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Ex-post Evaluation Report on the Project for Construction of Irrigation System in Batheay, Cambodia
한국국제협력단

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Ex-post Evaluation Report on the Project for Construction of Irrigation System in Batheay, Cambodia

2013. 12

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This evaluation study was entrusted to Korea Global Development Consulting Center (KGDC) by KOICA for the purpose of independent evaluation research. The views expressed in this report do not necessarily reflect KOICA's position.

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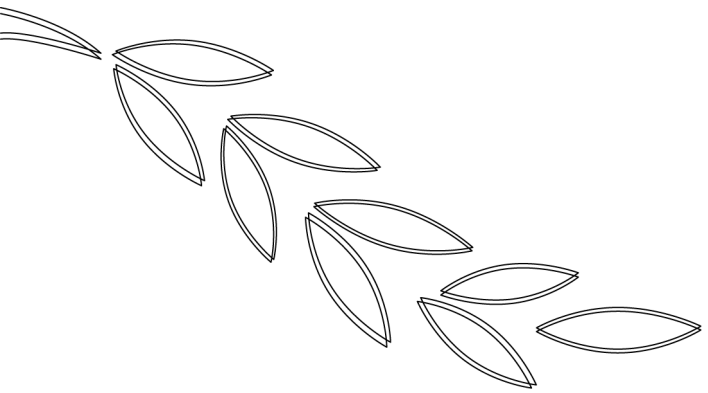
Abbreviations

AAA	Accra Agenda for Action
CAS	Country Assistance Strategy
CPS	Country Partnership Strategy
DEEP	Development Experience Exchange Partnership
FWUC	Farmer Water Users Community
ISF	Irrigation Service Fee
KGDC	Korea Global Development Consulting Center
KOICA	Korea International Cooperation Agency
MDGs	Millennium Development Goals
MoWRAM	Ministry of Water Resources & Meteorology
NSDP	National Strategic Development Plan
O&M	Operation and Maintenance
ODA	Official Development Assistance
PD	Paris Declaration
PDM	Project Design Matrix
PDO	Project Development Objective
PM	Project Manager
PMC	Project Management Consultancy
RGC	Royal Government of Cambodia
R/D	Record of Discussions
TCT	Technical Counterpart Team
TL	Team Leader
TM/TC	Telemetering and Telecontrol
WID	Women in Development



Ⅰ. Evaluation Summary

Chapter

I Evaluation Summary

(Background) Two of the grant cooperation projects were carried out consecutively in the region of Batheay District, Kampong Cham Province, Cambodia: (1) The Batheay Flood Control Project (2007-2008, US$ 2 Million); and (2) The Batheay Irrigation Construction Project (2009-2010, US$ 2.5 Million). Three years have passed since the completion of the two-phased projects, and these are now subject to ex-post evaluation according to the Development Cooperation Evaluation Guideline of KOICA.

The purpose of ex-post evaluation is (1) to improve future projects through feedback of the lessons learned in the process of a project's planning and implementation and (2) to provide a basis for accountability, including the provision of information to the public. Through the evaluation of failures as well as successes, valuable information is generated, which, if properly fed back, can improve future cooperation programs and projects.

KOICA entrusted the research study to Korea Global Development Consulting Center (KGDC), an independent research institute. The ex-post evaluation was undertaken by a team of experts arranged by KGDC during a five-month period that spanned from July to November of 2013.

(Rating of Overall Project Performance) The evaluation results, which were rated in accordance with KOICA's 『Guideline on Evaluation Result Ratings (May 2013)』 , were disclosed as 'Very Successful'. The Project received a total of 11 points out of a possible total of 12, based on 4 criteria of quantitative evaluation, each of which could be given a score of 1 to 3 points: (1) Relevance; (2) Effectiveness and Impact; (3) Efficiency ; (4) Sustainability. The overall performance of the Project was

'Excellent' in all criteria except the last, 'Sustainability.' It was evaluated that to secure continued project performance, measures to ensure financial and entrepreneurial sustainability should be taken immediately.

(Relevance) The overall development goal of the Cambodian government is 'poverty reduction and economic growth through enhancement of agriculture sector development.' As well, agricultural and rural development is the first priority area of Korea's commitment to Cambodia's progress through development cooperation. In this context, the Batheay Irrigation System Construction Project implemented between 2009 and 2010 is considered to be a very important program in Korea's bilateral development cooperation with Cambodia. The purpose and objective of the Project proved highly relevant to Korea's development cooperation policy and strategy, as well as to Cambodia's development strategy, by meeting the immediate developmental needs prioritized in the national development plan.

(Efficiency) It was confirmed that the results of the Project were highly effective in all project components in terms of the performance of inputs and outputs. There were some modifications of the project design to reflect the changes in local physical conditions in the course of detailed design, but these did not have a negative influence on the results of the Project. The management system in the field was operated highly efficiently. The field management of the 2nd phase project was quite smooth, due in part to the advantages gained through the experience of managing the 1st phase project, including procuring the local constructor. The level of professionalism of the technicians and experts employed was kept sufficiently high by retaining most of the experts who took part in the 1st phase project implementation.

(Effectiveness) The results of the Project were highly visible in terms of improving the capacity of agricultural water supply and irrigation. The Project produced direct effects not only in agricultural water supply but also in enhancing agricultural

productivity and farming techniques. Based on the positive results and the infrastructure brought about by the 1st phase project, the 2nd phase project produced a wide range of benefits, including the expansion of cultivation, increased productivity, the introduction of new varieties, a shortened cultivation period, and farm mechanization.

(Impact) The expansion of the agricultural infrastructure and the enhancements in productivity that resulted from this project led to an increase in farm incomes, creating employment opportunities, and eventually improving the rural living standard. Due to the increase of rural incomes, it appeared that there were positive effects on rural health and education in the region. It was confirmed that as a result of the Project, the attitude and awareness of local residents regarding development were changed toward a positive perception. They welcomed the introduction of new rice varieties, multi-cropping techniques and agricultural machineries. Furthermore, it proved apparent that the Project strengthened the reciprocal relationship between the two nations, and promoted greater cooperation and friendship.

(Sustainability) Through the years, the policy commitment and institutional support of the RGC to the Project appeared to be consistent and strong. The current sector policy and program continues to place a high priority on agricultural development irrigation. What might certainly be lacking in ensuring the sustainability of the Project was rather clearly recognized by most of the stakeholders of the Project. In particular, the financial sustainability is considered to be at stake due to the lack of funds for the maintenance and after-care of the facilities. In spite of the existence of the Farmer Water User Community (FWUC), the function of the FWUC is no longer in effective operation and the organization has very little financial, technical and entrepreneurial capabilities.

(Lessons Learned and Recommendations) The 2nd phase of the Batheay Project was implemented in the continuation of the 1st phase flood control project. The

paradigm of planning and execution for each project was highly similar, which means that the two separate but successive projects targeting closely related development objectives with similar modes and methods of aid delivery share many of the same conclusions and lessons learned in both phases of the Project.

(1) Project Formulation by Program-type Programming Modality: The single project-type modality of cooperation inevitably results in a substantial cost of transactions and fragmented management, as was the case in this Project. A strategic operational program should be projected in a coherent approach by which a set of clustered programs comprising a number of related projects and developmental activities is designed to address a certain theme or agenda of a sub-sector or area in an integrated manner.

(2) Comprehensive Project Programming: In programming the Project, only a very slight portion of the project component was assigned to soft/capacity development portfolio of the Project, such as policy consultation, human capacity building, and institutional and system development. Considering the limited capacity of financial resources, KOICA is advised to put a greater emphasis and higher priority on the software components of policy, human and institutional capacity, along with the expansion of physical infrastructure and hardware facilities.

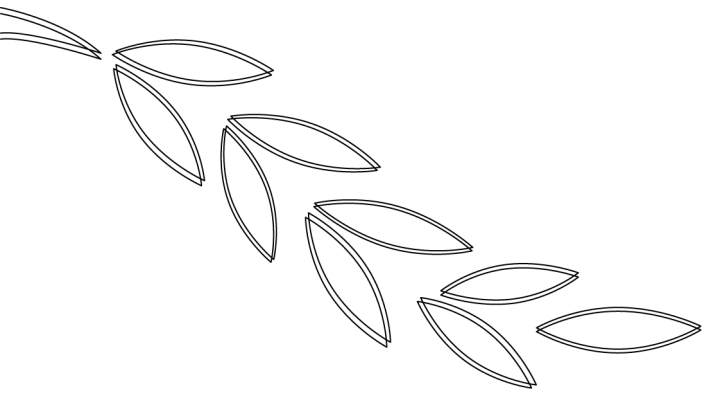
(3) Empowering Development Ownership and Participatory Development: The owner of the facilities constructed by the Project is primarily the MOWRAM of RGC; however, the assets are to be shared and owned by the local community. The routine operation and maintenance of the facilities should be mandated to the accountable authority of the local community.

(4) Thorough and Intensive Project Preparation: Thorough and intensive preparatory activities such as pre-feasibility and/or feasibility study and basic design are to be carried out in a more technically competent and sound manner that reflects the

characteristics of the project. If necessary, the related surveys, such as topographical investigation and geological survey, must be included in the project preparatory activities.

(5) Ensuring the Durability and Sustainability of the Project: It is observed that the Project and the management have shown little sign of medium-term durability and long-term sustainability. An immediate measure to ensure the medium-term durability of the project must be taken, especially for routine system operation and maintenance. The Evaluation Team recommends the preparation of an operation and maintenance (O&M) guideline for Batheay irrigation facilities, as well as some supportive measures for sustaining the effective operation of the Batheay FWUC. Not only the governments but also villagers should take ownership and lead in operation and maintenance.

(6) Searching for a Solution that Secures Long-term Sustainability: Despite the considerable positive effects and impacts of the Project, the performance shows some limitations. Most of all, the irrigation system didn't secure a permanent source of water supply. The water contained in the reservoirs inside the dam could not ensure a stable and sufficient supply of irrigable water in the whole farmland of the region. The possibility of drought shows another vulnerability in irrigation. In the longer-term perspective, it is necessary to construct an advanced irrigation system with a stable and sufficient water supply. In the near future, it is recommended to conduct an in-depth feasibility study that searches for a fundamental solution for permanent agricultural irrigation, together with flood control.



Ⅱ. Background and Outline

Chapter

Ⅱ Background and Outline

1. Background and Flow of the Evaluation

Cambodia is one of Korea's strategic development partners, and the Korean government is committed to promoting a stronger economic and cooperative relationship with the Kingdom of Cambodia. Over the years, the volume of development cooperation with Cambodia has increased significantly, both in the form of grant aid and concessional loans. From 2007 to 2011, the volume was US$ 187 million, and 27 development projects were implemented under the channel of bilateral cooperation between the two countries.

The overall development goal of the Royal Government of Cambodia (RGC) is "poverty reduction and economic growth through the development of the agriculture sector."[1] The Rectangular Strategy of the Cambodian government has established four pillars of strategic growth, putting the agricultural sector's development at the top of the national development agenda. Since Cambodia has abundant water resources and agricultural land, and depends heavily on paddy crops, the developmental potential for rehabilitating and enhancing the water management and irrigation system is one of the high priorities for national development and requires national investment in the future.

Agricultural and rural development is the first priority area of Korea's commitment to Cambodia through the development cooperation program. The Country Assistance Strategy 2008-2010 and the Country Partnership Strategy 2012-2015 for Cambodia put

1) Royal Government of Cambodia, National Strategic Development Plan 2009-2013, June 2010

a greater emphasis on supporting the program of agricultural investment, especially in the area of water resources management and irrigation. Accordingly, a number of projects have been implemented in these areas, including a reservoir rehabilitation project in Tamouk(2003), the integrated water resources development project in Kraing Ponley River(2007), and the feasibility study of Battambang Multi-Purpose Dam(2009).

With the following context, two of the grant aid projects were carried out consecutively in the region of Batheay District, Kam Pong Cham Province, from 2007 to 2010: (1) the Batheay Flood Control Project (2007-2008, US$ 2 Million) and (2) the Batheay Irrigation Construction Project (2009-2010, US$ 2.5 Million). Three years have passed since the completion of the projects, and those projects are subject to ex-post evaluation according to the Development Cooperation Project Evaluation Guideline (November 2008). The purposes of ex-post evaluation are (1) to improve future aid projects through feedback or lessons learned in the process of the project preparation and implementation, and (2) to provide a basis for accountability, including the sharing of information with the public.

2. Outline of the Evaluation

1) Project Outline

☐ Project Background

After the construction of the dike with the flood control project in 2007-08, the construction of an irrigation system was planned as the following step.

☐ Project Objective

With the irrigation system for the water supply in dry season, improvements in agricultural productivity and quality of life can be guaranteed.

☐ Project Budget and Period

2.5 million US dollar / 2009-2010 (16 months)

☐ Project Area and Recipients

30,550 people, 20 villages, 2 communes in Batheay District, Kampong Cham

☐ Project Details

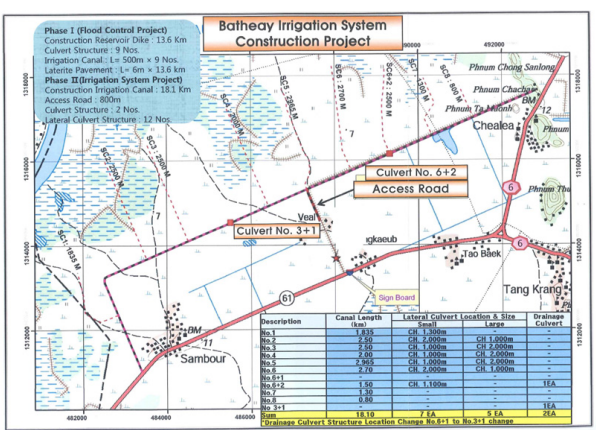
Constructing an irrigation system, culvert and regulating gate for the water supply in 4,000 ha of the agricultural land, including 1,600ha of new agricultural land, Site survey & investigation, Soil investigation, Project design, Construction and supervision, Training program for FWUC members about Project Operation and Maintenance (O&M), etc.

<Table 1> Brief Outline of Irrigation System Project

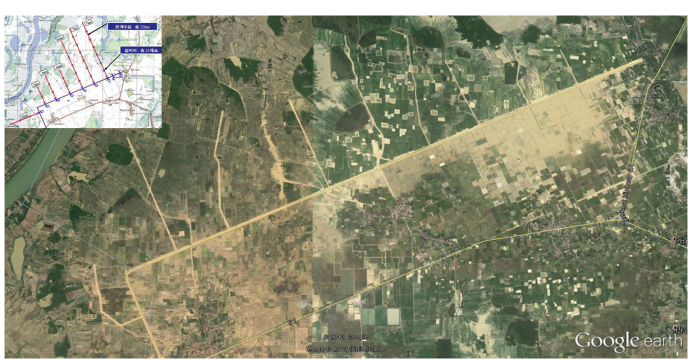
Categories		Contents	
Project Objective		• Improving agricultural productivity and quality of life for villagers through the development of an irrigation system to secure a water supply in dry season	
Project Contents		• Constructing an irrigation system such as canal, culvert and regulating gate for the water supply in 4,000ha of agricultural land including 1,600ha of new agricultural land, Site survey & investigation, Soil investigation, Project design, Construction and supervision, Training program for FWUC members in project Operation and Maintenance (O&M) * This project followed the previous project for the flood control in same region	
Responsi-bility	**Korea**	Expert Input ($0.5 million)	PM (1 ppl, 16 mths), Construction and supervision (1 ppl, 1 mths)
		Training Program ($50 thousand)	FWUC training program
		On-site Research ($13.6 thousand)	Site survey (26 thousand $), Soil investigation (110 thousand $)
		Design ($0.1 million)	Basic and detailed design
		Construction ($1.676 million)	Irrigation system, including canal, culvert and regulating gate
		Etc. ($38 thousand)	Project management (Operation meeting, evaluation)
	Cambodia	• Practical support and land holding during the project period, providing a project office	
Project Area		Batheay District, Kampong Cham	
Project Budget and Period		2.5 million US dollars/2009-2010(16 months)	
Recipient group		• 30,550 people, 20 villages, 2 communes in Batheay District, Kampong Cham Province	
Desired Effect	**Korea**	• Promoting the image of Korea and encouraging bilateral technical cooperation between Korea and Cambodia by transferring technology	
	Cambodia	• Improving agricultural productivity and the accessibility of agricultural water through an irrigation system	
Agency in Charge	**Korea**	• Korea International Cooperation Agency (KOICA)	
	Cambodia	• Ministry of Water Resources & Meteorology (MOWRAM)	

[Figure 1] Location of the Project Area

[Figure 2] Project Layout



[Figure 3] Satellite Picture of Project Area



Source: Google Earth

2) Objective, Scope and Focus of the Evaluation

(1) Evaluation Objective

Evaluation has been conducted to estimate the process and outcomes of the projects in terms of relevance, effectiveness, efficiency, impact, sustainability and the cross-cutting issues - gender main-streaming and environment – focusing on effects and impacts. The effects and impacts derived from the project include not only direct but also indirect social, economic, institutional, environmental and other changes resulting from the activities.

(2) Evaluation Scope and Focus

This ex-post evaluation is a comprehensive review of the overall results of the project. Based on the end-of-project evaluation, this ex-post evaluation is focused on the mid-to-long-term achievements and effects. The logic model for the evaluation is as follows: Input - Implementation - Output - Outcome. The detailed scope and focus of the evaluation is suggested in Table 2 and 3.

<Table 2> Detailed Scope of the Evaluation

Category	Detailed Criteria of Evaluation	Contents of the Evaluation
Relevance	1-1. Consistency with the Policy and Strategy of the Korean Government	■ Relevance to Korea's ODA policy and strategy ■ Relevance to KOICA's Country Assistance Strategy (CAS)[2)]
	1-2. Alignment with the Development Needs and Strategy of Cambodia	■ Consistency with Cambodia's national development strategy, the Rectangular Strategy ■ Consistency with the developmental policy and strategy, especially for the agriculture and water resource sector, and project priorities
	1-3. Appropriateness of the Project Procedure:	■ Appropriateness of project selection ■ Rationality of the preparation, design and

Category	Detailed Criteria of Evaluation	Contents of the Evaluation
	Preparation, Implementation, Operational Planning for the Project	operational planning of the project ■ Appropriateness of the Monitoring and Post-management, and follow-up project
	1-4. Appropriateness of the Project Formation: Project Factors and Implementation Process	■ Appropriateness of the project factors' formation ■ Appropriateness of the project implementation process
	1-5. Consistency with the International Development Objective and Standard	■ Achievement of Millennium Development Goals (MDGs) ■ Aid Effectiveness in Paris Declaration (PD) and Accra Agenda for Action (AAA) ■ concerning about cross-cutting issues (environment and gender mainstreaming)
Efficiency	2-1. Timely Delivery and Appropriate Input of the Project	■ Appropriateness of the project schedule and implementation period ■ Project input with appropriate timing
	2-2. Project Management and Implementation of the Project Management Consultancy (PMC)	■ Appropriate project management system (budget, schedule, manpower) ■ Field management and risk management
	2-3. Cooperation and Communication among the Stakeholders, Project Monitoring	■ Smooth cooperation and communication with Cambodian side ■ Gathering public opinion from the direct recipient group ■ Appropriate Project Monitoring and Interim Evaluation
	2-4. Quality of Manpower and Efficiency of the Project Implementation	■ Professional competence of the experts ■ Active participation and cooperation of the experts
	2-5. Comparative Analysis of a Similar Project as an Alternative	■ Case study of a similar project, like the Mekong river water resource development project
Effectiveness	1-1. Short-term Achievement	■ Attainment of the Project Development Objective (PDO)
	1-2. Mid-term Achievement	■ Expansion of the agricultural foundation ■ Improvement of agricultural productivity and household income ■ Improvement of quality of life for villagers
	1-3. Long-term Achievement	■ Contribution to agricultural and rural development ■ Poverty reduction, gender equality, social

Category	Detailed Criteria of Evaluation	Contents of the Evaluation
		development, etc.
Impact	2-1. Impact on the Local Community and Residents	■ Change of awareness regarding development, social integration, ethical and cultural behavior in the local community after the project
	2-2. Institutional Change and Capacity Building	■ Development and improvement of the water resource and agricultural water management system
	2-3. Other Unexpected Impacts	■ Transportation convenience with the new road ■ Employment in non-agricultural sectors and income improvement ■ Increase in land price
Sustainability	3-1. Potential for Political and Institutional Support	■ Willingness of central and regional government to provide political and institutional support for the O&M of project
	3-2. Financial Sustainability	■ Capacity of the facility operation and management, and long-term re-investment ■ Appropriateness and sustainability of the Irrigation Service Fee (ISF)
	3-3. Technical and Entrepreneurial Sustainability	■ Operational capacity and technical maintenance
	3-4. Next Phase of the Project	■ Need for follow-up project ■ Phase-out strategy with the independent O&M

2) During the project period (2007-2008), "Country Assistance Strategy (CAS) 2008-2010" was applied for bilateral cooperation with Cambodia.

<Table 3> Detailed Focus of the Evaluation

Achievement/ Effect	Contents
Short-term (Direct Outcome)	• Initial effect on the direct recipients - Dike construction, Strengthening of the agricultural foundation, Increase of agricultural productivity - Capacity building of the government officials in the area of water resource management and irrigation policy
Mid-term (Spread of the Project Effect)	• Effect on the direct/indirect recipients' group of the project - Contribution to the development of water resource management and agriculture sector - Capacity building of the relevant institution in the sector of policy, organization and system, etc.
Long-term (Ripple Effect)	• Ripple effects on the nation and society - Development of water resource and agriculture management policy, Encouragement of rural development - Poverty reduction, greater gender equality, and any other social developmental influence - Bilateral cooperation between Korea and Cambodia, Positive image of Korea as a development partner
Sustainability and the Other	• Sustainability of political and institutional support • Financial, technical and entrepreneurial independence • Project expansion and phase-out strategy • Satisfaction of the direct recipients with the project

3) Evaluation Team Organization and Evaluation Process

(1) Evaluation Team Organization

The evaluation of the irrigation system construction project was conducted with the evaluation of the irrigation system project, the follow-up project. To perform the evaluation, a team of 7 people was organized including Team Leader (TL), a specialist in the flood control and irrigation sector, research assistants and support workforce, local consultants and researchers. In addition, an advisory committee was organized to discuss the evaluation process. Notably, as the experts who participated in the project's preliminary study and operation meeting acted as members of the advisory committee, and the evaluation team could raise their awareness about the project's process.

[Figure 4] Evaluation Team and Job Description

(2) Evaluation Process

The evaluation process started with the inception reporting last July. As the first step, the research process in Korea was implemented prior to the field research. This process was for the document research and the interviews with main stakeholders in Korea. With the document review, the data about ODA policy and strategy for Cambodia, Country Partnership Strategy (CPS), project document and PMC project implementation plan, and the result of project monitoring and end-of-the-project evaluation were collected. The interview with core stakeholders proceeded for the KOICA Program Officer, PMC Project Manager (PM) and supervisor, etc. With these processes, the evaluation team can research the relevance of the project to determine whether the project is consistent with the policy and strategy of the Korean government, and the developmental needs and strategy of Cambodia, as well as whether the project has been conducted with the appropriate procedure. Also, in terms of the efficiency, the team can investigate the project input and output, project implementation and field management of the PMC, quality of manpower and technology, and implementation techniques of other projects for comparison.

The field research was scheduled for the 1st to 7th of September, and the research team included four(4) Korean experts, two(2) local consultants and researchers, one(1) MoWRAM government official, and one(1) KOICA evaluation specialist. During the field research, the evaluation team had several interviews with diverse stakeholders in the project (governmental institution, local construction contractor, PMC, and the other relevant organizations), made an on-site visit to the project area, surveyed the direct and indirect recipient group and held a workshop to share preliminary findings. During the field research period, the research team can collect ideas and feedback from diverse stakeholders and recipients. The workshop provided a great opportunity for both sides to share ideas and discuss the direction of the final evaluation.

After the field research, the evaluation team held an interim reporting seminar at KOICA. The team leader and experts shared the results of the field research and the draft concept of the evaluation, and got feedback from the chief of the evaluation office, evaluation specialist, program officer, etc. After the interim seminar, to collect additional data for better evaluation results, Korean expert Mr. Lee Manho and the local researcher Mr. Lak Chansok conducted additional field research and had 3 field visits at the end of October and in early November. With this additional field research, the research team collected the relevant statistics of the project and conducted a total inspection of certain developmental indicators in Sambo and Chea Lear Commune.

Ⅲ. Project Analysis and Evaluation Methodology

1. Project Analysis
2. Evaluation Methodology
3. Evaluation Matrix

Chapter

Ⅲ Project Analysis and Evaluation Methodology

1. Project Analysis

1) Analysis of the Country, Region, Sector Background

Cambodia is a typical agricultural country. Around 84% of the nation's population, or approximately 13 million people, are working in the agricultural sector. 77% of the agricultural land is rain-fed paddy fields, and as these are solely dependent on rainfall as agricultural water, agricultural productivity and household income cannot be guaranteed in the event of a drought. Crop productivity is highly influenced by irregular rainfall. On the other hand, this means that Cambodia has huge developmental potential in the sector of water resource management and irrigation systems.

Of the 4 strategic developmental pillars suggested by the "Rectangular Strategy" and "National Strategic Development Plan"[3], the Cambodian government declared that the agricultural sector is the most critical sector to be developed, and specifically, has placed a strategic focus on increasing crop production. The effective management of agricultural water and land is required for the strategic development of rural areas and the whole nation.

3) Rectangular Strategy is national developmental vision of the Royal Government of Cambodia established in 2004. This strategy suggest four pillars of national development with the basis of Good Governance: ① nurturing agricultural sector, ② developing private sector and job creation, ③ rehabilitation and construction of infrastructure, ④ capacity building and human resource development. Based on this strategy, National Strategic Development Plan(NSDP) has been established.

The project area, Batheay region in Kampong Cham Province, is 44km away from Phnom Penh, the capital of Cambodia. This region is an appropriate area to perform the development project in the water resource management sector, as it is close to the Mekong river and Tonle Sap river. 20 villages, 5,650 households and 30,550 villagers comprise the direct recipient group for this project. The PMC of this project expected that it will contribute to alleviating poverty in the region by increasing crop productivity and household incomes. After the project's completion, in 2011, this area suffered huge damages due to a massive flood.

2) Stakeholders Analysis

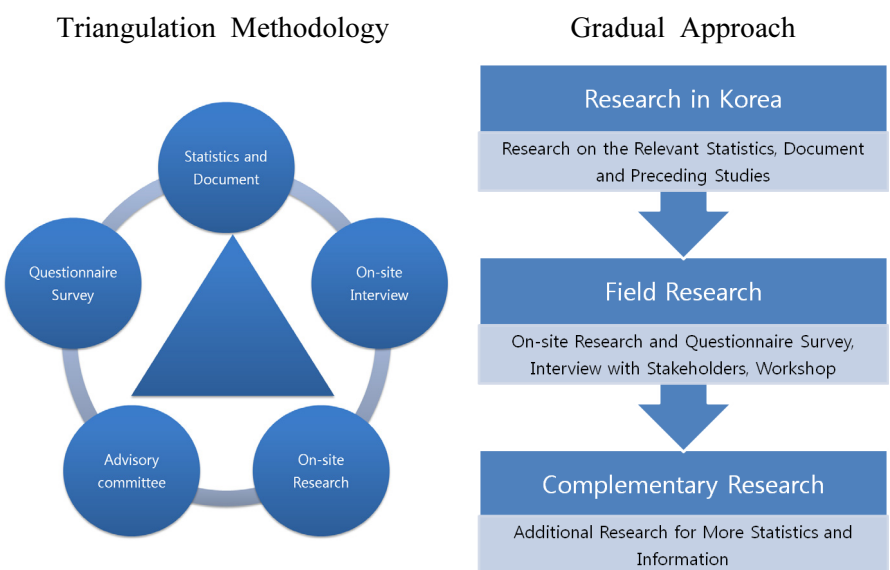
<Table 4> Classification of Stakeholders

Project Process	Stakeholders
Project Planning	■ Korean Side - KOICA Program Officer and Evaluation Specialist - Experts of project's preliminary study and operation meeting ■ Cambodian Side - Ministry of Water Resources & Meteorology (MOWRAM) - KOICA Cambodia Office
Project O&M	■ Korean Side - PMC (Yoosin Corporation) - CM - Experts on end-of-the-project evaluation - KOICA Regional Program Officer ■ Cambodian Side - MOWRAM - Local Construction Contractor - Participant in the end-of-the-project evaluation
Recipients	- Public Stakeholders (MOWRAM) - Local Residents in Campong Cham Province - Others (Cambodia Mekong Committee, etc.)

2. Evaluation Methodology

The logical model of this evaluation was established with the following flow: input- activity- output- outcome. In more detail, Triangulation Methodology was applied for the evaluation: statistics and document research, on-site interview and survey, advisory committee meeting, questionnaire survey, etc. In addition, the research process was implemented with a gradual approach. The detailed methodology can be visualized as shown in the figure below, and included (1) Literature research; (2) Data and statistics analysis; (3) Interview with policy practitioners and field workers; (4) Interview with local residents and beneficiaries; (5) Questionnaire survey of targeted group of stakeholders; and (6) On-site field trip and survey.

[Figure 5] Evaluation Methodology



3. Evaluation Matrix

1) Evaluation Matrix Frame

The evaluation matrix is composed of a research portfolio interwoven with six methods of survey and six categories of evaluation criteria, as follows.

