No.

Japan International Cooperation Agency (JICA)

Ministry of Water Resources and Meteorology
The Kingdom of Cambodia

THE STUDY
ON
THE REHABILITATION AND RECONSTRUCTION
OF AGRICULTURAL PRODUCTION SYSTEM
IN
THE SLAKOU RIVER BASIN,
THE KINGDOM OF CAMBODIA

VOLUME-II

APPENDICES

March 2002

Nippon Koei Co., Ltd.
Docon Co., Ltd.
Pasco International Inc.

Japan International Cooperation Agency (JICA)

Ministry of Water Resources and Meteorology
The Kingdom of Cambodia

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CHAPTER A-1 MEETINGS AND FIELD SURVERS RELATED TO THE STUDY

A-1.1 Meetings with the JCC

In accordance with the Scope of Work for the Study agreed on October 09, 2000, the Study Team had eight (8) meetings with "the Joint Coordinating Committee for the Study" (the JCC) organized by "the Ministry of Water Resources and Meteorology" (MOWRAM) at the MOWRAM in Phnom Penh. The dates and subjects of the meetings were as follows :

Meeting	Date	Subject
The 1st meeting	February 09, 2001	Inception Report*
The 2nd meeting	March 19, 2001	Progress Report (1)
The 3rd meeting	June 12, 2001	Progress Report (2) (Draft)
The 4th meeting	June 28, 2001	Progress Report (2)
The 5th meeting	August 13, 2001	Interim Report*
The 6th meeting	December 04, 2001	Progress Report (3) (Draft)
The 7th meeting	December 20, 2001	Progress Report (3)*
The 8th meeting	February 06, 2001	Draft Final Report*

The minutes of meetings with asterisk (*) are shown in the Main Report and those without asterisk (*) are included in Attachments-1 to 4 of Appendix-A.

A-1.2 Meetings with the Working Group and the Technology Transfer

In accordance with the Minutes of Meeting agreed on between MOWRAM and the Study Team on February 05, 2001, a meeting between the Working Group of counterpart personnel and the Study Team, was held every two weeks at the DWRAM Takeo. The content of meeting was to report a progress of the Study for the past two weeks and a schedule of the Study for next two weeks for mutual understanding of the Study. In addition, at the end of meeting, a lecture was always given by the Team member for technology transfer in accordance with the Plan of Technology Transfer which the Study Team submitted to MOWRAM on February 19, 2001. In total, 16 meetings were held. The subjects of technology transfer were as follows:

Meeting	Date	Subject
The 1st meeting	February 19, 2001	General Methodology of the Study
The 2nd meeting	March 05, 2001	Hydrology, Runoff Estimation
The 3rd meeting	April 27, 2001	Participatory Approach
The 4th meeting	May 15, 2001	Agricultural Development Plan
The 5th meeting	May 28, 2001	Initial Environmental Evaluation
The 6th meeting	June 08, 2001	Agro-Processing / Marketing Dev. Program
The 7th meeting	June 22, 2001	The Results of the Workshops
The 8th meeting	August 24, 2001	Topographic Map Preparation and Survey
The 9th meeting	September 08, 2001	Organization of Farmer Water User Community
The 10th meeting	September 21, 2001	Environmental Investigation
The 11th meeting	October 05, 2001	Soil Mechanics and Embankment Stability
The 12th meeting	October 19, 2001	Flood Analysis
The 13th meeting	November 02, 2001	Project Evaluation
The 14th meeting	November 16, 2001	Cost Estimate
The 15th meeting	November 30, 2001	Priority Projects of USP, SRP and PDP
The 16th meeting	December 14, 2001	Planning Guideline

For technology transfer during the Study period, on-the job training was provided to the counterpart personnel in addition to the above lectures in accordance with the Plan of Technology Transfer".

In accordance with MOWRAM's request, a workshop on the Draft Planning Guideline for Rehabilitation and Reconstruction of Irrigation Systems was held at conference room of MOWRAM's central office on December 21, 2001, and that on how to estimate water requirements and how to estimate river runoff was held at conference room of MOWRAM's central office on February 11, 2002.

