

Japan International Cooperation Agency (JICA)
Royal Irrigation Department (RID)

Study on
Application of Participatory Planning
in Rural and Agriculture Development Project
in the Lam Pa Chi River Basin
in
the Kingdom of Thailand

FINAL REPORT

March 2005

Sanyu Consultants Inc.

PREFACE

In response to a request from Government of the Kingdom of Thailand, the Government of Japan decided to conduct a study on Application of Participatory Planning in Rural and Agriculture Development Project in the Lam Pa Chi River Basin in the Kingdom of Thailand and entrusted the study to the Japan International Cooperation Agency (JICA).

JICA selected and dispatched a study team headed by Mr. Michio Goto of Sanyu Consultants Inc., between October 2002 and February 2005.

The team held discussions with the officials concerned in the Government of the Kingdom of Thailand and conducted field surveys in the study area. Upon returning to Japan, the team conducted further studies and prepared this final report.

I hope that this report will contribute to the promotion of the master plan in the study area and to the enhancement of friendly relationship between our two countries.

Finally, I wish to express my sincere appreciation to the officials concerned in the Government of the Kingdom of Thailand for their close cooperation extended to the study.

March 2005

Etsuo KITAHARA
Vice-President
Japan International Cooperation Agency

March 2005

Mr. Etsuo Kitahara
President,
Japan International Cooperation Agency
Tokyo, Japan

Dear Mr. Kitahara,

Letter of Transmittal

We are pleased to submit herewith the Final Report of the Study on Application of Participatory Planning in Rural and Agriculture Development Project in the Lam Pa Chi River Basin in the Kingdom of Thailand. The Report contains the Rural and Agricultural Development Plan formulated with the advices and suggestions of the authorities concerned in the Government of Japan and your Agency. Also included were comments made by the Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives, of the Kingdom of Thailand during the technical discussions on the draft final report, which were held at Bangkok in February 2005.

The development plan has been prepared in partnership with the RID, and incorporated the views of the beneficiaries and other stakeholders such as Department of Agricultural Extension (DOAE), local authorities, NGOs, etc. The objectives of the Study are as shown below:

- To formulate a rural and agricultural development master plan, with the participation of the communities in the study area, to increase incomes of small-scale farmers who are suffering from drought and/or flood damages.
- To carry out technology transfer to the personnel in RID, TAO and other relevant organizations on the subjects of planning and surveying methods such as participatory approach, with the aims to enhance institutional capabilities of such organizations.

To attain the above objectives, the Study has been carried out through the two phases from the end of October 2002 to the beginning of February 2005;

Phase I: Making clear the peoples' needs through the participatory development approaches as well as formulating the draft master plan and,