<Table 5> Evaluation Matrix Frame - Research Portfolio

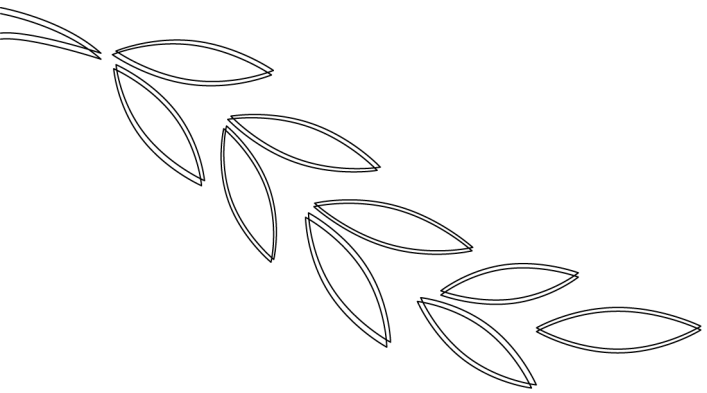
Evaluation Criteria	Document analysis	Data and Statistics analysis	Interview with policy practitioners and field workers	Interview with local residents and beneficiaries	Question-naire survey of targeting group	On-site field trip and survey
Relevance	○		○			
Efficiency	○	○	○			
Effectiveness		○		○	○	○
Impact	○	○	○	○	○	○
Sustainability			○	○		○
Contentment				○	○	○

2) Evaluation Matrix

Category	Detailed Evaluation Criteria	Research Method
Relevance	Consistency with the policy and strategy of the Korean government	Document
	Alignment with Cambodian development needs and strategy	Document, Interview, Questionnaire
	Appropriateness of project goal and implementation plan	Document, Interview
	Appropriateness of project objective and implementation	Document, Interview

Category	Detailed Evaluation Criteria	Research Method
	Consistency with the international development objectives and standards	Document
Efficiency	Input and Output: Project Cost-benefit	Document, Interview, Questionnaire
	System of Project Implementation and Field Management	Document, Interview, Questionnaire
	Quality of Manpower and Technology	Document, Interview, Questionnaire
	Project Implementation Methods and Management	Document
	Comparative Analysis of Similar Projects	Document, Interview
Effectiveness	Accomplishment of Project Development Objective (PDO): Short Term Achievement	Document, On-site
	Contribution to the Development of Water Resource Management and Agriculture Sector: Mid Term Achievement	Statistics, Interview, Questionnaire
	Contribution to National Development: Long Term Achievement	Document, Interview
Impact	Impact on Local Residents and Community	Interview, Questionnaire
	Contribution to institutional and Capacity Development	Interview, Questionnaire
	Improving Bilateral Relationship and the Image of Korea as a Development Partner	Interview, Questionnaire
Sustainability	Political and Institutional Sustainability	Interview, Questionnaire
	Financial Sustainability	Document, Statistic, Interview
	Technical and Entrepreneurial Sustainability	Document, Statistic, Interview
	Expansion and Phase-out Prospect of the Project	Interview

Note * : Document= Document Research; Interview=On-site Interview;
Questionnaire=Questionnaire Survey; On-site: Onsite Research



Ⅳ. Evaluation Results

1. Relevance
2. Efficiency
3. Effectiveness
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Chapter

Ⅳ Evaluation Results

1. Relevance

1) Alignment with Korea's Policy and Strategy

(1) Consistency with Korea's ODA Policy and Strategy

Subsequent to the completion of the Flood Control Project, the Irrigation System Construction Project was carried out in Batheay region. In the same context as the 1st phase Flood Control Project, the 2nd phase Project has a great degree of relevance to Korea's 『ODA Mid-term Strategy』 : ODA Base Consolidation 2008-2010』 , which placed a greater emphasis on strengthened cooperation with eight (8) neighbouring Asian priority countries, including Cambodia. The Mid-term Strategy identified seven (7) priority areas[4] including agricultural and rural development, which are considered as the main objectives of the Project.

(2) Consistency with Korea's Country Assistance Strategy for Cambodia

Korea's 『Country Assistance Strategy (CAS)[5] for Cambodia (2008-2010)』 placed agricultural and rural development on top of the four (4) priority areas of intervention through KOICA's grant cooperaton program in a medium-term perspective. In order to meet the developmental needs stipulated in the Rectangular Strategy 2004 and the National Strategic Development Plan 2006-2010, Korea's CAS

4) The seven priorities areas of Korea's intervention: human resources development; health and medical services; governance; ICT; agricultural, rural and marine development; Industrial infrastructure and energy; and global issues such as environmental protection.
5) The Country Assistance Strategy (CAS) was renamed the Country Partnership Strategy (CPS) when the 2nd Phase of Korea's ODA Mid-term Strategy was launched in 2010.

identified agricultural and rural development as the most immediate area for Korea's intervention. In particular, agricultural irrigation was considered as one of the preferred sub-sectors for investment in terms of poverty reduction by promoting rice cultivation. Korea's new CAS for Cambodia 2012-2015 maintains policy consistency by placing agricultural and rural development at the top of the priority areas for Korea's development cooperation.

2) Consistency with Basic Strategy and Needs of Cambodia

(1) Consistency with National Development Plan of Cambodia

Water is a critical natural resource. Its appropriate use and management by expanding irrigation facilities are important for realizing the national development strategy and plan of the Royal Government of Cambodia (RGC). Based on enhanced good governance by the government, the Rectangular Strategy 2004 of RGC projected four pillars of strategic growth rectangle pursuing (1) Agricultural Sector Promotion; (2) Private Sector Promotion and Job Creation; (3) Rehabilitation and Construction of Infrastructure; and (4) Capacity Building and Human Resources Development. The National Strategic Development Plan (NSDP) 2006-2010, which was implemented under the vision of the Rectangular Strategy of the Cambodian Government, put an added emphasis on the promotion of the agricultural sector, especially the production of rice. The Project is considered highly relevant to the needs of the Cambodia's national development strategy and plan, which emphasized agricultural and rural development as well as poverty reduction through the improvement of water resources management and irrigation. The Project rationale was confirmed in the national development objectives manifested in the new Rectangular Strategy Phase Ⅱ (2009) and the Updated National Strategic Development Plan (NSDP) 2009-2013.

(2) Alignment with Sector Policy and Investment Priority

The Ministry of Water Resources and Meteorology (MOWRAM) was established in 1999 and is responsible for water resources management, including flood control and large-scale irrigation and drainage. The two national sector strategy and development plans - the National Strategy for Agriculture and Water 2006-2010 and the Agriculture Sector Strategic Development Plan 2006-2010 - specified water resources management and agricultural irrigation facility expansion as the top priority for agricultural and rural investment. Along with the 1st phase of the Project, the project was made an investment priority by the Pol Pot regime in the 1970s and was confirmed as one of the most immediate targets of development in the agricultural sector plan as well as in the national strategy for agriculture and water of the new RGC.

(3) Responsiveness to Needs of the Project Region and Recipients

While the region of the Project was basically endowed with favorable conditions for rice farming, the repeated cycle of floods in wet season and droughts in dry season didn't provide farmers with a sufficient and stable supply of irrigated water. As the 1st phase of the Project - flood control - in the region progressed and the dam was being constructed, both the local residents and the local government authorities expressed their urgent needs and interests in the 2nd phase of the Project for improving irrigation in the region. The Kampong Cham provincial government and the regional office of MOWRAM made the project of irrigation system construction the highest priority for agricultural and regional development in the Batheay region. It was confirmed through interviews and questionnaire surveys of local stakeholders that the project objective met the critical needs of the people in the region.

3) Relevance to Setting Project Objectives and Methodologies

(1) Rationale and Reality of Setting Project Objectives

Thanks to the infrastructure that was built in the 1st phase of the Flood Control Project, the reserved water could be utilized by distributing it to the inside farmland of the dam throughout the year, including in the dry season. The two communes - Sambo and Chea Lear - clearly understood the realities of unstable and insufficient supply of water because of the droughts and the lack of water reservoirs. Based on this stark reality, the development objectives of the Project were defined and elaborated.

The resources available for the 2nd phase of the Project were quite limited considering the scant base of central government public finance and the low level of local technology. Lacked of relevant development experience in this area of agricultural irrigation, the policy practitioner of the Cambodian government was not but able to design a subsequent project by which immediate results were achieved through a small-scale minimum investment. The project program was comprised of very simple components with minimum inputs; however, the project development objectives of the Project were considered to be moderately concrete and practical in view of the local conditions.

Reviewing the development objectives of the Project in terms of medium and long-term sustainable and result-oriented outcome, it can be seen that the basic design and components of the Project are equipped with very elementary inputs targeting a minimum development objective. In comparison with a model project of Korea in similar conditions the basic design of the Project lacked some essential elements of an agricultural irrigation system such as a permanent water reservoir, both a main canal and a feeder line, and farmland consolidation, as shown in the below table.

<Table 6> Comparison of Agricultural Irrigation: Batheay and Korea

Classification	Batheay Project	Korea Typical Case
Water Source	• Reservoir taken water from the Tonle Sap River during wet season	• River water
Water Supply	• Artificial pumping	• Natural streaming
Irrigation	• Main channel	• Main channel and feeder line
Drainage	-	• Main channel and feeder line
Farmland Consolidation	-	• 80 percent of the irrigated farmland is consolidated
Others	• Access road	• Access road and farm road

Source: The Evaluation Team

(2) Relevance of Project Components and Inputs

Based on the plain and practical development objectives, the detailed components and inputs of the Project were considered to be reasonably identified and specified. In addition to the water gates construction conducted in the 1st phase of the Project, the 2nd phase of the Irrigation System Construction Project projected an implementation plan containing relatively simple input of project components, including civil works such as main canals, access road and drain culverts, and institution building and capacity development of a farmer water use community in the region.

As reviewed concerning the projection of development objectives, the identification and composition of project components was regarded as designed in consideration of the very basic requirements of the development objectives. As shown in the previous table, the project components did not include some sophisticated components of integrated irrigation system development, such as a facility for accessing permanent water resources, subsidiary water distribution feeder lines, and farmland consolidation and farm road construction.

Even though the Irrigation System Construction Project was planned and implemented in a context of consecutive investment upon the completion of the previous Flood Control Project in the same region, the two respective projects were identified and formulated independently in the aid modality of stand-alone project programming. Conceptualization, identification and formulation of each project were performed separately, each as a single project program. Further, the composition of the project components seemed to be prone to heavy dependency on hardware elements, while the proportion of software elements was negligible, which meant less emphasis on technical and human capacity building and institutional development. Input of soft elements for the capacity development of the recipient accounted for only 2.0 percent of the total project expenditures.

<Table 7> Composition of Project Components

Classification		Flood Control Project Cost	
		Amount($1,000)	Proportion(%)
Hard Element	Civil Works (Including site surveys)	1,812	72.5
	Sub Total	1,812	72.5
Soft Element	Technical Consulting (Expertise, field management)	600	24.5
	Capacity Building of the Recipient	50 (FWUC Program)	2.0
	Others (Project preparation and monitoring)	38	1.5
	Sub Total	638	27.5
Total		2,500	100.0

(3) Analysis on the Stakeholders and Beneficiaries

The evaluation team could not find the related documents regarding stakeholder survey and analysis in the course of project preparation. It was found that a couple of ad hoc consultative bodies among the main authorities responsible for the project implementation were organized: PSC (Project Steering Committee) and TCT (Technical

Counterpart Team). There was close consultation with the leaders of the communes and villages, especially in the course of FWUC program preparation and implementation. Based on the results of the questionnaire survey, the opinions of the villagers were fairly collected and fed back into the project implementation. However, it seemed not clear how the conflict in the interests between the farmers in the far lower land area near the dam and the farmers in the upper region in side of the dam was overcame.

(4) Projection and Operation of PDM and Performance Indicators

The Project Design Matrix (PDM) was established in the course of project design and implementation. The Matrix was attached to the Record of Discussions made between the two responsible authorities of both governments, as included below. However, the goals and objectives, inputs and outputs, and verifiable indicators stated in the PDM lacked concreteness because all of the indicators were qualitative rather than quantitative or measurable.

< Table 8 > Project Design Matrix - Irrigation System Construction Project

Narrative Summary	Verifiable Indicators	Means of Verification
Overall Goal 1. Improving the people's quality of life	1. Increase of income level	1. Statistics from the MOWRAM 2. Statistics on the economical status of the Batheay District
Project Purposes 1. Ensuing sufficient and stable water supply for agricultural use 2. Enlarging farm land 3. Improving agricultural productivity	1. Satisfactory level of the water users 2. Size of increased farm land 3. Increment level of the crop production per hectare	1. Interim and final evaluation 2. Interview with villagers and government officials 3. Comparative assessment of crop productivity 4. Measuring the size of the farm land
Outputs 1. Constructing irrigation cannals with farm	1. progress of the construction 2. Satisfaction of FWUC	1. Budget expenditure 2. Interim and final evaluation by external

Narrative Summary	Verifiable Indicators	Means of Verification
roads 2. Installing culvert structures 3. Training FWUC (Farmers Water Users Community)	members	experts 3. Reports from PMC company 4. A questionnaire survey of FWUC members about the training
Activities 1. Geological survey and estimation 2. Basic & detailed design for canal construction 3. Canal construction and supervise 4. Dispatch experts 5. Transfer professional skills by training program of FWUC	Input 1. KOICA o Constructing irrigation canals and related facilities o Dispatch Korean experts o Training the member of FWUC 2. The RGC o Building access roads from dike to the village o Completing stone pitching on the dike o Ensuring the safety of dispatched personnel o Providing tax exemption for necessary materials of the project and appropriate administrative measures	1. Establish a cooperative relationship with the Cambodian government(agency concerned) during project period Precondition 1. The recipient country has a sufficient budget 세o perform the assumed work with assertiveness

Source: Record of Discussion on the Project for Construction of Irrigation System in in Batheay District, January 20, 2009 Project Area

(5) Monitoring, Risk Management and Reporting

The monitoring, risk management and reporting on the project implementation were planned and executed in the due process of project management. A field office was opened and all the project activities were executed and monitored by the Korean experts in the office. Compulsory and regular reports were made, and delivered according to the planned schedule. Risks or unexpected issues occurring during the project implementation were ironed out through immediate intervention.

4) Relevance of Project Implementation and Progression

(1) Project identification and Formulation

The Irrigation System Development Project was requested to the government of the Republic of Korea through the diplomatic channel according to the procedures of the Cambodian government's protocol, which confirmed the priority of and commitment to the Project of the RGC. The 1st phase of the Flood Control Project gave way to the subsequent 2nd phase of the Project in the later part of former project completion. The project proposal was approved by KOICA in close consultation with the MOWRAM, the recipient agency of the RGC.

(2) Project Consultation and Implementation Planning

Based upon a couple of field surveys and consultations between the two authorities, the mutually agreed Record of Discussions (R/D) between the two government of the Republic of Korea and the Royal Government of Cambodia was produced, and then the implementation plan was elaborated to reflect the local conditions after detailed site data and information were investigated and analyzed.

Through these field surveys and consultations some considerable changes in the site conditions were identified, and a round of design modification took place by adjusting the detailed project components and inputs to account for the different site situations. The length of the canal to be constructed was reduced to 18.1 kilometers from 32 kilometers, and the number of drain culverts was also reduced to 14 from the 23 that had been planned in the basic design. Instead, a new component of the Project was added for the inclusion of an access road inside of the dam area. The modification of inputs in the basic design didn't result in an adjustment of development objectives regarding agricultural irrigation, but caused some delays in the project's progress in the inception stage and resulted in some relatively small management expenses related to modifying the detailed design. The change in the detailed design was considered to be needed because the technical

mission for feasibility study and basic design did not hire a competent agricultural irrigation specialist and engineer.

<Table 9> Modification of the Project Development Objectives (PDO)

Classification	Unit	Record of Discussion(A)	Detailed Design(B)	B-A
Irrigation Canal	Kilometer	32.0	18.1	- 13.9
Drain Culvert	Unit	23	14	- 9
Access Road	Meter	-	800	+ 800

(3) Selection of Project Execution Agency and Professionals

(PMC) KOICA awarded the project to the Yoo Shin Engineering Company Ltd. in accordance with the process of consultancy procurement through competitive bidding. The Company undertook the 1st phase of the Project and successfully completed the mandate that had been entrusted. The PMC was able to take full advantage of the local information, network and field experience accumulated in the course of the 1st project execution.

(Local Constructor) The civil engineering works were awarded to a local constructor through a open bidding procedure, upon receiving a letter of intent. After the experience of having had to replace the local constructor during the 1st phase project execution because of bankruptcy, much more attention was paid to selecting a company with high credibility as well as sound performance in the local market.

(Experts) In selecting the PMC, what mattered most was the experience and professional competence of the experts to be employed in the project execution. A group of Korean experts and professionals in water resources, hydrology, hydraulic, structural design, construction, road design, geotechnic, environment, geology, urban design, project supervision, and accounting as well as project management were recruited and organized as the project team for the implementation of the 2nd phase project. Experts were employed as scheduled for a total of 817 man·days. The

quality of manpower and technology applied to the Project were evaluated as superb in the sense that most of the experts and professionals who took part in the 1st phase of project implementation were reemployed for the 2nd phase of the project. However, the project team lacked experts in the area of irrigation and agricultural civil engineering. The Project might have needed some technical consultancy to ensure the efficacy of planning and implementation in the area of irrigation and agricultural engineering.

(4) Management of Risk and Stakeholders

The interviewees at the villages admitted that the project implementation was visible to the local residents of the project site. Because most of the project activities were composed of civil works, the progress of the Project had been exposed to public view. The results of the questionnaires given to local residents made it clear that the opinions they offered were appropriately addressed in the field works.

5) Consistency with the International Development Objectives and Global Standards

(1) Relevance to Millennium Development Goals (MDGs)

While the Project was not designed with the main objective of achieving MDGs, the objectives of the Project were expected to contribute to reducing the rampant poverty in the rural area, including the Batheay region, where the incidence of absolute poverty reached 35 per cent in 2007. The Project was considered as conducive to achieving MDGs: Goal 1 and Target 1.A - Eradicate extreme poverty and hunger; Halve, between 1990 and 2015, the proportion of people whose income is less than $1.25 a day.

(2) PD and AAA: Reinforce Recipient's Ownership, Aid Harmonization, Procure Mutual Responsibility, etc.

There was no statement regarding the assurance of aid effectiveness shown in the Paris Declaration (PD) in 2005 and in the Accra Agenda for Action (AAA).

(3) Cross-cutting Issues such as Gender Mainstreaming and Environment

(Gender main-streaming) There was no evidence that gender main-streaming was obviously taken into account in project design and preparation. In the results, however, it was evaluated that the project itself had positive impacts on the role of women in development and on the status of women.

(Environment) It was apparent that the Project itself was environmentally friendly, and was natural for the Project to be exempt from environmental assessment.

2. Efficiency

1) Input and Output: Project Cost-benefit

An investment in the irrigation system's construction had already been made in the construction works in the 1st phase of flood control project. There were 9 drain culverts which were connected with canals 500 meters in length each (total length of 4.4km), under and across the dike constructed in the 1st phase project. In the 2nd phase, 14 drainage facilities - 12 structures and 2 drain culverts - were installed under and across the 9 canals as described in the table below. The inputs had been accomplished as adjusted in the detailed design and the outputs were confirmed in the course of end-of-the-project evaluation conducted on September, 2011.

<Table 10> Main Irrigation Facilities in the 2nd Phase

Description	Canal length (Km)	Lateral Culvert Location & Size		Drain Culvert
		Small	Large	
No.1	1.835	CH.1,300m		
No.2	2.5	CH.2,000m	CH.1,000m	
No.3	2.5	CH.1,000m	CH.2,000m	
No.4	2.0	CH.1,000m	CH.2,000m	
No.5	2.965	CH.1,000m	CH.2,000m	
No.6	2.7	CH.2,000m	CH.1,000m	
No.6+1				
No.6+2	1.5	CH.1,100m		1 EA
No.7	1.3			
No.8	0.8			
No.3+1	-			1 EA
Total	18.1	7 EA	5 EA	2 EA

Sources: Yooshin Engineering Cor., Final Report: Batheay Irrigation System Construction Project, Sept., 2010

The results of the site survey and investigation performed for the detailed design led to some modifications being made to the basic design of the Project described in the Record of Discussions (R/D) and the Implementation Plan. Some of the inputs for the project were adjusted to reflect the changed local conditions, as shown in the table below. The length of irrigation canals and the number of drainage facilities were adjusted.

<Table 11> Comparison of Plan and Achievements

Plan(R/D)	Modified Inputs and Outputs
○ Expert Dispatch ($500 thousand) **- PM: 16 months** **- Construction supervisor 11 months** **- Survey & design** **- Construction & supervision**	○ Performance - Total : 817man•days - Site survey & detailed design, FWUC formation and training - Construction & supervision ○ Input by experts Expert: PM (Yooshin Vice President Kim, Kyu Tae) - 2009.04.06 -2009. 08.29 : 4M 24 Days (146 Days) - 2009.09.12 -2010. 01.11 : 4M (122D) - 2010.01.25 -2010. 05.24 : 4M (120D) - 2010.06.10 -2010. 09.10 : 3M 3D (93D) Expert : Construction & supervision (Director Kim, Jong Gab) - 2009.04.29 -2009. 07.17 : 2M 19D (80D) - 2009.12.16 -2010. 04.15 : 4M (121D) - 2010.04.29 -2010. 09.10 : 4M 13D (135D)
○ Investigation ($136 thousand) **- Site survey & investigation** **- Soil investigation**	○ Performance - 1st : 2009. 04 - 2009. 05: Basic survey & investigation - 2nd : 2010. 02 - 2010. 04: Soil investigation • For installation of culvert structures on the existing dike: Completed on Feb. 22, 2010 • For 12 locations at the point of structures: Completion of survey in dry season during canal construction works at the point for lateral structure (beginning of February, 2010~end of April, 2010)
○ Design ($100 thousand)	○ Performance - After discussion with government staff, making an announcement to villagers based on the design, collecting some ideas from them and reaching a conclusion. - Length of canal • Origin L=32.0 km → final L=18.1 km - Structure • Origin 23EA →final 14EA (Including drainage culvert) - Access Road • Origin(-) → Addition L=800m
○ Construction ($1,676 thousand) **- Canal : 32km** **- Drain culvert, etc. : 23EA**	○ Performance - Canal : 18.1km - Access Road : 800m - Drain Culvert, etc : 14EA ○ Input by schedule - Construction Contract : 2010. 1. 4 - Commencement of work : 2010. 1. 8 - Completion of work : 2010. 9.10

Plan(R/D)	Modified Inputs and Outputs
○ **Education ($50 thousand)**	○ Performance - PMC : Check for detailed education plan, lecture and lecture note, and check for field training of FWUC - MOWRAM : Preparation of Itinerary for detailed education, education program for FWUC - Submission of education plan for FWUC : 2009. 08. 21 - Approval of education plan for FWUC : 2009. 09. 09 - Meeting of executive composition for FWUC (Total of 11)
○ **Other ($38 thousand)**	○ Performance - Survey, discussion, interim and final appraisal, and project management, etc.

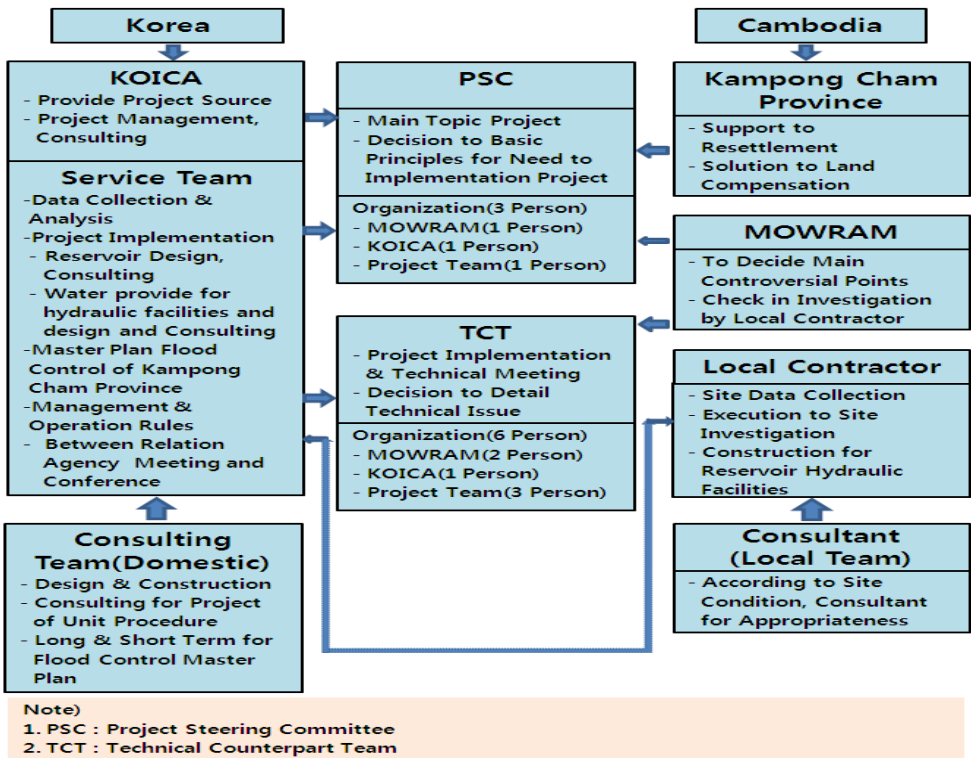
Source: KOICA (South East Asia Team), End-of-Project Evaluation Report: Cambodia Batheay Flood Control and Irrigation System Construction Project (In Korean), September, 2011

2) System of Project Implementation and Field Management

(1) Effectiveness of Management System

The appropriate division of labor among the responsible authorities of the project enabled the smooth progress of the Project. A mechanism of project coordination was established for technical consultation among the main partners in project implementation. With the full support of MOWRAM, a close collaborative business relationship was established. The Project Steering Committee (PSC), which was joined by MOWRAM, KOICA, and the PMC, addressed all the issues regarding project management and implementation in the field. The Technical Counterpart Team (TCT) ironed out technical issues or problems presented in the course of project implementation.

< Diagram 1> Mechanism of Project Management & Implementation

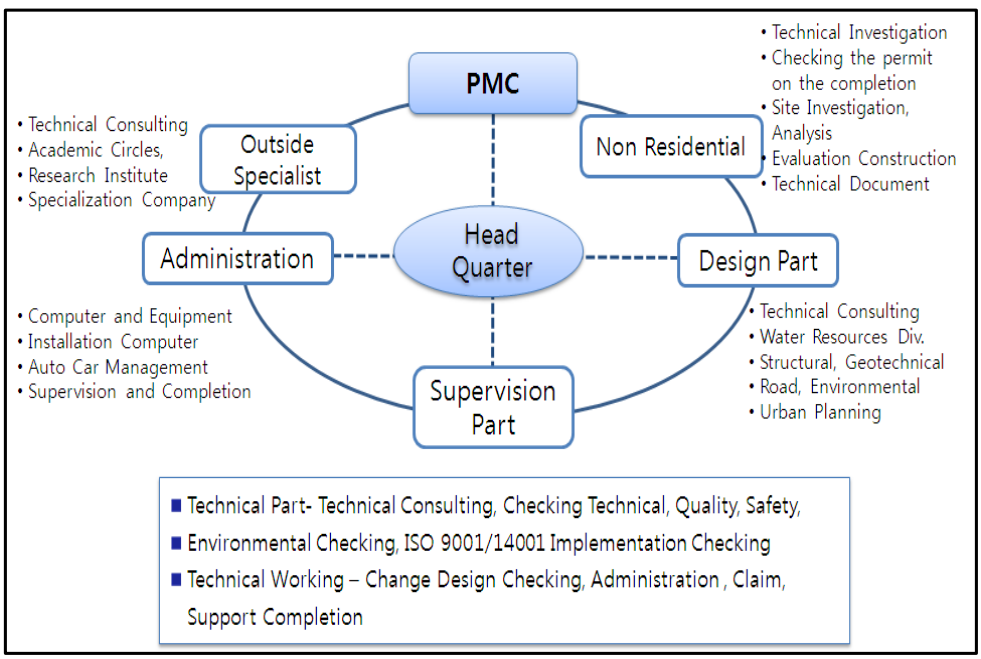


Sources: Yooshin Engineering Cor., Final Report: Batheay Irrigation System Construction Project, September, 2010

(2) Effectiveness of Field Implementation System

Yooshin Engineering Corporation, the PMC of the Project, organized an elaborate and harmonized project management system, a mechanism of internal coordination and division of labor. The field office of the PMC was supported by the three pillars of field works: Administration; Design; and Supervision. A group of non-resident and outside experts provided the field office with technical advice and consultation. The system of field management is as described in the diagram below.

< Diagram 2> System of Field Management



Sources: Yooshin Engineering Corp., Final Report: Batheay Irrigation System Construction Project, September, 2010

(3) Efficiency and Transparency of Budget Execution

There were some changes and modifications to the basic design and the initial implementation plan; however, the project was finished within the time table laid out in the budget plan. It was confirmed through interviews with the stakeholders concerned that the process of budget execution was punctual and transparent.

Due to some requirements of the work from the government officials and villagers, progress was delayed at the beginning of construction work. To catch up, various efforts were made to speed work up, such as concentrating manpower and equipment, and working extra hours in the night without increasing the volume of planned budget.

3) Quality of Manpower and Technology Applied

(1) Technical Expertise, Professional Competence of Experts, and Their Adaptability to Local Environment

The participants who took part in project management and implementation were scrutinized for their professional competence as well as their field experience in each area of expertise. The PMC organized an ad hoc Task Force Team for project management and implementation. There were no experts in agricultural irrigation and engineering among the members of the Task Force Team, but more than 30 Korean experts participated in the Team on a full or part-time basis as shown in the table below. Mr. Kim Kyu Tae, Project Manager, a management specialist, was stationed in Cambodia to handle diverse tasks related with this project from April 4, 2009 to September 10, 2010. In addition, Mr. Kim Jong Gab Kim, Construction Supervisor, was dispatched to Cambodia from April 29, 2009 to September 10, 2010. In the interviews with their Cambodian counterparts, it was found that the Korean experts had both sufficient professional competence and a deep understanding of the local cultural characteristics of Cambodia in doing business in Cambodia.

A team of Cambodian experts and government officials was organized as counterparts in project management and implementation. The Cambodian counterpart team was composed as follows: Mr. Ponh Sachak was responsible for the overall project management; Mr. Bak Bunna and Mr. Ponh Sachak were responsible for overall management and coordination; and Mr. Bak Bunna was responsible for project implementation and coordination between PMC and MOWRAM; Mr. Seok Hieng was responsible for construction supervision; and Mr. Sorn Srey was responsible for the FWUC formation and training program.

