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Kingdom of Cambodia

The Application Form

For

The Technical Cooperation by the Government of Japan

The Basinwide Basic Irrigation
and Drainage Master Plan
Study Project

July, 2004

Ministry of Water Resources and Meteorology

APPLICATION FORM FOR JAPAN'S DEVELOPMENT STUDY PROGRAM

Date of entry: month July year 2004Applicant: the Government of the Kingdom of Cambodia**1. Project digest**(1) Project Title: Basin-wide basic Irrigation and Drainage Mater Plan Study

*Enter the project title in English (Spanish or French).

(2) Location (province/county name): Four prioritized river basins that will be determined
in the study

(city/town/village name): _____

from the metropolis : about _____ hours' ride/flight

(3) Implementing Agency

Name of the Agency: Ministry of Water Resources and Meteorology

*Enter the name of the implementing agency including such details as the name of the bureau or department.

Year	<u>2001</u>	<u>2002</u>	<u>2003</u>	<u>2004</u>
Annual budget (Million Riels)	<u>7,511</u>	<u>10,503</u>	<u>10,739</u>	<u>13,500</u>
Number of staff	<u>1,581</u>	<u>1,550</u>	<u>1,528</u>	<u>1,511</u>

*Attach an organizational chart, and mark the department responsible for the study.

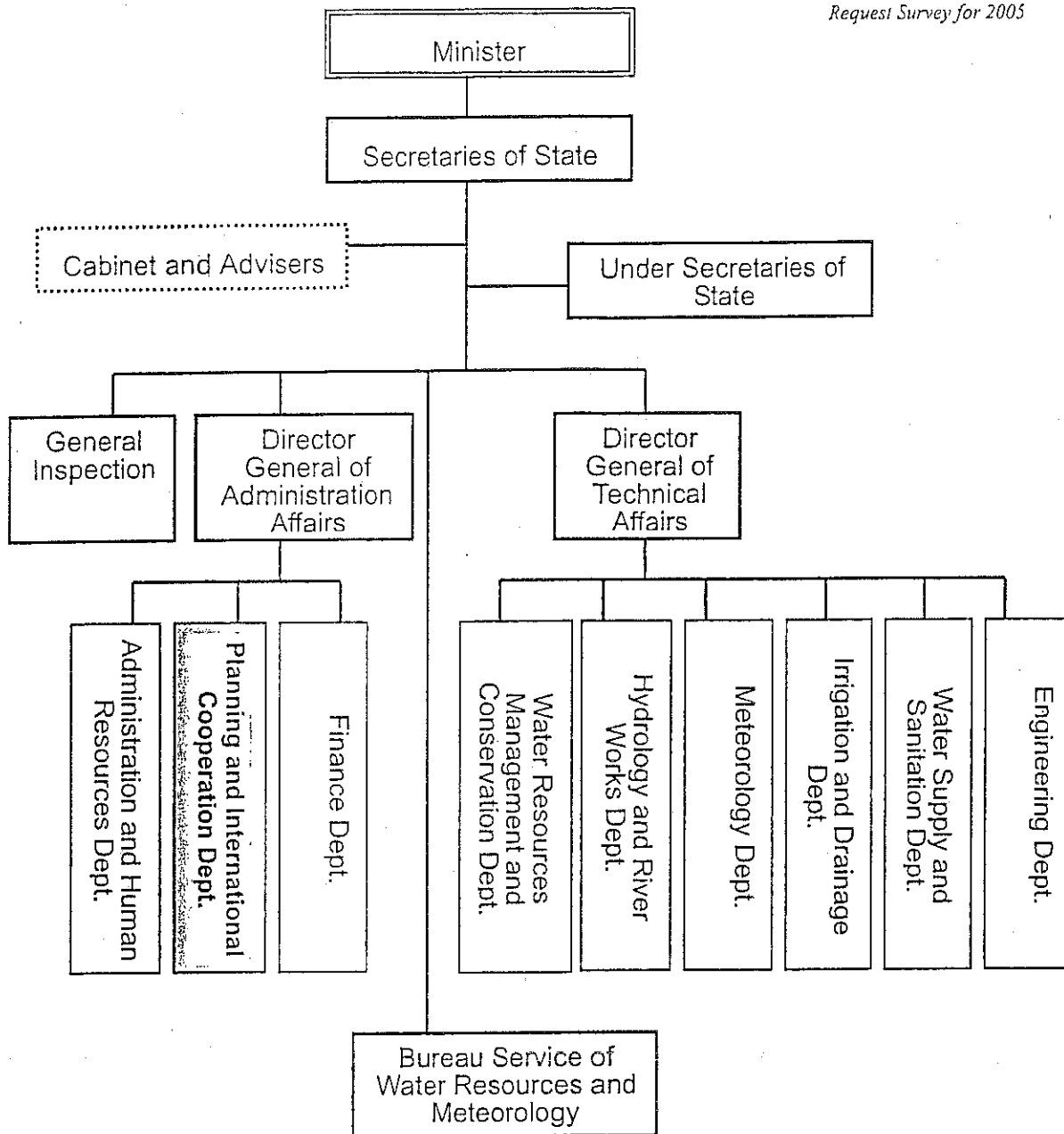


Fig. 1 Organization Chart of Ministry of Water Resources and Meteorology

(4) Justification of the Project

*Provide detailed information of the project regarding the items below.

- Present conditions of the sector:

GDP per capita of Cambodia is at very low level, US\$ 265 in 1999. Agriculture is the mainstay of Cambodia's economy, contributing to about 43 % of GDP and 80 % of the labor force. Population of Cambodia is 11,437,000 in 1998. 84 % of the total population is living in the rural area, and out of which 42 % of rural people's financial status is below the poverty line.

Irrigation facilities were destroyed during the civil war which lasted over 20 years. Although many irrigation systems were constructed under the Khmer Rouge government, their gates and canals were not properly designed nor constructed based on irrigation engineering. At present, it is said that only 560,000 ha out of 2,481,400 ha of paddy field access to supplementary irrigation. Agricultural production is often damaged by floods and draughts.

- Sectoral development policy of the national/local government:

The Royal Government of Cambodia (RGC) is making efforts to alleviate the poverty in accordance with the National Development Plan. In order to attain the alleviation of poverty, it is stressed by RGC that irrigation and agricultural development is one of the best countermeasures. It is also emphasized importance of improvement in food security through expansion of rice production and providing farmers opportunities for increasing income by diversification of agricultural production in the Action Program for Development of Agricultural Sector in Cambodia (2001-2010) prepared by Ministry of Agriculture, Forestry and Fisheries.

- Problems to be solved in the sector:

Taking the short view of the situation, it is very urgent to rehabilitate irrigation facilities constructed during the Pol Pot regime, which constitute majority of those facilities. However, those facilities were not constructed under the basin-wide irrigation/drainage master plan. The Pol Pot canals were often installed in lower part of beneficiary areas because design concept of efficient water distribution and drainage were not taken into consideration. It is rather difficult to distribute water to fields by gravity since water level in the canal is usually quite low. When large-scale of irrigation and drainage project is planed, it must be considered to keep water level as higher as possible so that it enables water distribution to fields by gravity and proper water drainage when flood occurs. In case of rehabilitating Pol Pot structures, such design principles must be taken into account.

- Outline of the Project:

Firstly, four river basins will be determined as target of the study through a baseline study and discussion among related organizations. After that, four basin-wide basic irrigation and

drainage master plan will be formulated for each basin in turn.

- Purpose (short-term objective) of the Project:

To contribute to realizing effective and efficient irrigation/drainage system

- Goal (long-term objective) of the Project:

To increase and stabilize agricultural production

- Prospective beneficiaries:

People living in the selected four river basins, which will be determined in the study

- The Project's priority in the National Development Plan / Public Investment Program:

It is emphasized importance of improvement in food security through expansion of rice production and providing farmers opportunities for increasing income by diversification of agricultural production in the Action Program for Development of Agricultural Sector in Cambodia (2001-2010) prepared by Ministry of Agriculture, Forestry and Fisheries. It is hoped that the study could directly contribute to increase of agricultural production and poverty reduction.

(5) Desirable or Scheduled time of the commencement of the Project:

month August year 2005

(6) Expected funding source and/or assistance (including external origin) for the Project:

Japan's assistance would be expected for the study.

*Describe the concrete policies for the realization of the project, and enter the prospects for realization and funding sources.

(7) Other relevant Projects, if any.

2. Terms of Reference of the proposed Study

*Please fill in (1) and (2) below, paying particular attention to the following items.

- In the case that a study was conducted in the same field in the past, describe the grounds for requesting this study, the present status of the previous project, and the situation regarding the technology transfer.
- Whether there are existing studies regarding this requested study or not.
- Coordination with other economic and technical cooperation from Japan

(1) Necessity/Justification of the Study:

To formulate basin-wide basic irrigation/drainage master plan must be urgent to achieve efficient utilization of basin-wide water resources, effective irrigation and drainage system and

appropriate water management. Basin-wide irrigation/drainage system shall be implemented by several projects with step-by-step approach. The effect of the rehabilitating the Pol Pot structures could be maximized if the project is implemented based on the basin-wide master plan.

Sufficient hydrological and meteorological data must be necessary for developing water resource plan. Unfortunately, such kind of data has not been accumulated sufficiently in Cambodia. It is necessary to make a tentative water resource plan and fix the basin-wide master plan. A monitoring system for these data is very critical in order to raise the precision of the water resource plan and concretize project implementation. In addition, the system is also important from the aspect of watershed management. To strengthen the monitoring system for hydrological and meteorological data must be key issue to deal with these matters. After sufficient accumulation of these data, the tentative water resources plan must be revised, and then the basin-wide master plan also must be modified.

JICA has often implemented the M/P and F/S studies at the same time based on the assumption that hydrological and meteorological data has already been accumulated to some extent. Taking insufficient data into account, to formulate the basin-wide master plan must be urgent. After completing several master plans, feasible projects shall be identified and divided into three categories of which should be implemented in short-, mid- and long-term, and those projects shall be prioritized for each category respectively. According to its category and priority, appropriate feasible study shall be implemented in order so that it enables timely and effective project implementation.

(2) Necessity/Justification of the Japanese Technical Cooperation:

It is hoped that this study could contribute to improvement of agricultural production infrastructure.

(3) Objectives of the Study:

*Describe the objectives of the study in detail. Also, indicate who will benefit from the study in as much detail as possible, and describe the beneficial effect in terms of quantity. Enter in a concise manner the goal expected to be achieved in the future by conducting the study.

*When the requested study is the only input scheme there is in the cooperation program, enter the same sentences given in the "Objective of the Cooperation Program" in the summary sheet. When more than one scheme is requested including this one, describe clearly the role of the requested study.

To contribute to realizing effective and efficient irrigation/drainage system

(4) Area to be covered by the Study:

*Enter the name of the target area for the study and attach a rough map to the documents submitted. The attached map should be at a scale that clearly shows the project site. Mark the site in red.

Four river basins will be determined as target areas in the study.

(5) Scope of the Study:

*Enter in a concise manner using an itemized statement.

- a) Base line Study : agriculture, socio-economic, rural environment, natural resource, basin environment etc.
- b) Collecting Data : hydrological and meteorological data, GIS data etc.
- c) Basic Plan : land use plan, water resource plan, irrigation and drainage plan, facility plan, project implementation schedule(short-, mid- and long-term)
- d) Strengthen monitoring system for hydrological and meteorological data

(6) Study Schedule:

*Enter the time/period of the study.

From August 2005 to September 2006

(7) Major Inputs of the Study

Japanese Side : Dispatch of a consultant team, Facilities for hydrological and meteorological data monitoring, Vehicles for the study etc.

Cambodia Side : Establishment of steering committee, assignment of counterparts, provision of office space and administrative services etc.

(8) Expected Major Outputs of the Study:

Four basin-wide basic irrigation and drainage master plan

(9) Possibility to be implemented / Expected funding resources:

Japan's assistance would be expected.

(10) Request of the Study to other donor agencies, if any:

*Please pay particular attention to the following items:

- Whether you have requested the same study to other donors or not.
- Whether any other donor has already started a similar study in the target area or not.
- Presence/absence of cooperation results or plans by third-countries or international agencies for similar projects.
- In the case that a study was conducted in the same field in the past, describe the grounds for requesting this study, the present status of the previous project, and the situation regarding the technology transfer.
- Whether there are existing studies regarding this requested study or not. (Enter the time/period, content and concerned agencies of the existing studies.)

None

(11) Other relevant information

*Enter relevant information other than that described above, if any.

None

3. Facilities and information for the Study

- (1) Assignment of counterpart personnel of the implementing agency for the Study:
(number, academic background, etc.)
H.E. Mr. Veng Sakhon, Under Secretary of State
Mr. Pich Veasna, Director of International Cooperation and Planning Department
- (2) Available data, information, documents, maps, etc. related to the Study:
(Please attach the list.)
- (3) Information on the security conditions in the Study Area:
Not identified

4. Global Issues (Environment, Gender, Poverty, etc.)

- (1) Environmental components (such as pollution control, water supply, sewage, environmental management, forestry, biodiversity) of the Project, if any.
Not identified
- (2) Anticipated environmental impacts (both natural and social) by the Project, if any.
Not identified
- (3) Women as main beneficiaries or not.
No
- (4) Project components which require special considerations for women (such as gender difference, women specific role, women's participation), if any.
Nothing special
- (5) Anticipated impacts on women caused by the Project, if any.
Nothing special
- (6) Poverty alleviation components of the Project, if any.
It is hoped that this study could contribute to poverty alleviation,
- (7) Any constraints against the low-income people caused by the Project.
Nothing special

5. Undertakings of the Government of (the recipient country)

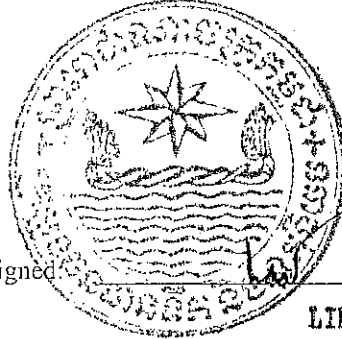
In order to facilitate the smooth and efficient conduct of the Study, the Government of (the recipient country) shall take necessary measures:

- (1) to secure the safety of the Study Team,

Security conditions in Cambodia have been improved so much these years and it is very stable at present. There is not any special problem on security conditions for the project implementation. W

12. Others

None.



Signed:

LIM KEAN HOR

Title:

Minister

On behalf of the Government of the Kingdom of Cambodia

Date:

06-07-04

MINUTES OF MEETING
ON
THE PRELIMINARY STUDY
FOR
THE BASINWIDE BASIC IRRIGATION AND DRAINAGE MASTER PLAN STUDY
IN THE KINGDOM OF CAMBODIA

Japan International Cooperation Agency (hereinafter referred to as "JICA") dispatched a preliminary study team for the Basin-wide Irrigation and Drainage Master Plan Study (hereinafter referred to as "the Study") from May 28, 2006 to June 3, 2006. The team, headed by Mr. Nobuo SAMBE, was dispatched for the purpose of; i) exchanging views on the framework of the Study, and ii) hydro-meteorological investigation which is planned to be commenced prior to the Study.

During its stay in the Kingdom of Cambodia, the team carried out field survey and made discussions on the Study with the authorities concerned of the Kingdom of Cambodia.

As a result of the above activities, the team and the Cambodian authorities concerned agreed to report to their respective governments the matters referred to in the document attached hereto.

Phnom Penh, June 2, 2006



三谷 信雄

Mr. Nobuo SAMBE
Leader
Preliminary Study Team
Japan International Cooperation Agency
Japan

H.E. Mr. Veng Sakhon
Secretary of State
Ministry of Water Resources and
Meteorology
The Kingdom of Cambodia

THE ATTACHED DOCUMENT

1. Framework of the Master Plan Study

(1) Reconfirmation on the Application Form for the Master Plan Study

The team and the Cambodian authorities concerned discussed on the official request for the Study. The following issues were discussed and confirmed.