A-1.3 Field Surveys Conducted on Local Sub-Contract Basis

The Study Team supervised 15 field survey works conducted on local sub-contract basis during the Study period, and the results were used for the Study. The objectives, major survey items and volumes are as follows :

For Phase-I First Field Work (January 31 to March 21, 2001)

(1) Laboratory Analysis of Soil:

In order to take soil samples in the Study Area, twelve test-pits with each space of 1m x 1m x 1m were dug. Three (3) soil samples were taken from each test-pit and 18 samples in total were taken from (6) test-pits. The following tests were carried out for the samples:

1) Soil bulk density (undisturbed)
2) Particle size analysis
3) pH
4) Electric conductivity (EC)
5) Total nitrogen (T-N)
6) Total carbon (T-C)
7) Ammonium-nitrogen (NH4-N)
8) Nitrate-nitrogen (NO3-N)
9) Total phosphate (T-P)
10) Available phosphate (Av-P)
11) Exchangeable cations (Ca, Mg, K, Na)
12) Cation exchangeable capacity (CEC)
13) Moisture content

(2) Water Quality Analysis (Dry Season):

In order to assess water quality during dry season in the Study Area, ten water samples were taken from three (3) rivers, four (4) wells and three (3) ponds. The location is shown. The following tests were carried out for the samples :

1) Conductivity
2) pH Value
3) Total dissolved solids (TDS)
4) Suspended solids
5) Alkalinity (as $CaCO_3$)
6) Total hardness (as Ca +Mg)
7) Micro-organism(Escherichia coli, Total coliforms, &Fecal coliforms)
8) Inorganic ions (F, Fe, Cu, Mn, Ca, Mg, NO_3-N, NH_4-N, Cl, K)
9) COD_{Mn}
10) BOD

(3) Installation of Water Level Gauges and Staff Gauges:

In order to observe water level of the Slakou river, and measure the runoff during dry season, two (2) automatic water level gauges were installed at Tumnup Lok reservoir site and at a crossing point with national road N0. 3 on February 19, 2001. Two (2) staff gauges were installed at the two (2) water level gauges sites, and the other two (2) staff gauges were installed at crossing points with dike of O Saray and Kpob Trobek reservoirs on February 28, 2001. The location is shown in Fig.A-1.

(4) Water Level Observation and Discharge Measurement (Dry Season):

In order to observe water level of rivers, canals, and wells in the Study Area, 20 observation sites were selected. Four (4) permanent and 16 temporary staff gauges were installed on February 25 to 28, 2001. The location is shown in Fig.A-1. The water level observation was conducted at 20 sites once a week up to March 05, 2001. Discharge measurement of rivers and canals at 16 sites were started with use of current meter on February 15, 2001, and continued once a week to March 05, 2001. The observation sites are as follows :

1) The Slakour river : 3 sites
2) Tributaries : 6 sites
3) Main Canals : 5 sites
4) Secondary Canals : 2 sites
5) Well : 4 sites

(5) Inventory Survey of Dikes/Roads, Canals, etc.:

In order to grasp the present condition of existing permanent facilities related to dikes/ roads, canals and railroads in the Study Area, an inventory survey was conducted for the following length (822 km in total) of the dikes/ roads, canals and railroad :

1) Dikes/roads with two main canals : 39 km
2) Other canals : 488 km
3) National roads : 38 km
4) Other roads : 232 km
5) Railroad : 25 km

(6) Profile and Cross Section Survey in Reservoir Areas:

In order to obtain topographic data for estimate of three (3) reservoir capacities, profile and cross section survey was conducted for the upstream reach of three reservoirs, namely, the Slakou river, and its two tributaries upstream of the dike or dike axis. The surveyed volume in total was as follows:

1) Tunup Lok reservoir : 21 cross sections and 24,100 m in total, 6,761 m for profile
2) O Saray reservoir : 20 cross sections and 20,000 m in total, 1,861 m for profile
3) Kpob Trobek reservoir: 47 cross sections and 46,000 m in total, 4,560 m for profile

(7) Social Environmental Baseline Survey:

In order to grasp i) beneficiaries' needs, expectation and worries about the project, and ii) social and rural condition, such as family condition, living condition, farm economy, farming practices, an interview survey was conducted with the use of questionnaire. Before the questionnaire survey, the Study Team interviewed commune leaders as Commune Profile Survey. Information from the commune profile survey, district leaders, other informant and available data such as population census were used to modify the questionnaire on which local condition could be reflected. The selection of interviewee (201 households) was made on the following conditions:

1) One village should be selected from every major commune,
2) The number of interviewee in selected villages should be determined in proportion to commune population, and
3) Interviewee should be selected at random from the villager registration.