<Table 12> Members of the PMC Task Force Team

Division	Part	Name	Age	Grade	Position	Level	Certification	Position
Full Time	P.M.	Kim Kyu Tae	66	Specialist	General	MA	Civil P.E.	General Project
	Water Resources	Guk Chun Pyo	68	Specialist	P.M.	BA	Water Resources P.E.	General
		Lee Myeong Hoon	40	Specialist	Sub P.M.	MA	Water Resources P.E.	Water Resources
	Hydrology& Hydraulic	Lee Byung Dae	50	Specialist	P.M.	MA	Water Resources P.E.	General
		Seo Sang Won	40	Specialist	Sub P.M.	MA	Water Resources P.E.	Hydrology& Hydraulic
	Water Resources Design	Park Eun Joo	54	Specialist	P.M.	BA	Water Resources P.E.	General
		Hwang Won Seon	48	Specialist	Sub P.M.	BA	-	Design
	Construct-ion Super-visor	Kim Jong Gab	44	Specialist	P.M.	MA	-	General
		Kanf Dong Hyun	31	Specialist	Sub P.M.	MA	-	Supervisor
	Structural Design	Byun Jong Gyu	58	Specialist	P.M.	MA	Structural P.E.	General
		Lee Kyung Hwan	57	Specialist	Sub P.M.	MA	Structural P.E.	Design
	Road Design	Hur Tae Sung	54	Specialist	P.M.	MA	Road & Airpot P.E.	General
		Jung Byeong Gweon	43	Specialist	Sub P.M.	BA	Road & Airpot P.E.	Design
	Geotechnic & Foundation	Jang Hyo Wan	67	Specialist	P.M.	BA	Geotechnic & Foundation P.E.	General
		Kim Nam Ho	46	Specialist	Sub P.M.	MA	Geotechnic & Foundation P.E.	Geotechnic & Foundation P.E.
	Cost Estimation	Kang Jong Soo	62	Specialist	P.M.	Phd	Civil P.E.	General
		Kim Ji Gon	41	Specialist	Sub P.M.	BA	Civil Engineer	Estimator
Part Time	Environmental	Ko Si On	54	Specialist	P.M.	MA	Air pollution P.E.	Environmental
		Park Gwang Hyun	53	Specialist	Sub P.M.	Phd	-	Environmental
	Survey	Lee Jong Myeong	51	Specialist	P.M.	BA	Survey Engineer	Survey
		Kim Gyung Hae	44	High Degree	Sub P.M.	BA	Survey Engineer	Survey
	Geology	Kim Nam Jong	56	Specialist	P.M.	MA	Applied Geology P.E.	Geology
		Lee Geun Byung	46	Specialist	Sub P.M.	MA	Applied Geology P.E.	Geology
	Urban Design	Mun Chun Jae	56	Specialist	P.M.	BA	Urban Design P.E.	Planning
		Baek Seung Gweon	49	Specialist	Sub P.M.	MA	Urban Design P.E.	Planning
	Assistant of Technical Part & Consulting	Oh Yoon Geun	48	Specialist	P.M.	MA	Water Resources P.E.	Water Resources
		Kim Chang Gil	67	Specialist	Sub P.M.	MA	Water Resources P.E.	Hydrology& Hydraulic
		Lee Byung Dae	50	Specialist	Sub P.M.	BA	Civil Engineer	Design
		Kang Hyun Tae	58	Specialist	Sub P.M.	MA	Structural P.E.	Structural
		Park Suk Seong	50	Specialist	Sub P.M.	MA	Road & Airpot P.E.	Road Design
		Mun Sang Jo	55	Specialist	Sub P.M.	MA	Geotechnic & Foundation P.E.	Geotechnic & Foundation
		Song Hoon Ho	48	Specialist	Sub P.M.	BA	-	Estimator

<Table 13> Members of the Counterpart (MOWRAM)

No	Specialty	Name	Department
1	Project Management	Ponh Sachak	Project General
2	Coordinator	Bak Bunna	Project Coordinator and Management
3	Construction Supervisor	Seok Hieng	Construction Supervisor
4	Irrigation System (FWUC)	Sorn Srey	MOWRAM (FWUC training responsibility)

Sources: Yooshin Engineering Cor., Final Report: Batheay Irrigation System Construction Project, Sept., 2010

(2) Appropriateness of techniques and technologies applied

The PMC Task Force Team found that Cambodia had little in their design criteria and engineering standards that related to irrigation system design and construction. The government officials and experts of the RGC admitted the necessity of developing basic criteria and guidelines for agricultural infrastructure design and civil engineering services, especially in agricultural irrigation and drainage. Most of the design standards and technical specifications were modified and applied to local conditions in Cambodia through the meeting and discussion of the TCT consultation. For example, the construction of drain culverts followed Korea's construction manuals, such as 『Note on River Design Standard, 2005』 and 『Standard of Concrete Structural Design. April 2003)』

4) Efficacy of Project Implementation and Progression

(1) Appropriateness of Project Inputs

In spite of delays due to a prolonged compensation process for land expropriation on the project site, civil works for the 2nd phase of construction were completed on schedule by mobilizing the maximum means available, such as transportation equipment and related technicians.

Only the administrative procedure for handing over the facilities to the authority of the RGC took place after the completion of the field works. Therefore, the Project was finally completed 40 days after it had been originally scheduled. But all inputs for the Project were delivered properly on time.

(2) Appropriateness of Projecting Performance Indicators

In the stage of project preparation and consultation, a Project Design Matrix (PDM) was projected in accordance with the standard format of project performance management. But the performance indicators manifested on the PDM were fairly qualitative in general terms of reference. Between the project implementation and completion, the performance objectives and tracking indicators were not being specified or modified to reflect changed conditions and adjusted inputs. It is expected that a set of project goals and objectives are identified, and the targets specified into a number of verifiable performance indicators with means of verification. Those indicators are subject to be modified to reflect changed conditions, design and input adjustment, etc.

(3) Communication and Feedback with/from Stakeholders

The main purpose of the irrigation system construction project was to supply water directly into paddy land through a canal that is directly controlled by farmers. The Project included the program of formulation and operation of an FWUC (Farmer Water User Community), in which most of the farmers had a keen stake. As such, it was inevitably necessary to implement the project through close collaboration with farmers and local residents in the region. It was evaluated that there was full communication and feedback with/from farmers and local residents. Through questionnaires and interviews in the field, it was confirmed that they understood that this project was assisted by the Korean government, and modifications to the design adopted suggestions from beneficiary stakeholders.

5) Comparative Analysis of a Similar Project for an Alternative Option

In Cambodia, the evaluation team could not find a reference case of irrigation system construction project that was similar to the Batheay Project. Though the physical background and conditions are rather different, the similar case of an irrigation system construction project in Korea might provide some implications for comparison with the Batheay Project in Cambodia.

The Seong San Irrigation System Construction Project could be taken as an example case for comparison. The aim of the Seong San Irrigation Project, which is currently under preparation, is to supply water to paddy fields after being conveyed and to store fresh water from Yeongsan Lake in Yeongsan-gang (III-1) Area. This project, which has not yet commenced, has an irrigable area nearly the same as Batheay`s (4,000 Ha).

Therefore, it is possible to presume a project cost for Batheay by comparing it with that of Seong San which has similar project components, as shown in the table below.

<Table 14> Comparison of Project Cost between Batheay and Seong San

Items	Batheay Irrigation Project (A)	Seong San Irrigation Project (B)	Comparison (B/A)	Remarks
Irrigable area(Ha)	4,000	3,495	0.87	
Pumping station(EA)	-	2	-	
Main canal(Km)	22.6(7)	49(5EA)	2.16	
Secondary canal(Km)	-	110((97EA)	-	
Project Cost($Thousand)	450	128,021	284.50	Incl. 1st phase project
Unit Cost ($Thousand/Ha)	1.2	36.6	30.5	

Sources: Calculated by the Evaluation Team

The pictures below show examples of similar facilities constructed in Korea.

[Figure 6] Sources of Water in Korea

Reservoir

Pumping Station

Weir

Ground Water

Tube Well

Irrigation Canal Farm Road

Secondary canal

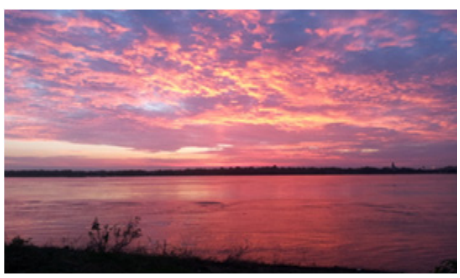
Main Canal

[Figure 7] Sources of Water in Batheay Irrigation Project, Cambodia

Low land area
Source of Water 1 : Natural pond which is Low land area from Mekong River inundated

Borrow Area
Source of Water 2: Artificial pond which is borrowed area for dike banked

Irrigation & Drainage Canal
Low land area 3: Bottom of Canal is lower than El. of paddy field, so water is accessed using a small pumping machine



Lake of Tonle Sap
Low land area 4: Original source of water

3. Effectiveness

1) Attainment of the Project Development Objectives (PDO)

(1) Basic Project Study and Site Survey

Both the 1st and 2nd phase of the Project were implemented after carrying out a pre-feasibility study, basic design and implementation planning. In the stage of detailed design, the basic design was considerably modified to reflect changes in local conditions and the opinions of local stakeholders: construction of 800m access

road, reduction of canal length(32km--->18.1km), and reduction of drainage structure(23--->12). This meant that basic survey and field investigations before design of the construction project were insufficient.

(2) Function of Irrigation Facilities and System

The section of the canal with earth works on both side slopes is good, but the surface of the farm road was partly damaged by erosion. Structures from cement concrete and concrete pipes for culvert are maintained in their original form. In general, with the exception of road surface conditions the irrigation facilities and system have been operated fairly satisfactorily up until now. This means that the performance or outcome of the Project has been fairly good in terms of short-term effect.

(3) Effectiveness of FWUC Program

The organization of FWUC has been operated well, but the only facilities installed for operation in the site are gate maintenance and operation. The technique of gate O&M is rather simple and easy. As such, an advanced program for capacity development in O&M may not need to be developed. However, what matters is the O&M of the general system operation and maintenance of irrigation canals. The role and function of the FWUC in O&M of irrigation facilities and the irrigation system hasn't been performed well in recent years. They are unable to collect fees, and they do not have the ability to perform O&M of the irrigation system. So, this worsens the situation. Basically, there is a huge lack of a sense of ownership among the residents. Residents do not take responsibility for the maintenance of the facilities.

2) Effect on Agricultural Sector

(1) Supply of Irrigated Water

Irrigated water could be supplied to at least 2,220 hectares of paddy inside the dike in rainy season and to around 3,500-8,000 hectares farmlands inside and outside the reservoir in dry season in the Sambo and Chealear communes. Due to sufficient water supply, the 2,220 hectares inside the basin now allow multiple cropping. Virtually all families grow rice twice or even three times a year compared the once-a-year heavy seed rice farming that farmers practiced before the implementation of the project. Some farmers grow rice for a shorter period by introducing three-month yield varieties.

In addition, per hectare cultivation of the yield has increased from 2.5-3 tons to 3-4 tons due to a sufficient supply of water and improved farming techniques. So, the practice of multiple cropping and the better yield enable the local residents to make more income and thus improve their livelihoods.

<Table 15> Before and After the Project - Sambo Commune

Indicators	Inside the dike		Outside the dike	
	Before project	After project	Before project	After project
Cultivation area (Ha)	2,800	2,800	3,500	4,500-8,000
Rice production (Ton/Ha)	3-3.5	3.5-4	3-3.5	3.5-4
Number of farmers (Family)	300-400	300-400	1,300	1,300
Total rice production (Thousand tons)	8.4-9.8	9.8-11.2	10.5-12.25	15.75-20

Sources: Data collected and analyzed by the Evaluation Team

<Table 16> Before and After the Project - Chea Lear Commune

Indicators	Inside the dike		Outside the dike	
	Before project	After project	Before project	After project
Cultivation area (Ha)	1,375	1,375	30	1,500
Rice production (Ton/Ha)	3-3.5	3.5-4	3-3.5	3.5-4
Number of farmers (Family)	1,441	1,441	109	196
Total rice production (Thousand tons)	4.13-4.81	4.81-5.5	0.09-0.11	5.25-6

Sources: Data collected and analyzed by the Evaluation Team

Admittedly, the Irrigation System Construction Project has had significant impacts on local residents, the authorities, and the country as a whole. First and most importantly, the projects positively influence the socio-economic status of local residents in various ways. Farmers began to use advanced, technological agricultural practices to replace the traditional ways of farming. They started to practice different ways of cropping. These can advance their skills and experience in farming, making them much more flexible and less vulnerable.

The following table shows the situation of agricultural production, farming system, agricultural machinery usage and land price before and after the project. As is shown, the project had the unexpected impact of a rise in land prices. Notably, the price of front land near the road that was constructed saw an extraordinary rise by more than 10-fold after the project's implementation.

<Table 17> Before and After the Project - Agricultural and Other Indicators

Indicators		Unit	Before project(2007) (A)	After project(2012) (B)	Difference (B-A)
Rice production	Cambodia	Ton/Ha	2.74	3.00	0.26
	Area 1	Ton/Ha	3.0	5.0	2.0
	Area 2	Month	5~6	3-4	- 2
Multi-crop	more than 2 Multi-crop	Rate, %	All the farmers responded that they had introduced multi-cropping techniques.		
Machinery usage	Rice production	Rate, %	10~20	40~50	30

Land price (Front land)	Chea Lear Commune (Village 1)	US Dollar	1,000~ 1,500	10,000~ 15,000	9,000~ 13,500
	Sambo Commune (village 2)	US Dollar	2,500	30,000	27,500

Sources: Data collected and analyzed by the Evaluation Team

Result of a survey on farm machine use before and after the project is shown in the table below.

<Table 18> Farm Machine Introduction in Sambo Commune

Year	Number			
	Combine	Walking tractor	Water-pumping machine	Pesticide fumigator
Before 2007	0	0	0	0
2007	0	10	60	0
2008	0	20	100	10
2009	0	50	130	20
2010	0	80	150	80
2011	0	100	180	80
2012	0	110	190~200	80
2013	0	130	200	100

Sources: Data collected and analyzed by the Evaluation Team

<Table 19> Farm Machine Introduction in Chea Lear Commune

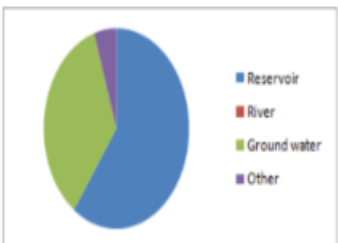
Year	Number			
	Combine	Walking tractor	Water-pumping machine	Pesticide fumigator
Before 2007	0	0	17	0
2007	2	30	20	5또는6
2008	0	38	30	12
2009	0	42	35	20
2010	0	43	37	22
2011	0	65	39	25
2012	0	82	42	27
2013	4	82	42	28

Sources: Data collected and analyzed by the Evaluation Team

Through questionnaire surveys, the evaluation team found that the main source of irrigation water is a reservoir constructed by the Project as shown in the table below. 60 percent of the respondents answered that their main source of agricultural water was the reservoir. More than 80 percent of the local residents surveyed answered that thanks to the Project it was more convenient for them to get agricultural water than before the project's completion.

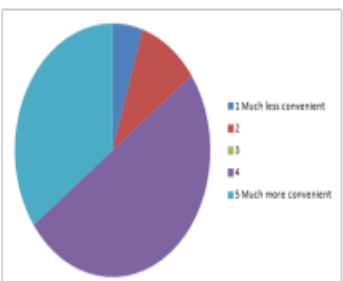
[Figure 8] Questionnaire Results on Agricultural Water Utilization

What is the main source for agricultural water?



Response	Rpdent.	Percent.
Reservoir	12	60%
River	0	0%
Ground water	7	35%
Other(rain)	1	5%

Do you think it is more convenient for you to get agricultural water than before the project?

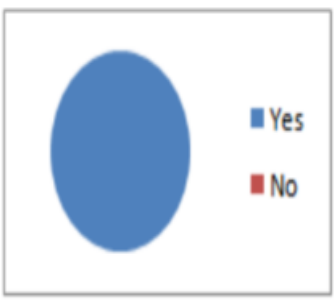


Response	Rpdent.	Percent.
1 Much less convenient	1	5%
2	2	10%
3	0	0%
4	10	50%
5 Much more convenient	7	35%

After finishing the project completely, all of the respondents practiced double cropping as shown in the table below. While not all introduced double cropping with the same intensity, all the respondents answered that they had introduced multi-cropping techniques after the project's completion. Therefore, this project contributed to enhancing agricultural productivity in a substantial way.

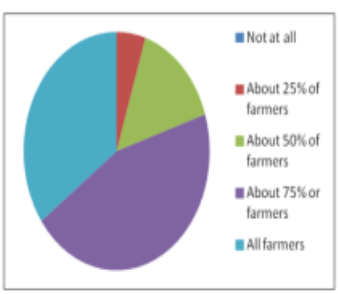
[Figure 9] Questionnaire Results on the Enhancement of Agricultural Productivity through Double Cropping

Are there farmers who start multiple cropping after this project?



Response	Rpdent.	Percent.
Yes	20	100%
No	0	0%

Do you think how much farmers have practicing multiple cropping cultivation after the KOICA project?



Response	Rpdent.	Percent.
Not at all	0	0%
About 25% of farmers	1	50%
About 50% of farmers	3	15%
About 75% of farmers	9	45%
All farmers	7	35%

3) Effect on Rural Development

(1) Improvement of Income and Rural Living Standard

Expansion of the agricultural infrastructure and enhancement of productivity from this project led to an increase in farm incomes, creating employment opportunities, and eventually improving the rural living standard. In addition, the increase in rural incomes might have resulted in a long-term alleviation of poverty in the rural area. The farmers and local residents the evaluation team interviewed answered that the

effect of the Project is clearly being felt in terms of rural income and living standards in the region. However, the evaluation team unfortunately failed to collect credible data on the improvements in rural and farm household income.

(2) Effect on Social Development

Due to increases in rural income, it appeared that there were positive effects on rural health and education in the region. In contrast with the data regarding school enrollment, the interviewees responded that due to the improvement in agricultural activities, farmers had their children assist with their work less than before the Project. This meant that the children in the region might have a better opportunity for schooling. The data investigated by the local assistant showed that there was a positive connection between improvements in rural income and greater accessibility to health services for women. Since the completion of the Project, the amount of prenatal care provided and childbirths in hospitals have both increased significantly in the project region. Purchases of electronic home appliances and motorcycles were also increased substantially in a village in Chea Lear Commune.

<Table 20> Social and Cultural Indicators

Indicators		Unit	Before project (2007-08) (A)	After project (2012-13) (B)	Difference (B-A)
Education	Sambo Primary School	Students (Girls)	879 (422)	628 (334)	-251 (- 88)
	Songkheurb Primary School	"	584 (257)	533 (248)	-51 (- 9)
	Songkheurb Secondary School	"	191 (99)	452 (216)	261 (117)
Clinic (Sambo Clinic)	Prenatal care	Case	621	1,018	397
	Baby delivery Home (Traditional)	"	15	0	- 15
	Baby delivery Home (Clinic staff)	"	128	0	- 128
	Baby delivery (At clinic)	"	91	257	166
	Birth Spacing	"	1,456	2,415	959

Others (Chea Lear Commune)	**Television**	EA	200	400	200
	Bicycle	"	220	205	- 15
	Motorcycle	"	230	300	70

Sources: Data collected and analyzed by the Evaluation Team

(3) Other Effects

9 villages and schools are protected from inundation when the river became flooded. In addition, the new and improved infrastructure on the dike and access road provided local residents with convenient transportation. This resulted in less need for field work, giving women more time for doing housework and taking care of the children and the entire family.

It is considered that the irrigation system constructed in this project was a model of water resources management and utilization in Cambodia. It might be the only example of an irrigation system that was constructed using a huge and abundant source of water, the Mekong River out of many kind of methods.

According to the responses of interviewees, the project had some positive effects on cross-cutting issues such as gender equality and women in development (WID), environmental protection, and energy conservation. For example, due to the improvements in farm operation, women in the region were able to upgrade their status by themselves in the family, and thus contribute to improving the household living standard.

4. Impact

1) Impact on Local Residents and Community

(1) Attitude and Awareness on Development

From the interviews and questionnaires given to central and provincial government officials, local residents and beneficiaries, it was found that in most cases, the recipients' attitude and awareness on development were changed toward a positive perception. In terms of agriculture the local residents developed the affirmative recognition that through the development of agricultural infrastructure, the farming system and techniques could be improved. It appeared that they welcomed the introduction of new rice varieties, multi-cropping techniques and agricultural machineries.

(2) Damages or Side Effects Caused by the Project

During the construction period, some noise and dust scattering had occurred, as with other civil works, but there were no complaints because the work sites were located a long distance from villages. Few farmers in the lower region of the project site near the dam were affected by the increase in the reservoir size. The size of their arable farmland was lessened to some extent, even though corresponding compensation had been made.

2) Contribution to Institutional and Capacity Development

Based on the interview with public servants, data from publications, and indicators surveyed, the evaluation team found that there was little impact on institutional and capacity development in the area of water resources management and agriculture. The main components of the project were hardware civil engineering, focusing less on institutional and capacity development.

However, the impact on farming and irrigation systems seemed visible. Double-cropping farming became common and prevailed in the region, while a new system of farmer water use communities was introduced.

3) Reciprocal Relationship and Effect on the Image of Korea and Korean People

It was apparent that the Project strengthened the cooperative and friendly reciprocal relationship between the two nations. Not only were the economic cooperation and non-economic exchanges between Cambodia and Korea continuously increased, but development cooperation, both in the public and private sector, is expected to be invigorated in the future. According to the results of our interviews and questionnaire surveys, the image of Korea and Korean people was significantly enhanced among the Cambodian people in the region.

4) Other Unexpected Impacts

The price of farmlands in the area significantly appreciated. This phenomenon was caused by a number of factors, but the local residents believed that the construction of the irrigation system and flood control was one of the important factors in the substantial rise in the land price.

5. Sustainability

1) Sustainability of Policy and Institutional Support

It was confirmed that the central government's policy and institutional support for water resources management and agricultural irrigation would be strongly continued in the future.

2) Financial Sustainability

The sources of the budgets of FWUC are irrigation service fees from members of FWUC, supported by funds from the Royal Government of Cambodia, international development organizations, and other NGOs. Profits from FWUC`s business, fines and other taxes are also included in the budgets.

Spending of budgets are the operation costs of FWUC, and current and extraordinary expenditures, such as irrigation system repair and maintenance, gasoline, functions of FWUC members, administration and current and other extra work.

The central government has a limited budget for this sector, and thus the provincial department as well as the district office seems likely to not be capable of carrying out appropriate operation and sufficient maintenance. It seems difficult for them to secure the budget for O&M and repair of facilities because the amount of the annual budget of Kampong Cham Province MOWRAM is only USD $50,000.

<Table 21> Regulation of FWUC Irrigation Service Fees and Fines

Specific Irrigation Service Fees	• Draining : 80,000R/Ha/one season • Both draining and pumping : 50,000R/Ha/one season • Pumping : 30,000R/Ha/one season * has not been successfully implemented
Fines (FWUC Members)	• Absent from three consecutive meetings : 15,000R or termination of membership • Absent from labor supply : 10,000R or no water supply for 15days • Stealing water from canals for cultivation : 100,000R • Closing or opening water gates without permission : 100,000R

	• Damaging irrigation system : 100,000R • Setting cattle free along irrigation areas : 5,000R • Weight of all transport exceeding 5 tons : 50,000R • Threshing rice/paddy along canals/dikes : 100,000R • Use of an illegal fishing net to fish : 100,000R • Shocking fish using electricity : 500,000R • Wasting water to water crops : 100,000R • Using explosives to damage the irrigation system : 2,000,000R • Closing canals without permission : 100,000R
Calculation of Water Cost per Hectare by FWUC:	• X= (X1+X2+X3+X4+X5) / (Total land surface) + 20% of production growth rate per hectare - X is the spending on the operation and maintenance - X1= spending on repairs and irrigation system maintenance - X2= spending on gasoline - X3= spending on function of FWUC - X4= spending on administration - X5= other extra work • Y is the cost of water usage:

Spending rates (Government and FWUC)

Year	Government spending(%)	FWUC spending(%)
1	80%	20%
2	60%	40%
3	40%	60%
4	20%	80%
5	0%	100%

Budget for Five Years

Year	Activities	Budget (USD$)	Activities	Budget (USD$)	Total
2010	Training, Meeting, Dissemination, etc.	2,000$	Facilities, Maintenance, and Repair	2,000$	4,000$
2011		2,000$		3,000$	5,000$
2012		2,000$		5,000$	7,000$
2013		2,000$		7,000$	9,000$
2014		2,000$		8,000$	10,000$
Five-Year Budget (Total)					350,000$

(2) Self-sustainability of FWUC by Collecting ISF

O&M depends to a great extent on the ISF (Irrigation Service Fee) collected by FWUC. FWUC is not functioning well either, even though a specific regulatory guideline for FWUC management and ISF collection has been prepared for execution.

They are unable to collect the fees, and they seem not to have the ability to carry out the O&M. This worsens the situation in terms of financial sustainability. There are many reasons for the difficulties in collecting ISF; for example, farmers couldn't use water because of both water insufficiency and inundation, like in 2011. Huge flooding damaged the dike which required much repair work. Therefore, the functions of the facilities themselves are also over-dependent on the flood water and water from the river. During seasons with low water, they do not have a sufficient amount of water to irrigate a lot of farmland. So, there is little they can do during these circumstances. One more special reason was that a political party made a political commitment to stopping irrigation fee collection in the latest regional election. It is difficult to evaluate the sustainability of collecting ISF and operating FWUC.

3) Technical and Entrepreneurial Sustainability

It is still hard to forecast improvement considering the budget limitation of government support and the significantly limited capacity of the FWUC. The financial uncertainty and weak capacity of FWUC hamper the continued building of technical and entrepreneurial capacity in the long run. At present, damaged facilities are not repaired due to a shortage of funds, and moreover, operation of an after-service and maintenance system are also almost completely suspended. There is little room for operating technical training and managerial education.

4) Next Phase of the Project

For more stable and efficient farming in the region, a permanent irrigation system with attributes such as permanent water source and storage facilities, conveyance canals and other subsidiary facilities is required by all means in the next phase. In addition, the construction of more main and secondary canals, and farm land consolidation including tertiary canals, are required. For ease of operation and

maintenance and automatic operation in a long-term perspective, the installation of a system of TM/TC (Telemetering and Telecontrol) by computer may be considered. Considering the favorable conditions for agricultural development in the region, the construction of a permanent system of irrigation is desirable.

(1) Pumping station

There are many facilities in a pumping station. One of the main machines in it is a pump. For this reason, it is important to choose pump type in this project, because the common type of pumps requires a great deal of care in setting up a system and O&M in cases in which the water level fluctuates by more than 10m.

For conveyance canals (pipe lines), pipe-type materials are desirable, because it is easy to control and maintain pipe lines which are submerged in the rainy season due to the inundation of Tonle Sap River.

[Figure 10] Pumping Station - Reference Photos

(2) Main and Secondary Canal

The canals, which were already constructed in the site, are adequate for drainage, because the bottom elevation of the canal is lower than the bottom of paddy field elevation. Proposed canal materials are reinforced cement concrete ready-made products, iron pipe or direct constructions using cement concrete in the field.

(3) Farm Land Consolidation and Farm Mechanization

An integrated consolidation of farm land which includes increasing parcellation of the land, irrigation and drainage facility installation, and farm road constructions will enable farming more efficient and productive by utilizing irrigated water in a more efficient way and promoting farm mechanization. Farm mechanization is expected to make farming more convenient and increase rice productivity in a great extent.

[Figure 11] Before and After Land Consolidation - Reference Photos

Before Land Consolidation

After Land Consolidation

[Figure 12] Farm Machinery and Mechanization - Reference Photos

Tilling & Plowing

Transplanting

Fertilizing

Weed control

Pest control

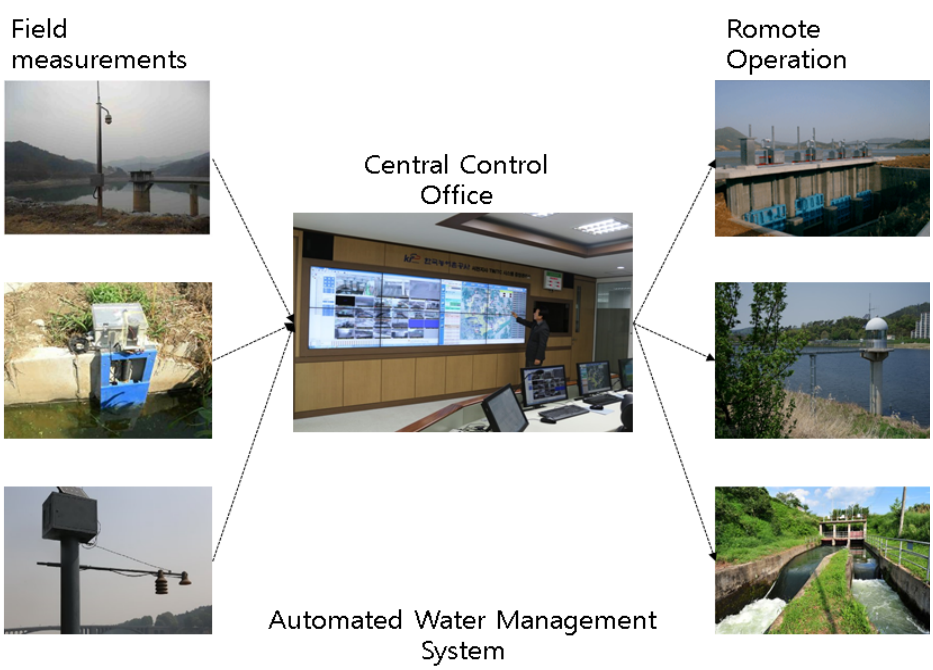
Harvesting

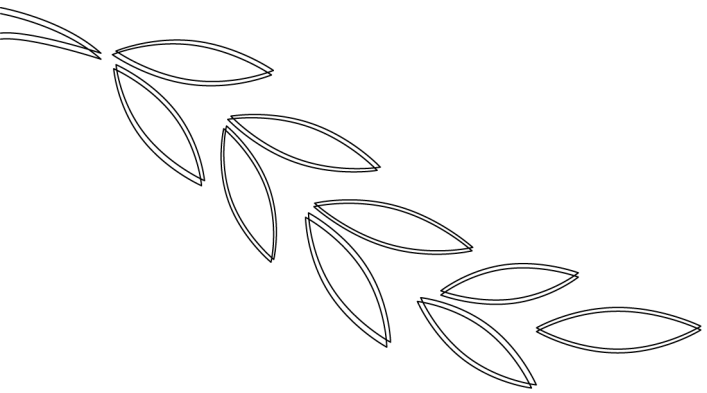
Harvesting & Combining

Milling

(4) Automated Water Management System

[Figure 13] TM/TC System





V. Conclusions and Recommendations

1. Conclusions and Lessons Learned
2. Recommendations

Chapter

V Conclusions and Recommendations

1. Conclusions and Lessons Learned

1) The Context and Rationale of the Project

Cambodia is one of the 26 strategic development partners with which Korea has put a greater emphasis on promoting foreign, economic and cultural relationship, as well as development cooperation. Over the years the volume of development cooperation with the Royal Kingdom of Cambodia has increased significantly, both in the form of grant aid and concessional loans.