- a) The Study Area will consist of the following four river basins:
 - Battambang River Basin (Battambang Province)
 - Moug Russey (Dauntri) River Basin (Battambang Province)
 - Pursat River Basin (Pursat Province)
 - Boribo River Basin (Kompong Chnam Province)
- b) Scope of the Study consists of the following items as mentioned in the application form:
 - Baseline survey on agriculture, socio-economic, rural environment, natural resource, basin environment, etc.
 - Collecting hydrological and meteorological data, GIS data, etc.
 - Basic plan consisting of land use plan, water resources assessment, irrigation and drainage improvement plan, project implementation schedule (short, middle and long term), etc.
 - Strengthening of monitoring system for hydro-meteorological data.
- c) Study schedule:

The Study was originally requested to be implemented from August 2005. The Cambodian side requested to the Japanese side for earlier implementation of the Study.

(2) Framework of the Master Plan Study

The Study consists of;

- Inventory survey on existing irrigation and drainage facilities
- Basic study (review of existing information and report, baseline survey, data collection, etc.)
- Formulation of Master Plan (assessment of water resources by basin, irrigation and drainage development plan by basin)
- Technology transfer (hydro-meteorological monitoring, water resources assessment, planning of irrigation and drainage, etc.)

The both sides also discussed on the approach of the Master Plan Study. The Cambodian side suggested the following approach.

- Phase-1: Basin-wise Master Plan will be formulated by basin, then priority

sub-basin(s) or irrigation scheme(s) will be selected by basin.

- Phase-2: Detailed study will be conducted for the selected priority sub-basin(s) or irrigation scheme(s).

The team will convey the intention of the Cambodian side to the Japanese side. Further discussions on this matter will be made in the preparatory study.

2. First-step Hydro-meteorological Observation in the Study Area

In order to take efficient and quick-yielding study procedures, the both sides agreed to start arrangement of “the first-step hydro-meteorological observation” in the proposed Study Area.

(1) Technical Findings by the Team

In the course of the field survey, the team found the following things:

- Although the Study Area is identified as “four river basins”, there exist a number of sub-basins that are independent and have different watershed characteristics.
- Therefore, it is difficult to select one representative sub-basin in each basin.
- It is better to utilize existing hydrological stations than to establish new stations taking maintenance and operation into consideration.
- Rain gauges on the upper watersheds should be given higher priority to be installed than those of irrigation areas so that water resources potential should be estimated earlier.
- Automatic river gauges, of which locations will be discussed in further stage, should be installed after the Study team comes, because the wet season has already started, which hampers civil works for the installation.

(2) Locations of Hydro-meteorological Stations

From the above technical point of view, the team proposed installation and observation at the following hydro-meteorological stations.

a) Battambang River Basin

1) Rain gauge (automatic rain gauge with a data logger)

- Ratnak Mondol
- Samlot
- Pailin town or Phnom Proek (as supplemental station)

2) River gauge (staff gauge only)

- Battambang
- Treng

b) Moug Russey (Dauntri) River Basin

- 1) Rain gauge (automatic rain gauge with a data logger)
 - Basak Reservoir
 - Mounng Russey (as supplemental station)
 - 2) River gauge (staff gauge only)
 - Toul Ta Thom
 - Basak Reservoir or Prek Chik
- c) Pursat River Basin
- 1) Rain gauge (automatic rain gauge with a data logger)
 - Roveang
 - Svay Don Keo
 - Koh Chhom
 - Bomnak (also covering the Boribo River Basin)
 - 2) River gauge (staff gauge only)
 - Svay Don Keo
 - Koh Chhom
 - Bomnak (also covering the Boribo River Basin)
- d) Boribo River Basin

The team did not carry out survey on Boribo River Basin during limited survey period. However, it is estimated three to four rain gauges and three to four staff gauges will cover the basin as other basins do. It should be confirmed through the field survey in further stage.

e) Common equipment

Beside the above, the following equipment is required for the operation.

- Current meter for flood period : 3 sets (1 for each PDOWRAM)
- Current meter for dry period : 3 sets (1 for each PDOWRAM)
- Lap-top computer for downloading data from the data logger of the rain gauges : 3 sets (1 for each PDOWRAM)

The Cambodian side agreed to the above proposal by the team.

The team further explained that;

- the number and location of the equipment and stations were proposed from the team's technical point of view,
- the number and location of the equipment and stations are subject to change depending on further discussions and available budget, and
- Details, including remaining hydro-meteorological stations for the Study, will be discussed and finalized through discussions with the preparatory study team (scope of work mission) which is supposed to be dispatched in July 2006.

(4) Role and Responsibility

a) MOWRAM

- Observation, collection and compilation of data from the above stations.
- Security management of the equipment at the above stations.

b) JICA

- Provision of necessary expenditures for the above activities of the Study.
- Procurement of the equipment above

Installation and/or establishment of the hydro-meteorological stations will be conducted in cooperation by MOWRAM and JICA.

The team also explained necessity of counterpart fund of the Cambodian side for the Study.

3. Further Schedule

The team explained the further schedule for the Master Plan Study as follows:

- Meeting on the results of the preliminary study will be held in June at JICA HQ.
- Preparatory Study Team (Scope of Work Mission) will be dispatched to Cambodia in July, 2006
- Hydro-meteorological stations will be installed.
- Hydro-meteorological observation will be started by MOWRAM
- Master Plan Study team will be dispatched in 2007.

ATTACHMENT

- 1 River basins in the Study Area.

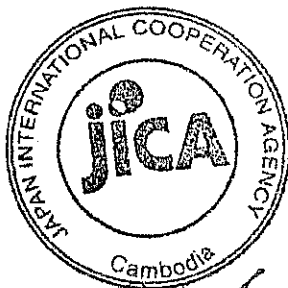
MINUTES OF MEETING
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SCOPE OF WORK
FOR
THE BASIN-WIDE BASIC IRRIGATION AND DRAINAGE
MASTER PLAN STUDY
IN
THE KINGDOM OF CAMBODIA

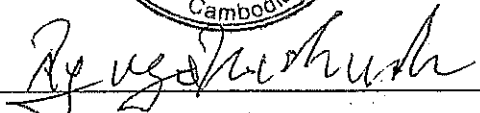
AGREED UPON BETWEEN

MINISTRY OF WATER RESOURCES AND METEOROLOGY
THE ROYAL GOVERNMENT OF CAMBODIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

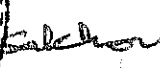
Phnom Penh

1st August 2006




Mr. Ryuzo NISHIMAKI
Leader
Preparatory Study Team
Japan International Cooperation Agency
(JICA)




H.E. Veng SAKHON
Secretary of State
Ministry of Water Resources and Meteorology
The Royal Government of Cambodia

I. INTRODUCTION

In response to a request of the Royal Government of Cambodia (hereinafter referred to as "RGC"), the Preparatory Study Team headed by Mr. Ryuzo NISHIMAKI (hereinafter referred to as "the Japanese side"), was sent to the Kingdom of Cambodia by Japan International Cooperation Agency (hereinafter referred to as "JICA"), from 23rd July to 3rd August, 2006 for the purpose of discussing and confirming the Scope of Work for the Basin-wide Basic Irrigation and Drainage Master Plan Study in the Kingdom of Cambodia (hereinafter referred to as "the Study").

The Japanese side held a series of discussions with the relevant authorities of Cambodia represented by H.E. Veng SAKHON, Secretary of State, Ministry of Water Resources and Meteorology, the Kingdom of Cambodia (hereinafter referred to as "the Cambodian side"). As a result of the discussions, the Cambodian side and the Japanese side mutually agreed on the Draft on Scope of Work for the Study as shown in Attachment 1.

The followings are the main issues discussed and agreed on by both sides in relation to the Draft on Scope of Work for the Study. The list of participants in the series of meetings is shown in Attachment 2.

II. RESULTS OF DISCUSSION

1. Objectives of the Study
 - 1) Both sides agreed that the Study aims at formulating Master Plan (M/P) on irrigation and drainage including the Farmer Water User Community and marketing in order to improve water management and agricultural productivity in four river basins.
 - 2) Both sides agreed to hold seminars in the course of and at the end of the Study. The seminars are to be jointly organized by the Cambodian side and the Study team.
 - 3) The Cambodian side requested counterpart training and study tour in Japan for effective technology transfer.
 - 4) The Cambodian side requested to technology transfer of environmental and social considerations. The Japanese side recognized the necessity of the technology transfer.
 - 5) Both sides agreed to jointly select priority areas for Detailed Plan in each river basin.

2. Implementing structure of the Study

(1) Steering Committee

For the smooth and effective implementation of the Study, both sides agreed that it is essential to establish the Steering Committee chaired by the Secretary of State, Ministry of Water Resources and Meteorology and vice-chaired by the Undersecretary of State, Ministry of Agriculture Forestry and Fisheries. The meeting of Steering Committee will be held when the Study team explains the reports and as required.

Members of the Steering Committee shall be composed of the following Governments:

a) Cambodian side:

- i) Ministry of Water Resources and Meteorology (hereinafter referred to as "MOWRAM")
- ii) Ministry of Agriculture Forestry and Fisheries (hereinafter referred to as "MAFF")
- iii) Ministry of Environment
- iv) Ministry of Economy and Finance
- v) Others

b) Japanese side:

- i) The Study team
- ii) JICA Cambodia Office
- iii) Embassy of Japan

(2) Counterpart Personnel

Both sides agreed that the MOWRAM, MAFF and lined Ministries concerned should assign suitable counterpart personnel for the Study.

3. Study area

The Study area of the M/P covers four (4) river basins of the Battambang, MOUNG RUSSEY, PURSAT and BORIBO, those are located at the Provinces of Battambang, Pursat, Kampong Chhnang, and a part of the Provinces of Kampong Speu and Kandal.

4. Scope of the Study

Both sides realized the following remarkable points with respect to the scope of the Study.

(1) Hydro-meteorological observation

Hydro-meteorological observation shall be conducted as soon as possible after the installation of the observation equipments. The Cambodian side promised to cooperate with the JICA and the Study team in conducting observation.

(2) Geographical survey

Present geographical and hydraulic conditions shall be studied to propose the suitable rehabilitation plan of the systems because improper hydraulic design of existing irrigation systems decreases efficiency of irrigation water supply in most of cases.

(3) Detailed plan

Detailed Plan is prepared for irrigation and drainage systems in the priority areas aiming at earlier project implementation. Priority areas are selected in each river basin for detailed plan in Phase 2 in accordance with the study result of the Draft Master plan prepared during Phase 1. Following factors shall be considered for priority area selection:

- i) Demonstrational effect on the entire irrigation and drainage systems
- ii) Water and land availability of the river basins
- iii) Operation and maintenance ability of the Farmers Water User Community
- iv) Economic viability and poverty reduction
- v) Environment and market

(4) GIS data and other information

The Cambodian side promised to provide all available GIS data including data base, and take necessary arrangements to obtain satellite image, aero photograph and other information related to the Study.

5. Report

(1) Final report

Both sides agreed that the Final Report of the Study would be made open to the public.

(2) Reports in Khmer language

The Cambodian side requested summaries of Inception Report, Interim Reports and Final Report would be translated into Khmer language.

6. Target year

The target year of the Master Plan is year 2020 taking into consideration of effective period of further Five Year National Strategic Development Plan.

7. Necessary equipment and facilities for the Study

The Cambodian side agreed to provide suitable office spaces equipped with desks, chairs and telephone

lines in MOWRAM and Provincial Departments of Water Resources and Meteorology to the Study team.

The Cambodian side requested equipments for meteorological and hydrological observation for the Study. The Japanese side promised to convey the request to the JICA Headquarter.

8. Location of Hydro-meteorological observation

The Cambodian side agreed to proposed locations of hydro-meteorological observation sites as listed in Attachment 3. The Japanese side informed that the number of installation sites would be finalized by the JICA Headquarter afterwards. In addition, the Cambodian side agreed to continuously carry out hydro-meteorological observation at several existing observation sites located in and around the Study area.

9. Others

(1) Signing of the Scope of Work

The Scope of Work will be signed between the Resident Representative of the JICA Cambodia Office and Secretary of State, the MOWRAM afterwards.

(2) Commencement of the Study

The Japanese side notified that the Study would be commenced in February 2007.

(3) Cooperation with Technical Service Center for Irrigation System Project Phase 2

Both sides agreed that the Study team should cooperate with Technical Service Center for Irrigation System Project Phase 2 in the formulation of the detailed plan during the study period.

(4) Environmental and Social Considerations

The Japanese side explained the outline of "JICA's Guideline for Environmental and Social Considerations" to the Cambodian side.

Attachment 1

DRAFT
ON
SCOPE OF WORK

FOR

THE BASIN-WIDE BASIC IRRIGATION AND DRAINAGE
MASTER PLAN STUDY

IN
THE KINGDOM OF CAMBODIA

AGREED UPON BETWEEN

MINISTRY OF WATER RESOURCES AND METEOROLOGY,
THE ROYAL GOVERNMENT OF CAMBODIA

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Phnom Penh
(Date)

Mr. Juro CHIKARAISHI
Resident Representative
JICA Cambodia Office

H.E. Veng SAKHON
Secretary of State
Ministry of Water Resources and Meteorology
The Royal Government of Cambodia

I. INTRODUCTION

In response to the request of the Royal Government of Cambodia (hereinafter referred to as "RGC"), the Government of Japan (hereinafter referred to as "GOJ") decided to conduct the Basin-wide Basic Irrigation and Drainage Master Plan Study in the Kingdom of Cambodia (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation program of GOJ, will undertake the Study in close cooperation with the authorities concerned of RGC.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. To formulate a Master Plan on Irrigation and Drainage (hereinafter referred to as "M/P") in order to improve the water management and the agricultural productivity in four (4) target river basins, and to formulate Detailed Plan for selected priority areas in each river basin, and
2. To transfer technologies to the counterpart personnel through on-the-job training in the course of the Study.

III. STUDY AREA

The Study Area covers the Battambang River Basin, the Mounng Russey River Basin the Pursat River Basin and the Boribo River Basin, as referred to the location map attached as Annex 1.

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Scope of Work for the Study shall cover the following activities:

[Phase 1] Formulation of a Draft M/P

1. To carry out basic study
 - Review of the existing reports and relevant information on the Study Area
 - Additional survey to the existing studies
2. To implement hydro-meteorological observation
 - Development of hydro-meteorological observation system

- Hydro-meteorological observation throughout the study period
3. To formulate a basin-wide Draft M/P composed of the following items:
 - (1) Agricultural water availability/ irrigation and drainage
 - Establishment of the appropriate irrigation and drainage system taking full consideration of rehabilitation of the existing irrigation systems and of the Farmer Water User Community (FWUC)
 - Efficient utilization of the agricultural water
 - (2) Farming/ Cultivation
 - Appropriate farming/ cultivation plan/ agricultural land use plan/ marketing
 - (3) Environmental and Social Considerations
 - Execution of Initial Environmental Examination (IEE) as shown in Annex 3
 4. To select priority area(s) in each basin
 - Selection of priority area(s) in each basin for Detailed Plan

[Phase 2] Formulation of Detailed Plan in the Priority Areas and Finalization of the M/P

1. To formulate Detailed Plan composed of the following items in the priority area(s):
 - (1) To implement hydro-meteorological observation in the priority area(s)
 - Development of supplementary hydro-meteorological observation system if necessary
 - Continuous hydro-meteorological observation from Phase 1 and supplementary observation in the priority area(s)
 - (2) Irrigation and drainage/ management of the agricultural water
 - (3) Farming/ Cultivation/ Agricultural land use plan/ Marketing
 - (4) Environmental and Social Considerations
2. To finalize the M/P.
 - Finalization of the M/P as results of phase1 and phase 2 studies

V. WORK SCHEDULE

The Study will be carried out in accordance with the tentative schedule as attached in the Annex 2.

VI. REPORTS

JICA shall prepare and submit the following reports in English to RGC.

1. Inception Report:
Thirty (30) copies at the commencement of Phase 1 in Cambodia.
2. Progress Report 1:
Thirty (30) copies at the end of the Phase 1 in Cambodia.
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Thirty (30) copies at the commencement of the Phase 2 in Cambodia.
4. Progress Report 2:
Thirty (30) copies in the middle of the Phase 2 in Cambodia.
5. Progress Report 3:
Thirty (30) copies at the end of the Phase 2 in Cambodia.
6. Draft Final Report:
Thirty (30) copies after the Phase 2 in Japan. RGC shall submit its comments to JICA Cambodia Office within one (1) month after the receipt of the Draft Final Report.
7. Final Report:
Fifty (50) copies will be submitted within one (1) month after the receipt of the comments on the Draft Final Report.