For Phase-I Second Field Work (April 22 to June 30, 2001)

(8) Supplementary Topographic Survey:

In order to obtain topographic data of the Slakou river, dike/road and main canals, profile and cross section survey was conducted. The surveyed volume in total was as follows:

1) The Slakou river : 10 cross sections and 50,000 m of profile (50 height points)
2) Main Canal between Route 22 and Tumnup Lok Reservoir : 20 cross sections and 50,000 m of profile (50 height points)
3) Main Canal between Srae Ronoung and Trapeang Lean : 8 cross sections and 20,000 m of profile (20 height points)
4) Main Canal between Kpob Trobek Reservoir and Trapeang Lean : 10 cross sections and 25,000 m of profile (25 height points)

(9) Participatory Rural Appraisal Workshops on the Master Plan (Draft):

In order to obtain opinions on the master plan (draft) from beneficiaries, related government offices and NGOs, 20-time workshops were conducted by five teams of the selected local contractor during four days of June 13 to 16, 2001.

For Phase-II Third Field Work (August 12 to December 24, 2001)

(10) Water Quality Analysis (Rainy Season):

In order to assess water quality during rainy season in the Study Area, ten water samples were taken from three (3) rivers, four (4) wells and three (3) ponds. The following tests were carried out for the samples :

1) Conductivity
2) pH Value
3) Total dissolved solids (TDS)
4) Suspended solids
5) Alkalinity (as $CaCO_3$)
6) Total hardness (as Ca +Mg)
7) Micro-organism(Escherichia coli, Total coliforms, &Fecal coliforms)
8) Inorganic ions (F, Fe, Cu, Mn, Ca, Mg, NO_3-N, NH_4-N, Cl, K)
9) COD_{Mn}
10) BOD

(11) Water Level Observation and Discharge Measurement (Rainy Season):

In order to observe water level of rivers, canals, and wells in the Study Area, 20 observation sites were selected. The water level observation was conducted at 20 sites up to November 15, 2001. Discharge measurement of rivers and canals at 16 sites were started with use of current meter, and continued once a week for the canals and every day for rivers to November 15, 2001. The location is shown in Fig.A-2.

The observation sites are as follows :

1) The Slakour river : 3 sites
2) Tributaries : 6 sites
3) Main Canals : 5 sites
4) Secondary Canals : 2 sites
5) Well : 4 sites

(12) Geotechnical Boring:

In order to take geotechnical data of the foundations of Tumnup Lok Reservoir, O Saray Reservoir, Kpob Trobek Reservoir and intake structures for Main Canal No.1 and No.2, geotechnical boring with standard penetration tests was conducted at eight places with a total boring length of 120 m. The location is shown in Appendix-C.

(13) Soil Mechanical Investigation:

In order to take soil samples in the Study Area and obtain soil mechanical data, 10 test pits were excavated and 24 samples were taken. Six in-situ density tests were conducted in the filed. The location is shown in Appendix-C. The following soil mechanical tests were carried out in laboratory for the samples:

1) Specific gravity test
2) Moisture content test
3) Grain size analysis
4) Atterberg limit test
5) Compaction test
6) Permeability test
7) Unconfined compression test

(14) Supplementary Topographic Survey:

In order to obtain topographic data of the dike/road and the main / secondary canals including connecting canal, profile and cross section survey was conducted. The surveyed volume in total was as follows:

1) Dike/road : 68 cross sections (at about 100 interval) and 6,500 m of profile
2) Main and secondary canals including connecting canal: 358 cross sections (at about 200m interval) and 67,500 m of profile

(15) Participatory Rural Appraisal Workshops on the Feasibility Study Plan (Draft):

In order to obtain opinions on the feasibility study plan (draft) from beneficiaries, related government offices and NGOs, 10-time workshops were conducted by five teams during two days of December 5 to 6, 2001.

A-1.4 Topographic Map Preparation

The Study Team prepared the following topographic maps for the Study:

For Phase-I Second Field Work: 1:50,000 topographic map with a contour interval of 20 - 40 m covering the Study Area (65,000 ha) by digital editing of aerial photos shot

in 1992.

For Phase-II Third Field Work: 1:10,000 topographic map with a contour interval of 1 m covering 6,800 ha based on aerial photos shot in 1992. The mapping area consists of 6,400 ha for the Upper Slakou River Irrigation Reconstruction Plan and the Small Reservoir Rehabilitation Plan (Ang 160 area), and 400 ha for the Small Reservoir Rehabilitation Plan (Tumnup Kim Sei area) and the Small Pond Development Plan (Trapeang Snao and Khpob Svay villages in Nhaeng Nhang commune).