The overall development goal of the Cambodian government is 'poverty reduction and economic growth through enhancement of agriculture sector development.' The Rectangular Strategy of the Royal Government of Cambodia established four pillars of strategic growth, and made agricultural sector development the single top priority for national development. Agricultural development is placed in the center of Cambodia's developmental program (National Strategic Development Plan 2009-2013, Royal Government of Cambodia, June 2010). Rehabilitating and enhancing irrigation potential along with water resources management is one of the high priority investment requirements for agricultural development. Cambodia's agriculture depends heavily on paddy crops, and the potential for expanding irrigated farming area is great.

Agricultural and rural development is the first priority area of Korea's commitment to Cambodia's progress through development cooperation. The Country Assistance Strategy (CAS) 2008-2010 and the Country Partnership Strategy (CPS) 2012-2015 for

Cambodia put a greater emphasis on supporting the program of agricultural investment, especially in the area of water resources management and irrigation. Accordingly, a number of projects have been implemented in these areas besides the two projects, including (1) A Reservoir Rehabilitation Project in Tamouk; (2) Integrated Water Resources Development Project in Kraing Ponley River; and (3) Feasibility of Battambang Multi-purpose Dam.

In this context, the Batheay Irrigation System Construction Project implemented between 2009 and 2010 is considered to be a very important program in Korea's bilateral development cooperation with Cambodia. The purpose and objective of the Project proved highly relevant to Korea's development cooperation policy and strategy as well as to Cambodia's development strategy, meeting the immediate developmental needs prioritized in the national development plan.

2) Efficiency

(1) Project Planning and Preparation

(Project formulation and design) For the planning and preparation activities the Irrigation System Construction Project followed the standard procedures of project-type cooperation. Thanks to the channel for cooperation that was developed in the 1st phase of Flood Control Project, the preparatory process of the 2nd phase project went smoothly. However, deficiencies were also found in some specific activities of project preparation. The pre-feasibility study on the 2nd phase project was also conducted during a rather short trip to Cambodia. The pre-feasibility study on the project lacked site investigation such as topographical investigation and geological survey. Repeatedly, as in the 1st phase project preparation, we learned the importance of basic study and survey in identifying and formulating a civil engineering project. In addition, sufficient inputs by experts need to be secured in carrying out the preparatory works.

In addition to the hard inputs of the project, the soft components such as technical, institutional and human capacity building are important. Considering the need for empowerment of the recipient's ownership and capacity development, it would be better if the soft component was taken into account in designing the project for building the capacity of the recipient in the project planning and implementation.

(2) Project Implementation

It was confirmed that the results of the Project were highly effective in all project components in terms of inputs and outputs performance. There were some modifications of the project design to reflect the changed local physical conditions in the course of detailed design, but these didn't have a negative influence on the results of the Project. The management system in the field was operated in a highly efficient manner. Taking advantage of the 1st phase project experience, the management of the 2nd phase project was run smoothly in terms of field management, including procuring the local constructor. The level of professionalism of the employed technicians and experts was kept sufficiently high during the implementation of the Project by keeping most of the experts who took part in the 1st phase project implementation. As was the case with the 1st phase project, it was found that there was a lack of expertise in the field of agricultural civil engineering and irrigation. In the planning stage, PDM was projected. However, specific development objectives and measurable tracking indicators of the Project were not developed appropriately. Furthermore, verifiable tracking or performance indicators were not modified in the course of project implementation and completion. The PDM should have been utilized as a strategic tool of result-oriented management of the Project.

3) Effectiveness and Impact

(1) Attainment of the Project Development Objectives (PDO)

Both of the upper and sector policy goals and development goals were considered to have been achieved 'very satisfactorily.' Though some of the project development objectives were modified to reflect the local conditions identified in the course of detailed design, most of the PDOs were achieved as planned. It was evaluated that the short-term performance of the Project had been realized sufficiently, as projected in the project planning stage.

(2) Medium-term Effect on Agricultural Sector Development

The results of the Project were highly visible in terms of improving the capacity of agricultural water supply and irrigation. The direct effect of the Project could be seen not only in the agricultural water supply but also in enhancing agricultural productivity and farming techniques. Based on the positive results and the infrastructure brought about by the 1st phase project, the 2nd phase project produced a wide range of effects including the expansion of cultivation, productivity increase, introduction of new varieties, shortening of the cultivation period, and farm mechanization. Some positive effects were also found in areas such as local transportation, livestock raising and inland aquaculture.

(3) Impact of the Project on the Other Arena

Along with the 1st phase project of flood control, the Project was implemented as an important investment program in the region after the inauguration of the New Government in 2004. The survey results showed that the Project helped to raise a renewed awareness among local residents on development and international development programs. The questionnaire survey received positive responses both regarding the idea that there was a "friendly relationship" between the two countries and regarding the image of Korea and the Korean people. It is expected

that an affirmative recognition of the efficacy of the Project might help induce some indirect effects of projecting a positive image of Korean experts and corporations in this area of specialization.

3) Sustainability

Through the years the policy commitment and institutional support of the RGC to the Project has appeared to be consistent and strong. The current sector policy and program continues to put a high priority on agricultural development irrigation. What might certainly be lacking in terms of ensuring the sustainability of the Project was rather clearly recognized by most of the stakeholders in the Project. In particular, the financial sustainability is supposed to be at stake due to the lack of finance for maintenance and after-care of the facilities. Despite the existence of the Farmer Water User Community (FWUC), the function of the FWUC is no longer effectively in operation and the organization has very little financial, technical and entrepreneurial capabilities.

Instead of phasing out the government intervention in the Project, a permanent solution that would address the intrinsic requirements for securing water resources must be sought, and an advanced system of agricultural irrigation in the region should be prepared in the long run.

4) Recognition and Contentment

An integrated questionnaire survey on recognition of the bilateral development partner for the 1st and 2nd phase project produced a modest result, showing that 16 among 20 questionnaire respondents composed of ordinary local farmers and residents had been aware of the donor nation: the Republic of Korea. The other questionnaire survey conducted among the members of the Farmer Water Users

Community (FWUC) who took part in the training program of the Project produced a different result, which showed a better recognition of the donor nation. All of the 9 respondents answered that they had been aware that the government of the Republic of Korea was the provider of the Project.

2. Recommendations

The 2nd phase of the Batheay Project was implemented in a continuation of the 1st phase flood control project. The paradigm of planning and execution in each project was very similar, which means the two separate but successive projects targeting closely related development objectives with similar mode and methods of aid delivery share many of the conclusions and lessons learned in both phases of the Project. Therefore, most of the recommendations made in this part could be explained in their perspectives and contents.

1) Programming Approaches and Project Formulation

(1) Project Formulation by Program-type Programming Modality

Though the Batheay Irrigation System Construction Project was closely related to the 1st phase flood control project, it was identified and formulated in accordance with the traditional aid modality of project-type programming by which a single free-standing and stand-alone project is selected and designed. The conventional method of project formulation is not able to effectively contribute to realizing a concerted development objective or target in a consistent and comprehensive manner. The single project-type modality of cooperation is inevitably subject to a substantial cost of transactions and fragmented management. A strategic operational program should be projected in a coherent approach by which a set of clustered programs comprising a number of related projects and developmental activities is

designed to address a certain theme or agenda of a sub-sector or area in an integrated manner.

(2) Comprehensive Project Programming

Similarly to the case of the 1st phase project, the composition of the Project was heavily dependent on the components of hard/physical infrastructure and external inputs, including civil engineering and foreign expertise. Only a very slight portion of the project component was spared for the soft/capacity development portfolio of the Project, such as policy consultation, human capacity building, and institutional and system development. Considering the limited capacity of financial resources, KOICA is advised to put a greater emphasis and higher priority on the software components of policy, human and institutional capacity, along with the expansion of physical infrastructure and hardware facilities. The newly introduced paradigm of technical cooperation is the so-called 'Development Experience Exchange Partnership (DEEP)' Program, in which in addition to policy consultation and strategy recommendation, a series of programs connecting to the projects of system development, institution establishment, professional capacity building and physical infrastructure construction is comprehensively identified and programmed in an integrated and comprehensive manner within an extended project or a sub-sector clustered program.

(3) Empowering Development Ownership and Participatory Development

The owner of the facilities constructed by the Project is primarily the MOWRAM of RGC; however, the assets are to be shared and owned by the local community. The routine operation and maintenance of the facilities should be mandated to the accountable authority of the local community. At the level of the local community, a self-regulatory guideline - FWUC Operation - had been prepared in the course of project implementation. Unfortunately, it does not operate well at present. A guideline on the continued operation and maintenance of the irrigation facilities at

the level of government should be formed through close consultation among the main stakeholders of the Project. The guideline should contain some essential articles on supporting and securing the sustainable functioning of the FWUC and operation of the irrigation facilities.

2) Sound Project Preparation and Flexible Implementation Management

(1) Thorough and Intensive Project Preparation

The Evaluation team found that the feasibility study on the 2nd phase project was also conducted within less than a week. The inputs of required manpower and expertise were insufficient. Thorough and intensive preparatory activities such as pre-feasibility and/or feasibility study and basic design should be carried out in a more technically competent and sound manner that reflects the characteristics of the project. If necessary, the related surveys such as topographical investigation and geological survey must be included in the project preparatory activities. Planning and design of civil engineering requires a basic site survey and preliminary analysis and study.

(2) Flexible Management of Project Implementation

Similar to the case of the 1st phase project, due to the less intensive project preparation there were some requirements for modifications of the project design and subsequent arrangement of project development objectives and specific inputs. Some elements of the project design proved not to be fully appropriate to the local physical conditions. Poor preparation usually resulted in some delays and changes in the division of labor, causing some deficiency in the quality of the civil engineering and construction. It is recommended that a thorough site survey and investigation be planned in the stage of project identification and feasibility study.

The Project Design Matrix (PDM) had been projected in the planning stage; however, the PDM lacked enough concrete development objectives for the

effective tracking of performance indicators. Usable tracking or performance indicators of the PDM were not developed or modified in the course of project implementation and completion. The PDM for managing results is required to have some concrete and measurable development indicators or performance targets, and these must be subject to modification to reflect changes in design and inputs during the progress of the project. The projection of a concrete project design matrix as well as consistent modification of the matrix is highly recommended when new projects are prepared and executed in the future.

3) Projecting a Model Program for Advancing Agricultural Irrigation

The Irrigation System Construction Project scored 11 points in rating the comprehensive performance of the Project, reaching the echelon of 'Very Successful,' the stratum of highest performance. This means that the Project could be developed as a model pilot program in the area of agricultural irrigation with a small and medium scale project size. If a strategic operational plan is being prepared under the Country Partnership Strategy for Cambodia 2012-2015, a pilot program for agricultural irrigation in parallel with flood control and water resources management might be developed and incorporated into a sub-sector program in the priority intervention area of agricultural and rural development.

4) Ensuring the Durability and Sustainability of the Project

It is observed that the Project and the management have shown little sign of medium durability and long-term sustainability. Neither the central nor the local government had a budget plan for operation and maintenance in the medium-term stand point. The operational system and management of the project facilities doesn't receive due support corresponding to the policy and institutional commitment of the government. An immediate measure should be taken to ensure the medium-term

durability of the project, particularly for routine system operation and maintenance. The Evaluation Team recommends that an operation and maintenance (O&M) guideline for the Batheay irrigation facilities be prepared, as well as some support measures for sustaining the effective operation of the Batheay FWUC. Not only the governments but also villagers should take ownership and lead in operation and maintenance. Farmers should consider the facilities as belonging to them, and take good care as much as they can in terms of operation and maintenance.

5) Searching for a Long-term Solution to Secure Long-term Sustainability

Despite the considerable positive effects and impact of the Project, its performance has some fundamental limitations. Most of all, the irrigation system didn't secure a permanent source of water supply. The water contained in the reservoirs inside the dam could not ensure a stable and sufficient supply of irrigable water in the whole farmland of the region. The possible droughts pose another vulnerability in irrigation. It is required that an advanced irrigation system with a stable and sufficient water supply be constructed in the longer term perspective. An in-depth feasibility study on searching for a fundamental solution for permanent agricultural irrigation along with flood control is recommended to be conducted in the near future.

6) Recommendations for the RGC and Related Main Stakeholders

(1) The Royal Government of Cambodia (RGC)

(Ensure Effective Communication) The RGC, particularly MoWRAM, should inform the local authority at the sub-national level as well as the local residents clearly about any development plan. Moreover, they should also conduct some public survey to hear what local residents need so that we can design the development project to reflect those needs.

(Process and Publicize Information and Reports among all Relevant Stakeholders) The evaluation team has observed that there is a great deal of difficulty in obtaining information about the projects. This does not apply only to these particular projects, but applies to most of the development projects. Either it is hard to access the information, or the information is not available. In addition, the authorities do not seem to know exactly where the information can be obtained. So often, one authority would refer a query to another, which would then refer it back to the first one.

(Empower Local Authority by Allocating the Annual Budget Required to Carry out O&M) The evaluation team have also found that the Provincial Department of Water Resources and Meteorology has a very limited annual budget allocated by MoWRAM for them to carry out O&M and other development in the entire Kampong Cham Province. As a result, they have complained that they are not able to fix minor damages to construction, which causes the damage to grow bigger and bigger and become hard to fix. The district office also encounters the same problem.

(Continue Good Relationship with Funding Agencies and Identify Areas of Partnership) The RGC has done well in maintaining a good relationship with funding agencies. For this reason, it is important to continue this good relationship as well as to try to look for areas that are in urgent need of development in order to make proposals for more funding.

(2) Local Authority

The local authority should carefully study and identify the needs of local residents and the problems they face. It is important for any development project to address the needs of the local residents and make sure the project benefits a large majority, if not all, of them.

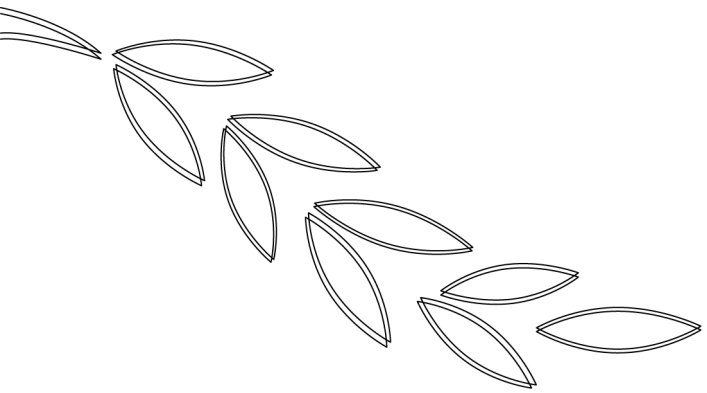
The Batheay District Office should carry out and encourage immediate problem solving. Delaying the resolution or repair of a minor problem or damage will cause it to get bigger and bigger, and eventually be out of control.

(3) Community/Local Residents

(Promote Mutual Understanding) A development project definitely cannot benefit every person equally, so it is important that every villager be open-minded and not compete with each other over the shared benefits.

(Take Ownership and Lead in O&M) Villagers should consider the facilities as belonging to them, and take good care to the extent that they are able in terms of operation and maintenance. This is the best way to make the facilities and the projects sustainable.

(Strengthen Cooperation with the Community) Since the FWUC plays an important role in O&M, empowering them is a must. For this reason, local residents have to trust and cooperate with the community as much as possible.



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Attachment

1. Ex-post Evaluation Questionnaire - An Integrated Version

KGDC KOICA

Ex-post Evaluation Questionnaire

An Integrated Version

On the Project of Flood Control and Irrigation System Construction in Batheay Area, Kam Pong Cham Province, Cambodia

I. Relevance

1. Alignment with Korea's Basic Policy and Strategy

1-1. Consistency with Korea's ODA Policy and Strategy

1-1-1. [Literature[1]] How does this project align with Korea's ODA policy and strategy?

1-1-2. [Literature] What are details of relevant information that align with Korea's ODA policy and strategy?

1.2 Appropriateness of Cambodia's Country Assistance Strategy (CAS)

1-2-1. [Literature] How does this project align with Cambodia's Country Assistance Strategy?

1-2-2. [Literature] What are the details of relevant information, and how are they related to newly established Country Partnership Strategy (CPS)?

2. Consistency to Basic Strategy and Need of Recipient Country

2-1. Consistency to National Development Project of Cambodia

2-1-1. [Literature] How does this project align with Cambodia's Rectangular Strategy?

2-1-2. [Literature] How does this project align with Cambodia's National Strategic Development Plan (NSDP)?

2-2. Consistencies with Cambodia's Water Resource and Agriculture Development Policy, and Project's Order of Priority

2-2-1. [Literature, Interview] How does this project align with water resource and agriculture development policy such as "The National Strategy for Agriculture and Water: 2006-2010" and "Agriculture Sector Strategic Development Plan: 2006-2010"?

2-2-2. [Literature, Interview] What was the order of priority of this project?

2-3. Responsiveness to Needs of the Project Region and Recipients

2-3-1. [Literature, Interview] How does this project align with regional development plan of Cam Pong Cham Province?

2-3-2. [Interview] What were the methods used to collect opinions of stake-holders? How were those opinions reflected on the implementation plan?

3. Setting Project Objective and Establishing Progress Method

3-1. Validity and Reality of Set Project Objective

3-1-1. [Literature] Was clear objective set?

3-1-2. [Literature] Was it adequately quantified?

3-1-3. [Literature] Was it realistic?

3-2. Composition of Project Components

3-2-1. [Literature] Were material, technical, socio-cultural, and humanistic components all harmoniously considered?

3-2-2. [Literature] Were soft and hard components well harmonized/balanced?

3-2-3. [Literature] Were components related to empowerment and improvement of the institution and capacity development adequately considered?

3-3 Analysis on the Stakeholders

3-3-1. [Literature] Was clear analysis made on the stakeholders?

3-3-2. [Literature] Was the result fully reflected in the process of establishing and implementing the project plan?

3-4. Projection of PDM (Project Design Matrix) and Performance Indicator

3-4-1. [Literature] Was PDM established during project planning phase?

3-4-2. [Literature] Were usable tracking performance indicators identified to be modified in the course of project implementation?

3.5 Monitoring, Risk Management, Evaluation and Reporting

3-5-1. [Literature, Interview] Was monitoring plan established well in order, and pursued as planned?

3-5-2. [Literature, Interview] Was plan for risk management established well in order?

3-5-3. [Literature] Were interim and end-of-the project evaluations pursued as planned?

3-5-4. [Literature, Interview] Was proper feedback regarding results of interim and end-of-the project evaluation provided?

4. Appropriateness of Project Formation and Implementation

4-1. Project Identification and Appropriateness of Selection Process

4-1-1. [Literature, Interview] Was project requested in proper manner and under recipient's ownership?

4-1-2. [Literature] Was there adequate base that underpinned propriety of selection process and the decision?

4-1-3 [Literature] Were project feasibility study and examinations implemented appropriately after taking its unique characteristics into consideration?

4-2. Appropriateness of Project Design, Consultation, and Preparation Process

4-2-1. [Literature, Interview] Were regional characteristics and basic conditions fully considered in the process?

4-2-2. [Literature] Were technological inputs (agronomical survey, BDS, Detailed Design, etc) used to design and establish project plan successfully implemented?

[1] Literature Research

4-3. Appropriateness of Selection of Business Operator, Subcontractor, and Regional Specialist

4-3-1. [Literature] Was selection of business operator properly carried out?

4-3-2. [Literature] Was selection of subcontractor properly carried out following its custom?

4-3-3. [Literature] Was establishment of construction supervision system and its inspection well-carried out?

4-4. Appropriateness of Stakeholders, Risk Management, etc

4-4-1. [Literature, Interview] Was there any conflict of interests ever erupted? If yes, was conflict resolution appropriate?

4-4-2. [Literature] What type of risks has emerged? Were appropriate responses made to resolute those risks?

5. Consistency to the International Development Objective and Global Standard.

5-1. Relevance to Millennium Development Goals (MDGs)

5-1-1. [Literature] Were due consideration on MDGs carried out during project formation, examination on feasibility study, and establishment of action plan?

5-1-2. [Literature, Interview] How did this project contribute to 8 targets of MDGs?

5-2. Paris Declaration (PD) and Accra Agenda for Action (AAA) (Reinforce Recipient's Ownership, Aid Harmonization, Procure of Mutual Responsibility, etc)

5-2-1. [Literature, Interview] How did this project contribute to reinforcement of recipient's ownership?

5-2-2. [Literature, Interview] Was aid harmonization –internal and external - achieved in the process?

5-2-3. [Literature, Interview] Was mutual responsibility assured in the process?

5-3. Crosscutting Issues such as Gender Mainstreaming and Environment

5-3-1. [Literature] Was gender main-streaming issue considered during examination of feasibility study?

5-3-2. [Literature] Was review on environmental impact considered during examination of feasibility study?

II. Efficiency

1. Input and Output: Project Cost-benefit

1-1. Comparison between Project Inputs and Outputs

< Projects of Irrigation System Construction>

1. Project enforcement and supervision of construction
2. Geological survey and soil analysis
3. Basic design
4. Construct irrigation system: irrigation canal, culverts, etc.
5. FWUC(Farmer Water User Community) on-site education

1-2. Project Input and Output in Terms of Planned Project Schedule

1-2-1. [Literature] Organize and apprehend expected outcome of input/output elements and actual outcome of input/output elements.

2. System of Project Implementation and Field Management

2-1. Efficiency of Project Management Structure and Cooperation System among Related Institutions

2-1-1. [Literature] Efficiency of the project management and coordination among relations organizations

2-1-2. [Literature] Efficiency of partnership with the recipient authority and implementing agency

2-1-3. [Literature] Efficiency of communications with beneficiary stakeholders

2-2. Field Management of the Prime Management Consultancy (PMC)

2-2-1. [Literature, Interview] Efficiency of field management system, and appropriateness of project implementation system

2-3. Procurement and Budget Execution

2-3-1.[Literature] Procurement and budget execution efficiency

3. Quality of Manpower and Technology

3-1. Technical Expertise and Professional Competence of Experts and the Management

3-1-1. [Literature, Interview] Technical expertise, professional competence of experts, and expert's adaptability and understandability of multicultural environment

3-2. Techniques and Technologies Applied

3-2-1. [Literature, Interview] Propriety of techniques and technologies applied

4. Mode and Methodology of Project Implementation and Progression

4-1. Timing of Project Inputs

4-1-1. [Literature] Appropriate timing of project inputs

4-2. Modification of PDM and Performance Indicator

4-2-1. [Literature] Appropriateness of modification method for PDM

4-2-2. [Literature] Appropriateness of modification method for performance indicator

4-3. Communication and Feedback with/from Stakeholders and Direct Beneficiaries like Local Farmers

4-3-1. [Literature, Interview] Appropriateness of communication and feedback method

4-4. [Literature, Interview] Monitoring, on-site evaluation, and feedback

4-4-1. [Literature] Appropriateness of monitoring, on-site evaluation, and feedback method

5. Comparative Analysis of Similar Project for an Alternative Option

5-1. Case Study of a Project Carried Out by Different Authority such as Cambodia Mekong Committee

5-1-1. [Literature, Interview] Comprehend similar cases and crosscheck our method with their ex-post

evaluation methods.

III. Effectiveness

1. Attainment of the Project Development Objective (POD)

1-1. The Attainment of the Upper Policy Goals and Development Targets

1-1-1. [Literature, Interview] Level of contribution to national development and economic development policy and strategy.

1-2. **Attainment of Planned Goals and Targets - Outcome**

< Irrigation System Construction Outcome >

1. Did geological survey, soil research, and basic design contributed to the Successful outcome?
2. How much of an improvement in technique has fellows participated in FWUC training program shown? Are they continuously used to help the community?
3. What areas have directly benefited from this project, and what is the estimated number of beneficiaries?

1-3. Effect on Rural Infrastructure Development in the Region

1-3-1. [Statistical Literature, Interview] Effect of field development shown through development index of water resource management, flood control, and irrigation system construction

1-3-2. [Interview, Field Survey] How did this project contributed to flood control? Was there any positive change after the project was carried out?

1-3-3. [Interview, Field Survey] How much of the farmland areas is protected from the flood?

1-3-4. [Interview, Field Survey] What specific functions do dikes have during flood season?

1-3-5. [Interview, Field Survey] Did the project contributed to stable supply of drinking water and agricultural irrigation?

1-3-6. [Interview, Field Survey] How much of an improvement has been made in water supply capacity in dry season?

1-3-7. [Interview, Field Survey] How much of a water supply capacity has increased through irrigation system construction project?

1-3-8. [Interview, Field Survey] How much of a stable agricultural water supply provided after irrigation system construction project?

1-4. Enhancement of Agricultural Productivity and Crop System

1-4-1. [Statistical, Literature, Interview] Effect of enhancement of agricultural productivity: double cropping, etc?

1-5. Increase of Rural Income and Improvement of Rural Living Standard

1-5-1. [Statistical, Literature, Interview] Increase in rural income, employment opportunity, and improvement of rural living standard, etc

1-6. Positive Contribution to Other Industries such as Inland Aquaculture Development

1-6-1. [Statistical, Literature, Interview] Promotion and development of inland aquaculture

2. Contribution to National Development

1. Promotion of Water Resources Management and Agriculture in National Level

1-1-1. [Literature, Interview] Promotion of water resources and agricultural development

1-1. Contribution to Poverty Alleviation, Gender Balance, Environmental Protection, Social Development, etc

1-2-1. [Literature, Interview] Long-run performance in poverty alleviation, gender balance, environmental protection, social development, etc

IV. Impact

1. **Impact on Local Residents and Community**?

1-1. Awareness on development and change in behavior

1-1-1. [Field Survey, Interview] Change in governmental attitude, behavior, and awareness on development?

1-1-2. [Field Survey, Interview] Was there any change in awareness on flood control and irrigation construction?

1-2. Influence on the Beneficiaries of These Projects

1-2-1. [Field Survey, Interview] Positive or negative responses from beneficiaries?

1-2-2. [Field Survey, Interview] Did any of the local residents get damaged from this project?

1-2-3. [Field Survey, Interview] What are the problems emerged during or after the project?

2. Contribution to Institutional and Capacity Development

2-1. Institutional and capacity development in the area of water resources management and agriculture

2-1-1. [Field Survey, Interview] Contribution to institutional and capacity development in the area of water resources management and agriculture

2-2. Cropping Structure and Irrigation Management System

2-2-1. [Field Survey, Interview] Contribution to cropping structure (double/triple cropping, etc) and irrigation management system construction

2-3. Other Institutional and Capacity Development

2-3-1. [Field Survey, Interview] Contribution to other institutional and capacity development

3. Contribution to Amicable Relationship between the Two Countries

3-1. Reciprocal Cooperative Relationship

3-1-1. [Field Survey, Interview] Contribution to establishment of reciprocal cooperative relationship between the two countries

3-1-2. [Field Survey, Interview] Did technological exchange in relevant areas increase after this project?

3-2. **Image on Korea and Korean People**

3-2-1. [Field Survey, Interview] Contribution to promotion of positive images on Korea and Korean people

4. Other Unexpected Impacts

4-1. Positive Impact: Development of Transportation Convenience, Energy Conservation Effect, Increase in Off-Farm Employment Opportunity, Etc.

4-1-1. [Field Survey, Interview] Positive economic impact (development of transportation convenience, energy conservation effect, increase in nonfarm employment opportunity, etc)

4-2. Impact on Household Affair Labor, Land Price, and Other Positive/Negative Impacts

4-2-1. [Field Survey, Interview] Social impact (household affair labor, increase in land Price, and other positive/negative impacts)

V. Sustainability

1. Sustainability of Policy and Institutional Support

1-1. Sustainability of Policy and Institutional Support from the Government

1-1-1. [Literature, Interview] Is there the sustainability of policy and institutional support from the central government?

2. Financial Sustainability

2-2. Financial Availability for Irrigation Facilities and System Management and Maintenance

2-2-1. [Literature, Interview] Financial availability for irrigation facilities and system management and maintenance

2-3. Self-sustainability of FWUC by Collecting ISP (Irrigation Service Fee)

3. Technical and Entrepreneurial Sustainability

3-1. Technical Capacity for Operation of the Facility and System, Forecast Improvement

3-1-1. [Literature, Interview] Technical capacity for operation of the facility and system, forecast improvement

3-2. Operation of After Service and Maintenance System

3-2-1. [Literature, Interview] Are operation of after service and maintenance system functioning flawlessly? Are damaged facilities being constantly repaired?

3. Next Phase of the Project

4-1. Re-investment and Expansion of the Project into a New Phase

4-1-1. [Literature, Interview] Need for the re-investment and expansion of the project into a new phase

4-2. Phase-out Handing Over to the Rural Community/Farmers Association

4-2-1. [Literature, Interview] Phase-out from the projects by handing over to the rural community/farmers association

2. Interviewee List

(1) Korean Stakeholders

Baek Sook Hee, Representative, KOICA Cambodia Office, KOICA

Chung Ki Whan, President, Korea Institute of Rural Development(KIRD)

Jo Young Taek, Project Manager of Cambodian Project, Yoosin Engineering Corporation

Kim Jong Gab, Construction Supervisor, former Department Manager, Yooshin Engineering Corporation(PMC Company)[cuttently Executive Director, Water Resources Department, Kunhwa Engineering & Consulting Co., Ltd.)