VII. UNDERTAKINGS OF THE RGC

1. To facilitate the smooth implementation of the Study, RGC shall take necessary measures as follows:
 - (1) To permit the members of the Japanese study team to enter, leave and sojourn in Cambodia for the duration of their assignments therein and exempt them from foreign registration requirements and consular fees,
 - (2) To exempt the members of the Japanese study team from taxes, duties and any other charges on equipment, machinery and other material brought into Cambodia for the implementation of the Study,
 - (3) To exempt the members of the Japanese study team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese study team for their services in connection with the implementation of the Study, and
 - (4) To provide necessary facilities to the Japanese study team for the remittance as well as utilization

of the funds introduced into Cambodia from Japan in connection with the implementation of the study.

2. RGC shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the Japanese study team.
3. Ministry of Water Resources and Meteorology (hereinafter referred to as "MOWRAM") and Ministry of Agriculture, Forestry and Fisheries (hereinafter referred to as "MAFF") act as counterpart agencies to the Japanese study team and also as a coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study, on behalf of RGC.
4. MOWRAM and MAFF shall, at their own expense, provide the Japanese study team with the following, in cooperation with other organizations concerned:
 - (1) Security-related information on as well as measures to ensure the safety of the Japanese study team,
 - (2) Information on as well as support in obtaining medical services,
 - (3) Available data (including maps and photographs) and information related to the Study,
 - (4) Counterpart personnel,
 - (5) Suitable office space with necessary equipment, and
 - (6) Credentials or identification cards.

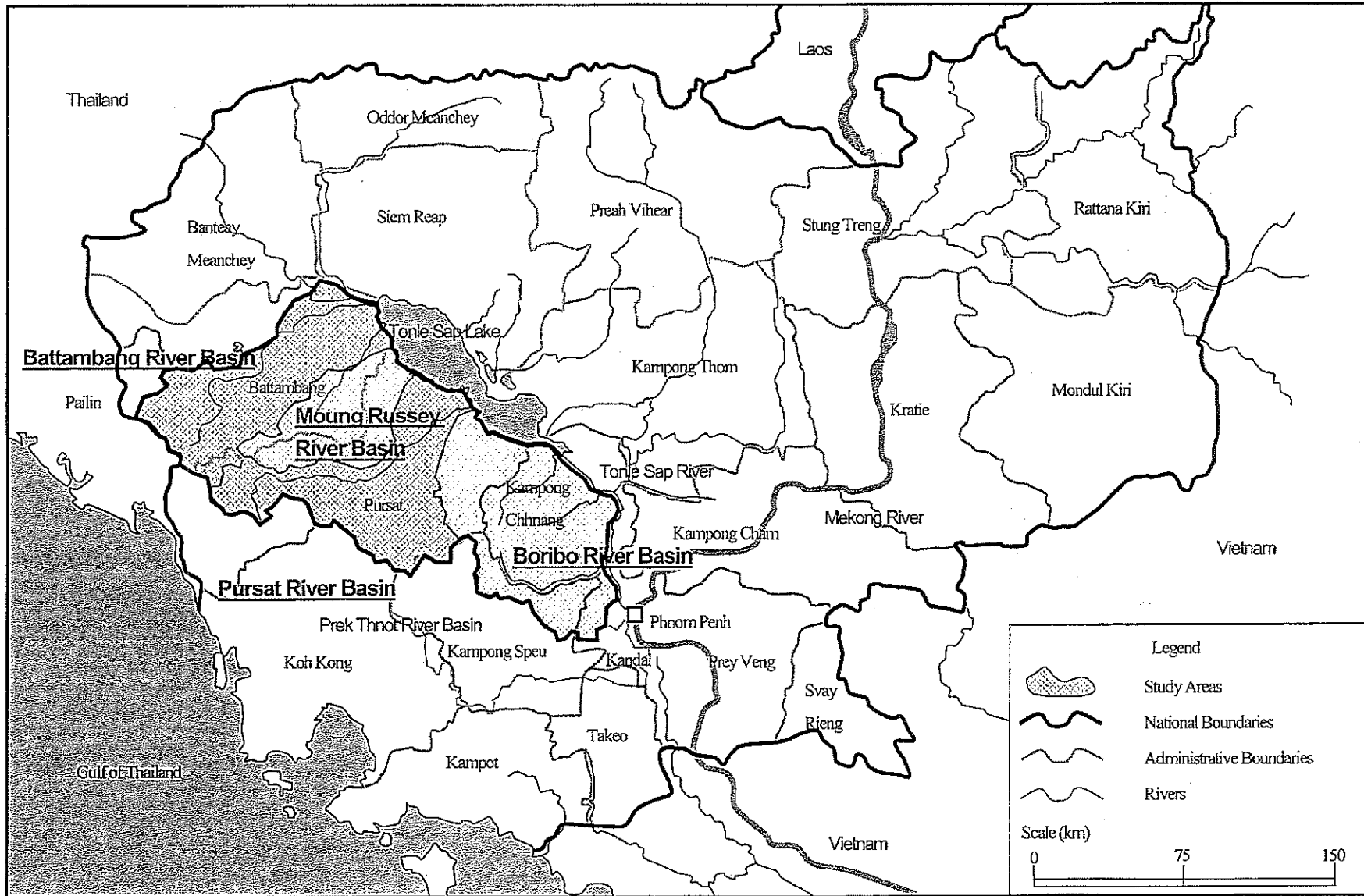
VIII. UNDERTAKINGS OF JICA

For the implementation of the study, JICA shall take the following measures:

1. To dispatch, as its own expense, the Japanese study team to the Kingdom of Cambodia, and
2. To pursue technology and skills transfer to Cambodian counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA, MOWRAM and MAFF shall consult with each other in respect of any matter that may arise from or in connection with the Study.



Study Area of Basin-wide Basic Irrigation and Drainage Master Plan Study

Tentative Work Schedule

Year	2007												2008												2009		
	Month	2	3	4	5	6	7	8	9	10	11	12	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
Total Month	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	
Work in Cambodia	← Phase 1 →												← Phase 2 →														
Work in Japan	□											□												□			
Reports*	↑ Ic/R									↑ P/R(1)	↑ Ir/R	↑ P/R(2)												↑ P/R(3)	↑ DF/R	↑ F/R	

*Reports

Ic/R: Inception Report P/R: Progress Report Ir/R: Interim Report
 DF/R: Draft Final Report F/R: Final Report

(Annex 3 of Draft S/W)

Draft Terms of Reference (TOR) for Environmental and Social Consideration

Initial Environmental Examination (IEE)

The IEE study includes the following items.

1. Policy, Legal and Administrative Framework
2. Project Description
3. Description of Environment in the Study Area
4. Environmental Impacts
5. Analysis of Alternatives
6. Environmental Management Plan
To prepare mitigation measures and monitoring plans
7. Stakeholder Consultation
To record consultation meetings with stakeholders

Terms of Reference for Environmental Impact Assessment (EIA) are prepared.

Environmental Impact Assessment (EIA)

The following items are examples of the study contents. TOR is decided in IEE study.

1. Policy, Legal and Administrative Framework
2. Project Description
3. Description of Environment in the Study Area
4. Environmental Impacts
5. Analysis of Alternatives
6. Environmental Management Plan
7. Stakeholder Consultation

Attachment 2

List of Participants

Cambodian side

Name	Position
Ministry of Water Resources and Meteorology	
H.E. Veng Sakhon	Secretary of State
Mr. Pich Veasna	Director, Department of Planning and International Cooperation
Dr. Theng Tara	Director, Department of Water Resources Management and Conservation
Mr. Mao Hak	Director, Department of Hydrology and River Works
Mr. Keo Vey	Director, Pursat Provincial Department of Water Resources and Meteorology
Ministry of Agriculture, Forestry and Fisheries	
Dr. Hean Vanhan	Deputy Director, Department of Agronomy and Agricultural Land Improvement
Mr. Prak Cheatho	Deputy Director, Department of Agronomy and Agricultural Land Improvement
Mr. Chea Sareth	Deputy Director, Department of Agricultural Extension
Mr. Sav Touch	Chief of Planning, Department of Agricultural Extension
Ministry of Environment	
Mr. Duong Samkeat	Deputy Director of EIA Department

Japanese side

Name	Position
Embassy of Japan	
Kenichi Kobayashi	Second Secretary, Embassy of Japan
JICA Experts	
Mr. Nobuhiro Moriyama	JICA Advisor, MOWRAM
Mr. Shigemitsu Tsukamoto	Chief Advisor, Technical Service Center for Irrigation System phase2 Project
JICA Cambodia Office	
Mr. Juro Chikaraishi	Resident Representative
Mr. Hikoyuki Ukai	Deputy Resident Representative
Ms. Tomoko Tanaka	Project Formulation Advisor
JICA Preparatory Study Team	
Mr. Ryuzo Nishimaki	Leader
Mr. Kenji Yasuda	Irrigation Planning
Mr. Takahiro Kato	Irrigation Agriculture
Mr. Hiroshi Yoshimura	Environmental and Social Considerations
Mr. Hiroaki Okuchi	Project Planning

Attachment 3

Proposed Location of Hydro-meteorological Observation Sites

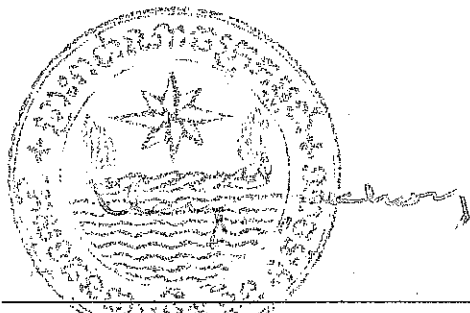
Observation Sites of Rainfall		Observation Sites of Water Level	
I. Battambang river basin		I. Battambang river basin	
1.	Ratnak Mondol	1.	Battambang
2.	Samlot	2.	Treng
3.	Phnom Proek		
II. Moung Russey river basin		II. Moung Russey river basin	
4.	Basak Reservoir	3.	Moung Russey
5.	Moung Russey	4.	Prek Chik (River)
		5.	Prek Chik (Canal)
III. Pursat river basin		III. Pursat river basin	
6.	Roveang	6.	Svay Don Keo
7.	Svay Don Keo	7.	Koh Chhom
8.	Koh Chhom	8.	Bomnak
9.	Bomnak		
IV. Boribo river basin		IV. Boribo river basin	
10.	Boribo	9.	Boribo
11.	Svay Chek	10.	Svay Chek
12.	Peam	11.	Peam

SCOPE OF WORK
FOR
THE BASIN-WIDE BASIC IRRIGATION AND DRAINAGE
MASTER PLAN STUDY
IN
THE KINGDOM OF CAMBODIA
AGREED UPON BETWEEN
MINISTRY OF WATER RESOURCES AND METEOROLOGY,
THE ROYAL GOVERNMENT OF CAMBODIA
AND
JAPAN INTERNATIONAL COOPERATION AGENCY

Phnom Penh
October 26, 2006



Mr. Kazuhiro YONEDA
Resident Representative
Cambodia Office
Japan International Cooperation Agency



H.E. Veng SAKHON
Secretary of State
Ministry of Water Resources and Meteorology
The Royal Government of Cambodia

I. INTRODUCTION

In response to the request of the Royal Government of Cambodia (hereinafter referred to as "RGC"), the Government of Japan (hereinafter referred to as "GOJ") decided to conduct the Basin-wide Basic Irrigation and Drainage Master Plan Study in the Kingdom of Cambodia (hereinafter referred to as "the Study") in accordance with the relevant laws and regulations in force in Japan.

Accordingly, Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical cooperation program of GOJ, will undertake the Study in close cooperation with the authorities concerned of RGC.

The present document sets forth the Scope of Work with regard to the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. To formulate a Master Plan on Irrigation and Drainage (hereinafter referred to as "M/P") in order to improve the water management and the agricultural productivity in four (4) target river basins, and to formulate Detailed Plan for selected priority areas in each river basin, and
2. To transfer technologies to the counterpart personnel through on-the-job training in the course of the Study.

III. STUDY AREA

The Study Area covers the Battambang River Basin, the Moung Russey River Basin, the Pursat River Basin and the Boribo River Basin, as referred to the location map attached as Annex 1.

IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Scope of Work for the Study shall cover the following activities:

[Phase 1] Formulation of a Draft M/P

1. To carry out basic study
 - Review of the existing reports and relevant information on the Study Area
 - Additional survey to the existing studies
2. To implement hydro-meteorological observation
 - Development of hydro-meteorological observation system



- Hydro-meteorological observation throughout the study period
3. To formulate a basin-wide Draft M/P composed of the following items:
 - (1) Agricultural water availability/ irrigation and drainage
 - Establishment of the appropriate irrigation and drainage system taking full consideration of rehabilitation of the existing irrigation systems and of the Farmer Water User Community (FWUC)
 - Efficient utilization of the agricultural water
 - (2) Farming/ Cultivation
 - Appropriate farming/ cultivation plan/ agricultural land use plan/ marketing
 - (3) Environmental and Social Considerations
 - Execution of Initial Environmental Examination (IEE) as shown in Annex 3
 4. To select priority area(s) in each basin
 - Selection of priority area(s) in each basin for Detailed Plan

[Phase 2] Formulation of Detailed Plan in the Priority Areas and Finalization of the M/P

1. To formulate Detailed Plan composed of the following items in the priority area(s):
 - (1) To implement hydro-meteorological observation in the priority area(s)
 - Development of supplementary hydro-meteorological observation system if necessary
 - Continuous hydro-meteorological observation from Phase 1 and supplementary observation in the priority area(s)
 - (2) Irrigation and drainage/ management of the agricultural water
 - (3) Farming/ Cultivation/ Agricultural land use plan/ Marketing
 - (4) Environmental and Social Considerations
2. To finalize the M/P.
 - Finalization of the M/P as results of phase1 and phase 2 studies

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The Study will be carried out in accordance with the tentative schedule as attached in the Annex 2.

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VII. UNDERTAKINGS OF THE RGC

1. RGC shall accord privileges, exemptions and other benefits to the Japanese Study Team in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Royal Government of Cambodia signed on 17 June, 2003.
2. RGC shall bear claims, if any arises, against the members of the Japanese study team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the Japanese study team.
3. Ministry of Water Resources and Meteorology (hereinafter referred to as "MOWRAM") and Ministry of Agriculture, Forestry and Fisheries (hereinafter referred to as "MAFF") act as counterpart agencies to the Japanese study team and also as a coordinating body in relation with other



governmental and non-governmental organizations concerned for the smooth implementation of the Study, on behalf of RGC.