CHAPTER A-2 NATIONAL BACKGROUND

A-2.1 National Development Plan

Cambodia's Second Five-year Development Plan (2001 - 2005) is being formulated following its First Five-year Development Plan (1996 - 2000) as of February 12, 2002. The major development targets in the First Five-year Development Plan were ① alleviation of poverty, ② administrative and judicial reform, ③ reform and development of national economy, ④ substantial investment in the upgrading and development of physical infrastructures, particularly rural roads, ⑤ human resources development, ⑥ extension of health, education and social services, ⑦ sustainable utilization of the natural resource base by strengthening the enforcement of environmental legislation. Out of those, the alleviation of poverty is the most important. To this goal, it is essential to develop the agriculture and the rural area. In other words, increase of the agricultural production is very effective to improve the Cambodian economy. For this purpose, irrigation development is highly expected to fulfill the objectives of the National Development Plan. When the available budget is considered, the prioritization of projects in order of ① rehabilitation project of existing irrigation system, ② project with high economic viability, and ③ project having moderate scale is essential.

A-2.2 Agriculture and Irrigation Development Strategy

A change of economic policy from a command economy to a free market economy, has already been made, and each governmental organization is making efforts to establish his strategy / policy for the goal of national development plan, and reform his institutional structure and legal system to comply with the free market economy.

According to Action Program for Development of Agricultural Sector in Cambodia (2001-2010) prepared by MAFF, the following basic goals are stressed :

1) Improve food security through expansion in the production of rice and other crops,
2) Contribute to economic growth and to foreign earning through export,
3) Improve opportunities income for farm households by diversifying crop production, particularly those headed by women, and
4) Add value to crop and livestock production by developing agro-processing industries.

The operational framework for long-term planning, 2000 - 2010 under the Action Program is as follows :

1) Increase rice cultivated areas to 2.5 million ha, equal to the areas before the civil war, and also increase the rice yield up to 2.45 ton/ha for food security for a whole population, poverty alleviation and job creation,
2) Improve yield and quality of all the production through research, extension and application of advanced technology,
3) Provide development opportunities of livestock to small holders through supporting services in animal husbandry, disease prevention, credit and marketing, and
4) Maintain per capita consumption of fish and increase incomes through greater value added activities.

Ministry of Water Resources and Meteorology (MOWRAM) is really a new organization of the Royal Government of Cambodia (RGC), which was created by Law June 23, 1999 in recognition of the fundamental role that water resources play in the socio-economic development of the country. MOWRAM has set up a task force to prepare strategy document and is finalizing it. So, in substance, there is no comprehensive strategy or policy for water resources sector in Cambodia at present. According to the draft National Water Resources Strategy of the Kingdom of Cambodia prepared by the task force in December 2000, the issues and possible strategies which will be related to the Study are as follows :

(1) Conflicts among Water Uses

Description : Since water resources are abundant in Cambodia, there is little scope for conflict among different water uses. Some conflicts, however, are presently emerging as regards the use of reservoirs for irrigation and fisheries purposes, for instance, or among water users within different irrigation command areas, or between navigation and uses requiring the construction of hydraulic works (dams or weirs) in the rivers, such as irrigation . Conflicts are also recorded among the users of neighboring wells, due to over-extraction of groundwater that leads to the lowering of the water table and the intrusion of salt (see below , at (3)). Conflicts further arise in connection with water use in ponds and lakes. Due to inadequate irrigation management, substantial amounts of water are lost to the sea. Poor drainage, together with an intensive application of fertilizers and pesticides, is a cause of pollution of the existing rural underground water supplies, which has negative repercussions on the health of the population. Data and information on the extent of this pollution and on the amount of water that is lost to the sea are scanty or unreliable.