Kim Kyu Tae, Project Manager of the Project, former Vice President, Yooshin Engineering Corporation(PMC Company)

Kim Myung Lim, Vice President, Dohwa Engineering Company

Kim Won Tae, Professor, Department of International Trade and Business, Hanseo University

Kim Yonghwan, Deputy Director, Southeast Asia Team, Korea International Cooperation Agency(KOICA)

Lee Byung Kook, Chief Research Fellow, Division of Water and Environment, Environmental Policy Group, Korea Environment Institute

Lee Joo Heon, Professor, Department of Civil Engineering, Joongbu University

Lee Myung Hoon, Managing Director, Water Resources Engineering Department, Yooshin Engineering Corporation

Ryu Jeon-Yong, Director, Overseas Project Office, Korea Rural Community Corporation

Yoo Jee Hyun, Deputy Representative, KOICA Cambodia Office, KOICA

(2) Cambodian Stakeholders

H.E. Veng Sakhon, Secretary of State, Ministry of Water Resources and Meteorology(MoWRAM)

Chhun Kheang, Head, International Relations Department, MoWRAM

H.E. Ponh Sachak, Director General, Directorate of Technical Affairs, MoWRAM

Bak Bunna, Head, Water Supply and Sanitation Department, MoWRAM

Seok Hieng, Deputy Head, Department of Irrigated Agriculture, MoWRAM

Seng Sereyvitou, Department of Irrigated Agriculture, MoWRAM

Oum Vibol, Director, Department of Water Resources and Meteorology, MoWRAM

Yea Voeun, Deputy Director, Department of Water Resources and Meteorology, MoWRAM

Theng Bunteng, Department of Engineering, MoWRAM

Sek Hieng, Department of Irrigated Agriculture, MoWRAM

Theam Sokvibol, Senior Local Consultant

Lak Chansok, Junior Local Consultant

Ly Sok Heng, Lecturer, Royal University of Phnom Penh(RUPP)

Khieu Sunlong, Lecturer, Royal University of Phnom Phnh(RUPP)

Keo Soheat, Researcher, Cambodia Development Resource Institute(CDRI)

Sok Sothyra, Managing Director, PISNOKA International Corporation (P.I.C.)

H.E. So Sophort, Deputy Secretary General, Cambodia National Mekong Committee(CNMC)

Lor Chanly, Batheay District Governor

(3) Local Residents and Beneficiaries

Korn Kan, Chief, Chea Lear Commune
Korn Nga, Chief, Chea Lear Village
Nga Chhay Leang, Chief, Sambo Commune
Chim Cheurn, Tapay Villager, Sambo Commune
Cheung Sok Chans, Villager/Farmer, Sambo Commune
Inn Som Ol, Farmer, Sorngkeurb Village
Kim Luy, Farmer, Sorngkeurb Village
Som Nan, Farmer, Sorngkeurb Village
Chum Nith, Farmer, Sorngkeurb Village
Chorb Thol, Farmer, Sorngkeurb Village
Chim Meoun, Farmer, Sorngkeurb Village
Thoeun, Farmer, Sorngkeurb Village
Chin Sok Kong, Farmer, Chea Lear Village
Nhem Doeurn, Farmer, Chea Lear Village
Mol Visal, Farmer, Sorngkeurb Village
Shin, Farmer, Chea Lear Village
Dam Sithan, Farmer, Sornkeurb Village
Shon Kimhong, Farmer, Sornkeurb Village
Choub Soy, Farmer, Sorngkeurb Village
Tak Channy, Farmer, Sambo Village
Son Channy, Farmer, Sambo Village
Ho Channa, Farmer, Sambo Village
Mos Chin, Farmer, Sambo Village
Sronn Mei, Farmer, Sambo Village

(4) Members of Farmer Water User Community(FWUC)

Ouk Vor, President, FWUC
Sorn Serey, Irrigation Agriculture Department, FWUC
Leng Lon, FWUC Member, Sambo Commune
Chor Chim, FWUC Member, Sambo Commune
Binn Sophal, FWUC Member, Sambo Commune
Sompov, FWUC Member, Sambo Commune
Yem Yorn, FWUC Member, Sambo Commune
Chin Hearb, FWUC Member, Sambo Commune
Vann Vorn, FWUC Member, Sambo Commune
Som Ream, FWUC Member, Sorngkeurb Village
Phay Phoeurng, FWUC Member, Sorngkeurb Village
Chub Cheurn, FWUC Member, Sambo Commune
Inn Toeum, FWUC Member, Sorngkeurb Village

3. Summary of Field Research and Survey

Ⅰ. Plan of Field Research and Survey

1. Outline

	Description
Period	• September 1 to 7, 2013
Venue	• Phnom Penh and Cam Pong Cham Province, Cambodia
Purpose & Main Activities	• Field research for survey on recipient stake-holders and beneficiaries • Interview, questionnaire survey, on-site survey regarding ex-post evaluation • Document survey for data and information gathering • Convening a workshop for presentation and discussion on preliminary findings and evaluation results of the field research, etc
Composition of Field Mission	• Korean Experts - LEE, Kyong Koo/Mr., Team Leader, Vice President, Korea Global Development Consulting Center(KGDC) - Dr. CHOI, Dong Jin/Mr., President, Korea Research Institute for Environment and Development(KRIED) - Lee, Man Ho/Mr., Senior Managing Director, Dongil Engineering Company - WON, Jieun/Ms., Researcher, KGDC • Official of MOWRAM - Seok Hieng/Mr., Irrigation Agriculture Department • Local Consultants - Sokvibol Theam/Mr., Senior Consultant - Lak Chansok/Mr., Assistant Consultant • Observer - YI, Jiyoung/Ms., Evaluation Specialist, Evaluation Office, Korea International Cooperation Agency(KOICA)

2. Activity Schedule

Date	Description	Remark
Sept. 1 Sunday	• 18:40-22:05 From Incheon to Phnom Penh	KE689
Sept. 2 Monday	• 07:00-08:00 Meeting with Local Consultants - Theam Sokvibol, Senior Consultant - Lak Chansok, Junior Consultant/Researcher [Visit to the Ministry of Water Resources and Meteorology] • 10:30-12:00 Interview with Mr. Veng Sakhon, Deputy Minister of MORAM * Chhun Kheang, Diector, International Relations Department, MOWRAM • 11:10-12:00 Interview with policy practitioners - Planning and International Cooperation Department - Water Resources Management Department - Irrigation and Drainage Department - Water Supply and Sanitation Department - Engineering Department, etc • 14:00-16:00 Interview with professional experts - Cambodian Project Manager(H. E. Ponh Sachak) - Project Coordinator(Mr. Pak Bunna) - Construction Supervisor(Mr. Soek Hieng) - Irrigation System Expert(Mr. Hun Sary) - Agricultural Development Expert(Mr. Seng Sereyvitou) - Technical Expert(Mr. Theng Bunteng) [Visit to KOICA Cambodia Office] • 17:30-18:00 Meeting with Ms. Ryu Jihuun, Deputy Resident Representative & Interview with Ms. Baek Sook Hee, Resident Representative	Breakfast Phnom Penh Phnom Penh
Sept. 3 Tuesday	[Meeting with private stakeholders] • 09:00-11:00 Interview with Civil Engineers & Construction Managers - Mr. Sok Sothyra, Managing Director, PISNOKA International Corporation [Visit to the Related Authorities and Organizations] • 14:30-16:00 Meeting with official in charge at Cambodia National Mekong Committee - H.E. So Sophort, Deputy Secretary General - HRD Director [Meeting with Korean stakeholders] • 17:00-18:00 Korean Experts - Mr. Kim Kyu Tae, Project Manager, PMC Company - Mr. Cho Young Taek, Managing Director, Yooshin Engineering Corporation	Phnom Penh Phnom Penh Phnom Penh

Sept. 4, Wednes-day	• 08:00-10:00 Move to Batheay project site • 10:00-11:00 Project site trip • 11:00-12:00 Move to Kampong Cham City • 14:00-15:30 Interview with officials in charge, MOWRAM Regional Office in Kampong Cham Province - Mr. Oum Vibol, Director, Regional Office, MOWRAM - Mr. Yea Voeun, Deputy Director, Regional Office - Mr. Hum Sary, Chief of Irrigation Department	By car Batheay Kampong Cham
Sept. 5 Thursday	• 09:00-10:00 Move to Batheay District • 10:00-11:00 Interviews with local residents • 11:00-12:00 On-site survey to the Project site - Sam Bo and Chea Lear Commune Area • 12:00-12:40 Interview with local residents in Ta Buoy Village - Mr. Cham Chi Eun and other two farmers - Ms. Chung Sok Chan, female resident • 13:30-15:00 Meeting and interview with local stakeholders - Mr. Kon Nga, Chief, Chea Lear Commune - Mr. Nga Chhay Leng, Chief, Sambo Commune - Mr. Ouk Vor, Chairman, Farmers Water User Community(FWUC) - Other local residents and farmers • 15:00-16:00 Interview with District Governor - Mr. Lo Chanly • 15:30-16:30 Questionnaire Survey - Local farmers and residents(20 respondents) - Fellows of FWUC Training Program(10 respondents) • 16:30-19:00 Move to Phnom Penh	By car Village Batheay area Village Batheay District Office Batheay District Office Sambo Commune Office
Sept. 6 Friday	• 09:00-12:00 Preliminary Wrap-up of Field Research Activities • 14:00-17:00 Convening Workshop: Presentation and discussion on preliminary findings and evaluation results of the field research - Session 1: Presentation(14:00-16:00) - Session 2: Q & A, Grand Discussion (16:00-17:00) • 17:00-18:00 Wrap-up of overall activities in Cambodia and debriefing to KOICA Cambodia Office	Phnom Penh Phnom Penh Phnom Penh
Sept. 7 Saturday	• 23:20-06:35(+1 Day) Phnom Penh to Incheon	KE 690

Ⅱ. Description of the Field Research & Survey

1. Meetings in Phnom Penh

(A) Meeting conducted on 2nd September 2013 with

- H.E. Veng Sakhon, Deputy Minister of Ministry of Water Resources and Meteorology
- Mr. Chhun Kheang, Director, International Relations Department

H.E Veng Sakhon addressed the overview on Cambodia's development plans and the challenges. In 2011, the Royal Government of Cambodia (RGC) conducted a comprehensive review on the previous development plans to enhance future's development projects.

Moreover, the Royal Government of Cambodia passed a royal code dated June 23, 1999 promulgating the Law on Establishment of Ministry of Water Resources and Meteorology (MoWRAM); sub-decree No. 58 dated June 30, 1999, on the Organization and Functioning of Ministry of Water Resources and Meteorology; and royal code dated June 29, 2007 promulgating the Law on Management of Water Resources in the Kingdom of Cambodia.

In accordance with the above mentioned royal decree, there is a reform particularly in capacity building of MoWRAM because there has been the limitation of ITC to MoWRAM and O&M. As a consequence, trainings are provided for the MoRWAM staff. Knowledge and skill sharing are further improved, and budgets are also provided for O&M of the existing projects.

Over recent years, Cambodia has had many development partners such ADB, JICA, and particularly People's Republic of China which is Cambodia's biggest partner investing in more than hundred- million-US dollar projects. The Royal Government of Cambodia has also sought more financial supports from other external donors including KOICA.

In the line with the O&M of MoWRAM, the Farmer Water User Community (FWUC) was finally created to operate and maintain the flood control and irrigation system to supply water to farmers in both upper and lower areas or outside and inside the reservoir. H.E. added that the ISF has not been charged

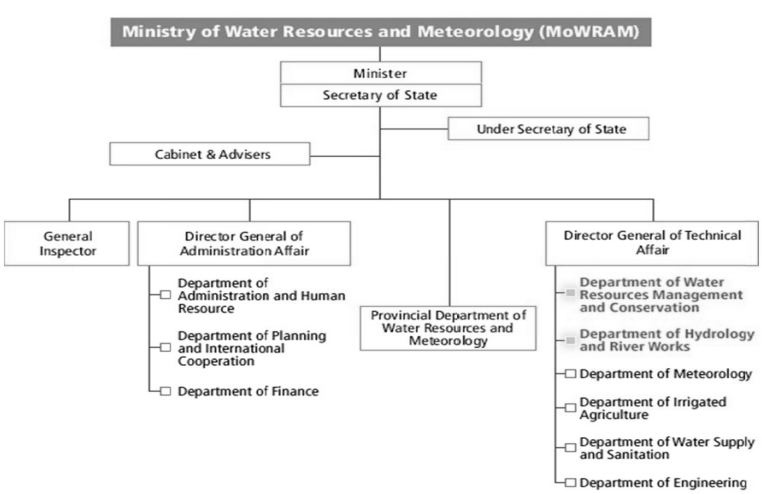
yet, but in the future, the charge of the ISF depends on the scale of the scheme.

In addition, from Cambodia's side, H.E. Veng Sakhon recommended that the project planning would be successfully accomplished if more financial supports are provided and more detailed information are shared with the Royal Government of Cambodia.

(B) Meeting on 2nd September 2013 with

- H.E. Ponh Sachak, Director-General of Ministry of Water Resources and Meteorology
- Mr. Sorn Serey, Irrigation Agriculture Department of FWUC
- Mr. Seng Sereyvitou
- Mr. Theng Bunteng, Engineering Department
- Mr. Bak Bunna, Sanitation Department
- Mr. Sek Hieng, Irrigation Agriculture Department

At the beginning of the meeting at Ministry of Water Resources and Meteorology (MoWRAM) held on 2nd September 2013 from 2:00 to 4:00pm, H.E. Ponh Sachak, Director-General of MoWRAM, introduced members who used to participate in the Batheay Flood Control and Irrigation System projects and mentioned the structure of the MoWRAM, shown as follow:



Source: Policies: State of Water Environment and Water-related Issue Policies

He added that the MoWRAM is given the following missions by the Royal Government of Cambodia:

(1) defining and developing the policies and strategies towards the utilisation, development and sustainable conservation of water resources at national and international levels in line with the royal government policy;

(2) studying and researching potential water resources in terms of surface, underground and atmosphere in order to establish the basic scientific techniques;

(3) developing the short, medium and long term plans for exploration, development and conservation of water resources and atmosphere in order to conserve the national economy and living standard of Cambodia;

(4) managing all direct and indirect utilization of water resources and minimizing the disasters;

(5) developing legislations related to water resources management, and their application; and

(6) providing necessary technical support and advice to private sectors, organizations, communities, and all people who are related to the improvement and exploitation of water resources.

H.E. Ponh Sachak overviewed the background of Mekong River. He said that the Mekong River runs from the mountains of Tibet to the delta in Vietnam. Four Rivers Cambodia's greatest rivers, the Mekong and the Tonle Sap cross directly in front of Phnom Penh's Royal Palace, named as "Four Rivers Palace, giving birth to the smaller Bassac River. The meeting of these rivers also results in a meeting of silts, fish and ethnicities as Khmer, Vietnamese and Cham communities live and fish the area. Tonle Sap River for most of the year, the Tonle Sap drains the great lake into the Mekong, but in flood season when the Mekong swells, the Tonle Sap actually changes direction, filling the great lake.

H.E. Ponh Sachak also addressed the background of the Batheay irrigation system. This dam was first constructed during Khmer Rouge regime between 1976 and 1979. This dam was manmade. During that time, people were

forced to construct the dam, and as a result many died of overwork, disease, and starvation. Moreover, during the civil war, the dam was not properly maintained and eroded from time to time. There are some problems occurred. First, in lower areas, villagers, their animals, and real estate could not be prevented from the flood. Second, water was inadequately supplied to their cultivated land in the upper and lower lands. Thus, the lands remained empty without any cropping.

Consequently, the Royal Government of Cambodia requested many development partners including the Korea International Cooperation Agency (KOICA) to help assist in construction of flood control and irrigation system in those areas.There are two phases of the projects. The first phase of the dam was started in 2007, named as the Batheay Flood Control Project consisting of a dam 13.6 km in length, nine places of irrigators with gate installation, nine lines of irrigation canals 4.5 km in length. total cost USD $2,452,015. Government of Republic of Korea spent USD $1,790,600 on infrastructure and construction, while the Royal Government of Cambodia spent USD $661,415 on the affected land compensation. This flood control and irrigation system benefited nine villages inside the area and twenty villages outside the area. Another phase consists of nine lines of main canals 18.1 m in length, two places of head regulators with gate installation, twelve outlet structures, and compensation to affected people. The total cost of project is USD $2,686,740 among which USD $2,303,000 on the infrastructure and construction was funded by Government of Republic of Korea.

After the construction of the flood control and irrigation system, there are 25000 hectares of land used for cropping. The villagers in both areas are able to do cropping twice per year and thus double their cropping productivity since the water is sufficiently supplied. Around 30,000 farmers have benefited from the projects.

However, there are some limitations to the MoWRAM to effectively carry out O&M. First, the budget provided by the Royal Government of Cambodia is limited. Second, high techniques are required.

Furthermore, H.E. Ponh Sachak also listed three scales of flood control such as "big flood" happening two times in 2000 and 201, "middle flood", and "small flood". He also added there were three scales of irrigation system. The "big scale" refers to more than 5000 hectares for which 2/3 of budget would be paid by the Royal Government of Cambodia. The "medium scale" is between 200 and 5000 hectares. In this scale, the O&M is ensured by the Royal Government of Cambodia. Lastly, the "small scale" that is below 200 hectares is operated and maintained by the respective community. He confirmed that the Batheay Flood Control and Irrigation System is categorized as the big scale.

In addition, due to high flood and climate change damaging the dikes, the FWUC requested to get more financial supports and a concrete strategic plan to control more than 2000 irrigation system. However, more than 300 irrigation systems have currently been constructed. The quantity of the irrigation system is required, and the quality of the systems can be enhanced later. To succeed in this plan, the Royal Government of Cambodia needs a big amount of funds for construction and O&M.

H.E. Ponh Sachak also said that the strategic plan of MoWRAM has not perfectly been succeeded yet, but at least a number of positive outcomes can be seen, among which trainings are provided for farmer to use better seeds (to grow cassava, sweet potato, water melon, and cucumber depending on the interests of farmers besides rice), to properly cultivate their cropping, and to be aware of some techniques (nonuse of chemical pesticide, waste, etc.).

H.E. Ponh Sachak also confirmed that the project was almost controlled by the KOICA, not the respective Ministry, MoWRAM, which just assisted in the project planning and implementation. He refused that Cambodia had no good constructors.

Mr. Sorn Serey, Deputy Director of Irrigation Agriculture Department of FWUC, said that the FWUC had not been supported by the KOICA yet since

there has been no any positive response from KOICA for the financial and technical O&M assistance.

He also added that there were two main beneficiaries: local farmers inside and outside the reservoir areas and FWUC members. In 2010, 53 FWUC members were trained how to properly operate and maintain the flood control and irrigation system and he expected that the ISF would be paid by the benefited farmers in order to buy soils to fulfill holes and to sustain O&M.

H.E. Ponh Sachak added that other projects were also implemented in Takeo province by the Royal Government of Cambodia and in other areas by ADB.

(C) Meeting on 3rd September 2013 with

- Mr. Sok Sothyra, Managing Director, PISNOKA International Corporation (P.I.C.)

Mr. Sok Sothyra introduced the background of PISNOKA international corp. (P.I.C), which is one of the leading construction companies in Cambodia. P.I.C has long built notable achievements since 1993 in the business with many skilled workers and a large collection of construction equipment owned by the company itself. The P.I.C is not merely known by local residents but also foreigners because of its strong business reputation and its high standards for Cambodian with strong focuses on safety and sanitation.

The P.I.C mostly works as the sub-constructor of JICA and receives a few projects annually. Since its inception in 1993, the P.I.C just provided only labor supply but now transforms itself into a well- known private construction company which has so far received a total of 77 projects. The cost of each project is not more than one millions US dollars.

According to Mr. Sothyra, there is no a fixed construction standard for Cambodia. P.I.C is flexible and carried out many major projects including American and Austrian Embassy in Cambodia. He said that Japanese standard

is stricter than that of Korea in terms of safety, but both Japan and Korea have almost similar construction quality.

Regarding the Batheay project, P.I.C. also took part in the construction and provided two-year guarantee over the projects. As a consequence, only 1% or 2% of damaged construction needed to be repaired. Mr. Sothyra also said that the success criteria of the P.I.C. are its own quality equipment, engineering skill, and very qualified engineers.

Mr. Sathyra noted that the problem working with the Royal Government of Cambodia is that no payment is given to the P.I.C. He also said that in Cambodia, it has become common that many construction companies hind the profit report to the Royal Government of Cambodia in order to avoid heavy taxes due to the hierarchy and complex administrative process.

(D) Meeting on 3rd September 2013 with

- H.E. So Sophort, Deputy Secretary General, Cambodia National Mekong Committee (CNCM)
- Two officials

On 3rd September 2013 at Mekong River Commission, Korean and Cambodia teams met H.E. So Sophort. His Excellency first addressed the background of Mekong River. The Mekong River is one of the world's great river systems, flowing 4,909 km through six countries: China, Myanmar, Thailand, Lao PDR, Cambodia, and Viet Nam. The source of the river's great productivity is its seasonal variation in water level and the range of wetland habitats inundated. The Mekong River Basin's biodiversity is immense, even in comparison with other parts of tropical Asia. Its biodiversity is fundamental to the viability of natural resource-based rural livelihoods of a population of 60 million people living in the Lower Mekong Basin. 86% of Cambodia is located in Mekong.

In addition, His Excellency also overviewed the Mekong River Commission (MRC). His Excellency said that the Commission is the only inter-governmental agency that works directly with the governments of Cambodia, Lao PDR, Thailand and Viet Nam on their common specific interests - joint management

of shared water resources and sustainable development of the Mekong River. As a regional facilitating and advisory body governed by water and environment ministers of the four countries, the MRC aims to ensure that the Mekong water is developed in the most efficient manner that mutually benefits all Member Countries and minimizes harmful effects on people and the environment in the Lower Mekong Basin. Serving its member states with technical know-how and basin-wide perspectives, the MRC plays a key role in regional decision-making and the execution of policies in a way that promotes sustainable development and poverty alleviation. The MRC engages a wide range of stakeholders into its programme work and strategic planning.

His Excellency clarified that the Mekong River Commission did not get involved much in the Batheay Flood Control and Irrigation System and thus he could not precisely answer some specific questions. He suggested the CDRI and CEDAC be met since these two nongovernmental institutions are specializing in carrying out the agriculture research and implementation.

(E) Other two meetings were held by only Korean team with KOICA Country Office at Phnom Penh Tower on 2nd September 2013 and Yooshin Engineering Cooperation Corporation on 4th September 2013.

2. Meetings in Kampong Cham Province

(A) Meeting on 4th September 2013 with

- Mr. Oum Vibol, Director of Department of Water Resources and Meteorology
- Mr. Hun Sary, Chief of Irrigation Office
- Mr. Yea Voeun, Deputy Director of Department of Water Resources and Meteorology

The more than two-hour meeting was held on 4th September 2013 at Department of Water Resources and Meteorology in Batheay district, Kompong Cham province. The meeting was attended by three government officials and the ex-post evaluation Korean and Cambodian team.

Mr. Oum Vibol briefly addressed the background and areas located in two communes Sambo and Chea Lear where the Batheay projects were implemented. In the lower lands, there are approximately 2220 hectares of lands able to be cultivated and protected from the flood after the completion of the projects. Ten villages and schools are also protected from the Mekong flood. And the lands outside the reservoir (3500 - 8000 hectares) have also benefited from the projects because people have enough water for their cropping. As a result, 5650 families equal to 30,500 villagers in 20 villages in Sambo and Chea Lear commune, Batheay district, have gotten benefits from the Batheay projects.

As a consequence, the villagers can increase their yield production from 2.5or 3 tons per hectare to 4 tons per hectare of land after the completion of the projects. Moreover, the hospitals and schools have been protected from the flood and increasingly accessed because of convenient access of the roads.

According to Mr. Vibol, there is a concern regarding the information sharing from the central government to local authorities since the information about big project worth more than millions US dollars is not publicized or disseminated to the local authorities. Another problem is that big protects require more technical engineers, which exceed the capacity of the local authorities.

Regarding the flood control and irrigation system in Batheay district, there have been some damages to the dikes which need to be repaired and maintained. Although the Royal Government of Cambodia provides 200 million riel approximately equal to USD $50,000 on the O&M, it is not enough. Therefore, more funds sources need to be diversified.

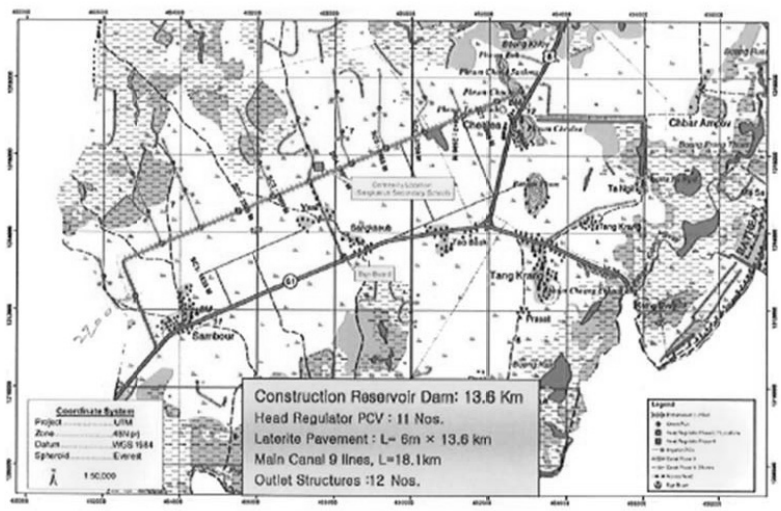


Photo of Batheay Projects: Lands Inside (Lower) and Outside the Reservoir (Upper)

(B) Meeting on 4th September 2013 with

- Mr. Korn Kan, Chief of Chea Lear Commune
- Mr. Nga Chhay Leang, Chief of Sambo Commune
- Mr. Ouk Vor, Leader of Farmer Water User Community (FWUC)
- And other FWUC members

This meeting was held at Batheay District Office on 4th September 2103, attended two commune chiefs, FWUC leader, and FWUC members. The background and outcomes of the Batheay projects were shared by Mr. Nga Chhay Leang. Before the projects, the lower areas were flooded and the entire lands were left empty. After the construction of the flood control and irrigation system, the people living in both outside and inside the reservoirs are "very happy" because their lands, houses, and schools can be protected from the seasonal floods. Furthermore, before they cultivated only once, but now they can do two or three-time cropping annually since they afford to use agricultural machinery. Consequently, their rice yield can be double or triple.

Mr. Korn Kan added more to the improvement of quality of villagers' living standards. Now approximately 80% of families afford to use electricity 24 hours per day. However, the electricity price is quite expensive (3,200 riel/k).

Equally important, the education access also keeps increasing thanks to the roads. The hospital access is also more convenient. For instance, pregnant women frequently go to have medical check and deliver babies more safely. Moreover, before women went to the rice field to bring their husband food because of difficulty in the road conditions, but now they can go to have lunch with their families at home.

Mr. Ouk Vor addressed the structure of the FWUC: Leader, sub-leaders, and members. There are 52 members in FWUC branches to operate and maintain the flood control and irrigation system. However, according to Mr. Ouk Vor, the main problem is that despite some budgets provided by the Royal Government of Cambodia, FWUC has no enough financial and technical capacity to fix the damages to dikes. Therefore, FWUC needs other donors including the Government of Republic of Korea fund to repair the dikes. Mr. Ouk Vor added that FWUC needed a meeting office that KOICA previously promised to build. He further requested KOICA to extend canals to three or four kilometter in order to get enough water.

Photo: Meeting between Ex-Post Evaluation Team and Two Commune Chiefs, FWUC Leader and Members at Batheay District Office

(C) Meeting on 5th September 2013 with

- Mr. Lor Chanly, Batheay District Governor

This meeting was attended by the Korean team (Mr. Lee Kyong Koo, Dr. Choi Dong Jin, and Mr. Lee Man Ho), Senior Local Consultant (Mr. Theam Sokvibol), and Batheay District Governor at Batheay District Office.

(D) Meeting on 5th September 2013 with

- Mr. Chim Cheurn, Tapay villager, Sambo commune
- Mr. Cheung Sok Chans, villager/farmer
- And other three villagers

According to Mr. Chim Cheurn, a villager in Tapay village of Sambo commune, addressed the significance of the Batheay projects. According to Mr. Cheurn, there are around 360 families in Tapay village. He said he has only a few hectares of cropping land, while five other hectares are rent to increase their rice production. The farmers in this village also shifted from using "heavy rice" to "light rice". The heavy rice takes 6 months, while light rice takes only a few months. Therefore, the villages are able to crop three times per year during both dry and raining season. The water in the village is not always enough for their cultivation, so sometimes people depend on the seasonal rainfall to watter their crops. The control over the water gate is also another controversy between the villagers living inside and outside the reservoir areas where the floods can cause at least minor damages.

Parking outside the houses, many new tractors are used to facilitate their farming. According to Mr. Cheurn, the cost of each tractor is USD $3,000. He bought his tractor three years ago and rents it to other villagers if needed. He also said that there are around 30 tractors in the Tapay village, and not all the villagers own tractors.

Due to the lack of techniques, the villagers quit raising pigs, and now they dig the pounds to raise fish. The size of the pond is 40 square meters. Regarding the land price, before, maybe in 2008, each hectare of land cost USD $2500. However, the current price of the land is USD $30,000 per hectare. That is the reason why most of the lands now along the dikes belong to the middleman or rich people.

Photo: Meeting with Ex-Post Evaluation Team with Villagers at Tapay Village

(E) Meeting on 5th September 2013 with 26 Sambo Commune Residents

A Korean researcher (Ms. Won Jieun), a Korean evaluation specialist (Ms. Yi Jiyoung) from the KOICA, and a Junior Local Consultant (Mr. Lak Chansok) delivered questionnaires to 26 villagers. Among those 26 questionnaires, only 21 were deemed quite valid. The invalidity of questionnaires and inactive participation of villagers in sharing their own opinions were caused by illiteracy and political constraint.

The field questionnaire surveys were supplemented by the 2nd field trip made in October in which Mr. Lee Man Ho and Mr. Lak Chansok took part. The summary of the questionnaire surveys is attached in a separate attachment of the Report.