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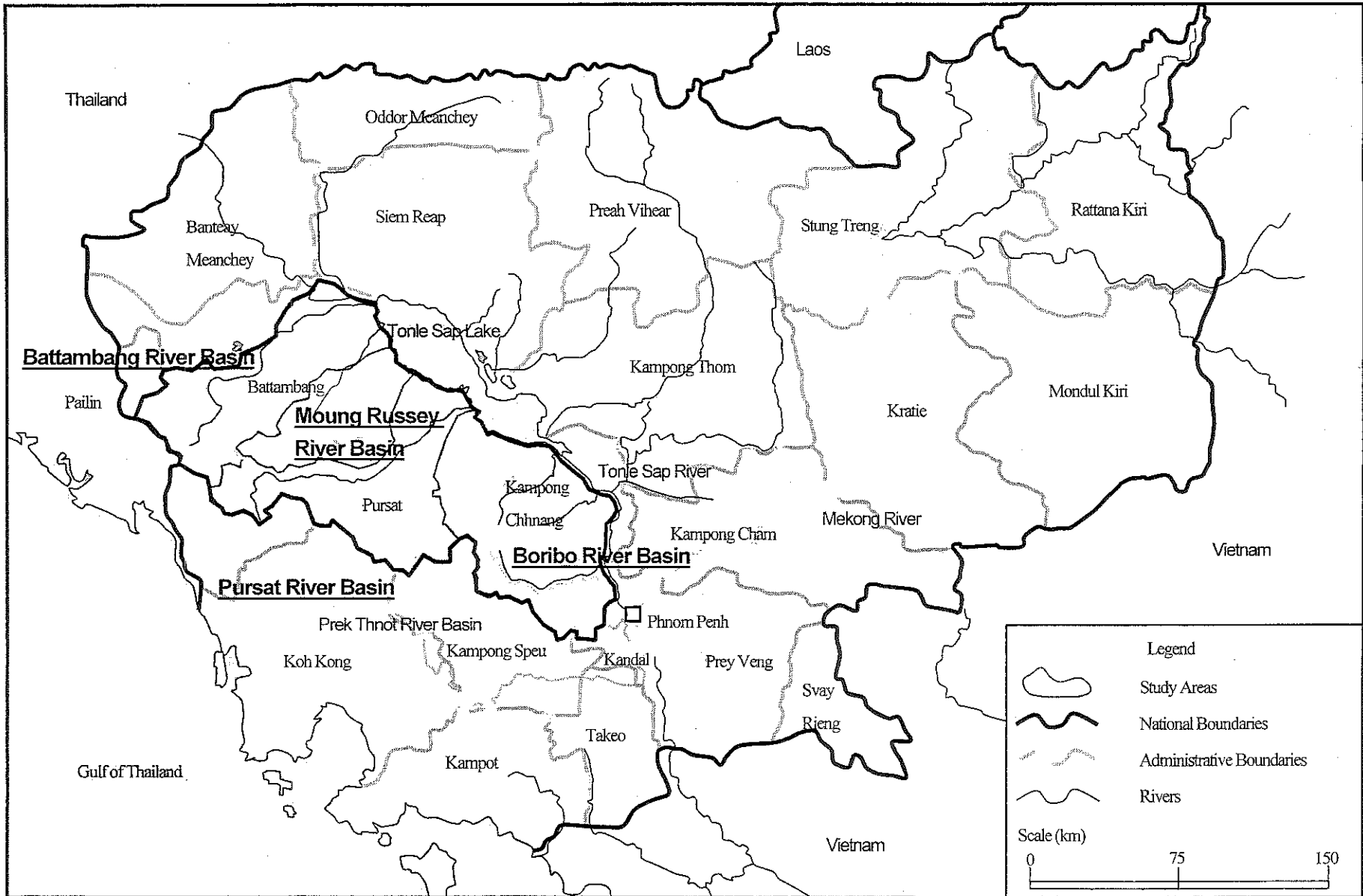
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Study Area of Basin-wide Basic Irrigation and Drainage Master Plan Study



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Environmental Impact Assessment (EIA)

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事業事前評価表（開発調査）

作成日：平成18年10月5日

担当グループ：農村開発部第1グループ

1. 案件名
カンボジア国流域灌漑・排水基本計画調査
2. 協力概要
(1) 事業の目的
1) 調査対象4流域において、水管理の改善、農業生産性の向上のための灌漑・排水マスタープランを策定する。
2) 同マスタープラン(案)から優先的に開発すべき地区(優先地区)を選定し(各流域1~2カ所を想定)、灌漑排水施設整備を中心としたマスタープランの事業化のための詳細計画を策定する。
3) 調査を通じてカウンターパート(以下、「C/P」)の計画策定等に係る技術力が向上する。
(2) 調査期間
2007年2月~2009年3月(26カ月)
(3) 総調査費用
2.4億円
(4) 協力相手先機関
a. 協力相手国実施機関の責任者： 水資源気象省(MOWRAM)次官
b. 協力相手国実施機関名： 水資源気象省(MOWRAM)及び農林水産省(MAFF)
(5) 計画の対象(対象分野、対象規模等)
a. 調査対象：バタンバン川流域、ムンルセイ川流域、プルサット川流域、ボリボ川流域 (バタンバン州、プルサット州、コンボン・チュナン州が主要3州となり、カンダール州、コンボン・スプー州の一部を含む)
b. 計画対象面積：上記4流域の農地(面積約24万ha)
c. 対象分野：灌漑・排水施設整備、水管理、営農/栽培、市場
3. 協力の必要性・位置付け
(1) 現状及び問題点
カンボジア王国(以下、「カンボジア国」)において農業は経済の中心であり、GDPの約30%を占め、就業人口の80%近くが農業に携わっている。更に、カンボジア国の人口の85%は農村部に居住し、貧困層(1日当たり1US\$以下の収入)の75%が農業を主体とした世帯となっている。このような状況下で、カンボジア国政府は、社会経済開発計画に基づき貧困からの脱出に取り組んでおり、灌漑と農業分野の開発を最優先課題としている。
カンボジア国の灌漑施設は、設計上・施工上の問題を含んだ建設、維持管理の欠如、20年以上にわたる戦乱による破壊から十分に機能していない。2005年における全国のコメの作付面積は約237万haであり、この内灌漑システムは、ポンプ灌漑地区を含めて946システム存在し、計画灌漑面積は約89万haと概算される。しかし、実際の灌漑面積は補給灌漑地区を含めても雨期約26万ha、乾期約14万haに過ぎない。これら施設は、流域全体の水資源賦存量を効率的に利用する様な灌漑・排水計画に基づいたものでなく、また水路の水位が低い等技術的問題があることから、各水田への自然配水が困難な状況であるところも多い。係る状況を改善するため、水資源気象省は各ドナーに灌漑排水施設の整備を要望しており、ADB、世銀、韓国等は施設改修事業を実施している。しかし、流域の水資源を包括した長期的な水利用計画に基づいたものではなく、短期的かつ単独の施設改修という視点から実施されてきたものもあり、当該地域の水資源、農地等のポテンシャルを有効に活かさないばかりでなく、他地域への水配分ができなくなる等、それらポテンシャルを喪失する可能性も懸念される。
カンボジア国は、トンレ・サップ湖及び周辺地域を貧困削減、経済において非常に重要な地域としており、同地域の自然資源を考慮に入れた現実的かつ着実な開発を進めていくことが地域発展の重要な課題と認識している。同地域は内戦終結後も開発から取り残され、道路を始めとした農村インフラは整備も遅れており、カンボジア国の中でも貧困度の高い地域の1つである。対象地域を含むトンレ・サップ湖沿岸の州の貧困人口比率はカンボジア全国の34.7%に対し42.8%であり、農村貧困人口比率はカンボジア国の37.8%に対し45.4%である。また、農村貧困人口の36.2%が今回の対象流域を含むトンレ・サップ湖沿岸の

州に居住している。地域の主要産業は農業であり、稲作が中心に行われているが生産性は低く、供給量は需要を満たしていないのが現状である。本調査対象地域での問題点は以下に集約できる。

a. 灌漑排水施設

既存灌漑システムの多くはボル・ポト政権時代に建設されたもので、建設から30年以上経過しており老朽化が著しく、水配分の点で技術的な問題があり、実際の灌漑率は10%以下と推察される。

b. 気象水文資料

気象水文観測データが整理されていないため、灌漑計画を策定するための基礎資料が不十分である。

c. 営農/普及

営農技術が低く、それを補う普及体制も不十分である。また、農民の資金不足による肥料や農薬の利用も困難であることから、農産物の生産量が低い上に変動も大きく、市場性欠如の大きな要因となっている。

一方で本調査対象地域の上流域は、年間降水量が低平地部より30%程度高く、2,000mmを超える高地部であり、高い水資源ポテンシャルを有している。これを有効に利用し、農地資源を適切に活用するための中長期的な流域灌漑・排水マスタープランが策定・実施されることにより、農業生産性を拡大し、地域の貧困削減を実現することが期待される。

(2) 相手国政府国家政策上の位置付け

カンボジア国政府は1996年から2000年を対象とする第1次社会経済開発計画（SEDP）、2001年から2005年を対象とする第2次社会経済開発計画（SEDP II）及び国家開発計画2006-2010（NSDP）において、特に農村部における貧困削減を最優先課題としており、その中でも農業の発展を最も重要な政策課題としている。また農林水産省が策定したカンボジア農業分野開発計画（2001年～2010年）においても、コメ生産の拡大による食料安全保障の実現が優先課題としている。更に、農林水産省、水資源気象省、各ドナーにより作成中の農業・水戦略（Agriculture and Water Strategy, 2006-2010）においても農業生産性の向上、作物の多様化、水資源・灌漑システム管理を優先課題とし、重要な戦略の1つとして水資源・灌漑・土地プログラムが策定される予定である。

本協力は、水管理改善、灌漑施設改修を中心とした内容となっており、カンボジア国の開発計画との整合性が図られていると判断できる。

(3) 他国機関の関連事業との整合性

アジア開発銀行（ADB）は農業・水資源開発プログラムの1つとして北西地域灌漑セクター・プログラム（2004年～2010年）を実施している。同プログラムでは、①農民の能力向上、②高価値農産物の導入と市場開拓、③競争力のある農業への転換を目的とし、灌漑開発では農業生産向上への総合的支援、安定かつ高い農家収入を実現するための支援を行なう一方で、流域を単位とした灌漑開発（Small and medium-seized irrigation）、農民組織（Water-using farming communities）の支援を明確に述べている。また、AusAIDにより農業普及計画フェーズ2（CAAEP II）（2002年～2006年）が実施されており、本計画の調査地域は同計画に含まれる。両計画は灌漑システムの改修、農業普及の分野に大きく関わっているため、本調査においても、これらプロジェクトの調査結果を活用することが有効である。また、ADBにより実施されている事業とは必要に応じて連携し、詳細計画策定においては、調査項目、対象地区について重複に留意する必要がある。

(4) 我が国援助政策との関連、JICA 国別事業実施計画上の位置付け

国別援助計画では、カンボジア国に対する重点分野・課題別援助方針の1つに「農業・農村開発と農業生産性向上」が掲げられており、灌漑施設の整備、水管理システムの改善、水利組織の育成、農業生産性の向上等が必要とされている。

また、JICA 国別事業実施計画では、優先課題「農業・農村開発」分野における主要な開発課題の1つとして「農業生産の振興」を掲げており、灌漑施設の老朽化や未熟な水管理体制、低い農業生産性への対応が必要とされている。

従って、これら我が国及びJICAのカンボジア国への重点的な援助政策・課題と、当案件の内容は合致している。

4. 協力の枠組み

本プロジェクトは、トンレ・サップ湖西岸に位置する4流域を対象として、灌漑排水施設の整備を中心とした農業生産性向上のためのマスタープラン策定を行うものである。

当該地域では、各種ドナーの短期的な視点からの灌漑施設整備事業が実施されているが、それらは流域単

位を視野に入れたマスタープランに基づくものではない。そのため、本プロジェクトでは、流域単位での水資源賦存量や灌漑可能農地面積、現地に適した営農計画・土地利用計画、市場アクセス等を総合的に考慮に入れた、他ドナーの事業でも活用できる灌漑排水施設整備のマスタープランを策定する。フェーズⅠにおいては、当該地域の農業生産性向上のために実施すべき灌漑施設整備を中心とした、流域単位の視点による流域灌漑・排水マスタープラン（案）を策定する。また、同マスタープラン（案）から優先的に開発すべき地区（優先地区）を選定する。その結果を踏まえ、フェーズⅡでは、優先地区においてフェーズⅠで策定したマスタープラン（案）を事業実施へ結びつけるための詳細計画を策定する。更に、詳細計画の結果をマスタープラン（案）へ反映させ、最終的な流域灌漑・排水マスタープランとして固める。

なお、カンボジア国では、気象水文データの観測体制が整っていないことから、灌漑排水施設の整備計画を立てる上で必須となる雨量、河川流量・水位等の気象水文データが不足している。そのため、本プロジェクトでは既存及びフェーズⅠで新設する気象水文観測施設（必要に応じてフェーズⅡでも設置）においてデータを収集し、計画策定に反映させるとともに、プロジェクト終了後も持続的に気象水文観測が実施され、その結果が計画へフィードバックできるための技術移転、体制づくりを併せて実施する。

更に、灌漑排水施設の改修を実施する際には、環境面及び社会面に配慮することが必要となることから、マスタープランに基づく事業実施が環境や社会へ与える影響を調査するとともに、カンボジア国側が事業実施の際に適切な環境影響評価が実施できる様に技術移転を併せて実施する。

(1) 調査項目

本調査ではマスタープラン（案）の策定を中心としたフェーズⅠ（11カ月）と、詳細計画策定及び最終的なマスタープラン策定を中心としたフェーズⅡ（15カ月）から構成される。

【フェーズⅠ】流域灌漑・排水マスタープラン（案）の策定

1) 基礎調査

- ・調査地域に関する既存報告書及び情報のレビュー
- ・現地調査の実施

2) 気象水文観測の実施

- ・気象水文観測システムの構築
- ・気象水文観測の実施

3) 流域灌漑・排水マスタープラン（案）の作成

①農業用水の利用可能量及び灌漑・排水計画

- ・既存施設の改修を優先するとともに、農民水利組合の能力を考慮した最適な灌漑・排水システム計画を策定する。
- ・灌漑用水の効率的利用促進計画を策定する。

②営農及び栽培

- ・最適な営農、栽培、土地利用計画の策定及び市場調査

③環境及び社会配慮

- ・初期環境影響評価（IEE）の実施

4) 優先地区の選定

- ・フェーズⅡにおける詳細計画の対象となる優先地区の選定
優先地区の選定においては、下記の項目を考慮に入れることとする。

- a) 展示、波及効果
- b) 水資源、土地資源の優位性
- c) 農民水利組織の維持管理能力
- d) 経済的優位性及び貧困削減効果
- e) 環境及び市場性

【フェーズⅡ】優先地区における詳細計画及び最終的な流域灌漑・排水マスタープランの策定

1) 優先地区に関する詳細計画の策定

①優先地区の詳細計画の策定に必要な気象水文観測の実施

- ・必要に応じ、補足的に気象水文観測を実施する。

- ・フェーズ I で実施している地点での気象水文観測を継続し、優先地区の詳細計画策定の基礎資料とする。

②詳細計画に関連するより具体的で詳細な灌漑・排水計画及び農業用水の管理計画

③詳細計画策定のためにフェーズ I の成果を補足する目的で実施する営農、栽培、土地利用計画及び市場調査

④環境及び社会配慮

- ・状況に応じて環境影響評価（EIA）の実施

2) 最終的な流域灌漑・排水マスタープランの完成

- ・フェーズ I 及び II の調査結果に基づく、流域灌漑・排水マスタープランの完成

(2) アウトプット（成果）

1) 対象地域の基礎調査を実施することにより、現況の自然・社会経済・営農状況、また灌漑・排水施設の現状及び問題点が認識される。

2) 対象流域において流域灌漑・排水マスタープランが策定される。

3) 優先度の高い地区に関する詳細計画が策定される。

4) 営農計画による灌漑用水量の概定、水資源の利用可能量の調査に必要な気象水文資料の解析が実施されるとともに、観測体制が整備される。

5) 本調査の実施により、相手国 C/P への技術移転が行われる。

(3) インプット（投入）：以下の投入による調査の実施

(a) コンサルタント（分野/人数）

	分 野	人数
1	総括/灌漑排水計画	1
2	灌漑排水施設/水管理	1
3	気象/水文	1
4	営農/栽培/市場調査	1
5	環境社会配慮/農村社会経済	1
6	事業評価	1

(b) その他 研修員受入れ

- ・C/P 研修受入れ（1～2 人/年）

- ・調査用資機材（気象水文観測機器等）

5. 協力終了後に達成が期待される目標

(1) 提案計画の活用目標

- ・策定した流域灌漑・排水マスタープランが、水資源気象省及び農林水産省の施策として採用される。

- ・詳細計画を実施した優先地区に対し、灌漑排水施設の整備事業が実施される。

- ・気象水文観測システムが確立され、継続的に観測が行われるとともに、観測結果の分析・評価に基づき、灌漑排水施設の整備計画が詳細に検討される。

(2) 活用による達成目標

- ・整備された灌漑排水施設が維持管理され有効活用され、対象地域の農業生産性が向上し、農民の貧困削減に資する。

- ・計画策定を通じ、気象水文観測の重要性が認識され、カンボジア国全体を対象とした観測システム網（特に人材育成と配置）が拡充される。

- ・優先地区以外の灌漑・排水システムについて詳細計画が実施され、流域全体の具体的改修計画が策定される。また農業・営農に関するプログラムが構築され、農業技術普及体制が確立する。

