneficiary households, while the balance of the investment would be funded by the central and provincial governments as well as external funding. The forthcoming NTP (2011-2015) would more or less follow this approach. However, the reality in the MKD is that few of the provinces were able to collect households' contribution, as households are either poor or do not wish to make large cash payment as water - albeit of low quality - is available elsewhere. In practice, some provinces had to sell off assets (including public land) to meet the requirement of the NTP. The tariffs set under the NTP are typically below the average water supply production costs, jeopardizing the financial sustainability of the rural water supply systems. Clearly there is a need to revise the current capital cost sharing mechanism and the tariff structure in order to balance the financial viability of the investments and affordability for poor households.

14. Financing Household Sanitation is also an issue. Under the current NTP, a block grant has been provided to households without proper training. This has led to rapid installation of household latrines, but constructed latrines are often not properly used. In addition, many household latrines reportedly do not meet the technical standards, as construction of the latrines was often carried out by respective households. In order to effectively promote sanitation, there is a need to provide training to households, suppliers, and contractors to proper installation and use of the latrines (sanitation marketing). Considering the affordability, an option to adopt an approach of community-based revolving funds should also be explored.

[8] An estimate suggests that the annual deposit of sediment in the Mekong Delta is 140 million cubic meters.