3. Workshop in Phnom Penh

(A) Partcipants

- H.E. Ponh Sachak, Director-General of Ministry of Water Resources and Meteorology
- Mr. Sorn Serey, Irrigation Agriculture Department of FWUC
- Mr. Seng Sereyvitou
- Mr. Theng Bunteng, Engineering Department

- Mr. Bak Bunna, Sanitation Department
- Mr. Soek Hieng, Irrigation Agriculture Department
- Mr. Yoo Jee Hyun, Deputy Representative KOICA Cambodia Office
- Mr. Kim Sang Jun, Deputy Representative KOICA Cambodia Office
- Mr. Lee Kyong Koo, Team Leader, Vice President, Korea Global Development Consulting Center (KGDC)
- Dr. Choi Dong Jin, President, Korea Research Institute for Environment and Development (KRIED)
- Mr. Lee Man Ho, Senior Managing Director, Dongil Engineering Company
- Ms. Yi Jiyoung, Evaluation Specialist, Evaluation Office, KOICA
- Ms. WON, Jieun, Researcher, KGDC
- Mr. Nga Chhay Leang, Chief of Sambo Commune
- Mr. Ouk Vor, Chairman of Farmer Water User Community (FWUC)
- Mr. Kout Chheurn, Assistant to Chea Lear Chief
- Mr. Sorn Theoun, Deputy-Director of FWUC
- Mr. Theam Sokvibol, Senior Local Consultant
- Mr. Lak Chansok, Junior Local Consultant
- Mr. Keo Socheat, Researcher, CDRI
- Mr. Ly Sok Heng, Lecturer, RUPP
- Mr. Khieu Sunlong, Lecturer, RUPP

(B) Workshop Program

Time	Contents
Registration and Inception	
14:00-14:10	Opening Remarks by H.E. Ponh Sachak and Mr. Yoo Jee Hyun
14:10-14:15	Orientation to the Workshop by H.E. Ponh Sachak
Session I: Presentation	
14:15-15:00	Presentation by Korean Experts • Presentation on the performance of the Flood Control Project presented by Mr. Lee Kyong Koo • Presentation on the performance of the Irrigation System Construction Project presented by Dr. Choi Dong Jin • Presentation on summative evaluation results of the Projects presented by Mr. Lee Man Ho

Coffee Break (15:00 – 15:15)	
15:15-16:00	Presentation by the Cambodian experts • Presentation by Mr. Bak Bunna • Presentation by Mr. Theam Sokvibol • Presentation by Mr. Nga Chhay Leang
Session II: Q & A, Discussion	
16:00-16:30	Q & A and Discussion
16:30-16:40	Concluding by H.E. Ponh Sachak
Closing	

(C) Minutes of Discussion

(a) Mr. Lee Kyong Koo, Team Leader of the ex-post evaluation on the Flood Control and Irrigation System in Batheay District and Vice President of Korea Global Development Consulting Center (KGDC) presented the overview on the background of the two projects, scope of the ex-post evaluation, evaluation team, evaluation criteria and methodology, research field, and preliminary results of the research field.

The Batheay Flood Control Project from 2007 to 2008 totally cost US$ 2 Million, and the Batheay Irrigation Construction Project from 2009 to 2010 spent US$ 2.5 Million. Three years after the completion of the projects, these two projects are subject to the ex-post evaluation in accordance with the Development Cooperation Evaluation Guideline (November 2008, KOICA). The purpose of ex- post evaluation is (1) to improve future projects through feedback of lessons learned in the process of the project planning and implementation and (2) to provide a basis for accountability, including the provision of information to the public. Through the evaluation of failures as well as successes, valuable information is generated which, if properly fed back, can improve future cooperation programs and projects.

This ex-post evaluation is a comprehensive review on the overall results of the projects including impacts, effects, and sustainability as well as the appropriateness of the process. An end-of-the-project evaluation was made in

2011, confirming the rationale and achievement of the projects' development objectives. The scope of the ex-post evaluation research will encompass (1) the process and outcome of the projects in terms of relevance, effectiveness, efficiency, impact, sustainability and the cross- cutting issues - gender main-streaming and environment, (2) focusing on effects and impacts, not only direct but also indirect social, economic, institutional, environmental and other development indicators resulting from the activities. As this research study is an ex-post evaluation, the focus of the study will be highlighted on the outcomes of the projects - short, mid and long term effect and impact - as well as sustainability.

KOICA entrusted the research study to Korea Global Development Consulting Center (KGDC), an independent research institute. This evaluation task will be undertaken by a team of experts arranged by KGDC for five months from July to November 2013. The study team consists of three (3) Korean experts, one (1) Korean research assistant and two (2) local consultants of Cambodia. A Cambodian official in charge of monitoring the projects joined the activities of field research survey in Cambodia for a joint evaluation. Korean team is consisted of one Team Leader (T/L), two experts in water resources management and agricultural irrigation respectively and one assistant research. The evaluation research follows an logical approach of analysis and the methodology of tri-angular surveying, including document and statistics analysis, interviews, questionnaire survey, field research on site, workshop, etc.

The field research took from September 1 to 7, 2013 (6 nights 7 days) in Phnom Penh and Kompong Cham Province, Cambodia. The main activities carried out during the field research are (1) field research for survey on recipient stake-holders and beneficiaries; (2) Interview, questionnaire survey, on-site survey regarding ex-post evaluation ; (3) Document survey for data and information gathering ; and (4) Convening a workshop for presentation and discussion on preliminary findings and evaluation results of the field research, etc.

Literature research; Data and statistics analysis; Interview with policy practitioners and field workers; Interview with local residents and beneficiaries; Questionnaire survey on targeting group of stakeholders; On-site field trip and survey; workshop in Phnom Penh, etc. Moreover, there are five criteria of the ex-post evaluation: Relevance, efficiency, effectiveness, impact and sustainability.

According to Mr. Lee's preliminary Findings of the field research, the cooperation with the Royal Government of Cambodia has been relevant to the overall development goal of the Cambodian government - "poverty reduction and economic growth through enhancement of agriculture sector development, and the Rectangular Strategy of the Royal Government of Cambodia establishing the four pillars of strategic growth, National Strategic Development Plan 2009-2013.

In the short and medium term, the effects of the projects are evident in various realms concerning the project such as rural infrastructure development in the region, enhancement of agricultural productivity and management system, increase in rural income and improvement of rural living standard, increased rural employment and provision of off-farm opportunities, and positive contribution to cattle raising, inland aquaculture, etc.

The Impacts on poverty reduction and cross-cutting issues are positivity on alleviating rural poverty in a the region and women in development (WID), and friendliness to the environment and conducive to better vegetation and environmental protection. Moreover, the impacts on social development are positive on promoting education and improving primary health. Other unexpected impacts and influence are high rise of land price within the project site due to enhancement of agricultural infrastructure, better supply of irrigated water, flood control, better road access, etc. and conflicts of interests among the villagers between farmers of lower land owner and upper land owner.

Sustainability of policy and institutional support are fair because they are

consistent government's policy with added emphasis on water resources management and rural development and political intervention (related to the collection of Irrigation Service Fee, etc.). Regarding the financial sustainability, the financial availability for irrigation facilities and system management and maintenance is very pessimistic because the self-sustainability of FWUC by collecting ISP is unfeasible and lacks of operation and maintenance.

As recommended, the next phase of the projects needs some immediate supplementary maintenance investment and rehabilitation of the system of FWUC, a substantial new additional investment for a fundamental solution for flood control, water supply and irrigation in the medium term perspective.

Photo: Workshop on Preliminary Results of the Field Research, Phonom Penh Hotel, Cambodia

(b) Dr. Choi Dong Jin presented the background of the ex-post evaluation and formation of a model program for IWRM and rural development to secure long-term sustainability in order to manage many cooperation projects with ODA and find needs for sustainability of Batheay project. The best practice model of Korea-Cambodia Cooperation Program Infrastructure, Knowledge Sharing, and Capacity Building should be properly made and applied to other future's projects.

Moreover, Dr. Choi overviewed the characteristics of Batheay project and project outputs. In Phase I and II, the beneficiaries are 20 villages equal to 5,650 households (30,000 villagers). The paddy area increases from 1,800 hectares to 65,000 hectares, and crop production significantly increases from 2.7 tons per hectare (4,860 tons per year) to 4.5 tons per hectare (29,250 tons per year). In addition, the farmers in the respective areas cultivate twice or triple per year since there is enough water supply. It is noted that the maximum water storage capacity is 50 million metric meters.

Furthermore, Dr. Choi addressed the evaluation after the construction conducted by KOICA and MoWRAM and the ex-post evaluation focus on five main criteria: relevance, efficiency, effectiveness, impact, and sustainability. There are some suggestions. First, there should be a proper water-use planning with good information. The water is demanded for dry season irrigation and multi-cropping, and the existing water supply capacity depends on the seasonal rainfall. Therefore, villagers still face water deficit. As suggested, first, the size of reservoir should be further extended. Second, the amount of budgets to invest should be enhanced. Third, water use rule to avoid conflict should be promoted and encouraged. Moreover, as suggested, there should wise use of floodplain. Regarding the FWUC, it should have been started in the beginning stage of the project, and training program should have been focused more on capacity building and irrigation system. As found out, the responsibility without appropriate power or managerial roles including water allocation is not sustainable. Moreover, the ISF is not for financing but for motivation.

There are four recommendations to make the FWUC sustainable. First, the responsibility with adequate payoff means that the duty to pay ISF will be equipped with benefits. Second, the FWUC should have self-supporting business such as managing form tractors, micro-financing, crop distribution center, rice polishing mills, etc. Third, the cooperation with central government, stakeholders, and other beneficiaries should be strengthened, and the FWUC members should be extended. Last but not least, the initial

support from external partners in terms of knowledge sharing, technology transfer, and financial supports should be promoted and sought.

(c) Mr. Lee Man Ho presented a brief overview of Batheay Flood Control and Irrigation System. He also addressed the project location and main facilities. The projects were carried out in Batheay district, Kompong Cham province, consisting of 13.6 km reservoir dike, 18.1 km main canal, 12 EA lateral culverts, and 2EA drainage culverts. 800m of roads have been currently accessed. Moreover, Mr. Lee presented that 20 villages (5,650 households) approximately equal to 30,000 villagers have benefited from the projects. First, water can be reserved in the flood season and water is sufficiently supplied in the dry season. Second, the projects also prevent villagers and real estate from damaging. Fourth, villagers' living quality has been upgraded since the agricultural production has been increased after the completion of the projects.

Moreover, Mr. Lee shared some considerations over the operation and maintenance which is now almost stopped because ISF is not properly collected from the farmers who use the water to repair facilities. During the rainy season, the houses, farm lands, and schools located in the lower areas are damaged.

As recommended, this project requires all means to covey water to fields as many different volume or size of channels, drainage canal and pumping station. Second, after the implementation of construction work of secondary canal, farm land consolidation work including tertiary canals should be followed.

Photo: Mr. Lee Man Ho Presented His Findings of Field Research During the Workshop

(d) Mr. Bak Bunna narrated the background of the Batheay Flood Control and Irrigation System project. The system is located in two communes Sambo and Chea Lear, Batheay district Kampong Cham province, which is 50 km north of Phnom Penh. The dam was built in Khmer Rouge regime.

Due to not enough funds for operation and maintenance, nearly all of the dam and main canals were eroded and broken.

Every year Tonle Sap Flood caused to damage rice and other crops of the farmers around 2500 hectares on wet season and shortage water for rice, animals and other crops on dry season. Therefore, the Batheay project was carried out in two phases (I and II).

The project consists of a dam 13.6 km in length, 11 areas of head regulators with water gate, 9 lines of main canals 18.1 km in length, 12 outlet structures and compensation to affected lands. Phase I was finished on 20 January 2009, while Phase II on 03 March 2011.

To operate and maintain the Batheay flood control and irrigation system, Farmer Water User Community (FWUC) was established as the following steps:

Step 1: Hold initial meeting at system or subsystem levels.

Step 2: Identify irrigation service area and potential members of FWUC and conduct PRA.

Step 3 & 4: Farmers agree to form FWUC and plan organizing activities.

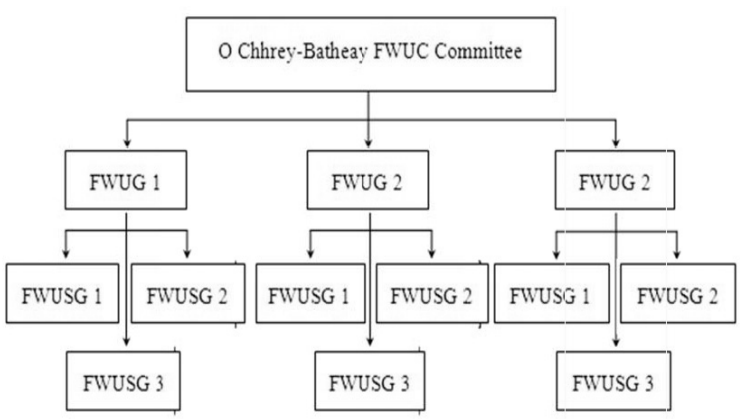
Step 5: Farmers prepare and adopt FWUC statute and by-law

Step 6, 7 & 8: Farmers establish FWUC and select leaders and conduct five years works plan.

Step 9: Training to FWUC committee and local authorities.

Step 10: Raising awareness of FWUC Policies to farmers

As a result, O Chrey-Batheay FWUC was finally established in February 11th, 2010 elected based on free and fair election from farmers in the command area. The following is the structure of the O Chrey-Batheay FWUC.



After the construction of the Batheay flood control and irrigation system, the beneficiaries are 9 villages and some schools were protected from Mekong flood. The wet season rice 2220 hectares were protected from the flood and able to cultivation 2 times per year. And the dry season rice outside of reservoir around 3500-8000 hectares is sufficiently watered owing to enough water from the irrigation. Around 5650 families equal to 30,500 people in 20 villages in Batheay district, Kampong Cham province, have also got benefits from the projects.

Photo: Mr. Bak Bunna delivered His Presentation During the Workshop

(e) Mr. Theam Sokvibol, Senior Local Consultant, presented five criteria of evaluation on the preliminary findings of the field research: Relevance, efficiency, effectiveness, impact, and sustainability of the two projects, followed by some recommendations for the Royal Government of Cambodia, funding agencies, local authority, and local residents.

Regarding the relevance, the two projects are consistent with Rectangular Strategy of the Royal Government of Cambodia since the projects have improved agricultural productivity and diversification. Moreover, the projects are relevant to the agriculture Sector Strategic Development Plan by increasing in market access, productivity, and irrigation and improvement of technique. Additionally, the Millennium Development Goals (MDG) have partially been met such as poverty reduction, education access, health service access, decrease in child mortality rate, improved maternal health, promotion of global partnership, and good environment consideration.

Regarding the efficiency of the projects, the KOICA and the Royal Government of Cambodia chose qualified construction company, have good

communications with beneficiary stakeholders, and established the Farmer Water User Community (FWUC) as well as have trained its members on the operation and maintenance.

For the effectiveness, the projects were very successfully completed. Moreover, it is very effective in control of the flood and irrigating farmland over two communes, Sambo and Chea Lear, in the functions of the dike during flood season, and in management of facilities and the FWUC. As a consequence, productivity, income, employment, agricultural techniques and livelihood have become better, compared to those before the construction of the projects.

Regarding the impacts of the projects, there are many positive impacts such as improving farmers' practices, increasing in the value of their land, having new management and problem-solving experience for local authority, strengthening relationship between the two countries and peoples, and improving social wellbeing.

Sustainability of the projects is fair because there is a little support from the central government and financial availability for the operation and maintenance. However, te FWUC's roles have been limited to collect Irrigation Service Fee (ISF) from the beneficiary, particularly farmers. There is still lack of sense of ownership within the community, leading to tragedy of the commons.

According to Mr. Sokvibol, there are some policy recommendations in order to the future's projects and the cooperation between Republic of Korea and the Kingdom of Cambodia better. For the Royal Government of Cambodia, first, effective communication should be ensured between the central governments, stakeholders, and beneficiaries. Second, information and reports among all relevant stakeholders should be publicized. Third, local authority by allocating necessary annual budget to carry out operation and maintenance should be empowered. Last but not least, good relationship with funding agencies and identifying areas of partnership should be continued. For the

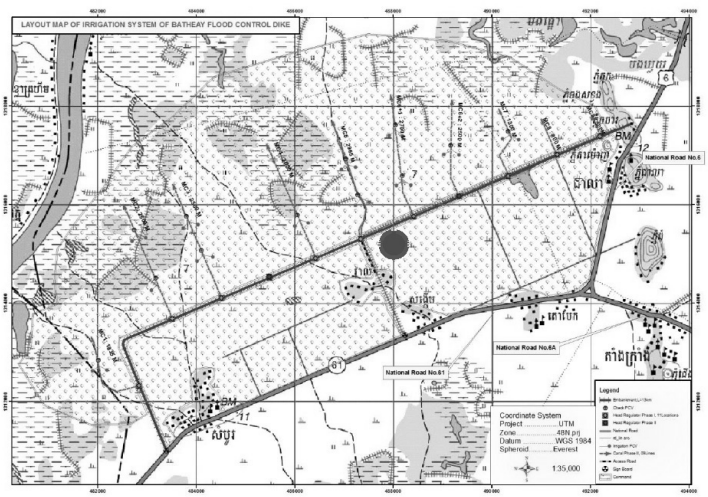
funding agencies, thorough feasibility study and design should be conducted. Moreover, durability and sustainability of the project should be ensured. For local authorities, the needs of the local residents and the problems they face should be carefully studied and identified, and the immediate problem solving should be carried out and encouraged. For the community and local residents, first, mutual understanding should be further promoted. Second, the ownership and leadership in the operation and maintenance should be taken. Last not least, cooperation with the community should be strengthened for the sake of the common interests.

(f) Mr. Nga Chhay Leang, Sambo Commune Chief, shared the exact ideas with Mr. Theam Sokvibol and requested the Government of Republic of Korea to further assist Cambodia in repairing and maintaining dikes and dams in two communes, Sambo and Chea Lear, Batheay district, Kompong Cham province.

(g) Discussion: The workshop was dominated by the debate over the canals dug to prevent the lower areas inside the reservoir from the flood and concluded by H.E. Ponh Sachak. Moderated by H.E Ponh Sachak, the 30-minute discussion among the government officials focused on the previous work and a new suggested location to dig another canal to prevent the seasonable floods in the area inside the reservoir.

Mr. Nga Chhay Leang, Chief of Sambo commune, praised the grant aid of the Government of Republic of Korea on the Batheay projects beneficial to villagers living inside and outside the reservoir and voiced a concern over the existing floods in the lower land inside the reservoir.

Mr. Bak Bunna, a former Batheay project coordinator, pointed the locations of the dikes and canals successfully built in accordance with the Batheay projects. And he further suggested that another canal should have been dug to protect the seasonable floods damaging the crop fields of the farmers living in the lower area inside the reservoir (See: the red circle on the map identifying the location of anther new canal that should be constructed).



Layout: The proposed location of new canal construction

Mr. Theng Bunteng from Ministry of Water Resources and Meteorology (MoWRAM) agreed with Mr. Bunna on the location and discussed how the canal construction should be carried out to prevent the floods from causing damages to the villagers.

After the discussion, H.E. Ponh Sachak summarized all the main points of the whole workshop. His Excellency thanked Korean ex-post evaluation team and especially Korean Government to provide Cambodia with development aids, and His Excellency hoped that Korean Government would further develop a good strategic partner with Cambodia.

Photo: Mr. Bak Bunna pointed the locations of the Batheay Projects

Ⅲ. Supplementary Field Research and Survey

1. Outline

Upon analyzing and making summery of the domestic research in Korea and the 1st field study in Cambodia, the Evaluation Team found that an additional field survey was needed for supplementing the previous questionnaire surveys and the confirmation of the project impact and effects requiring persuasive verifications. Some questionnaire answers could not be deciphered because of lacking respondent data and incompleteness of the answers given.

The supplementary field research and survey was conducted by Mr. Lee Man Ho, expert in agricultural engineering and irrigation, and Mr. Lak Chansok, local assistant consultant, from October 21 to November 1, 2013. based on the initial analysis on the results of field research and questionnaire survey the study team made additional questionnaire surveys and gathered complementary figures and opinions on some performance

data and impact indicators of the project through field trips to the Batheay region. Especially, two representative groups of local residents of Sambo Village in Sambo Commune and Chea Lear Village in Chea Lear Commune were chosen as the samples for surveys focusing on main indicators as follow:

- Usage of agricultural machineries
- The amount and percentage of cultivated land using agricultural machineries
- Multi-crop production
- Average land price
- Cultural accessibility, etc

2. Results of the Supplementary Research and Survey

A) Survey in Sambo Village

(a) Sambo Village Representative Group of Local Residents

In Sambo Village, there are 5,187 people equal to 1,117 families. There were only 24 local residents participating in this additional field interview. Their names and positions are listed as follow:

No.	Full name	Position
1	Chop Hong	Farmer
2	Houl Him	2nd Sewer System Leader
3	Jen Heam	2nd Sewer System Deputy-Leader
4	Len Lon	3rd Sewer System Deputy-Leader
5	Pin Lang	Farmer
6	Lan Ly	Farmer
7	Tam Ta	Farmer
8	Ork Ros	Farmer
9	Ngil Moeung	Farmer
10	Pham Soreang	Farmer
11	Heang Heat	Farmer
12	Too Varim	1st Sewer System Deputy-Leader
13	Le Leang	Farmer
14	Lon Men	Farmer
15	Jon Chin	Farmer
16	Ouk Vor	President of FWUC
17	Jorn Khean	Farmer
18	Ten Kheang	Farmer

19	Too Khoeurn	Farmer
20	Ngim Chamroeun	Sambo Village Chief
21	Sourn Sor	Farmer
22	Sorn Theourn	3rd Sewer System Leader
23	Chon Khon	Farmer
24	Som Yorn	Farmer

B) Results of the Survey

① Usage of Agricultural Machineries

According to Sambo Village representative group of local residents, the main machineries used for agricultural purposes are combine (big tractor), walking tractor (small tractor), water pumping machine, and pesticide fumigating machine. Yet, they have not had any combine.

Year	Number			
	Combine	Walking Tractor	Water-pumping machine	Pesticide fumigating machine
Before	0	0	0	0
2007	0	10	60	0
2008	0	20	100	10
2009	0	50	130	20
2010	0	80	150	80
2011	0	100	180	80
2012	0	110	Between 190 & 200	80
2013	0	130	200	110

② Amount of Cultivated Land Using Agricultural Machineries

The representative group of local residents agreed on the change in the amount of cultivated land inside the reservoir where Sambo Village is located. Before 2007, only 150 hectares of the land were cultivated due to the insufficiency of water. However, since 2007 after the construction of the Batheay projects, the entire 500 hectares of land are used for cultivation because of enough water.

③ Multiple-Crop Production

In Sambo Vllage, farmers grow only rice because of the soil condition unsuitable for other types of cropping. Depending on the amount of water, farmers in the village mostly cultivate rice only once per year. In some years when water is sufficient, they can do rice cultivation twice in every six month.

④ Average Land Price

The land is categorized into three types: Front land (the land next/near national roads), middle land (the land between front and back land), and back land (the land far away from the national roads). However, the local residents are not sure how to measure the exact distance among those types of land. Before 2007, the price of lands was very low since no one wanted to buy them at all. After 2007 when the Batheay construction started, the land price increased significantly. From 2009 to 2013, the price of the middle and back land fell down sharply as the land demand decreased dramatically, while the front land price has stagnated.

Year	Types of Land	Price
Before	Front Land	USD 1,500$/ha
	Middle Land	USD 1,000$/ha
	Back Land	USD 1,000$/ha
2007-2008	Front Land	USD 40,000$/ha
	Middle Land	USD 10,000-20,000$/ha
	Back Land	USD 10,000$/ha
2009-2013	Front Land	USD 40,000$/ha
	Middle Land	USD 3,000-4,000$/ha
	Back Land	USD 3,000$/ha

⑤ Cultural Accessibility

There has been a huge change of cultural accessibility since 2007. The table below details the estimated number of television, motorcycle, and bicycle in 2003, 2008, and 2013.

Year	Number		
	Television	Motorcycle	Bicycle
2003	20 (Black and White)	100	200
2008	300	500	500
2013	800	500	500

Moreover, people find it more convenient to access to the clinic service owing to three main reasons. First, the clinic (e.g. Sambo Clinic) is located near the village. Second, the road condition is better. Last but not least, there are many better transports (e.g. motorcycle).

Before 2007, more women used traditional baby-delivering practice. This means that they took a lot of risk to delivery their babies at home. After 2007, most of women started using maternity nursing service at the clinics nearby. Since 2009, the clinic maternity nursing service has been widely used by women in the village.

In terms of education, before 2007, the accessibility to education was relatively low due to the poor road condition, school location and low living standard of families. Since 2007, the number of enrollment of children to study at school has been relatively increasing. According to the local residents, every child in the village is not able to go to school when she or he is 6 years old. Only 60% of those children can continue to higher education at Songkheurb High School 5 km from the village.

B) Survey in Chea Lear Village

(a) Chea Lear Village Representative Group of Local Residents

Chea Lear Commune where there are 1,495 families is composed of five villages among which Chea Lear Village consists of 515 families. There were only 12 local residents participating in this additional field interview. Their names and positions are listed as follow:

No.	Full name	Position
1	Cheurn Krak	Soldier/Farmer
2	Chap Chariya	Farmer
3	Kris Noeun	Farmer
4	Pal Py	Chea Lear Village Chief
5	Noun Ratha	Farmer
6	Noun Chin	Farmer
7	Chin Simon	Farmer
8	Ngat Sokchan	Farmer
9	Em Heap	Farmer
10	Sous Vang	Farmer
11	Kuot Cheurn	1st Chea Lear Commune Deputy Chief
12	Em Heam	Chea Lear Village Deputy Chief

(b) Results of the Survey

① Usage of Agricultural Machineries

Much similar to Sambo Village representative group of local residents, the main machineries used for agricultural purposes are combine (big tractor), walking tractor (small tractor), water pumping machine, and Pesticide fumigating machine. There are only four combines in the village: two bought in 2007 and other two in 2013.

Year	Number			
	Combine	Walking Tractor	Water-pumping machine	Pesticide fumigating machine
Before	0	0	17	0
2007	2	30	20	5 or 6
2008	0	38	30	12
2009	0	42	35	20
2010	0	43	37	22
2011	0	65	39	25
2012	0	82	42	27
2013	4	82	42	28

② Amount of Cultivated Land Using Agricultural Machineries

Similar to the representative group of local residents in Sambo Village, the amount of cultivated land inside the reservoir increased significantly. Before 2007, only 60 or 70 hectares of the land were able to be cultivated due to the lack of water. However, since 2007, the entire 290 hectares of land (220 hectares with land titles and other 70 hectares without land titles) have been used for cultivation because of enough water.

③ Multiple-Crop Production

In Chea Lear Village, farmers also grow only rice because of the soil condition unsuitable for other types of cropping. Much depending on the amount of water, the farmers in the village mostly cultivate rice only once per year. In some years when water is enough, they can do rice cultivation twice in every six month or even three times within a year.

④ Average Land Price

Similarly, the land is categorized into three types: Front land, middle land, and back land. Before 2007, the price of lands had no price because there was no any demand. After 2007, the land price increased significantly. Since 2009, the price of all types of lands fell down dramatically as the land demand decreased very fast.

Year	Types of Land	Price
Before	Front Land	N/A(no price)
	Middle Land	N/A(no price)
	Back Land	N/A(no price)
2007-2008	Front Land	USD 100,000$/ha
	Middle Land	USD 30,000-40,000$/ha
	Back Land	USD 50,000$/ha (next to the reservoir) USD 20,000$/ha (far from the reservoir)
2009-2013	Front Land	USD 30,000-60,000$/ha
	Middle Land	USD 1,000$/ha
	Back Land	USD 2,500-5,000$/ha

⑤ Cultural Accessibility:

There has been a big change of cultural accessibility since 2007. The table below details the estimated number of television, motorcycle, and bicycle in 2003, 2008, and 2013.

Year	Number		
	Television	Motorcycle	Bicycle
2003	100 (Black and White)	20	220
2008	200	230	220
2013	400	300	205

Moreover, people in Chea Lear Village find it more convenient to access to the clinic service also owing to three main reasons. First, the clinic is located near the village. Second, the road condition is better. Last but not least, there are many better transports. In 2008, most of women used the clinic maternity nursing service in the village, while in 2013 every pregnant woman receives the maternity nursing service in clinics where they think are convenient.

In terms of education, before 2007, the accessibility to education was a bit low due to three reasons: poor road condition, far distance from home to school and low living standard. Since 2007, the number of enrollment of children to study at school is relatively high. According to Mr. Pal Py, Chea Lear Village chief, there are 54 kids enrolling in kindergarten, over 500 children going to primary school, and around 300 teenagers studying at secondary school. Mr. Py is not sure about the estimated number of students going to high schools 5 or 6 km from the village.

Note: According to Mr. Pal Py, in Chea Lear village, the majority of people (over 400) are farmers. There are approximately 200 are public servants, 5 engineers, around 30 to 40 NGO staff members. Some people have two jobs. For example, they can be both famers and public servants because as the public servants, they get a very low salary (e.g. a month salary of teachers at primary school is around 300,000 riel equal to USD $75).

C) Document Survey on FWUC Operation and Management

a) Articles of FWUC Operation and Management

① The Sources of Budgets of FWUC

- Irrigation Service Fees from members of FWUC
- Funds from Royal Government of Cambodia, International Organizations, and other NGOs
- Profits from FWUC's business
- Fines and other taxes

② Expenditure

- Irrigation system reparation and maintenance
- Gasoline
- Functions of FWUC members
- Administration
- Other extra work

③ Specific Irrigation Service Fees

Services	Fees (Riel Per Hectare)
Draining	80,000R/ha in one season
Both Draining and Pumping	50,000R/ha in one season
Pumping	30,000R/ha in one season

Note: According to Mr. Ouk Vor, FWUC leader, the ISF plan has not been successfully implemented due to the fact that people are not willing to pay at all.