6. 外部要因

(1) 協力相手国内の事情

(a) 政策的要因：開発政策の変更による事業計画の優先度の低下は無いと見込まれる。

(b) 経済的要因：カンボジア国内外の経済状況の変化は無いと見込まれる。

(2) 関連プロジェクトの遅れ

特に無し

<p>7. 貧困・ジェンダー・環境等への配慮（注）</p> <p>環境について、優先地区が既存灌漑システムから選定される可能性が高いため、環境に対する重大な問題が発生することはない。しかし、計画範囲が広大であり、将来的に下流に位置し生物多様性や地域経済にとって重要なトンレ・サップ湖への環境影響も想定されるので、下記について留意する必要がある。(i) 灌漑施設の整備とともに肥料、農薬の使用量が増加し、水質への重大な影響が想定されるので、それらの使用方法などについての指導を組み込む等の留意の必要がある。(ii) 魚類の移動を阻止しない様な設計とする等の留意の必要がある。</p> <p>5,000ha 以上の灌漑事業は、初期環境調査ないし環境影響評価を要することから、将来的な灌漑事業実施を見越し、環境社会配慮調査に関わる技術移転を実施する。</p>
<p>8. 過去の類似案件からの教訓の活用（注）</p> <p>開発調査においては、これまでに多くの灌漑計画が策定されてきたが、事業化までに長い時間を要している。本調査の詳細計画において事業化が早期に必要なものは、ADB、世銀等の他ドナー及びカンボジア国独自において行われる灌漑プロジェクト、また日本国の援助の各種援助スキーム（技術協力プロジェクト、有償資金協力、無償資金協力）等、幅広い可能性を視野に入れて調査を進めることが必要である。そのためには、現在作成中の農業・水戦略のプログラムの下で実施する案件として本調査を位置付け、各ドナーやカンボジア国側への情報提供を行うとともに、調査結果を国家プログラムの一部として扱える様に、同戦略との調整を図る必要がある。</p> <p>水資源気象省と農林水産省の連携を促進することはもとより、その連携の下で地方行政レベル（気象水文観測時）や農民（水管理時）の積極的参加を促すことに配慮して、調査を進めることが必要である。</p> <p>カンボジア国では各ドナーによる灌漑施設改修等の協力後、施設の維持管理や水分配に問題のある地区がある一方、水利費を徴収し良好に運営している灌漑地区もある。これら協力案件の維持管理・水分配・農民水利組合等の問題例や優良事例を検証し、公平で持続的な維持管理計画や水分配を視野に入れて、マスタープランを策定することが有効である。</p>
<p>9. 今後の評価計画</p> <p>(1) 事後評価に用いる指標</p> <p>(a) 活用の進捗度</p> <ul style="list-style-type: none"> ・ 灌漑・排水マスタープランの詳細計画に基づき実施された灌漑システム数及び整備工事実施（または申請）事業数 ・ 気象水文観測が継続実施されている観測所数と、観測資料を基に分析された河川流出や圃場用水量等の検討件数 <p>(b) 活用による達成目標の指標</p> <ul style="list-style-type: none"> ・ 灌漑面積の増加量 ・ 灌漑地区の反収増加量 ・ 農業収入の増加量 <p>(2) 上記(a)及び(b)を評価する方法及び時期 フォローアップ調査によるモニタリング（2009年度以降）</p>

(注) 調査にあたっての配慮事項

環境社会配慮調査サマリー (M/P)

2006年9月13日

1. プロジェクトと関連する報告書の正式名称

カンボジア国流域灌漑・排水基本計画調査

2. 調査の分類

マスタープラン

3. 環境カテゴリ及びその理由

カテゴリ B

理由：本件は既存灌漑施設の改修が主であり、住民移転は発生せず、保護区や文化遺産等への影響は小さい。但し、調査対象地域が広大であり、新たな灌漑用水による小さな営農の変化も下流のトンレ・サップ湖には何らかの影響があり、また、水利用方法の変化により社会的な影響がある。また、建設工事期間及び供用後の環境管理は配慮が必要である。

カンボジア国では 5,000ha 以上の灌漑プロジェクトは、初期環境影響評価 (IEIA) または環境影響評価 (EIA) をする必要がある。従って、フェーズ I の流域単位のマスタープラン策定段階では、初期環境影響評価 (IEE) を実施し、フェーズ II の優先地域での詳細計画の提案段階では、提案されたプロジェクトに応じ、IEE もしくは EIA を実施する。

4. 先方実施機関

水資源気象省：Ministry of Water Resources and Meteorology (MOWRAM)

農林水産省：Ministry of Agriculture, Forestry and Fisheries (MAFF)

5. 案件の概要

(1) 要請の背景

カンボジア国において農業は経済の中心であり、GDP の約 31% を占め、就業人口の 80% が農業に携わっている。人口は 2004 年時点で 1300 万人、内 84% は農村部に居住し、その内 39% の収入は貧困ラインを下回っている。このような状況下で、カンボジア国政府は、社会経済開発計画に基づいた貧困からの脱出に取り組んでおり、灌漑と農業分野の開発を最優先課題としている。しかし、灌漑施設は、20 年以上にわたる戦乱による破壊や、設計上・施工上の問題を含んだ建設から十分に機能しておらず、現在は 220 万 ha の農地の内、25 万 ha に補給灌漑が行われているに過ぎない。

このため、カンボジア国政府は優先する 4 流域に関する流域単位での水資源の有効利用と効率的な灌漑排水を計画するマスタープランを要請してきた。

(2) 調査の目的

- 1) 調査対象の 4 流域の水資源管理と農業生産性を向上するためのマスタープランを策定するとともに各流域の優先地域において詳細計画を策定する。
- 2) 調査期間中 OJT にて C/P に技術移転する。

(3) 調査対象地域

バタンバン、ムンルセイ、プルサット及びポリボ川の 4 流域

(4) マスタープランの計画期間

マスタープランの計画年は 5 年毎の国家戦略的開発計画の期間を考慮し、2020 年とする。

(5) 調査の項目

フェーズ I として各流域のマスタープランを策定し、流域毎の優先流域を選定する。フェーズ II として、各流域の優先地域に対する詳細マスタープランを策定する。

フェーズ I: ドラフト・マスタープランの策定

1) 基礎調査の実施

- 計画対象地域に関する既存資料と情報のレビュー
- 追加調査

2) 水文気象観測の実施

- 水文気象観測システムの開発
- 調査期間を通じた水文気象観測

3) 流域単位のドラフト・マスタープランの策定：以下を含む

i) 農業用水の賦存量／灌漑排水

- 適切な灌漑排水システムの構築：既存灌漑施設の改修と農民水利組合を十分に考慮
- 農業用水の効率利用

ii) 営農

- 適切な営農計画、土地利用計画及びマーケティング

iii) 環境社会配慮

- 初期環境影響調査の実施

4) 流域毎の優先地域の選定

フェーズ II: 優先地域に於ける詳細計画の策定及びマスタープランの確定

1) 優先地域における詳細計画の策定

i) 優先地域における水文気象観測の実施

- 必要に応じた補足的な水文気象観測システムの構築

- フェーズ I からの継続的な水文気象観測の実施及び優先地域における補足的な水文気象観測の実施
 - ii) 灌漑排水/水管理
 - iii) 営農/農地利用計画/マーケティング
 - iv) 環境社会配慮
- 2) マスタープランの確定
- フェーズ I と II に基づいたマスタープランの確定

6. 対象地域の概要

調査対象地域の立地環境を表 1 に整理した。特に、調査対象流域の下流にあたるトンレ・サップ湖周辺は保護区（トンレ・サップ多目的地区）に指定されており、生物多様性において国際的にも重要な地域であり、かつその自然資源は内水面漁業や農業のベースとなっており地域経済においても重要である。

表 1 対象地域の概要

(1) 自然環境の現況

	環境項目	立地環境の状況
自然環境	気候	気候：熱帯モンスーン気候。乾期（5月～10月）と雨期（11月～4月）。計画地域内の年降水量：1,200mm～1,500mm。
	動植物と生息域	保護地区：調査対象地域内に 5 保護地区があり、中でもトンレ・サップ多目的保護地区は流域の下流に位置しており重要。トンレ・サップ湖は水鳥、魚類、は虫類の繁殖域や生息域として重要。 希少生物：トンレ・サップ湖のプレクトアル（Prek Toal）地区は世界的に絶滅危惧種のあるハイイロペリカン（Spot-billed Pelican）等の水鳥の重要な繁殖地。
	森林・植生	調査対象州の森林被覆率は 50～77%。但し、カンダール州は首都に近く 9%。

(2) 経済社会状況

	環境項目	立地環境の状況
社会環境	住民	対象地域の人口は 180 万人、内、農業世帯人口は 150 万人。トンレ・サップ湖畔には漁業に従事するベトナム人やイスラム教徒であるチャム族も居住。
	地域資源利用	土地利用：ボル・ポト時代後、農地が分配され農家平均 1ha 以下。 水利権：正式に設定されていない。水利用は農業目的が大部分を占める。水分配は灌漑施設が無く自然に任せて流れているものをポンプで取水する。灌漑システム内での水利用調整を行う農民水利組合（FWUC）は余り機能していない。 漁場：トンレ・サップ湖の浸水域では農業と漁業の間の争いがある。また、違法漁業がある。 地雷：プルサット川上流は地雷除去の終えてない地域がある。
	生活社会インフラ	教育：識字率はバタンバン、カンダール州において全国平均より高く、プルサット、コンボン・チュナン、コンボン・スプー州において低い。 公衆衛生：バタンバン、プルサットにおいてマラリア感染が多い。 飲料水へのアクセス：農村では井戸給水が多い。 電気へのアクセス：幹線道路沿いのみ電化。

	経済活動	生計手段は農業が主。首都に近いコンボン・チュナン、コンボン・スパー、カンダール州では野菜栽培も多く、バットンバン州は稲作地帯。トンレ・サップ湖沿岸では漁業従事者も多い。多くの住民がタンパク源としてトンレ・サップ湖の魚類に依存しており、社会経済の面からも重要。
環境汚染	現在の汚染	トンレ・サップ湖畔の住民が湖に生活排水や廃棄物を流している。農業による汚染（農薬や肥料）は現時点では大きくない。灌漑施設が整えば将来的に使用量が増え、下流のトンレ・サップ湖の汚染が懸念。

7. 相手国側の環境社会配慮制度の現況

(1) 環境社会配慮に関連する法令や基準、法制度

環境に関する法律は下表の通り整備が進められ、これらの法令により担当機関や自然文化保護地域の保全手段、EIA 手続き、環境基準や排出基準等が定められている。

表 2 環境に係る法令と政策

種類	No	法令/政策	備考
環境一般	1	Law on Environmental Protection and Natural Resource Management, December 1996	環境保護と自然資源管理法
環境管理体制	2	Law on the Establishment of the Ministry of Environment, January 1996	環境省設置法
	3	Sub-Decree No. 57 on the Organization and Functions of the Ministry of Environment, September 1997	環境省の組織と機能に係る施行令
環境影響評価	4	Sub-Decree No. 72 on Environmental Impact Assessment process, August 1999	環境影響評価の手続きに係る施行令
	5	Declaration No. 49 on Guideline for Conducting Environmental Impact Assessment Report, March 2000	環境影響評価報告書ガイドライン
自然保護区	6	Royal Decree on the Creation and Designation of Protected Areas, November 1993	保護区の設置に係る王令
	7	Declaration No. 1033 on Protected Area, June 1994	保護区に係る宣言
	8	Royal Decree on the Establishment and Management of Tonle Sap Biosphere Reserve	トンレ・サップ生物圏保護区の設置に係る王令
	9	Sub-Decree on the Establishment, Role and Functions of the Secretariat for Tonle Sap Biosphere Reserve	トンレ・サップ生物圏保護区事務局の設置、役割、機能に係る施行令
文化財保護	10	Law on the Protection of Cultural Heritage, January 1996	文化財保護法
環境汚染	11	Sub-Decree No. 27 on Water Pollution Control, April 1999	水質汚濁規制に係る施行令
	12	Sub-Decree No. 36 on Solid Waste Management, April 1999	固形廃棄物管理に係る施行令
	13	Sub-Decree No. 42 on the Control of Air Pollution and Noise Disturbance, July 2000	大気汚染及び騒音規制に係る施行令
資源管理	14	Law on Water Resources Management (Draft)	水資源管理法
	15	Circular No.1 on the Implementation Policy for Sustainable Irrigation Systems, 1999	持続的灌漑システムの実施政策に係る配布文

16	Policy for Sustainability of Operation and Maintenance of Irrigation Systems, June 2000	灌漑システム運用管理の持続性のための政策
17	Land Law, 2001	土地法

Source : 調査団作成

これらの中で環境保護と自然資源管理に係る法律（Law on Environmental Protection and Natural Resource Management、1996年）が基本的な法律であり、環境計画の策定、環境汚染防止、開発プロジェクトの環境影響の評価、自然資源の持続的な保全・開発・管理・利用、環境保護と自然資源管理への参加の奨励等を定めている。

環境影響評価

「環境保護と自然資源管理にかかる法律」の第三章で、環境影響評価（EIA）について公共及び民間の全てのプロジェクトは環境相によって実施の決定前に審査・評価されることとされている。また、全ての政府の投資/プロジェクトは初期環境影響評価（IEIA）あるいは環境影響評価（EIA）を行い、環境省が審査することとされている。

環境影響強化の手続きについては、「環境影響評価に係る施行令 No. 72」によって、環境影響の評価が必要なプロジェクトの内容と規模及び具体的な手続きについて定められている。EIA または IEIA の必要なプロジェクトは分野毎に定められ、農業分野では表 3 の様に定められており、灌漑排水分野では 5,000ha 以上が必要とされている。

表 1 初期環境影響評価（IEIA）または環境影響評価（EIA）を要する
農業プロジェクト

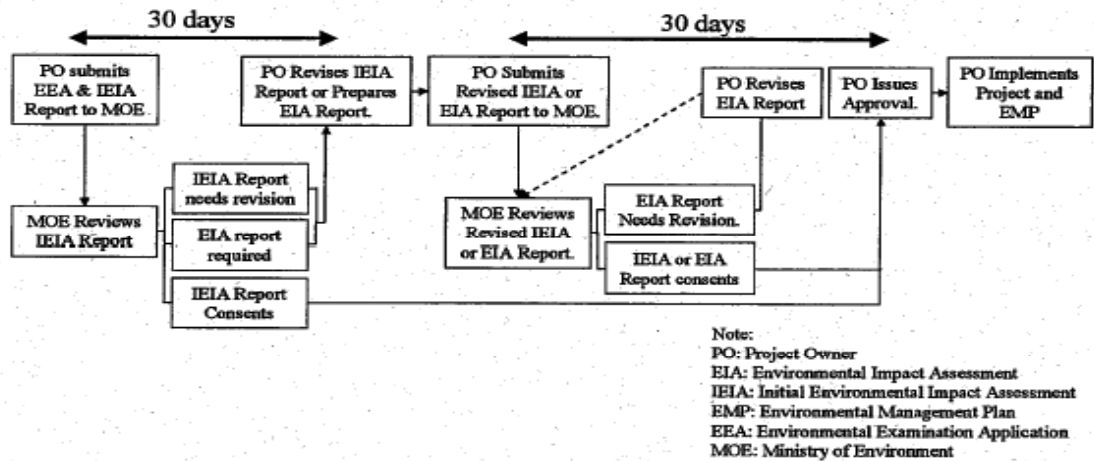
No.	Type and Activities of the Projects	Size/Capacity
B	Agriculture	
1	Concession forest	≥10,000 hectares
2	Logging	≥500 hectares
3	Land covered by forest	≥500 hectares
4	Agriculture and agro industrial land	>10,000 hectares
5	Flooded and coastal forests	All sizes
6	Irrigation systems	≥5,000 hectares
7	Drainage systems	≥5,000 hectares
8	Fishing ports	All sizes

Source : Sub-Decree No. 72 on Environmental Impact Assessment process, August 1999

手続きについては次の通りである（図 1 のフロー参照）。

- 1) 事業者が計画のスクリーニングとして初期環境影響評価（IEIA）をプレフィージビリティ調査報告書とともに環境省に提出する。

- 2) 環境省は提出された IEIA を審査し 30 日以内に、(i) 影響が軽微であれば事業許可を、(ii) IEIA が不備の場合は修正指示を、(iii) 大きな影響があると判断した場合には EIA 実施指示を事業者に通知する。
- 3) 再審査通知された事業者は IEIA の修正もしくは EIA を行い、環境省に提出する。環境省は再審査し 30 日以内に事業許可またはコメントを与える。再修正指示のあった場合、事業者は再修正し事業許可が与えられる。