Solution and Time Frame for Implementation:

1) Regulate, through a water law and subsidiary legislation, the planning and allocation of water resources (Short Term)
2) Identify priority areas for implementation of the law (Medium Term);
3) Formulate planning procedures (Medium Term);
4) Establish mechanisms for coordination with line agencies (Medium Term);
5) Establish mechanisms for public participation in planning (Medium Term);
6) Register existing uses (Medium Term);
7) Within priority areas, plan water use and development (by basin, sub-basin, aquifer), on the basis of available data (Medium Term);
8) License new (selected) uses, following procedures established under subsidiary legislation (Medium-Long Term);
9) Establish and staff registration and licensing unit at MOWRAM (Medium Term);
10) Build capacity of MOWRAM officials (Medium Term)

(2) Deteriorated and/or Poorly Designed Irrigation System

Description : Poor hydraulic design and irrigation layout stemming from the Khmer Rouge regime, together with lack of financial resources for operation and maintenance, have caused a number of irrigation to deteriorate. Drainage requirements, also, have been overlooked. The consequences are high water losses, resulting in on-farm conflicts with regard to the use of available water, uncontrolled drainage, with risks of waterlogging and salinization and, in general, environmental degradation.

Solution and Time Frame for Implementation:

1) Conduct technical, socio-economic and feasibility studies (Medium-Long Term)
2) Rehabilitate irrigation schemes with provision of storage, irrigation and drainage facilities (Short-Medium Term);
3) Form Farmer Water User Communities (FWUC) to operate and maintain the schemes (Short Term);
4) Introduce water charges to cover O & M costs (Short Term);
5) Regulate, through legislation, the establishment and functioning of FWUC and the handing over to them of management responsibilities (Short Term);
6) Implement land titling legislation so as to ensure security of land tenure, thus stimulating farmers to invest in O & M (Short Term);
7) Build capacity at MOWRAM, line agencies, local authorities and users'(FWUC) level (Short Term).

(3) Insufficient Irrigation

Description : At present, only 16 % of the total rice-growing area is irrigated. There is a need to increase this area to 20 % by 2003.

Solution and Time Frame for Implementation:

1) Conduct technical, socio-economic and feasibility studies (Short Term)
2) Construct new schemes (Short-Medium Term);
3) As 3) to 7) in above (2). (Short-Medium Term).

A-2.3 Rural Development Strategy

The Ministry of Rural Development (MRD) is responsible for the following rural development initiatives and activities for improvement of living standard and alleviating the poverty of rural people :

1) Co-ordinating, co-operating, implementing, monitoring and evaluating rural development projects and programs to rehabilitate and develop rural areas by assisting the rural population.
2) Co-ordinating the operational efforts of the various line ministries and assistance programs.
3) Undertaking research to develop the rural areas of Cambodia.

The strategy of the rural development of the MRD are as follows :

1) Development activities will be oriented towards solving socio-economic, cultural and security problems in specific areas according to the situation and the needs of the people. The selection of target areas will be delegated to Provincial Development Committees.
2) Efforts will be made to improve the standard of living in all areas - whether backward, middle level or progressive. The government and international agencies will concentrate their efforts and resources on developing backward and middle level areas while encouraging increased private sector investment in progressive areas.
3) Emphasis will be given to integrating the efforts of government institutions, international agencies, the private sector and the public. This will help solve the fundamental problems of rural communities and will promote activities generating production, income and employment using technology appropriate to each locality and need.
4) To promote self-reliance, the MRD will encourage the community - especially Village Development Committees and the general public - to solve community

problems. Communities can achieve significant results independently but they may need practical encouragement and advice.

The core activities of the MRD are as follows :

1) To take responsibility for integrating rural development, at family, village and commune levels through the country.
2) To raise the living standards and quality of life for rural people by alleviating poverty through improved rural infrastructure like roads, water supply, health care, agriculture, credit provision, small business/industry and market facilities.
3) To promote human resource development for rural communities and MRD staff by organizing and publicizing local training programs, seminars and workshops that relate to relevant, specific training needs. This will develop individual talents and skills and collectively enhance community independence through increased employment opportunities.

A-2.4 Related Aids and NGOs

For agriculture, irrigation and rural development in terms of software and hardware, the following cooperation was or has been given to MOWRAM, MRD and MAFF by some international aid organizations. The results / procedure/ methodology of and some lessons obtained from such cooperation were used for the Study.