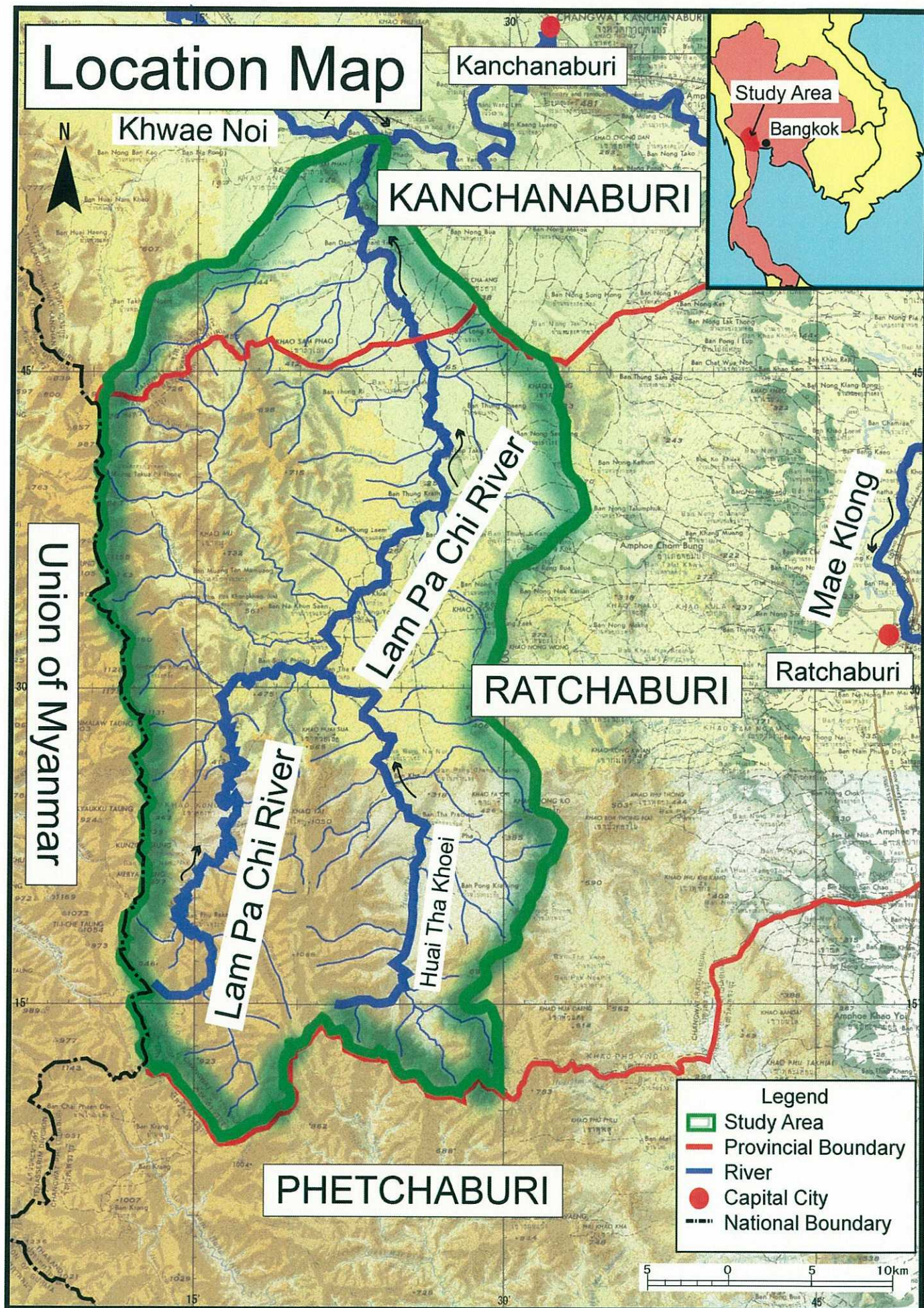
Phase II: Implementing the Pilot Projects to verify the project components proposed by the draft master plan and finalize the final report feeding back the lessons learned in the Pilot Projects.