Source : Sub-Decree No. 72 on Environmental Impact Assessment process, August 1999

図 1 環境影響評価のフロー

施行令 No. 72 は EIA のプロセスに住民参加を奨励し、意見を反映させるとしている。情報公開についての記述は無いが、JICA ガイドラインでは情報公開により意思決定プロセスへの住民参加を定めている。また、カンボジア国政府の「環境影響評価報告書ガイドライン」では EIA 報告書の項目を定めている。

(2) 関係機関の概要

カンボジア国の環境管理は環境省が担い、環境保護と自然資源の保全を推進することとし、環境政策立案、規制の実施、環境教育を行っている。環境省内の環境影響評価部が環境影響評価の審査を行っている。

8. 予備的スコーピング

事業の特性と立地特性を基に、予備的スコーピングを実施した。各環境項目への影響を整理したものが表 4 である。まとめると、社会的な面として主に水供給の変化による社会影響及び自然環境面としてトンレ・サップ生物圏への影響が主な配慮事項となる。

- 工事期間中における「建設工事に起因する各種の環境社会影響」

社会環境に関して：

- 灌漑施設が整備され、限られた水資源を今まで自然に任せていたものを人為的に分配することにより、不公正な水分配や期待した水が利用できず「水争い等、住

民間の軋轢」、それに伴う「既存社会システムへの悪影響」

- 灌漑用水が供給されることにより、化学肥料や農薬の使用量が増加し人々の生活用水が汚染されることによる「健康や衛生条件の悪化」

自然環境に関して：

- 灌漑施設が整備されることにより「動植物の移動の阻害など生態への影響」
- 化学肥料や農薬の使用量が増加することにより、「河川の水質の悪化及びこれに伴うトンレ・サップ湖多目的地区への影響」

表 4 想定される環境社会への負の影響と緩和措置

項目	時期	影響の大きさ	負の影響	緩和措置
社会環境				
1	非自発的住民移転			
2	雇用や生計手段等の地域経済	建設段階 供用段階	C 内水面漁業条件の変化による漁業の制限	計画段階での内水面漁業の実態の調査、十分なステークホルダー協議、魚類の移動阻害防止など生息環境変化の緩和
3	土地利用や地域資源利用	計画段階	B 農地の灌漑排水施設への転用	影響の少ない設計、十分なステークホルダー協議
		供用段階	C 新たな水供給による農地拡大意欲とそれに伴う森林伐採	適切な土地利用計画、十分な農民への指導
4	社会関係資本や地域の意思決定機関等の社会組織	供用段階	C 水利用システムの変更による既存社会システムへの悪影響	水利用における既存社会システム(コミュニティ)などステークホルダーの参加
5	既存の社会インフラや社会サービス	建設段階 供用段階	C 灌漑施設など構造物による人々の移動・往來の阻害、コミュニティの分断	コミュニケーションを容易にするための簡易橋などの設置
6	貧困層・先住民・少数民族			
7	被害と便益の偏在			
8	文化遺産			
9	地域内の利害対立	建設段階	C 労働者と住民との軋轢、治安の悪化	住民への十分な事前説明、労働者の生活指導
		供用段階	B 不公正な水利用や水争いによる住民間の軋轢	住民への十分な説明、水調整への住民の参加
10	水利用あるいは水権利と入会権	建設段階	C 生活用水の利用制限	十分なステークホルダー協議、代替手段の確保
		建設段階	C 水制限による農業、漁業の制限	十分なステークホルダー協議、乾期の建設や魚類の繁殖期以外の工事など影響の少ない工事
		供用段階	B 不公正な水供給、水分配調整の困難	公正な水分配調整メカニズムの計画への組み込み(流域内での行政界を超える水分配調整、灌漑システム間及び内部の調整)、公正な水利用を配慮した設計、農民水利組合(FWUC/G)の設立と指導
		供用段階		
11	衛生	建設段階	C 建設労働者の流入による生活排水、廃棄物の増加	労働者の衛生環境改善、労働者への指導、廃棄物処理の徹底
		供用段階	C 農業等の使用増加による水の汚染	生活用水の水質モニタリング
12	危険(リスク) HIV/AIDS等の感染症	建設段階	C 建設労働者の流入によるHIVなど感染症の増加	労働者の衛生環境改善、労働者への生活指導
自然環境				
13	地形・地質的特徴			
14	土壌浸食			
15	地下水			
16	水文状況			
17	沿岸域(マングローブ、さんご礁、Tidal flats, etc.)	供用段階	C 農業や化学肥料使用量の増加などによるトンレサップ湖への影響	環境管理計画の策定、排水の水質モニタリング
		建設段階 供用段階	C 灌漑施設など構造物による魚の移動の制限	計画段階での魚類利用実態調査、魚用水路の建設
18	動植物と生物多様性	建設段階	C 鳥類など動物の水利用阻害	計画段階での鳥類の水利用状況調査、動物の生態にあわせた工事計画
		建設段階	C 農地拡大による森林伐採	土地利用計画と農民への指導、モニタリング
		供用段階		
19	気象			
20	景観			
21	地球温暖化			
汚染				
22	大気汚染	建設段階	C 工用建設機械・車両の排気ガス、煤塵	ラテライト道路へのスプリンクラー、建設車両のアイドリングの短縮
23	水質汚濁	建設段階	C 掘削工事による土砂流出、コンクリート工事などによる水質汚染	土砂の河川流出の防止、排水の適切な処理
		建設段階	C 建設労働者による生活排水の増加	労働者のトイレ、下水整備
		供用段階	B 農業、化学肥料の使用増加による水質汚染	IPMや適切な農業指導とモニタリング
24	土壌汚染	供用段階	C 農業、化学肥料の使用増加による土壌汚染	IPMや適切な農業指導とモニタリング
25	廃棄物	建設段階	C 建設廃棄物	建設土砂の有効利用、適切な廃棄(家屋や水から離れた場所)など建設環境配慮
		建設段階	C 建設労働者による生活廃棄物の増加	適切な廃棄物処理と労働者への指導
26	騒音・振動	建設段階	C 工事中の騒音・振動	事前の住民への説明、工事時間帯の制限など建設環境配慮
27	地盤沈下			
28	悪臭			
29	堆積			
30	事故	建設段階	C 工事中の工事車両による事故	建設機械の定期点検とメンテナンス、ドライバーへの安全運転指導など
		建設段階	C 建設関係車両の増加による交通事故	ドライバーへの安全運転指導、住民への交通安全指導など

Rating: A: Serious impact expected; B: Some impact expected; C: Extent of impact unknown; No mark: No impact expected.

A: Serious impact expected; B: Some impact expected; C: Extent of impact unknown; No mark: No impact expected.

Source : 調査団作成

9. 代替案

現在の灌漑施設は、技術的な検討がなされておらず、効率的な水利用ができていない。また、ドナーの協力等で行われている改修や灌漑整備は、調査流域全体の水資源の賦存量を考慮したものではなく、局地のみの水利用しか検討していない。このため、本マスタープランが無ければ、次の様な問題を惹起することが想定される。従って、本マスタープランを策定することによって、環境にも社会にも良い影響を与えることになる。

- 先に取水した者が水を使い後から来た者は使えない。結果、水争いになり水資源の効率的利用につながらない。
- 条件の良い地域のみ灌漑が行われて、条件の悪い地域は水が得られずより貧困となり格差が拡大する。

10. 相手国との協議結果

カンボジア国側は環境社会配慮の重要性を認識し、本調査のステアリングコミティーに環境省からもメンバーを入れることとなった。

11. 環境社会配慮調査の TOR 案

フェーズ I : 初期環境影響評価 (IEE) を実施する。

1. 制度政策、行政の枠組み
2. プロジェクトの概要
3. 調査対象地域の環境の概要
4. 環境影響
5. 代替案分析
6. 環境管理計画
7. 緩和措置やモニタリング計画
8. ステークホルダー協議
9. ステークホルダー協議の記録
10. フェーズ II の環境影響評価 (EIA) または IEE の TOR 案

フェーズ II : 優先地域での詳細計画にて提案されたプロジェクトに対して初期環境影響評価 (IEE) または環境影響評価 (EIA) を実施する。

1. 制度政策、行政の枠組み
2. プロジェクトの概要
3. 調査対象地域の環境の概要
4. 環境影響
5. 代替案分析
6. 環境管理計画
7. ステークホルダー協議

12. その他関連情報 特に無し

Summary of Preparatory Study for Development Study (M/P or F/S)

Date: September 13, 2006

1. Full title of the Project

The Basin-wide Basic Irrigation and Drainage Master Plan Study in the Kingdom of Cambodia

2. Type of the study

Master Plan Study

3. Categorization and its reason

Category B

There is no serious environmental impact except small potential environmental effects on Tonle Sap area and potential social impacts on local communities.

Neither new farm land reclamation nor resettlement occurs, and a large-scale construction is not anticipated. Minimal or no negative impacts on the protected area of nature and cultural heritages are anticipated. However, the change of water use may need new social rule for water use, which requires social consideration. An additional irrigation water supply may change the agricultural practice, which may have some impacts on Tonle Sap Lake that has ecological and local economic importance since the study area covers such a wide area lying in the upstream of the Lake that even a small change may cause some impacts on aggregate in the future. It is also necessary to consider environmental management in the course of construction and service period.

Irrigation project with service area of 5,000 ha and more is subject to Initial Environmental Assessment (IEIA) or Environmental Impact Assessment (EIA), according to Sub-Decree No.72 in 1999. Initial Environmental Examination (IEE) stipulated in JICA Environmental and Social Guideline in 2004 which is corresponding to IEIA shall be conducted in Phase 1 of formulation of basin-wide master plan, and IEE or EIA shall be conducted in Phase 2 of formulation of Detailed Plan in the priority areas according to the types of proposed projects.

4. Agency or institution responsible for the implementation of the project

Ministry of Water Resources and Meteorology (MOWRAM) and Ministry of Agriculture, Forestry and Fisheries (MAFF)

5. Outline of the Project

The outline of the project is shown in the table below.

Table 1: Outline of the Project

(1) Objectives:	The objectives of the Study are: 1) To formulate the efficient and effective master plan on Irrigation and Drainage in order to improve the water management and the agricultural productivity in the four (4) target river basins, and to formulate Detailed Plan for selected priority areas in each river basin, and 2) To transfer technologies to the counterpart personnel through on-the-job training in the course of the Study.
(2) Study area	The Study Area covers the Battambang, the Moug Russey, the Pursat and the Boribo River Basins.
(3) Target year of Master Plan	Year 2020
(4) Scope of the study	[Phase 1] Formulation of Draft M/P 1) To carry out basic study. 2) To implement hydro-meteorological observation. 3) To formulate a basin-wide Draft M/P composed of the following Items: i) Agricultural water availability / Irrigation and Drainage. ii) Farming / Cultivation. iii) Environmental and Social Considerations Execution of Initial Environmental Examination (IEE) 4) To select priority area(s) in each basin [Phase 2] Formation of Detailed Plan in the Priority Areas and Finalization of M/P 1) To formulate Detailed Plan composed of the following items in the priority area(s): i) To implement hydro-meteorological observation in the priority area(s) ii) Irrigation and Drainage / Management of the agricultural water. iii) Farming / Cultivation/ Agricultural land use plan/ Marketing iv) Environmental and Social Considerations 2) To finalize M/P

Source: JICA Study Team

6. Description of the project site

Environmental and social conditions of the project site are described below.

Table 2: Environmental and Social Conditions of the Project Site

(1) Natural environment	
Protected areas:	The study area includes 5 protected areas; four of these are located in the upstream of the river basins and only Tonle Sap Multi-purpose Protected Area is located in the downstream. Tonle Sap Multi-purpose Area is significant area for habitats of water birds, reptiles and fishes. Some of these are threatened species. Fishes are important as a protein source for the people, and fisheries have social and economic importance. Tonle Sap Multi-purpose Protected Area needs environmental consideration.
Forest:	Forest cover ratio to the total land areas in the provinces of the study area are 50% in Battambang, 77% in Pursat, 40% in Kampong chhnang, 61% in Kampong Speu and 9% in Kandal provinces.
(2) Social environment	
Population:	1.8 million people reside in the study area; out of those the agricultural population is 1.5 million. The Khmer is dominant. The Vietnamese fishermen and Islam are living on/around the Tonle Sap Lake. 43% of people living in Tonle Sap area is poverty.
Water use and allocation:	Water use right is not formally established yet. Agricultural water use is dominant among various water usages. FWUCs(Farmer Water User Communities) are expected to be responsible for sustainable water resources management, while these are not functioning well for water allocation for the most of cases, which brings about water conflicts among farmers.
Education and health:	Literacy rates in Battambang and Kandal provinces are higher than its average of country, while those are lower in Pursat, Kompong Chhnang and Kompong Speu provinces. There are many death cases by Malaria in Battambang and Pursat provinces.
Economy and livelihood:	Agriculture is the main economic activity. Fisheries also take place in/around Tonle Sap Lake, which provide sources of protein to the people.
(3) Pollution	
Pollution by agriculture is not significant due to limited use of agricultural chemicals.	

Source: JICA Study Team

7. Legal Framework of Environmental and Social Considerations

(1) Laws, regulations and standards related to environmental and social issues including requirements and procedures of Environmental Impact Assessment (EIA), stakeholder participation, and information disclosure.

The following table shows laws, regulations and policies on the environment. Out of these, Law on Environmental Protection and Natural Resources Management in 1996 is the principle law that stipulates the formulation of environmental plans, protection of the environment, environmental assessment of the development project, and public participation in the environmental management.

Table 3: List of the relevant environmental laws, regulations and policies

Field	No.	Legislations and policies
General	1	Law on Environmental Protection and Natural Resource Management, December 1996
	2	Law on the Establishment of the Ministry of Environment, January 1996
Institutions	3	Sub-Decree No. 57 on the Organization and Functions of the Ministry of Environment, September 1997
	4	Sub-Decree No. 72 on Environmental Impact Assessment process, August 1999
EIA	5	Declaration No. 49 on Guideline for Conducting Environmental Impact Assessment Report, March 2000
	6	Royal Decree on the Creation and Designation of Protected Areas, November 1993
Protected area	7	Declaration No. 1033 on Protected Area, June 1994
	8	Royal Decree on the Establishment and Management of Tonle Sap Biosphere Reserve
	9	Sub-Decree on the Establishment, Role and Functions of the Secretariat for Tonle Sap Biosphere Reserve
Cultural heritage	10	Law on the Protection of Cultural Heritage, January 1996
Pollution control	11	Sub-Decree No. 27 on Water Pollution Control, April 1999
	12	Sub-Decree No. 36 on Solid Waste Management, April 1999
	13	Sub-Decree No. 42 on the Control of Air Pollution and Noise Disturbance, July 2000
Resource management	14	Law on Water Resources Management (Draft)
	15	Circular No.1 on the Implementation Policy for Sustainable Irrigation Systems, 1999
	16	Policy for Sustainability of Operation and Maintenance of Irrigation Systems, June 2000
	17	Land Law, 2001

Source: Ministry of Environment

Environmental Impact Assessment (EIA)

Sub-Decree No. 72 on Environmental Impact Assessment process in August 1999 stipulates the project types for which EIA is required and EIA process. The following table are the types of agricultural project required EIA. A project owner who plans to develop or/and rehabilitate an irrigation system with a service area of 5,000 ha and more requires approval of the EIA from Ministry of Environment (MOE).

Table 4: The type of projects subject to EIA

No.	Type and Activities of the Projects	Size/Capacity
B	Agriculture	
1	Concession forest	≥10,000 hectares
2	Logging	≥500 hectares
3	Land covered by forest	≥500 hectares
4	Agriculture and agro industrial land	>10,000 hectares
5	Flooded and coastal forests	All sizes
6	Irrigation systems	≥5,000 hectares
7	Drainage systems	≥5,000 hectares
8	Fishing ports	All sizes

Source: Sub-Decree No. 72 on Environmental Impact Assessment process, August 1999

The procedure of EIA is as follows:

- i) Project owners shall prepare and the Initial Environmental Impact Assessment (IEIA) report to MOE.
- ii) MOE shall review the IEIA reports and determine whether a) the EIA is approved, b) the IEIA should be revised, or c) a full Environmental Impact Assessment is required. MOE shall inform the results to the project owner within 30 days after the submission of the IEIA report.

iii) Project owners who are informed of a revision to the IEIA or of a preparation of full EIA shall revise/prepare the report and submit it to MOE. MOE shall review and examine the IEIA/EIA report and notify the project owners of comments/ suggestions within 30 days from submission.