④ Fines (FWUC members)

Cases	Fees (Riel Per Hectare)
Absence in three consecutive meetings	15,000R or termination of membership
Absence from labor supply	10,000R or no water supply for 15 days
Stealing water from canals for cultivation	100,000R
Closing or opening water gates without permission	100,000R
Damaging irrigation system	100,000R
Setting cattle free along irrigation areas	5,000R
Weight of all transports exceeding 5 tons	50,000R
Threshing rice/paddy along canals/dikes	100,000R
Illegal fishnet to fish	100,000R
Shocking fish by using electricity	500,000R
Wasting water to water crops	100,000R
Explosive weapons to damage irrigation system	2,000,000R
Closing canals without permission	1,000,000R

⑤ Calculation of Water Cost per Hectare by FWUC

$$X = \frac{X1 + X2 + X3 + X4 + X5}{Total\ land\ surface} + 20\%\ of\ production\ growth\ rate\ per\ hectare$$

X is the spending on the operation and maintenance

- X1= spending on reparation and irrigation system maintenance
- X2= spending on gasoline
- X3= spending on function of FWUC
- X4= spending on administration
- X5= other extra work

Y is the cost of water usage:

Year	Government	Percentage	FWUC	Percentage
1	spending	80%	spending	20%
2		60%		40%
3		40%		60%
4		20%		80%
5		0%		100%

b) Other Findings

① Budget Plan for Five Years

Year	Activities	Budget (USD $)	Activities	Budget (USD $)
2010	Training, Meeting, Dissemination , etc.	2,000$	Facilities, maintenance, and reparation	4,000$
2011		2,000$		5,000$
2012		2,000$		7,000$
2013		2,000$		9,000$
2014		2,000$		10,000$
Five-Year Budget (Total)				350,000$

② Budget to Establish FWUC Office

The members of the FWUC, the majority of the local community, want to have an office of adminstration and other communal activities regarding FWUC operation and management in the village. According to Mr. Ouk Vor, FWUC leader, the amount of budget to establish a FWUC office (8m x 15m) is estimated to be between USD $15,000 and USD $20,000.

D) Reference Data and Figures Collected from Various Sources

(A) Socio-economic Development Indicators

a) National Level

b) Kampong Cham Province Level

c) Batheay District Level

d) Sambo Commune Level

e) Chea Lear Commune Level

(B) Survey on Education Service Accessibility

(C) Survey on Clinic Service Accessibility

(A) Socio-economic Development Indicators

a) National Level

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013p
Economic Indicators	Gross domestic product	Annual percentage change	13.3	10.8	10.2	6.7	0.1	6.0	7.1	7.3	6.5
	Population	Million people	13.3	13.5	13.7	13.9	14.1	14.3	14.5	14.8	14.7
	Sector GDP Performance	Agriculture, annual percentage change	15.7	5.5	5.0	5.7	5.4	4.0	3.1	4.3	3.2
		Industry, annual percentage change	12.7	18.3	8.4	4.0	-9.5	13.6	14.5	9.2	8.2
		Service, annual percentage change	13.1	10.1	10.1	9.0	2.3	3.3	5.0	8.1	7.4
	Economic structure	Agriculture, proportion of GDP (%)	32.4	31.7	31.9	34.9	35.7	36.0	36.7	35.6	
		Industry, proportion of GDP (%)	26.4	27.6	26.8	23.8	23.1	23.3	23.5	24.3	
		Service, proportion of GDP (%)	41.2	40.8	41.3	41.3	41.3	40.7	39.8	40.1	
	Per capita GDP	US Dollar	471	537	628	743	736	783	878	944	981
		PPP basis, US Dollar	1646	1,699	1,900	2,043	2,033	2,150	2,312	2,494	
	Consumer Price Index	Annual percentage change	5.8	4.7	5.9	19.7	-0.7	4.0	5.4	2.9	
	Budget	Total budget revenues, % of GDP				13.3	11.8	12.6	13.2	13.7	14.2
		Total budget expenditure, % of GDP	14.90			15.9	17.5	17.9	17.8	17.8	17.7
		Budget balance, % of GDP	-2.5	-2.7	-2.9	-2.8	-8.4	-7.5	-6.0	-5.8	
		Current Surplus, % of GDP				3.0	0.1	1.3	1.7	2.2	2.8
	Export volume	Million US Dollar	2908	3692.4	3247.8	3493.1	2995.7	3884.3	5219.5	3015.7	
	Import volume	Million US Dollar	3918.3	4771.2	4516.7	5076.7	4489.9	5466	6709.5	7964.9	
Social Indicators	Poverty rate	% of people under poverty line			47.8	29.9	22.9	21.1	19.8		
	Unemployment rate	Percentage of workforce				1.7	0.1	0.4	0.2		

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013p
	Enrollment rate of primary school	Nos				6,565	6,635	6,685	6,785	6,865	6,945
		Net Enrollment, %		95.4	96.8	96.0	95.0	95.9	98.2	97.5	98.0
		Boys, %				94.8	95.0	95.5	96.0	96.5	97.0
		Girls, %				94.0	95.0	96.0	97.0	98.0	99.0
	literacy rate	Percentage				77.6	73.9				
	Life Expectancy	Male, Years	57.87			60.5	60.65	61.35	62.04	62.73	63.43
		Female, Years	64.14			64.3	66.97	67.68	68.38	69.09	69.8
	Infant mortality rae	Per 1,000 live births	55.6	51.9	48.1	45	41.9	39	36.2		
Water Resources and Irrigation Agriculture and Rural Economy	Rainfall	Millimeter in the year									
	Water reserves	Metric ton per capita									
	Rural population	Thousand people	10,795	10,939	11,076	11,214	11,360	11,519	11,864	11,863	
	Rural household income	Riel									
	Arable land area	hectare per person	0.28	0.28	0.28	0.28	0.28	0.28	0.27		
	Paddy	Cultivated area, thousand hectare	2.37			2.61	2.63	2.65	2.65	2.65	2.65
		Yield, thousand ton	1.97			2.74	2.77	2.80	2.83	2.87	3.00
	Irrigation area	Thousand hectare				818,155	840,638	908,338	947,134		
	Production of rice	Thousand metric ton									
	Export of rice	Thousand metric ton	7,018	5,682	4,366	6,390	16,184	51,672	178,278	207,168	

b) Kampong Cham Province Level

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013p
Economic Indicators	Gross domestic product										
	Population	Million people				1.679			1.745		
	Number of District	Number	16	16	16	16	16	16	16	16	16
	Sector GDP Performance	Agriculture, annual percentage change									
		Industry, annual percentage change									
		Service, annual percentage change									
	Economic structure	Agriculture, proportion of GDP (%)									
		Industry, proportion of GDP (%)									
		Service, proportion of GDP (%)									
	Per capita GDP	US Dollar									
Social Indicators	Poverty rate	Portion of people under poverty line (%)									
	Unemployment rate	Percentage of workforce									
	Enrollment rate of primary school	Percentage				20.83%					
	Illiteracy rate	Percentage				23.69%					
	Life Expectancy	Years									
	Infant mortality rae	Per 1,000 live births									
Water Resources and Irrigation	Rainfall	Millimeter in the year			1536.5	1501.4	1770.4	1374.0	1393.1	1709.3	1709.3
	Water reserves	Metric ton per capita									
	Water dams	Number									
	Water reserves	Million metric ton									

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013p
	River dike	Kilometer in length									
	Irrigation Channel	Kilometer in length									
	Area damaged by flood	Hectare									
Agriculture and Rural Economy	Rural population	Thousand people									
	Rural household income	Riel									
	Arable land area	Thousand hectare									
	Paddy area	Thousand hectare									
	Irrigation area	Thousand hectare									
	Production of rice	Thousand metric ton									
	FWUC	Number of the Community									
	FWUC	Number of FWUC Members									
	Irrigation Service Fee	Riel									
	Farming Road	Kilometer in length									
	Paddy Production Productivity	Metric ton per hectare									
	Area of multi-crops	Hectare									
	Production of other crops										
Other indicators	Road										
	Road paved	Kilometer in length									

c) Batheay District Level

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Economic Indicators	Gross domestic product										
	Population	Family (Number)	N/A	N/A	22,039	22,556	22,947	22,971	23,361	24,808	N/A
		People (Number)	N/A	N/A	105,807	107,362	110,324	111,126	111,599	114,886	N/A
	Number of Commune	Number	12	12	12	12	12	12	12	12	12
	Sector GDP Performance	Agriculture, annual percentage change								88.40%	
		Industry, annual percentage change								5.40%	
		Service, annual percentage change								6.20%	
	Economic structure	Agriculture, proportion of GDP (%)									
		Industry, proportion of GDP (%)									
		Service, proportion of GDP (%)									
	Per capita GDP	US Dollar									
Social Indicators	Poverty rate	Portion of people under poverty line (%)				31%					24%
	Unemployment rate	Percentage of workforce				45.87%					
	Enrollment rate of primary school	Percentage				19.27%					
	Illiteracy rate	Percentage				28%					
	Life Expectancy	Male (Year)									est. 65
		Female (Year)									est. 67
	Infant mortality rae	Per 1,000 live births									
Water Resources and Irrigation	Rainfall	Millimeter in the year	N/A	1,120	954	861	1,075	1,248	1,013	1,234	823
	Water reserves	Metric ton per capita									
	Water dams	Number	210	210	210	210	210	210	210	210	210
	Water reserves	Million metric ton									
	River dike	Kilometer in length									
	Irrigation Channel	Kilometer in length									
	Area damaged by flood	Hectare							12,600		
Agriculture and	Rural population	People	N/A	N/A	105,807	107,362	110,324	111,126	111,599	114,886	N/A

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Rural Economy	Rural household income	Riel									
	Arable land area	hectare	36,890	36,890	36,890	36,890	36,890	36,890	36,890	36,890	36,890
	Paddy area	hectare	36,890	36,890	36,890	36,890	36,890	36,890	36,890	36,890	36,890
	Irrigation area	Inside (hectare)	3500 -8000	3500 -8000	3500 -8000	3500 -8000	3500 -8000	3500 -8000	3500 -8000	3500 -8000	3500 -8000
		Outside (hectare)	2800 -3000	2800 -3000	2800 -3000	2800 -3000	2800 -3000	2800 -3000	2800 -3000	2800 -3000	2800 -3000
	Production of paddy	Inside (ton per hectare)	3	3	3 - 3.5	3 - 3.5	3 - 3.5	3 - 3.5	3 - 3.5	3 - 3.5	3 - 3.5
		Productivity (thousand tons)	10.5-24	10.5-24	10.5-28	10.5-28	10.5-28	10.5-28	10.5-28	10.5-28	10.5-28
		Outside (ton per hectare)	3.5	3.5	3.5 - 4	3.5 - 4	3.5 - 4	3.5 - 4	3.5 - 4	3.5 - 4	3.5 - 4
		Productivity (thousand tons)	9.8-10.5	9.8-10.5	10.5-12	10.5-12	10.5-12	10.5-12	10.5-12	10.5-12	10.5-12
	FWUC	Number of the Community									
	FWUC	Number of FWUC Members									
	Irrigation Service Fee	Riel									
	Farming Road	Kilometer in length	18	18	18	18	18	18	18	18	18
	Area of multi-crops	Hectare	0	0	0	0	0	0	0	0	0
	Production of other crops		0	0	0	0	0	0	0	0	0
Other indicators	Road										
	Road paved										
	National Road	Road No 61 (Kilometer in length)	12	12	12	12	12	12	12	12	12
		Road No 6 (Kilometer in length)	34	34	34	34	34	34	34	34	34

d) Sambo Commune Level

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
Economic Indicators	Gross domestic product										
	Population	Family (number)	2,327	2,464	2,464	2,539	2,597	2,597	2,611	2,699	2,790
		People (Number)	11,426	11,651	11,676	11,913	12,074	12,192	12,313	12,811	12,949
	Number of Village	Number	7	7	7	7	7	7	7	7	7
	Sector GDP Performance	Agriculture, annual percentage change									est. 95%
		Industry, annual percentage change									est. 4%
		Service, annual percentage change									est. 1%
	Economic structure	Agriculture, proportion of GDP (%)									
		Industry, proportion of GDP (%)									
		Service, proportion of GDP (%)									
	Per capita GDP	US Dollar									
Social Indicators	Poverty rate	Portion of people under poverty line (%)				N/A					est. 65%
	Unemployment rate	Percentage of workforce									
	Enrollment rate of primary school	Percentage									
	Illiteracy rate	Percentage								30%	
	Life Expectancy	Years								est. 60s	
	Infant mortality rate	Per 1,000 live births								est. 60s	
Water Resources and Irrigation	Rainfall	Millimeter in the year									
	Water reserves	Metric ton per capita									
	Water dams	Number	37	37	37	37	37	37	37	37	37
	Water reserves	Million metric ton									
	River dike	Kilometer in length									

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013
	Irrigation Channel	Kilometer in length	13	13	13	13	13	13	13	13	13
	Area damaged by flood	Hectare								50	
Agriculture and Rural Economy	Rural population	People	11,426	11,651	11,676	11,913	12,074	12,192	12,313	12,811	12,949
	Rural household income	Riel									
	Arable land area	Hectare	5,529	5,529	5,529	5,529	5,529	5,529	5,529	5,529	5,529
	Paddy area	Hectare	5,529	5,529	5,529	5,529	5,529	5,529	5,529	5,529	5,529
	Irrigation area	Hectare	N/A	N/A	1,948	1,948	1,948	1,948	1,948	1,948	1,948
	Production of paddy	Ton per hectare	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
		Productivity (thousand tons)	16.59	16.59	19.35	19.35	19.35	19.35	19.35	19.35	19.35
	FWUC	Number of the Community	0	0	0	0	1	1	1	1	1
	FWUC	Members (O&M) (Number)	0	0	0	0	52	52	52	52	52
		Members using water (Number of family)									
	Irrigation Service Fee	Riel									
	Farming Road	Kilometer in length	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6
	Area of multi-crops	Hectare	0	0	0	0	0	0	0	0	0
	Production of other crops		0	0	0	0	0	0	0	0	0
Other indicators	Road										
	Road paved	Kilometer in length	12	12	12	12	12	12	12	12	12

e) Chea Lear Commune Level

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013p
Economic Indicators	Gross domestic product										
	Population	Family (Number)	1,349	1,375	1,403	1,429	1,456	1,480	1,504	1,529	1,555
		People (Number)	6,585	6,719	6,356	7,031	7,169	7,271	7,416	7,561	7,584
	Number of Village	Number	5	5	5	5	5	5	5	5	5
	Sector GDP Performance	Agriculture, annual percentage change									85%
		Industry, annual percentage change									7%
		Service, annual percentage change									3%
	Economic structure	Agriculture, proportion of GDP (%)									
		Industry, proportion of GDP (%)									
		Service, proportion of GDP (%)									
	Per capita GDP	US Dollar									
Social Indicators	Poverty rate	Portion of people under poverty line (%)				45%					22%
	Unemployment rate	Percentage of workforce									
	Enrollment rate of primary school	Percentage									
	Illiteracy rate	Percentage									0.70%
	Life Expectancy	Male (Years)								65	
		Female (Years)								67	
	Infant mortality rae	Per 1,000 live births						1	0	0	0
Water Resources and Irrigation	Rainfall	Millimeter in the year									
	Water reserves	Metric ton per capita									
	Water dams	Number	23	23	23	23	23	23	23	23	23
	Water reserves	Million metric ton									

Indicators		Unit	2005	2006	2007	2008	2009	2010	2011	2012	2013p
	River dike	Kilometer in length									
	Irrigation Channel	Kilometer in length	45	45	45	45	45	45	45	45	45
	Area damaged by flood	Hectare							137		
Agriculture and Rural Economy	Rural population	People	6,585	6,719	6,356	7,031	7,169	7,271	7,416	7,561	7,584
	Rural household income	Riel									
	Arable land area	Hectare	3025	3025	3025	3025	3025	3025	3025	3025	3025
	Paddy area	Hectare	3025	3025	3025	3025	3025	3025	3025	3025	3025
	Irrigation area	Hectare	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251	1,251
	Production of rice	Ton per hectare	3	3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
		Productivity (thousand tons)	9.08	9.08	10.59	10.59	10.59	10.59	10.59	10.59	10.59
	FWUC	Number of the Community	0	0	0	0	1	1	1	1	2
	FWUC	Members (O&M) (Number)									
		Members using water (Number of family)					846	846	846	846	846
	Irrigation Service Fee	Riel									
	Farming Road	Kilometer in length									
	Area of multi-crops	Hectare	0	0	0	0	0	0	0	0	0
	Production of other crops		0	0	0	0	0	0	0	0	0
Other indicators	Road										
	Road paved	Kilometer in length	4	4	4	4	4	4	4	4	4

(B) Survey on Education Service Accessibility

Four schools: Hun Sen Songkheurb secondary school, Sambo primary school, Songkheurb primary school, and Pnov primary school

School	Academic year	Number							
		Student (Total)	Female	School dropping	Female	%	Entrance into higher grade	Female	%
Songkheurb secondary school	2006-2007	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2007-2008	191	99	21	8	10.99	156	79	91.76
	2008-2009	319	163	14	9	4.38	305	154	95.6
	2009-2010	460	232	62	36	13.47	354	172	76.95
	2010-2011	456	229	54	30	11.84	356	175	78.07
	2011-2012	460	223	79	45	17.17	338	157	73.47
	2012-2013	452	216	82	37	18.14	333	164	73.67
Sambo primary school	2006-2007	936	469	41	23	4.38	806	391	86.11
	2007-2008	879	422	46	23	5.23	771	358	87.71
	2008-2009	874	404	21	5	2.40	801	378	91.64
	2009-2010	836	388	24	8	2.87	770	364	92.10
	2010-2011	847	400	19	9	2.24	787	372	92.91
	2011-2012	754	356	11	5	1.46	715	334	94.82
	2012-2013	628	334	3	2	0.44	643	314	94.28
Songkheurb primary school	2006-2007	656	305	31	13	4.72	564	253	85.37
	2007-2008	584	257	26	13	3.29	512	213	87.35
	2008-2009	604	254	17	9	2.81	541	222	89.56
	2009-2010	607	259	28	13	4.61	560	236	92.25
	2010-2011	581	257	23	8	3.95	539	243	92.77

School	Academic year	Number							
		Student (Total)	Female	School dropping	Female	%	Entrance into higher grade	Female	%
	2011-2012	570	257	12	4	2.10	537	244	94.21
	2012-2013	533	248	11	4	2.06	502	234	94.18
Pnov primary school	2006-2007	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
	2007-2008	703	344	24	8	3.44	604	305	86.78
	2008-2009	693	343	27	13	3.90	623	308	89.89
	2009-2010	707	335	18	7	2.54	652	308	92.22
	2010-2011	674	312	8	7	1.18	626	282	92.87
	2011-2012	612	300	7	5	1.14	583	285	95.26
	2012-2013	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

Note: % = Total Percentage; N/A = No Available Data

(C) Survey on Clinic Service Accessibility

Sambo Healthcare Clinic is located in Sambo village, Sambo commune, Batheay district, Kompong Cham province, Cambodia

a) Total number of Patients

	Year	Zone A	Zone B	Zone C	Male	Female	Total
TNC	2008	3,537	1,485	313	2,091	3,244	5,335
TC		3,666	1,550	323	2,161	3,378	5,539
TNC	2009	5,440	4,054	655	3,864	6,285	10,146
TC		5,721	4,235	731	4,032	6,655	10,687
TNC	2010	4,054	3,525	958	3,384	5,153	8,537
TC		4,108	3,608	993	3,457	5,252	8,709
TNC	2011	4,219	3,259	1,419	3,647	5,250	8,897
TC		4,399	3,378	1,459	3,765	5,471	9,236
TNC	2012	4,632	4,544	969	4,324	5,821	10,145
TC		4,819	4,685	1,002	4,454	6,052	10,506

Note: TNC = Total New Cases; TC = Total Cases
- Zone A: The village where Sambo Healthcare Clinic is located
- Zone B: Outside the village where Sambo Healthcare Clinic is located but in responsible areas of the clinic
- Zone C: Other areas

b) Total Number of Antenatal Cares, Delivery, Post-partum Cares, and Birth Spacing

Year	Total number					
	Antenatal Cares	Delivery			Post-partum Cares	Birth Spacing
		Clinic	Home (Clinic staff)	Home (Traditional)		
2008	621	91	128	15	432	1,456
2009	1,284	261	5	0	547	1,410
2010	1,053	251	0	0	648	1,854
2011	988	235	0	1	450	2,314
2012	1,018	257	0	0	483	2,415

4. Evaluation Report of the Local Consultant

Evaluation Report
Flood Control and Irrigation System Construction Project in Batheay District, Kampong Cham Province, Kingdom of Cambodia

THEAM, SOKVIBOL
Senior Local Consultant,
Korea Global Development Consulting, KGDC

September 12, 2013

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A. BACKGROUND OF THE PROJECTS

On February 8, 2007, the Government of the Republic of Korea and the Royal Government of Cambodia (RGC) through the Korean International Cooperation Agency (KOICA) and the Ministry of Water Resources and Meteorology (MoWRAM) respectively agreed on a USD $2,452,015 Flood Control Construction Project to be conducted in Kampong Cham Province's Batheay District, Cambodia. The project was believed to help protect about 2,500 hectares of farmland from the annual flood from Tonle Sap River during rainy season and supply agricultural water during dry season. The total amount was a share between USD $1,790,600 from the Korean Government for the construction project and USD $661,415 from the RGC for compensating farmers for their affected land.

Two years later, on February 28, 2009, the two Governments agreed on an extension of the Flood Control Construction Project to build an irrigation system, consisting of nine main canals of 18.1 kilometers in length. Out of the total cost of USD $2,686,740 for this Irrigation System Construction Project, the RGC contributed USD $383,740 to compensate farmers for their affected land.

As an immediate result, a large area of farmland both inside and outside of the dike has been, to a large extent, saved from flood annually as well as supplied with water for farming during dry season. The project has benefited 5,650 families living in two communes, Sambo and Chealear, enabling them to boost crop yield and cultivate multiple times.

Therefore, this report is intended to evaluate the two projects from an independent local development expert's perspective with a one-week site observation and interviews with government officials and local authority in charge as well as the community and local residents. The evaluation will be done based on five main pillars: Relevance, efficiency, effectiveness, impact, and sustainability. Finally, recommendations to various relevant entities are provided.

B. EVALUATION RESULTS

Relevance

The Flood Control and Irrigation System Construction Projects in Batheay District, Kampong Cham Province, entail a great degree of relevance to the Agriculture Sector Strategic Development Plan of the Ministry of Agriculture, the Rectangular Strategies of the RGC, and the overall Millennium Development Goals of the United Nations.

These two projects have apparently provided an increase in market access, productivity, and irrigation and also improvement in farming techniques, and these are among the prime objectives of the Agricultural Sector Strategic Development Plan. First, the 13.6 kilometer dike has functioned as a convenient transportation means for farmers to deliver their harvests more direct and efficient to the market. More or less, this brings a significant reduction of unnecessary employment of middlemen and also costs that would otherwise be incurred by poorer transportation means. Secondly, the construction allows farmers in Sambo and Chealear communes whose farmlands are located inside the 2,220 hectare reservoir to do multiple cropping up to three times a year and those owning farmlands outside the basin over 3,500 - 8,000 hectares of land to do farming in the dry season. Prior to the projects, farmers were able to cultivate their crops only once a year even with a lot of difficulty owing to either big threats of damage brought about by flood or the drought during dry season. Today, the dam controls flood water from damaging the crops and stores enough valuable water to irrigate farmlands across seasons. Apart from being able to cultivate multiple times per year, farmers are also able to boost their yield per hectare per cultivation due to their improve techniques and the sufficient amount of water. Before the projects, one hectare of farmland yielded only 2.5-3 tons per cultivation. After the projects, however, the yield rises to 3-4 tons. Moreover, with enough water throughout the two seasons, farmers are able to cultivate early cropping and other kinds of cropping multiple times per year, so we have seen the applications of modern tools and machineries in

their farming practices in order to keep up with the shorter time of each of the multiple cultivations. Today, in each village, there are about 20 rice farming machineries owned by the villagers, and other fellow villagers can also rent them to cultivate their own farmlands.

In addition, The Flood Control and Irrigation System Construction Projects supported by KOICA contribute to the Rectangular Strategies of the RGC: "Improving agricultural productivity and diversification." As having mentioned earlier, today, with one hectare of farmland, farmers are able to produce more between 3-4 tons due to improved techniques and the sufficient quantity of water. Also, other than doing rice farming, villagers are growing other crops, e.g. cucumber, and raising livestock, e.g. duck and pig, and fish.

Apart from those, the projects contribute to the overall Millennium Development Goals (MDGs) of the United Nations (UN). Local residents in the two communes have better standard of living because of the higher income they make from higher productivity. Children now can go to school regularly and get better grades because they have to worry much less about flooded roads and schools. Improved transportation means allow mothers and villagers as a whole to get more convenient access to health services. Most importantly, the projects definitely strengthen global partnership, particularly between Cambodia and the Republic of Korea. Overall, the projects take part in reducing poverty, promoting education and health service access, and tightening the partnership among countries, which are major components of the MDGs.

Efficiency

From the construction side, selecting the PISNOKA International Corporation as the sub-contractor under the Yooshin Engineering Cooperation has proved to be a very efficient choice. PISNOKA has exhibited their competence and capability in following the set standard measures of construction to ensure neatness and safety at the construction site. Plus, they possessed enough necessary heavy equipment, not to mention the light ones, so they could self-make most of the basic materials for the construction at the site without

having to transport them from the downtown areas. In addition, they provided up to one year maintenance services, which doubled the normal period of the post-construction maintenance services.

After the completion of the construction, a Farmer Water User Community (FWUC) was established to be in charge of the operation and maintenance (O&M) of the dam, the water gates, and other facilities. There were proper selection and division of the community members and necessary O&M trainings for them. There is also a mechanism for communication between the community and MoWRAM in order to exchange information and especially needs.

However, based on the interviews with various beneficiaries, it is apparent that the involvement of the local residents in the planning and implementation of the projects is limited. Basically, all of local residents are aware of the presence of the project. Nevertheless, a majority of them reported that they did not take any significant part in the planning and implementation process. Instead, the village chiefs only went to their to house to get their signature as the evidence of them showing support, and the village chiefs did not inform any further or elicit the actual needs and opinions from those villagers. As a result, today, many villagers who live in Sangkeurb and Chealear villages, just to name a few, are unhappy about the projects. They critically claimed that the projects do not do any good for their family but make their living condition, especially their farming practice, even worse. These villagers asserted that the management of the projects within the FWUC is not transparent. There is steep competition among the farmers for water.

Effectiveness

The prime objectives of these projects are to control and reduce the damage caused by flood and to provide water to irrigate farmland in Sambo and Chea Lear communes.

In terms of flood control, these projects have done little to protect the

farmers' farmlands from flood. Evidently, in 2011, about six months after the completion of the second phase project, not only did a heavy flooding destroy the farmers' crops in the area, but the dike itself was severely damaged. In the following years, the area has not experienced any flooding from the river anymore. So, it can be assessed that the projects have done little so far to protect the farmlands from flood. Having said this, we cannot say for certain that the projects are not able to control flood. It is just that there is little so far that the projects have done with regards to controlling flood. We need more evidence to make the judgment. Now, it is too early to say.

On a separate line, however, the projects have been successfully completed. Farmlands at over 2,220 hectares inside the basin and especially those 3,500-8,000 hectare farmlands outside the reservoir in the Sambo and Chealear commune are now irrigated despite the fact that during certain years, low water cannot supply abundant water for irrigation so Sae farmlands still lack water. Today, the 3,500-8,000 hectares outside the basin become arable land during dry season. The 2,220 hectares inside the basin now allow multiple cropping. Virtually all families grow rice twice or even three times a year compared the once-a-year heavy seed rice farming that farmers practiced before the implementation of the projects. Today, farmers grow rice for a shorter period, three months to be precious. Therefore, they have practiced new agricultural techniques and grown different kinds of rice. Each village now processed around 20 heavy farming machineries. Rarely are cattle employed in farming. More importantly, villagers can get self-employed all year round. They do not need to migrate to other area to look for job during the off-farming season.

In addition, per hectare cultivation as having mentioned earlier, the yield increases from 2.5-3 tons to 3-4 tons due to sufficient supply of water and improved farming techniques. So, the practice of multiple cropping and the better yield enable the local residents to make more income and thus improve their livelihood. The new and improved transportation means have

made their lives, especially women, much more convenient. Women can save lots of time for doing housework and taking care of the children and the entire family, other than helping with the field work.

Apart from the construction, the operation and maintenance of the facilities and the functioning of the FWUC have been on a negative side. After the construction, the community depends so much on the Irrigation Service Fee (ISF) that the FWUC collect from every farmer. Farmers have to pay a certain amount depending on the size of their farmlands and the means of supplying water. If water needs to be only drained, 80,000 Riels (about USD $20) is charged. If it has to be both pumped and drained, 50,000 Riels is charged. For only pumped, 30,000 Riels is charged. Recently, however, farmers have refused to pay the ISF because they claimed they did not see any services provided by the FWUC. In my opinion, the underlying reason for this entails the competition for water that has been raised above. Sae farmers are not happy, so they do not pay the fee, and neither do other farmers.

Furthermore, there are Sae other maintenance issues that have not been managed appropriately. The flood in 2011 damaged the dam severely, and the repair process was not carried out carefully. The fills of the damaged parts of the dam were not hardened properly. Now, rain water has caused erosion and created so many dragon holes, which makes it so difficult to travel on the dam. Sae of the water gates were positioned a little higher than the crops. As water cannot be drained outside because the level of the water is lower than the water gates, either crops in the land inside the basin next the dam are destroyed or farmers cannot make use of the land in that area. So far, it has been reported that very minimal effort, if any has been put into maintaining the dam, making minor damages become serious. Therefore, these have caused a vicious circle. When there little, or no, O&M, the farmers refuse to pay the ISF to the FWUC, and when there is no ISF, O&M cannot be done.

Impact

Admittedly, the Flood Control and Irrigation System Construction Projects presented great impacts local residents, the authorities, as well as the country as a whole.

First and most importantly, the projects positively influence the socio-economic status of the local residents in various ways. Farmers begin to use advanced, technological agricultural practices to replace the traditional ways of doing farming. They start to practice different ways of cropping. These can advance their skills and experience in farming, making them much more flexible and less vulnerable. Another fascinating observation after the completion of the projects is that the values of farmlands in the area rose exponentially. Generally speaking, this phenomenon is caused by a number of factors, but based on what the farmers believe, the construction of the irrigation system and flood control has a big contribution in the rise of their land prices. Roughly, the average price of farmland climbed from just over USD $1,000 per hectare before the projects to over USD $10,000 per hectare. These eventually promote the wellbeing of the local residents. Women now no longer need to travel to the rice field to take the packed meal for their husbands because they can actually make their way home a lot more easily. So, there is no need for the husbands to stay at the field the entire day. Now, women have more time to take part in other social activities and take care of their households and children. Children, too, are able to go to school much more conveniently.