Japan International Cooperation Agency (JICA)

1) Master Plan Study on the Integrated Agricultural and Rural Development Project in the Suburbs of Phnom Penh in February 1995.
2) The Agricultural Development Study of the Mekong Flooded Area in Cambodia in March 1998.
3) The Study on Groundwater Development in Southern Cambodia in 1999 (covering Kandal, Kompong Speu, Takeo, Prey Veng, Svay Rieng, Urban Districts of Phnom Penh).
4) The Study on Improvement of Marketing System and Post-Harvest Quality Control of Rice in Cambodia in May 2001.
5) The Basic Design Study on the Project for the Improvement of Facilities of the Colmatage System in Kandal Province along the Mekong River in Kingdom of Cambodia in 1999. The construction of the facilities of project was finished in June 2001 under grant aid of the Japanese Government (GOJ).
6) Technical Cooperation for the Project for Improvement of the Survey and Forecast System on Meteorology and Agro-meteorology in the Kingdom of

Cambodia. This cooperation will be conducted during 3 years from January 2001.

7) Technical Cooperation for Technical Service Center for Irrigation System Project. This cooperation will be conducted during 5 years from January 2001.

JICA and ASEAN Countries

8) The Rural Development and Resettlement Project in Cambodia (RD-RP) as tripartite project by Japan, Indonesia, the Philippines, Malaysia, Thailand, and Cambodia. This project has been implemented in Kampong Spueu and Takeo Provinces based on grass-roots methodology for i) agriculture, ii) public health, iii) education and iv) income generation since December 1992, and is scheduled to be finished in March 2004. This project will be transferred to MRD. It is noted that construction of meeting huts and promotion of partner revolving material (PRM) have been effective for smooth and stable establishment of farmers organizations. The main activities of RD&RP are as follows:
   - Agriculture including vegetable, subsidiary crops, fruits tree, fish culture, livestock, agro-processing and credit for income increase and improvement of nutrition of family.
   - Income generation including skill training to women and youth for motorcycle repairing, carpentry, dress making, ceramic, etc. in the multipurpose meeting hut.
   - Education including school building and improvement teaching method.
   - Public health including promotion of health, preventive measures and creation of vital village.

World Bank

9) Task Force on National Water Resources Strategy assisted by the World Bank: The task force prepared a draft National Water Resources Strategy of the Kingdom of Cambodia in December 2000, which has been reviewed by MOWRAM.

Asian Devepoment Bank (ADB)

10) Technical Assistance Team financed by the Asian Development Bank (ADB): The team prepared a draft National Water Sector Profile in December 2000, which has been reviewed by MOWRAM.

11) Stung Chinit Irrigation and Rural Infrastructure Project financed by ADB: This project aims to i) form and train water user groups, ii) form cost recovery measures for roads and irrigation works, iii) strengthen Government staff, and iv) conduct benefit monitoring and evacuation by providing irrigation and drainage for 7,000 ha in Kompong Thom Province. For the implementation, MOWRAM

selected consultants for pre-survey / design, construction supervision and system management training in accordance with ADB's procurement guideline. The project completion will need 4-5 years from now.

12) Thnot Te Reservoir System in Takeo Province under ADB loan : The rehabilitation of reservoir with a storage volume of 13.4 million m^3 was finished in 1995 for irrigation of 2,000 ha to 3,000 ha.

13) O'Tom Lake Flood Protection Rehabilitation in Takeo Province under ADB loan : This project rehabilitated in 1996, includes O'Tom embankment and Dong Knyom embankment for Kantourt irrigation scheme (250 ha) , Moeun Tumrung irrigation scheme (210 ha), and Neal village irrigation scheme (75 ha).

IFAD

14) Dong Pe Irrigation Rehabilitation Project (about 2,000 ha) under Rural Development in Kampot Province. The appraisal report was signed between IFAD and RGC on January 16, 2001. The feasibility study, detailed design and the rehabilitation will be started.

European Communities (EC)

15) PRASAC II (Support Program for the Agricultural Sector in Cambodia), which is supported by EC, covers 4 districts in southeast of Takeo Province (one of 6 provinces targeted in Cambodia). PRASAC II Takeo consists of 4 activity components, namely domestic water supply, sustainable agricultural productivity, credit and micro enterprises, and project management / institutional support. PRASAC II assists farmers in establishing and strengthening VDCs at target village to steer all community-based activities. PRASAC II also assists VDC in preparing and formulating village development plan to get support from local authorities, international organizations and NGOs. PRASAC II is also implementing village projects for farmers to manage and maintain their achievements with sustainability. The target villages are 130 in total in Takeo Province.

Australia

16) The Cambodian Agricultural Research and Development Institute (CARDI) sponsored by the Cambodia-IRRI-Australia Project : CARDI is a semi-autonomous institution working with its stakeholders to improve the living standards of all Cambodians, especially farmers, through agricultural research, training and technology transfer. CARDI aims to increase agricultural productivity through human resource and institutional development, scientific research and the development of sustainable agricultural technologies appropriate for Cambodian conditions.