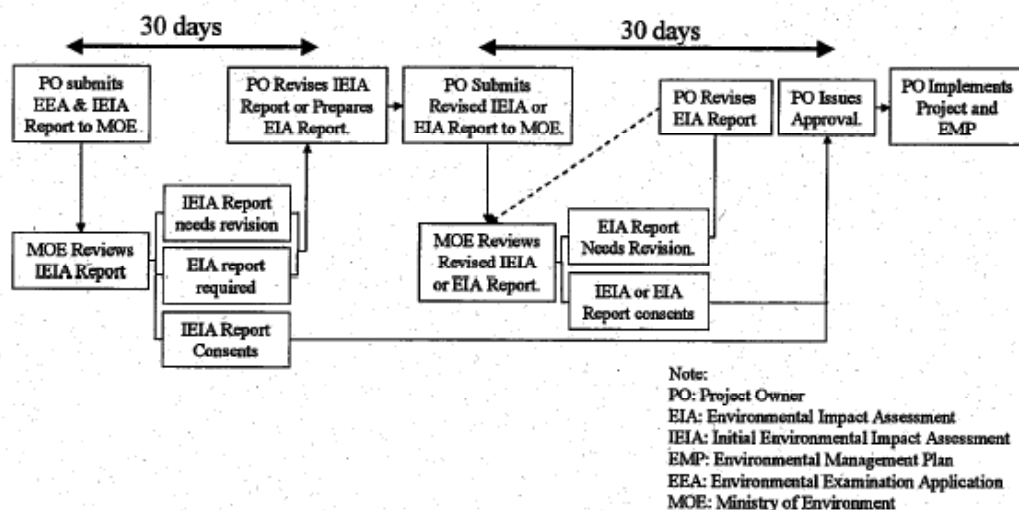


Figure 1: Flow of the procedure of EIA

Source: Sub-Decree No. 72 on Environmental Impact Assessment process, August 1999

The Sub-decree No. 72 also mentions the encouragement of the public participation in the EIA implementation for taking ideas and suggestions into consideration for the project approbation.

The information disclosure is not mentioned in the said Sub-decree, however, it is stipulated by JICA guideline that all opinions given by the public should be taken account into the decision making process.

Declaration No. 49 on Guideline for Conducting Environmental Impact Assessment Report in March 2000 stipulates the minimum contents of EIA reports.

(2) Relative agencies and institutions

Ministry of Environment (MOE) is responsible for environmental management. MOE is responsible for review of IEIA and EIA mentioned in the EIA procedure above.

8. Provisional Scoping

The result of the provisional scoping is shown in the table below.

Table 5: Provisional Scoping

Item	Timing	Significance	Possible Impacts	Mitigation Measures
Social Environment				
1	Involuntary Resettlement			
2	Local economy such as employment and livelihood, etc.	Construction/Service	C Disturbance of fisheries due to change of water flow.	Survey on inland fisheries, stakeholder consultation, and appropriate design of canal network such as a passage for migrating fishes

3	Land use and utilization of local resources	Designing	B	Agricultural land acquisition for irrigation facilities limits farming activities	Appropriate design minimizing land acquired, stakeholder consultation
		Service	C	Forest encroachment by land development induced by additional irrigation water supply	Appropriate land use planning, guidance to farmers
4	Social institutions such as social infrastructure and local decision-making institutions	Service	C	Negative impacts on the existing social institution caused by water conflict among farmers	Stakeholder's participation in water management
5	Existing social infrastructures and services	Construction/Service	C	Disturbance of accessibility in/ out of communities by irrigation structure	Construction of a pass bridging irrigation canals
6	The poor, indigenous and ethnic people				
7	Misdistribution				
8	Cultural heritage				
9	Local conflict of interests	Construction	C	Conflict between construction workers and local people causing security problem	Stakeholder consultation, guidance to construction workers
		Service	B	Conflict among local people through competition for water due to unfair and improper water usage management	Stakeholder consultation, public participation in water management
10	Water Usage or Water Rights and Rights of Common	Construction	C	Limitation of water use for domestic use	Public consultation, providing alternatives
		Construction	C	Disturbance of agriculture and fisheries due to the limitation of water use	Stakeholder consultation, construction in dry season
		Service	B	Unfair water allocation and difficulty in water allocation causing water conflict	Incorporating a fair water allocation mechanism into M/P, appropriate design securing fair water distribution, and establishing FWUC and support for their management capacity
11	Sanitation	Construction	C	Increase of waste water and solid waste by inflow of construction workers	Improvement of sanitary condition of construction workers, guidance to workers, and sound waste management
		Service	C	Water contamination by increased use of agricultural chemicals	Monitoring of domestic water quality
12	Hazards (Risk), Infectious diseases such as HIV/AIDS	Construction	C	Increase of infectious diseases due to inflow of construction workers	Improvement of sanitary condition of construction workers, guidance to worker
Natural Environment					
13	Topography and Geographical features				
14	Soil Erosion				
15	Groundwater				
16	Hydrological Situation				
17	Coastal Zone (Mangroves, Coral reefs, Tidal flats, etc.)	Service	C	Negative impacts on Tonle Sap Lake by increased use of agricultural chemicals	Preparing environmental management plan, monitoring of drain water
18	Flora, Fauna and Biodiversity	Construction/Service	C	Blocking fish migration route by irrigation structure	Survey on fish migration, appropriate design of canal network such as a passage for migrating fishes
		Construction	C	Disturbance of birds and other wildlife for their utilization	Survey on birds and wildlife, construction plan minimizing negative impacts on them in consideration of wildlife living conditions
		Service	C	Forest encroachment through agricultural land expansion	Appropriate land use plan, guidance to farmers, and monitoring
19	Meteorology				
20	Landscape				
21	Global Warming				
Pollution					
22	Air Pollution	Construction	C	Dust spread and emission gas exhausted by construction vehicles	Sprinkling for unpaved roads, minimizing idling period for construction vehicles
23	Water Pollution	Construction	C	Water polluted by concrete works and soil sedimentation by excavation works	Appropriate construction management reducing sedimentation, adequate treatment of wastewater
		Construction	C	Increase of wastewater by inflow of workers	Installation of toilets for workers, treatment of domestic wastewater
		Service	B	Water contamination by increased use of agricultural chemicals	Promotion of environment-friendly practice such as integrated pest management and compost, guidance on appropriate utilization of chemicals, and monitoring

24	Soil Contamination	Service	C	Soil contamination by increased use of agricultural chemicals	Promotion of environment-friendly practice such as integrated pest management and compost, guidance on appropriate utilization of chemicals, and monitoring
25	Waste	Construction	C	Increase of construction waste from construction works	Utilization of surplus soil, soil disposing far from residence areas and water bodies
		Construction	C	Increase of domestic waste by inflow of workers	Appropriate waste management, guidance to workers
26	Noise and Vibration	Construction	C	Noise and vibration by construction works	Public consultation prior to construction works, limiting construction time
27	Ground Subsidence				
28	Offensive Odor				
29	Bottom sediment				
30	Accidents	Construction	C	Accidents by construction vehicles	Maintenance of machinery and vehicles, instruction on safety operation
		Construction	C	Traffic accident increased by inflow of vehicles	Instruction for safety driving, guidance to people on traffic safety

Rating: A: Serious impact expected; B:Some impact expected; C:Extent of impact unknown; No mark: No impact expected.

A: Serious impact expected; B:Some impact expected; C:Extent of impact unknown; No mark: No impact expected.

9. Alternatives to the project activities including ‘without project’ option

The existing irrigation systems cannot ensure efficient water utilization in the river basins since these irrigation systems were constructed during Pol Pot regime without technically viable design and designed for water utilization not in the river basins but in the limited area or within a scheme. No action alternative may cause the following negative environmental and social impacts.

- Competition for water among farmers causes local conflicts, which leads to inefficient water utilization
- Only better conditioned area will be irrigated, and other areas left not irrigated, which enlarges income disparity among farmers.

To avoid uncontrolled water utilization under the no action alternative mentioned above, the option with the master plan aiming at efficient water utilization in river basins, which brings about positive economic and social impact, is preferable.

10. Result of the consultation with recipient government on environmental and social consideration including roles and responsibilities.

Recognizing the importance of Environmental and Social Consideration, relevant personnel of Ministry of Environment participates in the Steering Committee as a member.

11. Terms of Reference for Environmental and Social Considerations

During Phase 1, IEE (IEIA) is conducted covering the following items

- 1) Policy, Legal and Administrative Framework
- 2) Project Description
- 3) Description of Environment in the Study Area
- 4) Environmental Impacts
- 5) Analysis of Alternatives
- 6) Environmental Management Plan

To prepare mitigation measures and monitoring plans

7) Stakeholder Consultation

To record consultation meetings with stakeholders

During Phase 2, IEIA or EIA is conducted for the proposed projects covering the following items: TOR is decided in IEE study.

- 1) Policy, Legal and Administrative Framework
- 2) Project Description
- 3) Description of Environment in the Study Area
- 4) Environmental Impacts
- 5) Analysis of Alternatives
- 6) Environmental Management Plan
- 7) Stakeholder Consultation

12. Other relevant information

Environmental and Social Considerations Review

Date

1. Title of the Cooperation Project

2. Categorization

3. Procedures in accordance with JICA Guidelines: Yes or No

4. Areas, Categories and Rating System

No.	Areas	Categories	Rating
1	Description of the project and local environmental and social conditions	Purpose, physical characteristics, scale and design of project; its land requirements; types and quantities of residuals (e.g. wastes) and methods or routes of their disposal; likely geographic extent of the affected environment	
2	Identification of key impacts and idea of alternatives	Identification of potential impacts of the project; scoping of impacts; feasible alternatives planned, without project option and most environmentally and socially friendly option	
3	Framework of environmental and social considerations	Legal framework of assessment; terms of reference; information disclosure and stakeholders consultation	
		Overall assessment	

A	Generally satisfactory and complete.
B	Can be considered just satisfactory.
C	Not satisfactory.
N/A	Not applicable.

5. Comments

C/P との打合せ議事録

1. S/W 協議第 1 回 (概要)

日時：2006 年 7 月 25 日 14:30～15:00

場所：MOWRAM

参加者：ベン・サコン次官、テン・タラ部長、森山専門家、田中所員、調査団 (5 名)

(当方)

S/W 案の概要説明。

(先方指摘事項)

- ・灌漑施設整備に加え、水管理の調査も実施して欲しい。
- ・プロジェクト内容は暫定的に了解。細部に関するコメントについては、後ほ伝える。
- ・調査の結果としての施設整備については、ドナー間で協調願いたい。ADB 等のプロジェクトも動いている。現在国全体では 50 のプロジェクトがある。
- ・正確な気象水文観測データの収集の責任者についてはノミネートする。
- ・水文観測について、既存施設と新施設を組み合わせることは了解。

2. S/W 協議第 2 回 (概要)

日時：2006 年 7 月 31 日 14:30～15:30、18:00～18:30

場所：MOWRAM

参加者：バスナー部長、テン・タラ部長、森山専門家、田中所員、調査団 (5 名)

(先方指摘事項)

1. S/W

(1) II. OBJECTIVES

- ・M/P に農民水利組合 (FWUC) と市場 (market) の設立を書く。
- ・M/P の目的に優先 4 地域の選定及び水管理の推進を書く。

(2) IV. SCOPE (フェーズ I 及びフェーズ II)

- ・灌漑排水の項目に農民水利組合を書く。
- ・営農の項目に農業水利用、市場を追加する。

2. M/M

(1) II. R/D

- ・農民水利組合 (FWUC) と市場 (market) の設立を書く。
- ・水管理の推進を書く。
- ・training を study tour に直す。
- ・流域毎に優先地域を選定することを追加。
- ・C/P として MOWRAM、MAFF 以外の関係省庁も書く。
- ・コンピンプイ地区の灌漑計画は対象地域から外す。

- ・ 詳細計画（DP）の内容として水利用に加え土地利用も位置付ける。
- ・ DP の内容として貧困削減、環境、市場も追加する。

(当方の対応)

1. S/W

- ・ **OBJECTIVES** の項目に農民水利組合（FWUC）と市場（market）の設立は書かない。
SCOPE の項目にこれらを考慮して調査することのみ記載（設立とは書かない）。
- ・ この他、先方指摘に沿って修正。

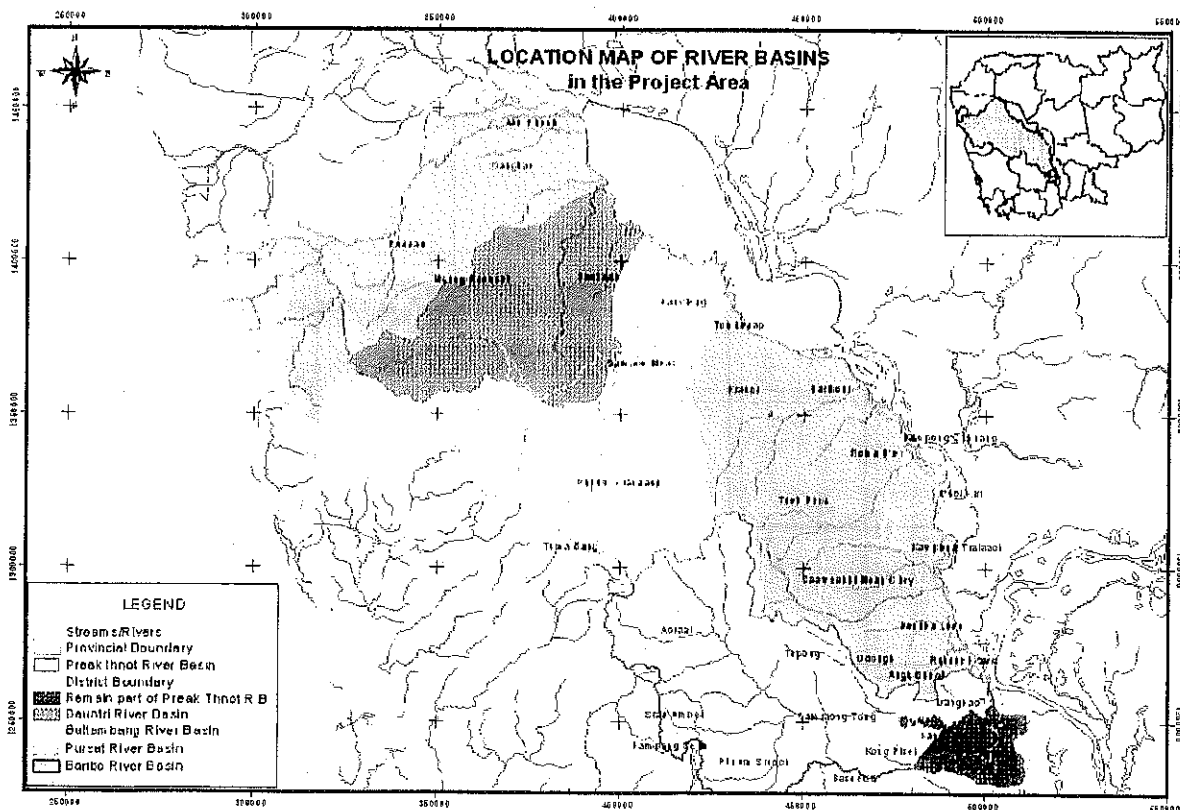
2. M/M

- ・ 農民水利組合（FWUC）と市場（market）を考慮して調査することのみ記載（設立とは書かない）。
- ・ この他、先方指摘に沿って修正。

インベントリー調査 (中間報告)