Additionally, these projects have presented a new management practice and problem-solving experience for the community as well as the local authority at both national and subnational levels. The FWUC, as having mentioned earlier, have had up and down time for the O&M of the facilities. Initially, they were trained and implemented the O&M very well by collecting ISF regularly. After a couple of years, O&M has been a challenge for FWUC. They become incapable of collecting fees regularly since maintenance has not been done properly. Now, the FWUC is struggling with its own existence and

sustainability. At district level, these projects serve as a unique experience in terms of collecting water fee. We have seen conflict of interest among local residents that the district office has to deal with. They have also experienced the difficult situations when they had to intervene in the O&M when there were Sae major damages to the facilities. Based on the district governor, all these challenges made him and his entire office to work for solutions. Similar lessons can be learned by MoWRAM at the national level. MoWRAM officials, particular those at the General Department of Technical, can get more experience working with KOICA, such as following standard, meeting requirements, etc. They also took part in the implementation of the project and the maintenance. They have also learned the importance of making concrete bank of the dam in order to make the facility stronger and much more durable. So, these are valuable lessons for authorities at various levels, ranging from the local community and district office to the concerned ministry, to learn and improve their practices. Lastly, these projects help strengthen relationship between the two countries and peoples. All the local villagers are aware of the support from the Korean Government in constructing the flood control and irrigation system, and they are very thankful and grateful for this support and hope the two countries continue such a good relation.

Sustainability

Based on the observation, these projects and their management have shown little sign of long-term sustainability. First, there is a lack of financial support from the local and central government. The central government has limited budget for this sector, and thus the provincial department as well as the district office are not capable of carrying out sufficient maintenance. The central government in 2011 financially supported the reparation of the facilities destroyed by the flood; however, it was carelessly done, making the facilities not functioning well in just a short period after the reparation. Since O&M requires financial availability, these pose a major constraint in the sustainability of the projects. Today, O&M depends to a great extent on the ISF. Now, FWUC is not functioning well either. They are unable to collect fee,

and they do not have the ability to do the O&M. So, this worsens the situation. Basically, there is a huge lack of sense of ownership among the residents. Residents do not take responsibility of the maintenance of the facilities. Sae even believe that it is the community or the authority who have to be responsible. To be precise, there is a tragedy of the commons in this situation. When everyone is responsible for the same thing, then nobody will actually take responsibility.

One underlying factor is the fact that farmers do not find the facilities helpful or reliable in providing them with water for farming. Today, many families use ground water for farming. This makes Sae family even believe that the projects actually make their living and farming conditions worse. The functions of the facilities themselves are also overdependent on the flood water and water from the river. During seasons with low or small water, they do not have sufficient amount of water to irrigate a lot of farmlands. So, there is little they can do during these circumstances.

All in all, if this scenario is going to prevail, it poses great danger to the sustainability of the projects.

C. RECOMMENDATIONS

The followings are the recommendations to different entities.

The Royal Government of Cambodia (RGC)

Below are Sae recommendations for the RGC:

- Ensure effective communication: The RGC, particularly MoWRAM, should inform the local authority at the sub-national level as well as the local residents clearly about any development plan. Moreover, they should also conduct Sae public survey to hear what local residents need so that we can design the development project to reflect those needs.

- Process and publicize information and reports among all relevant stakeholders: We have observed that there is so much difficulty in obtaining information about the projects. This does not apply to these

particular projects, but most of the development projects. Either it is hard to access the information, or the information is not available. In addition, the authorities do not seem to know exactly where the information can be obtained. So, often times, they actually pointed at each other.

❖ Empower local authority by allocating necessary annual budget to carry out O&M: We have also found that the Provincial Department of Water Resources and Meteorology has very limited amount of annual budget allocated by MoWRAM for them to carry out O&M and other development in the entire Kampong Cham Province. So, they also complained that when they are not able to fix minor damages of a construction, that leaves the damage to grow bigger and bigger and hard to fix. The district office also encounters the same problem.

❖ Continue good relationship with funding agencies and identifying areas of partnership: The RGC has done well in maintaining good relationship with funding agencies. So, it is important to continue this good relationship as well as try to look for areas that are in urgent needs for development in order to propose for more funding.

Funding Agencies

Below are Sae recommendations for the RGC:

❖ Conduct thorough feasibility study and design: We have learned that the feasibility study was conducted by a team of Korean experts in about one week. This is too short. Feasibility study should be conducted much more thoroughly so that all the facilities will be put in place properly.

❖ Ensure durability and sustainability of the project: Concreteness should be emphasized in the construction of such projects since without concrete base, the structure is prone to damage since they have to withstand flood water and other potential sources of damage.

Local Authority

Local authority should:

- ❖ Carefully study and identify the needs of the local residents and the problems they face: This is important for any development project to address the needs of the local residents and make sure the project benefits a large majority, if not all, of them.

- ❖ Carry out and encourage immediate problem solving: Delayed solution or reparation to a minor problem or damage will make it get bigger and bigger, and eventually it is out of control.

Community / Local Residents

The community and local residents should:

- ❖ Promote mutual understanding: A development project definitely cannot benefit every person equally, so it is important that every villager be open-minded and not compete with each other over the shared benefits.

- ❖ Take ownership and lead in O&M: Villagers should consider the facilities as belonging to them and take a good care as much as they can in terms of operation and maintenance. This is the best way to make the facilities and the projects sustainable.

- ❖ Strengthen cooperation with the community: Since the FWUC plays important role in O&M, empowering them is a must. So, local residents have to trust and cooperate with the community as much as possible.

5. Results of Questionnaire Survey

1. Outline

As the two projects - Flood Control and Irrigation System Construction - had been implemented in a closely related context, the basic design of the ex-post evaluation on the projects were planned within an integrated research and survey scheme. Therefore, interviews, site visits, questionnaire surveys, and meetings and discussions as well as the projection of evaluation matrix were prepared in a same portfolio of evaluation research and survey.

The plan for questionnaire survey on main stakeholders of the projects classified the two groups of direct beneficiaries: (1) farmers and local residents in the project area; and (2) members of the Farmer Water Use Community (FWUC). For each group of beneficiaries, a questionnaire survey form was developed and the questionnaire included around two dozens of fairly simple questions so that the answers could clarify the performance of the projects produced.

Each group of respondents were selected by the local leaders in guidance of the local consultants. The two commune leaders - Sambo and Chea Lear - selected the 20(twenty) respondents of 'Questionnaire to Local Residents and Beneficiaries' Questionnaire. The Chairman of the FWUC selected the 10(ten) respondents of 'Questionnaire to FWUC Members/Representatives.

The questionnaire survey was conducted during the 1st field research and survey mission in the 1st week of September 2013. However, the survey results proved that a number of the answers were not credible enough lacking respondent's identification and missed answers. In order to make the results of questionnaire more credible a complementary questionnaire survey was conducted during the 2nd field trip to Batheay region in the last week of September 2013. The followings are the results of the questionnaire surveys into which the eligible answers of the two surveys were integrated.

2. List of the Questionnaire Respondents

A) List of Local Residents/Beneficiaries

No.	Name in Khmer	Name in English	Sex	Position	Commune	Interview Date
1	អន្ទិស អំល	Inn Sa Ol	M	Farmer	Sorngkeurb	22 Sep 2013
2	គីមឺល ឃុ	Kim Luy	M	Farmer	Sorngkeurb	22 Sep 2013
3	អន្ទិជមឺ	Inn Toeum	M	FWUC Member	Sorngkeurb	22 Sep 2013
4	ស ម៉ុន	Sa Nan	F	Farmer	Sorngkeurb	22 Sep 2013
5	ឈ ពុំនតិ	Chum Nith	M	Farmer	Sorngkeurb	22 Sep 2013
6	ជប ថល	Chorb Thol	M	Farmer	Sorngkeurb	22 Sep 2013
7	ជម មន	Chim Meoun	M	Farmer	Sorngkeurb	22 Sep 2013
8	ធន	Thoeun	M	Farmer	Sorngkeurb	22 Sep 2013
9	ចន សកគង	Chin Sok Kong	M	Farmer	Chea Lear	22 Sep 2013
10	យ ម ឌើរឿ	Nhem Doeurn	M	Farmer	Chea Lear	22 Sep 2013
11	មល់ រ ិល	Mol Visal	M	Farmer	Sorngkeurb	22 Sep 2013
12	ស ន	Shin	F	Farmer	Chea Lear	22 Sep 2013
13	មស ថ៊ីន	Dam Sithan	M	Farmer	Sorngkeurb	22 Sep 2013
14	ស ន គមហ ង	Shon Kimhong	F	Farmer	Sorngkeurb	22 Sep 2013
15	ជប ស យ	Choub Soy	M	Farmer	Sorngkeurb	22 Sep 2013
16	កប់ចននន ី	Tak Channy	F	Farmer	Sambo	05 Sep 2013
17	ស ន ចនន	Son Channy	F	Farmer	Sambo	05 Sep 2013
18	ហ ូចនប់	Ho Channa	F	Farmer	Sambo	05 Sep 2013
19	មស ជន	Mos Chin	M	Farmer	Sambo	05 Sep 2013
20	ស ន ម	Sronn Mei	M	Farmer	Sambo	05 Sep 2013

B) List of FWUC Members

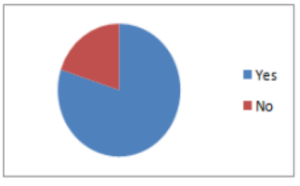
No.	Name in Khmer	Name in English	Sex	Position	Commune	Interview Date
1	ឡេង លន់	Leng Lon	M	FWUC Member	Sambo	05 Sep 2013
2	ជរ ជម	Chor Chim	M	FWUC Member	Sambo	05 Sep 2013
3	បន្ន សផល	Binn Sophal	M	FWUC Member	Sambo	05 Sep 2013
4	ស្ពៅ	Sompov	M	FWUC Member	Sambo	05 Sep 2013
5	យែម យន	Yem Yorn	M	FWUC Member	Sambo	05 Sep 2013
6	ជន ហៀប	Chin Hearb	M	FWUC Member	Sambo	05 Sep 2013
7	ន វន	Vann Vorn	M	FWUC Member	Sambo	05 Sep 2013
8	សុម ឈើម	Som Ream	M	FWUC Member	Sorngkeurb	05 Sep 2013
9	ផៃ ភឿង	Phay Phoeurng	M	FWUC Member	Sorngkeurb	05 Sep 2013
10	ជប ឈើន	Chub Cheurn	M	FWUC Member	Sambo	05 Sep 2013

3. Graphic Description of Questionnaire Survey Results

A) Answers of Local Residents and Farmers

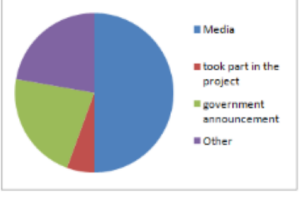
(A) Regarding the Cooperation Project

1-1. Do you know the fact that this project was assisted by the Korean Government?



Response	Rpdent.	Percent.
Yes	16	80%
No	4	20%

1-2. If your answer of question 1-1 is 'Yes', how did you know?

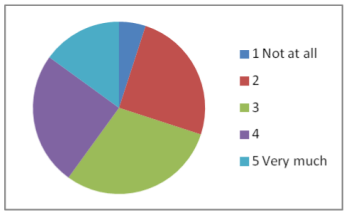


Response	Rpdent.	Percent.
Media	9	50%
Took part the project	1	6%
Government announcement	4	22%
Other	4	22%

Other answers:

- I saw Cambodian and Korean flag on the signboard.
- I knew it from my friends/relatives (hearsay).
- Korean experts came and interviewed residents.
- I saw Korean people.

1-3. Do you know this project has reflected local residents' opinions and suggestions?

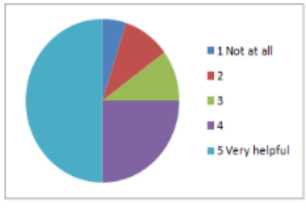


Response	Rpdent.	Percent.
1 Not at all	1	5%
2	5	25%
3	6	30%
4	5	25%
5 Very much	3	15%

1-4. If your answer of question 1-3 is negative, why do you think so?

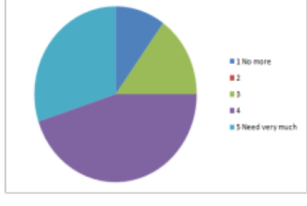
- I did not know the project well.
- I did not participate in the project.

1-5. Do you think this project is helpful for you and your community?



Response	Rpdent.	Percent.
1 Not at all	1	5%
2	2	10%
3	2	10%
4	5	25%
5 Very helpful	10	50%

1-6. Does your community still need more water for agriculture in addition to these KOICA project?



Response	Rpdent.	Percent.
1 No more	2	10%
2	0	0%
3	3	15%
4	9	45%
5 Need very much	6	30%

1-7. Do you think new facilities installed by the projects are functioning well?

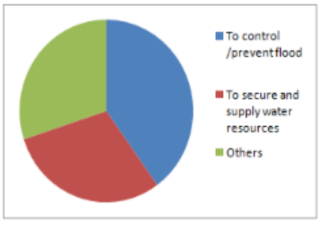
Response	Rpdent.	Percent.
1 No more	0	0%
2	0	0%
3	2	10%
4	9	45%
5 Very well	9	45%

1-8. If you are not satisfied with the way how new facilities are functioning, please describe main constraint or deficiency and your suggestion.

- I am quite satisfied with the new facilities because the irrigation system is functioning quite well, and there are just small damages (minor dragon holes) to the dikes.
- I would like Government of Republic of Korea to repair the dikes/irrigation system.
- I would like to request for one more water pumping station to bring water to the fields.
- I am not really satisfied with the new facilities due to its operation. Most of the water inside the reservoir is drained to water crops in the land outside the reservoir from November to December.

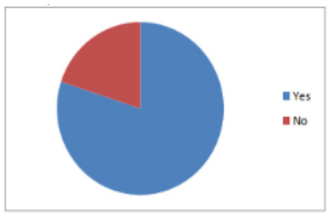
  Therefore, the water in lower lands is not sufficient.
- I was satisfied with the facilities before. But, now my satisfaction faded away because of the improper function of those facilities.
- I really urge Korean government to have appropriate O&M system.

1-9. What kind of further improvements do you expect on this projects?



Response	Rpdent.	Percent.
To control /prevent flood	8	40%
To secure and supply water resources	6	30%
Others	6	30%

1-10. Do you think your community need further assistance from external development partners (such as KOICA) for water resources management and irrigation? (including the maintenance needs)



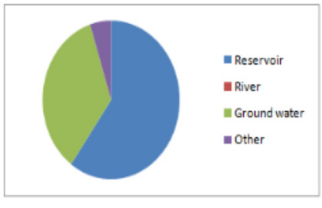
Response	Rpdent.	Percent.
Yes	16	80%
No	4	20%

If the answer is 'Yes', please specify the reason.

- I want more funds to control and further repair the dikes.
- I need more water for my cropping in order to raise my rice productivity.
- I want more water supplies.
- I want more water sources.
- I want to have more convenient roads.
- I want more canals connecting from the Tonle Sab to the commune.
- I want further O&M system.
- I want to have markets in my commune so that the price of my rice can be higher.

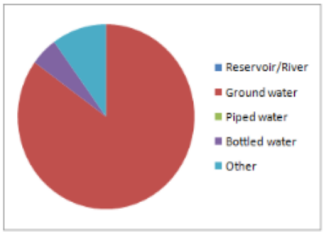
(B) Regarding the Physical Data and Information

2-1. What is the main source for agricultural water?



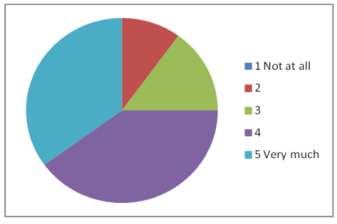
Response	Rpdent.	Percent.
Reservoir	12	60%
River	0	0%
Ground water	7	35%
Other(rain)	1	5%

2-2. What is the main source for drinking water?



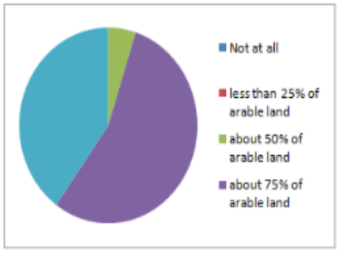
Response	Rpdent.	Percent.
Reservoir/River	0	0%
Ground water	17	85%
Piped water	0	0%
Bottled water	1	5%
Other(rain)	2	10%

2-3. Do you think flood damage in your village has been reduced since KOICA project had finished?



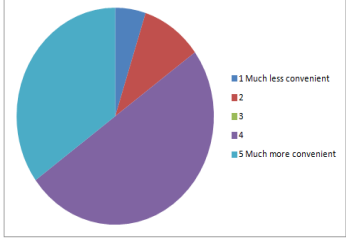
Response	Rpdent.	Percent.
1 Not at all	0	0%
2	2	10%
3	3	15%
4	8	40%
5 Very much	7	35%

2-4. How much agricultural land get benefit from KOICA flood control project?



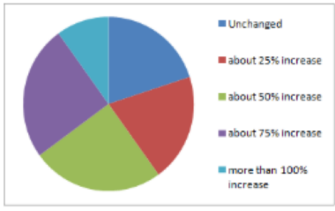
Response	Rpdent.	Percent.
Not at all	0	0%
Less than 25% of arable land	0	0%
About 50% of arable land	1	5%
About 75% of arable land	11	55%
100% of arable land	8	40%

2-5. Do you think it is more convenient for you to get agricultural water than before the project?



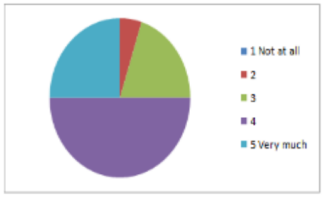
Response	Rpdent.	Percent.
1 Much less convenient	1	5%
2	2	10%
3	0	0%
4	10	50%
5 Much more convenient	7	35%

2-6. How much do you expect the increase of crop yield after the KOICA project?



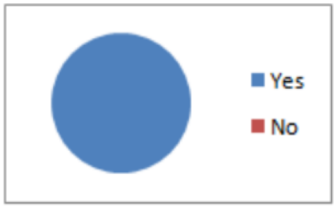
Response	Rpdent.	Percent.
Unchanged	4	20%
About 25% increase	4	20%
About 50% increase	5	25%
About 75% increase	5	25%
More than 100% increase	2	10%

2-7. Do you expect the increase of crop production could lead to the increase of rural household income?



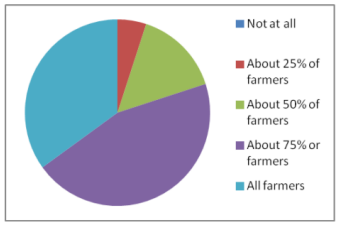
Response	Rpdent.	Percent.
1 Not at all	0	0%
2	1	5%
3	4	20%
4	10	50%
5 Very much	5	25%

2-8. Are there farmers who start multiple cropping after this project?



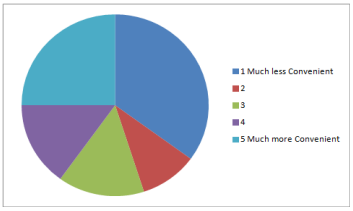
Response	Rpdent.	Percent.
Yes	20	100%
No	0	0%

2-9. Do you think how much farmers have practicing multiple cropping cultivation after the KOICA project?



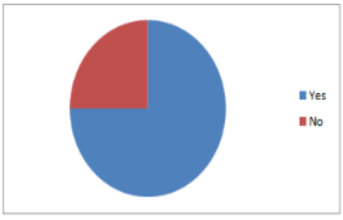
Response	Rpdent.	Percent.
Not at all	0	0%
About 25% of farmers	1	50%
About 50% of farmers	3	15%
About 75% of farmers	9	45%
All farmers	7	35%

2-10. Do you think it is more convenient to get drinking water than before the projects?



Response	Rpdent.	Percent.
1 Much less Convenient	7	35%
2	2	10%
3	3	15%
4	3	15%
5 Much more Convenient	5	25%

2-11. Is there any unexpected positive or negative impact derived from these projects?



Response	Rpdent.	Percent.
Yes	15	75%
No	5	25%

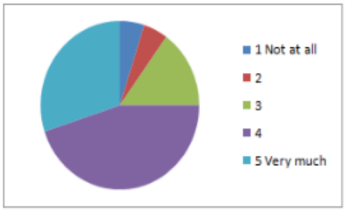
If the answer is 'Yes', please specify them below.

- Positive impacts:
  - o I can crop twice per year.
  - o I can do multiple cropping per year.
  - o I can have more productivity.
  - o There is more water supply than before.
  - o I have enough water for my cropping.
  - o I have sufficient water to raise my animals and water my crops.

- Negative impacts:
  - o I have less income.
  - o The dike is damaged, causing the flood.
  - o There is still flood in the lower areas inside the reservoir sometimes.
  - o There was violence over the targeted land for the projects.

(C) Contentment on the Performance of the Projects

3-1. How do you satisfied with the outcome of the projects?



Response	Rpdent.	Percent.
1 Not at all	1	5%
2	1	5%
3	3	15%
4	9	45%
5 Very much	6	30%

3-2. If you are not satisfied with the projects, what are the main deficiencies of the projects?

- There is no water left from November to December because the water is drained to the land outside the reservoir.
- Before I was very satisfied, but now the land inside the reservoir is flooded during the rainy season.
- There was violence over the targeted lands for the projects.
- There are a lot of damages to the dikes.
- There is still lack of "water pumping system".
- There is no proper operation and maintenance.
- There is violence over the water.
- There is no water control.
- FWUC members are corrupted, so the water sharing is unequal.
- I would like to have more proper maintenance.

3-2. If you have other opinions or suggestions about the whole project, please specify them below.

- I would like to request another canal bringing water from Tonle Sab.
- I would like to request from more water supplied/sources.
- There are so many dragon holes, and not many people use it anymore.
- Properly control the dikes.
- I request one canal from Prek Kdam.
- I would like to have one water pumping station to bring water.
- I want to have a commune market so that the price is stable and/or higher.

B) Answers of FWUC Members

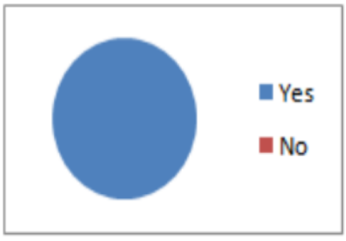
(A) Information on the Respondent of the Questionnaire

1-1. I took part in the project from the earlier stage (2009) of this project as a representative of villages or a member of the FWUC Committee.

Response	Rpdent.	Percent.
Yes	10	100%
No	0	0%

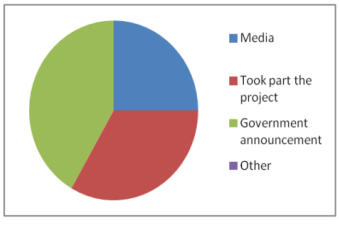
(B) Regarding Awareness of the Irrigation System Construction Project

2-1. Do you know the fact that this project was assisted by the Korean Government?



Response	Rpdent.	Percent.
Yes	10	100%
No	0	0%

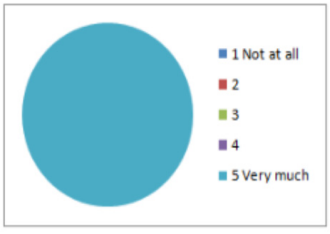
2-2. If your answer of question 2-1 is 'Yes', how did you know?



Response	Rpdent.	Percent.
Media	6	25%
Took part the project	8	33%
Government announcement	10	42%
Other	0	0%

(C) On Preparation and Implementation of the FWUC Program

3-1. Do you think this project(FWUC Formation and Operation) has reflected local residents' opinion and suggestions?

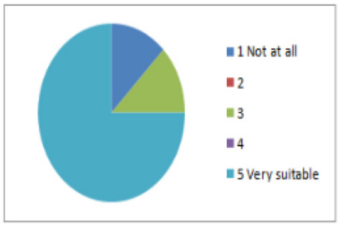


Response	Rpdent.	Percent.
1 Not at all	0	0%
2	0	0%
3	0	0%
4	0	0%
5 Very much	8	100%

3-2. If your answer of question 3-1 is in a negative scale, why do you think so?

Response	Rpdent.	Percent.
The experts and officials in charge did not ask what you wanted	2	34%
You could not communicate with the experts and officials well	1	16%
Though you let them your ideas, they did not accept them	1	16%
In the initial stage of the project, most of the villagers did not have their ideas or opinions, unfamiliar with the concrete and exact idea of FWUC	1	16%
Etc.	1	16%

3-3. In case you took part in this project from the initial stage, do you think the program for public relations and training was suitable in terms of getting relevant knowledge and know-how for your capacity development as a member of FWUC?

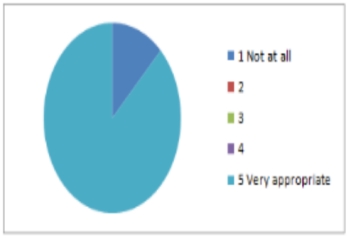


Response	Rpdent.	Percent.
1 Not at all	1	12.5%
2	0	0%
3	1	12.5%
4	0	0%
5 Very suitable	6	75%

3-4. If your answer of question 3-3 is in a negative scale, why do you think so?

Response	Rpdent.	Percent.
The length of the training program was too short	1	25%
The contents of the training program did not cover some of the required curricula	1	25%
The level of the training was under expectation, not reflecting the local conditions and the opinions of the villagers	1	25%
Etc. (not punctual)	1	25%

3-5. Do you think the design on the organization and operation of the FWUC was appropriate in terms of functioning, self-sufficiency and sustainability of the community?



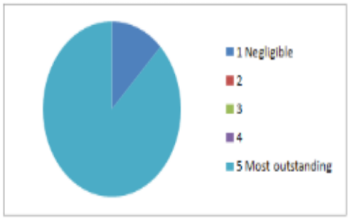
Response	Rpdent.	Percent.
1 Not at all	1	12.5%
2	0	0%
3	0	%
4	0	0%
5 Very appropriate	7	87.5%

3-6. If your answer of question 3-5 is in a negative scale, why do you think so? Please describe your opinion and give some suggestion for modification in the future.

(They had no any comments)

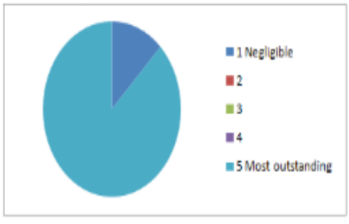
(D) On Performance of the Irrigation System Construction Project

4-1. (On FWUC formation and operation) What do you think of the outcome of the FWUC formation and operation?



Response	Rpdent.	Percent.
1 Negligible	1	12.5%
2	0	0%
3	0	%
4	0	0%
5 Most outstanding	7	87.5%

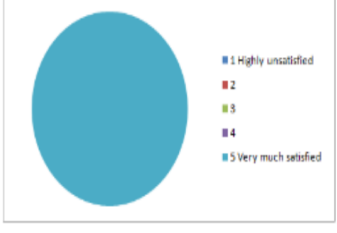
4-2. (On the construction and operation of irrigation facilities) What do you think of the outcome of the construction and operation of the irrigation facilities?



Response	Rpdent.	Percent.
1 Negligible	1	12.5%
2	0	0%
3	0	%
4	0	0%
5 Most outstanding	7	87.5%

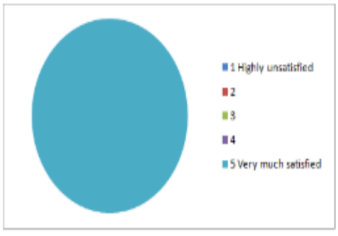
(E) Maintenance and Sustainability of the Project

5-1. (On FWUC system) Do you think the FWUC operational mechanism runs smooth as expected?



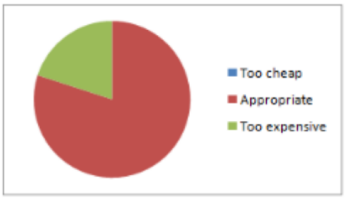
Response	Rpdent.	Percent.
1 Highly unsatisfied	0	0%
2	0	0%
3	0	%
4	0	0%
5 Very much satisfied	7	100%

5-2. (On FWUC system) Do you think the operation and management of the FWUC is sound in terms of financial and managerial capability?



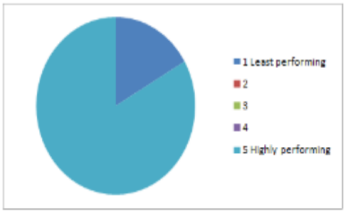
Response	Rpdent.	Percent.
1 Highly unsatisfied	0	0%
2	0	0%
3	0	%
4	0	0%
5 Very much satisfied	7	100%

5-3. (On FWUC system) Do you think the level of the Irrigation Service Fee(ISF) is appropriate in terms of the FWUC system management?



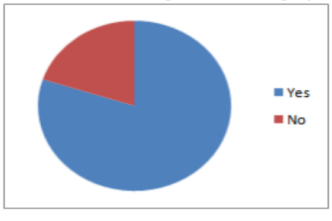
Response	Rpdent.	Percent.
Too cheap	0	0%
Appropriate	4	80%
Too expensive	1	20%

5-4. (On irrigation system and field facilities) Do you think the irrigation system and field facilities are under due operation and maintenance?



Response	Rpdent.	Percent.
1 Least performing	1	16%
2	0	0%
3	0	0%
4	0	0%
5 Highly performing	5	84%

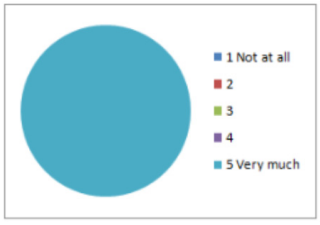
5-5. (On irrigation system and field facilities) Were there appropriate repair works of damage caused after the completion of the project?



Response	Rpdent.	Percent.
Yes	4	80%
No	1	20%

(F) Overall Contentment on project Performance

6-1. How do you satisfied with the overall outcome of the two consecutive projects: Flood Control and Irrigation System Construction?



Response	Rpdent.	Percent.
1 Not at all	0	0%
2	0	0%
3	0	0%
4	0	0%
5 Very much	9	100%

6-2. If you have other opinions or suggestions about the project, please specify them below.

(They had no any comments)

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