Community Development by OXFAM

17) Community Aid Abroad Oxfam Australia (NGO) aims at i) establishment of FWUC, ii) establishment of community organization, iii) providing credit / village bank, iv) developing home garden, v) developing hog raising, vi) promoting irrigation development, and vii) arranging water and sanitation facilities in Takeo Province.

Other International Organizations and NGOs

18) Other international organizations and NGOs are working for community and rural development in the Study Area. UNICEF supports well drilling and organization of drinking water users group. WFP is repairing farm road leading to food shortage villages under Food Program. The NGOs are MCC (Mennonite Central Committee), CRS (Christian Relief Service) and AMDA (Association of Medical Doctors of Asia) which are working in forestry, credit and health sectors, respectively.

Figures

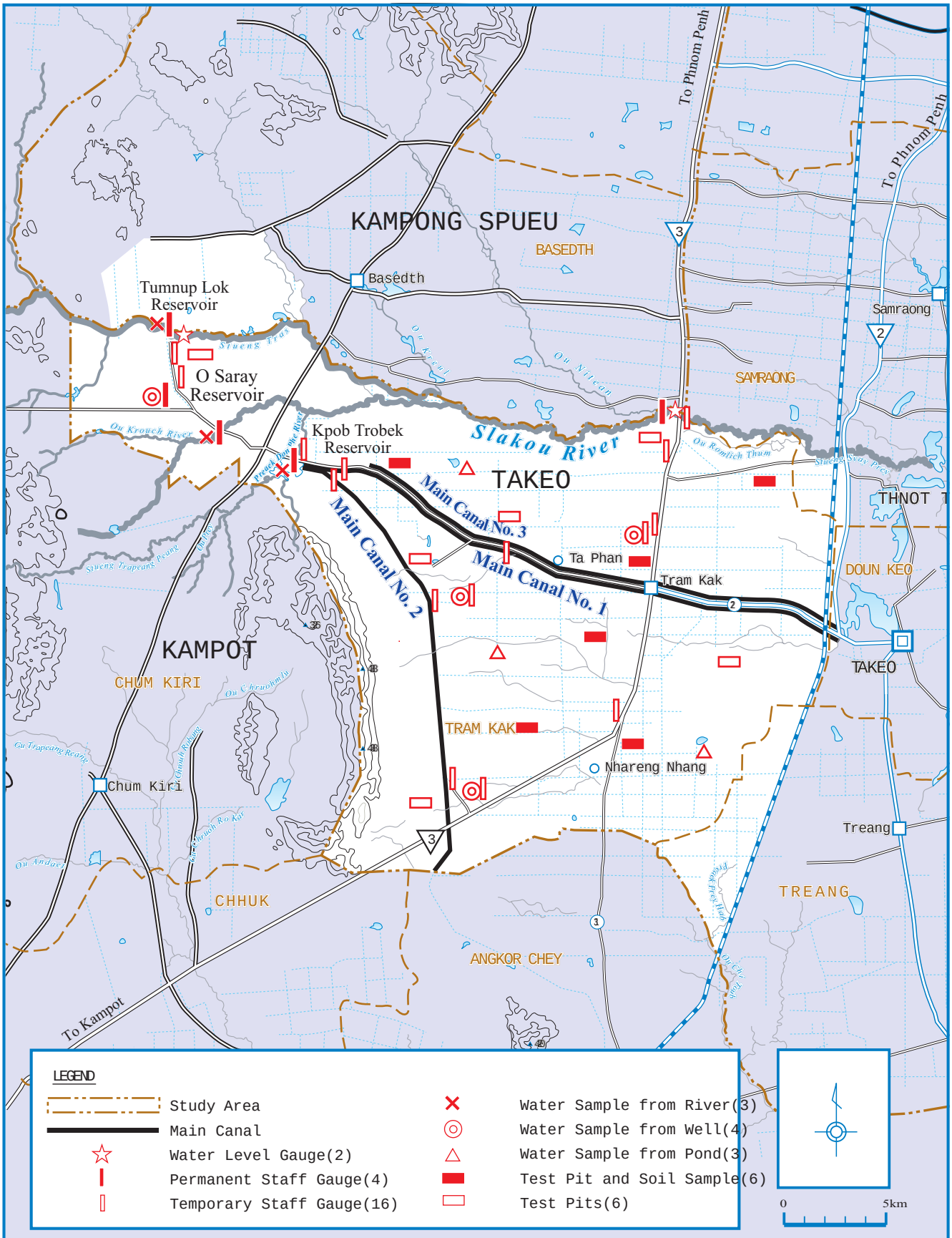

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Figure A-1

Location Map of Field Surveys During Phase-I First Field Work

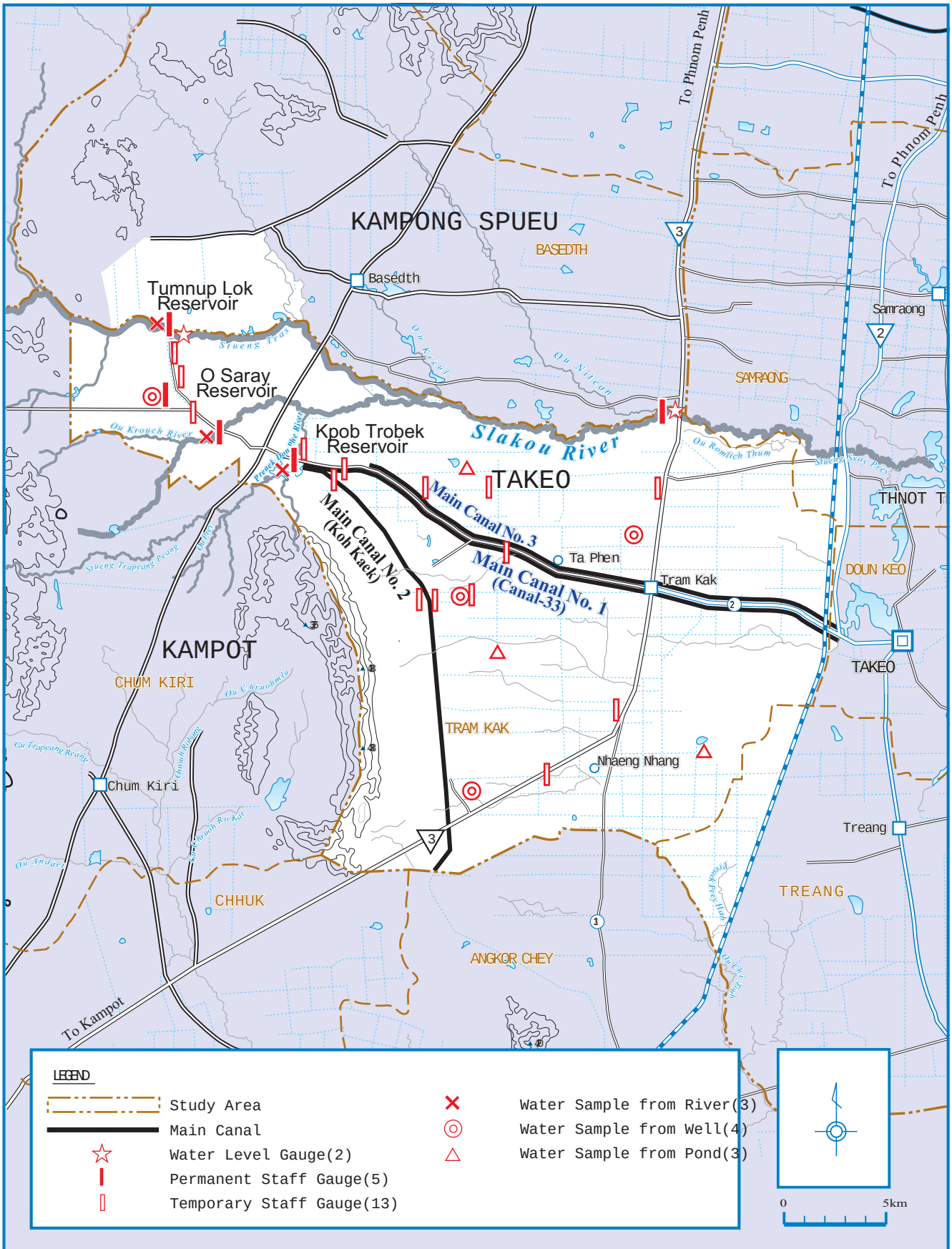

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Figure A - 2

Location Map of Field Surveys During
Phase-II Third Field Work