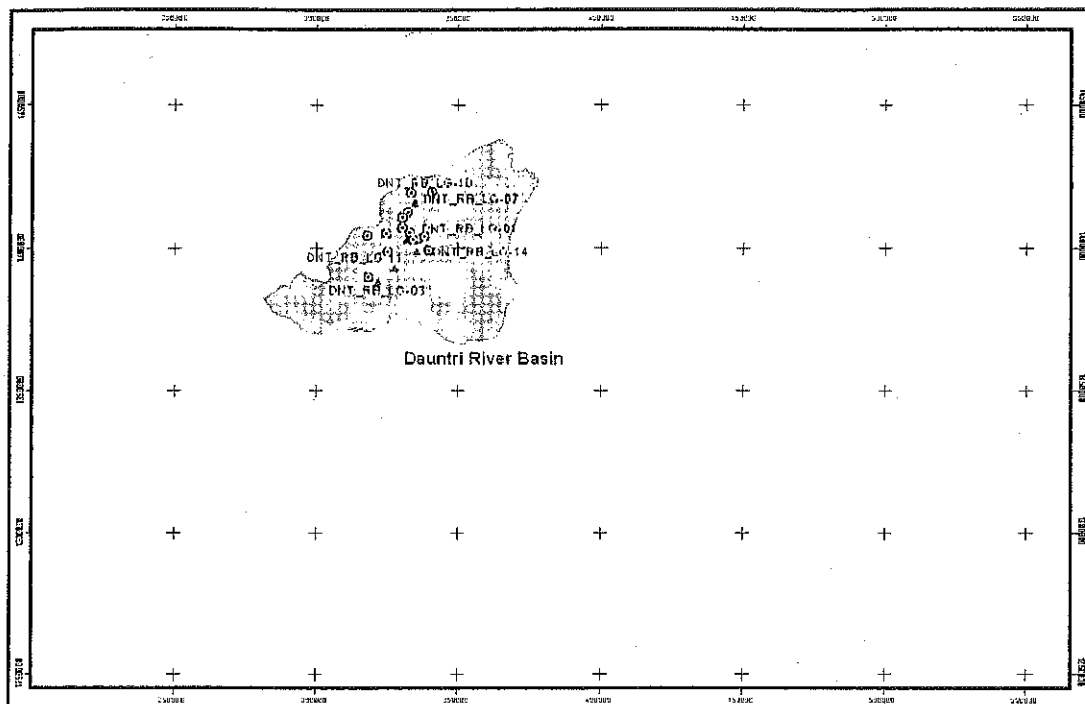
(1) 調査地域

River basins	Provinces	Districts
Batam Bang	Batam Bang	1. Aek Phnom 2. Sang Ker
Dauntri	1. Batam Bang 2. Pursat	1. Moung Rossei 2. Bakan
Pursat	Pursat	1. Kandieng 2. Phnum Kravanh 3. Krakor 4. Sampove Meas
Boribo	Kampong Chnang	1. Boribo 2. Kampong Chnang 3. Kampong Tralach 4. Rolea Phear 5. Samaki Meanchey and 6. Teuk Phos
Prek Thnoat	1. Kandal 2. Takeo	1. Kandal Steung, Sa Ang 2. Bati

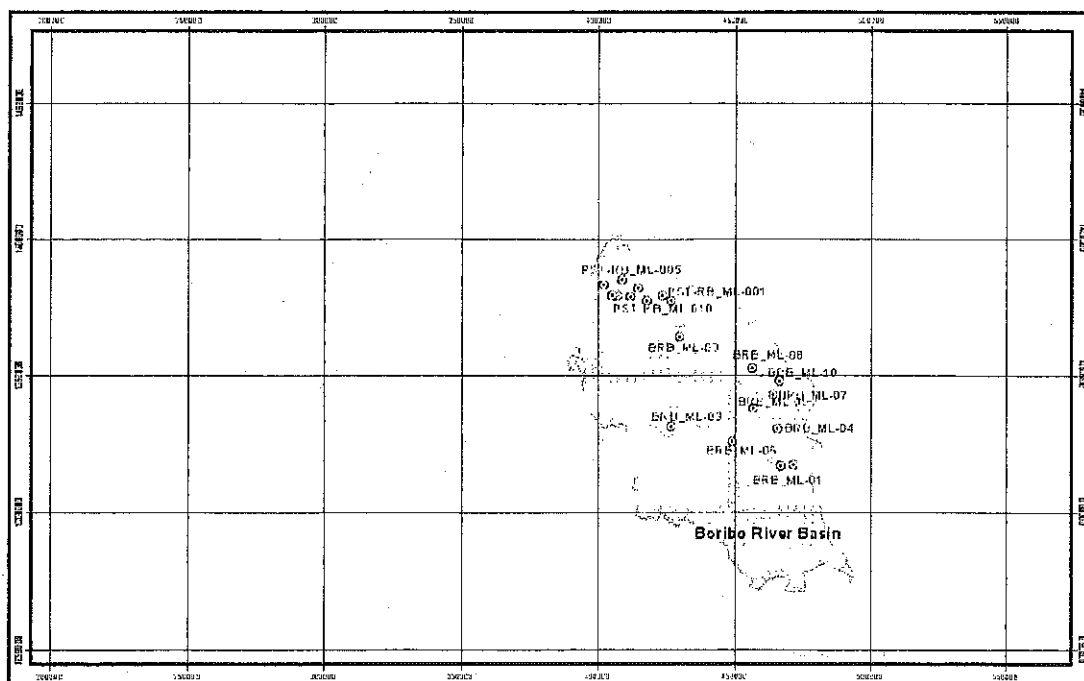


(2) 現在までの調査灌漑システム位置図

Moung Russey 流域



Boribo 流域



インベントリー調査項目

Data and information to be collected are as following:

Name of irrigation system

Location of irrigation system (UTM Grid)

Description about cropping pattern in the command area for both in wet and dry seasons.

Existing irrigated area and potential irrigated area after rehabilitation of existing facilities.

Date of construction

Duration of operation

Type of irrigation system (Gravity, Pump)

Water Source and intake measures

Establishment of FWUC

現在までの進捗状況 (2006年6月末)

No.	Basin names	% Completed
1	Batambang	60
2	Dauntri	80
3	Pursat	60
4	Boribo	60
5	Prek Thnaot	90

収集資料リスト

番号	資料の名称	内容	形態(図書、ビデオ、地図、写真等)	オリジナル or コピー	発行元 Organization of Publication	発行年月 Published	備考
No.	Name of Documents	Contents	Type	Orig./ Copy			
1	Battambang Town Map	Battambang Town Map	Map	Copy			
2	Battambang Map: Northwestern Rural Development Project	Battambang Map	Map	Original			
3	Battambang Map: 1:100000	Battambang Map: 1:100000	Map	Original			
4	Pailin Map 1:100000	Pailin Map 1:100000	Map	Original			
5	Administrative Map of Battambang Province 1:250000	Administrative Map of Battambang Province 1:250000	Map	Original			
6	Environment in Transition, Cambodia, lao PDR, Thailand, Viet Nam	メコンの環境	Book	Original	ADB	2001	
7	Mekong Fish Database	メコンの魚類データベース	DATA	Original	Mekong River Commission	2003	
8	An Introduction to Cambodia's Inland Fisheries, Mekong Development Series No.4 November 2004	カンボジアの内水魚類	Book	Original	Mekong River Commission	2004	
9	Cambodia Agricultural Development Report, June 2006	カンボジア農業開発報告2006	Book	Original	Economic Institute of Cambodia	2006	
10	Agricultural Statistics 2004-2005	全国農業統計2004-05	Book	Original	Ministry of Agriculture, Forestry and Fisheries	2005	
11	General Population Census of Cambodia 1998, Final Census Results (2nd edition)	人口センサス1998	Book	Original	National Institute of Statistics	Aug/2002	
12	Compendium on Environment Statistics 2003 Cambodia	環境統計	Book	Original	National Institute of Statistics	Nov/2003	
13	Cambodia Socio-Economic Survey 2004	社会経済調査	Book	Original	National Institute of Statistics	Sep/2006	
14	Cambodia Inter-censal Population Survey 2004 Report 2, General Report at Province Level, 02 Battambang Province, 24 Pailin	人口センサス:中間年(2004):バタンバン、パイルン州	Book	Original	National Institute of Statistics	May/2005	
15	Cambodia Inter-censal Population Survey 2004 Report 2, General Report at Province Level, 04 Kampong Chhnang Province	人口センサス:中間年(2004):コンボン・チュナン州	Book	Original	National Institute of Statistics	May/2005	
16	Cambodia Inter-censal Population Survey 2004 Report 2, General Report at Province Level, 05 Kampong Speu Province	人口センサス:中間年(2004):コンボン・スプー州	Book	Original	National Institute of Statistics	May/2005	
17	Cambodia Inter-censal Population Survey 2004 Report 2, General Report at Province Level, 08 Kandal Province	人口センサス:中間年(2004):カンダル州	Book	Original	National Institute of Statistics	May/2005	
18	Cambodia Inter-censal Population Survey 2004 Report 2, General Report at Province Level, 15 Pursat Province	人口センサス:中間年(2004):プルスット州	Book	Original	National Institute of Statistics	May/2005	
19	Cambodia Inter-censal Population Survey 2004 Analysis of CIPS Results Report 3, Labour Force and Employment	人口センサス:中間年(2004):人口と雇用	Book	Original	National Institute of Statistics	Sep/2005	
20	Cambodia Inter-censal Population Survey 2004 Analysis of CIPS Results Report 4, Housing and Household Amenities	人口センサス:中間年(2004):家屋とアメニティ	Book	Original	National Institute of Statistics	Sep/2005	
21	Cambodia Inter-censal Population Survey 2004 Analysis of CIPS Results Report 7, Literacy and Education	人口センサス:中間年(2004):識字と教育	Book	Original	National Institute of Statistics	Sep/2005	
22	Cambodia Inter-censal Population Survey 2004 Analysis of CIPS Results Report 8, Women in Cambodia	人口センサス:中間年(2004):女性	Book	Original	National Institute of Statistics	Sep/2005	
23	National Strategic Development Plan 2006-2010	国家開発戦略:2006-2010:正式翻訳最終版	Book	Original	Ministry of Planning	Jun/2006	
24	Achieving the Cambodia Millennium Development Goals 2005 Update	ミレニアム開発目標:正式翻訳最終版	Book	Original	Ministry of Planning	Oct/2005	
25	Public Investment Programme 2006-2008	国家投資計画:2006-2010正式翻訳最終版	Book	Original	Ministry of Planning	Jan/2006	
26	1998 Census Village Level Data	人口センサス1998:村落レベル	DATA	Original	National Institute of Statistics	Oct/1999	
27	A Poverty Profile of Cambodia 2004	カンボジアの貧困	Book	Original	Ministry of Planning	Feb/2006	
28	Tonle Sap Watch, Issue 4, April-June 2005	トンレ・サップウォッチ リーフレット	Leaflet	Original	Fisheries Action Coalition Team,	Jun/2005	
29	Tonle Sap Watch, Issue 5, July-September 2005	トンレ・サップウォッチ リーフレット	Leaflet	Original	Fisheries Action Coalition Team,	Sep/2005	
30	River Basin and Water Use Study, Inception Report, Northwest Irrigation Sector Project - ADB Loan No. 2035-CAM (SF) Package 1	ADB, NWISPパッケージ1のインセプションレポート	Book	Copy	CADTIS-Consultant, Co. Ltd - ADB Loan No. 2035-CAM (SF) Package 1	2006	
31	IWRM/ RBO Specialist Report, Summary Report, Consulting Service for Northwest Irrigation Sector Project - ADB	ADB, NWISPパッケージ1の水資源管理専門家レポート	Book	Copy	BCEOM, ACIL and SAWAC	May/2006	
32	Community Development and FWUC Specialist End of Input Report, Summary Report, Consulting Service for Northwest Irrigation Sector Project - ADB	ADB, NWISPパッケージ1の農民水利組合専門家レポート	Book	Copy	BCEOM, ACIL and SAWAC	Jul/2006	

33	Four years of Waterbird Conservation Activities in the Prek Toal Core Area of the Tonle Sap Biosphere Reserve (2001-2004)	トンレ・サップ生物圏のPrek Toal コアゾーンでの水鳥保護活動報告	Book	Copy	Wildlife Conservation Society	May/2005	
34	Tonle Sap Environmental Management Project, Report for First Quarter 2006, ADB Loan 1939-CAM (SF)	ADB、トンレ・サップ環境管理プロジェクト:4半期報告	Book	Copy	Tonle Sap Environmental Management Project	Apr/2006	
35	Policy and Strategy for the Tonle Sap Biosphere Reserve, Tonle Sap Environmental Management Project	トンレ・サップ環境管理の政策と戦略:ADB、トンレ・サップ環境管理プロジェクト成果品	Book	Copy	Tonle Sap Biosphere Reserve Secretariat, Cambodia National Mekong Committee (CNMC)	Feb/2006	
36	Technical Service Center for Irrigation System Project Phase 2	TSC2の資料	Leaflet	Copy	MOWRAM - JICA	2006	
37	Strategy for the Improvement of the Agricultural Market Information Service (AIMS)	農業市場情報サービス改善戦略	Book	Copy	Ministry of Agriculture, Forestry and Fisheries, Agricultural Marketing Office (AMO)	2006	
38	Module 1 on Introduction of Participatory Irrigation Management and Development (PIMD)	参加型灌漑管理開発資料	Book	Copy	MOWRAM	Oct/2003	
39	Module 2 on Participatory Irrigation Management and Development: Policy, Legal and Institutional Framework	参加型灌漑管理開発資料	Book	Copy	MOWRAM	Oct/2003	
40	Module 3 on Planning and Implementing Participatory Irrigation Management and Development at the National Level	参加型灌漑管理開発資料	Book	Copy	MOWRAM	Oct/2003	
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89	Area of Battambang Province Under Environmental Managemeng	バタンバン州の環境管理地区の地図	Map	Copy	Provincial Department of Environment in Battambang		
90	Protected Areas of Cambodia,1:3,000,000	カンボジアの環境保護地区の地図	Map	Copy	National Mekong River Committee		
91	Tonle Sap Biosphere Reserve,1:1,100,000	トンレ・サップ生物圏保護地区の地図	Map	Copy	National Mekong River Committee		
92	Tonle Sap Biosphere Reserve,1:1,125,000	トンレサップ生物圏保護地区の地図	Map	Copy	National Mekong River Committee		
93	Land Use Map of Tonle Sap Biosphere Reserved 1997	トンレ・サップ生物圏保護地区の土地利用地図	Map	Copy	National Mekong River Com	1997	
94	Map of Komping Puoy Irrigation System	コンピン・プイ灌漑システム地図	Map	Copy	Provincial Department of Water Resources and Meteorology in Battambang		
95	Map of Bovel Irrigation System	ボヴェル灌漑システム地図	Map	Copy	Provincial Department of Water Resources and Meteorology in Battambang		

96	Inventory List of FWUCs in Cambodia	FWUCのインベントリー	Sheet	Copy	MOWRAM	2004	
97	List of Agricultural Development Communities Certified by Provincial Department of Agriculture	バタンバン州の農民組合リスト	Sheet	Copy	Provincial Department of Agriculture in Battambang		
98	Agricultural Chemical Statistics	農業と肥料の統計	Sheet	Copy	Ministry of Agriculture, Forestry and Fisheries	2006	
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99	Map of Kamping Puoy Irrigation System			Copy (A3)	Provincial Department of Battambang, PDWRAM		
100	Map of Bovel Irrigation System			Copy (A3)	-do-		
101	Map of Prek Cheak Irrigation System			Copy (A3)	-do-		
102	Topographic, hydrological and Land Use Map of Kampong Chhnang Province			Copy (A3)	Provincial Department of Kampong Chhnang Province, MAFF		
103	River Basin in Cambodia			Copy (A4)	Public Work Research Center, Ministry of Public Works and Transport		
104	Hydrology Map (Battambang, Pursat, Kampong Chhnang, Kampong Speu, Kandal Provinces)			Digital data	-do-		
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	Land Use Map (Battambang, Pursat, Kampong Chhnang, Kampong Speu, Kandal Provinces)			Digital data	-do-		
	Geology Map (Battambang, Pursat, Kampong Chhnang, Kampong Speu, Kandal Provinces)			Digital data			
	【気象水文資料等】						
105	Hydro-meteorological data			Digital data	Hydrological Department, Ministry of Water resources and Meteorology		
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