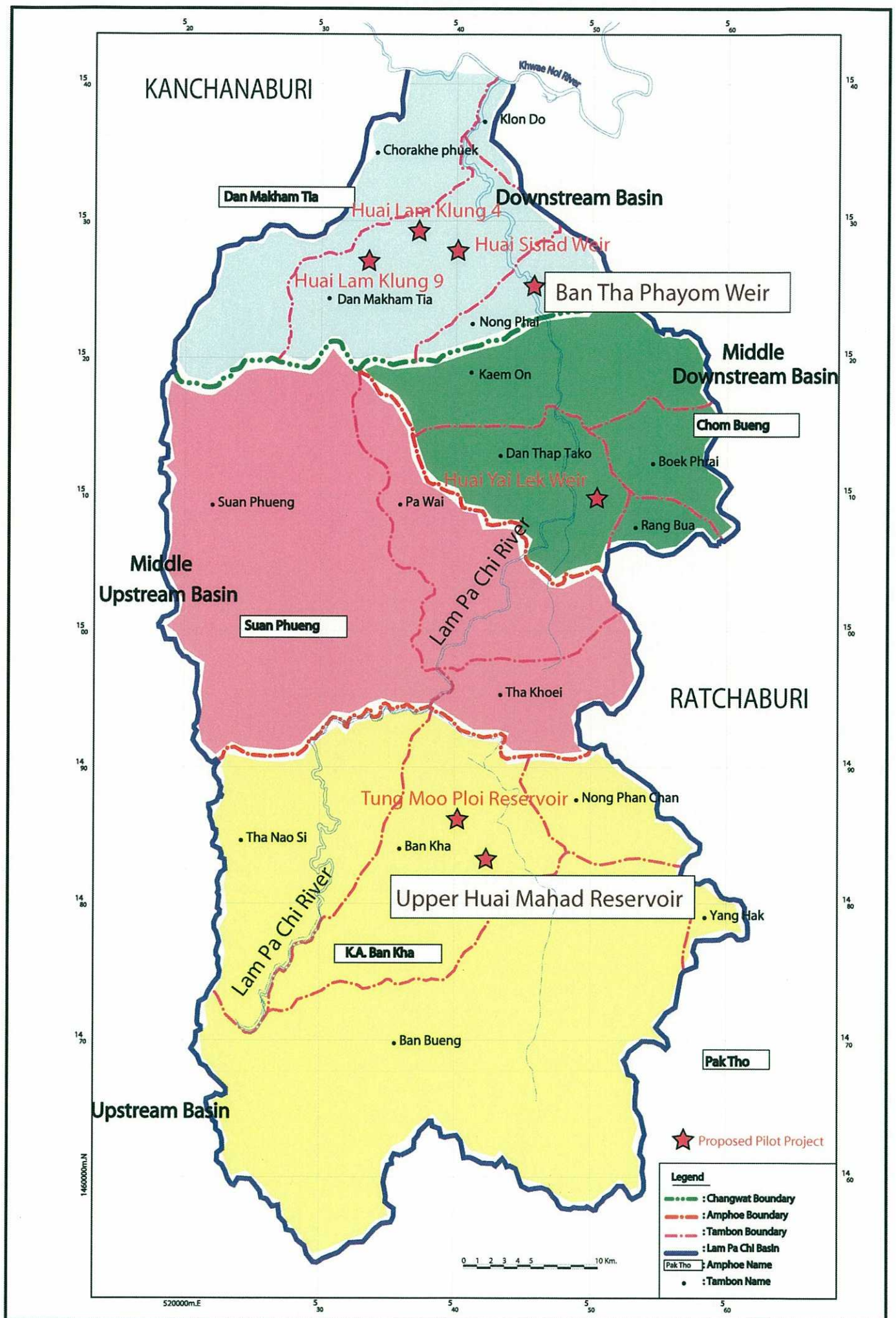
To realize the improvement of the living standard of the local people in the Study Area, the Final Report of the above-mentioned project has drawn up as the output.

We wish to take this opportunity to express our sincere gratitude to your Agency, the Ministry of Foreign Affairs, Ministry of Agriculture, Forestry and Fisheries of the Government of Japan. We also wish to express our deepest appreciation to RID, the counterpart agency, in the Kingdom of Thailand for the close cooperation and assistances extended to us during the Study.

Very truly yours,

Michio Goto
Team Leader of the Study Team





Location Map of the Proposed Pilot Project



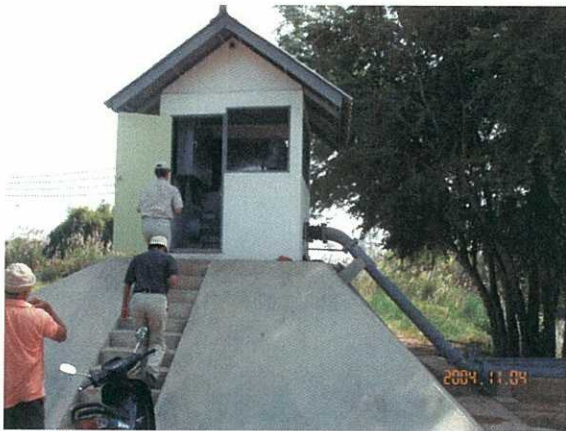
Bank erosion and sedimentation along with the Lam Pa Chi river



Training on facilitation of PCM workshop at RID 13 regional office



PCM workshop at TAO for establishment of the Master Plan



Pumping house
at BTPW Project



Booster pump installed by a farmer



Facilities for compost making constructed by the Pilot Project



Products of the compost



Study Tour on livestock breeding



Irrigation for maize



Demonstration plot of sugarcane
provided by RID



Irrigation for cucumbers



Trial of irrigation system



Irrigation for Chinese cabbage



Furrow irrigation for
bitter melon



Farmers and TTC meeting for monitoring and evaluation of the Pilot Project



Technology Transfer Seminar



Poster for demonstration of the project activities

EXECUTIVE SUMMARY

1. BACKGROUND AND OBJECTIVES

1.1 Background

The Water Resources Development Plan of Mae Klong river basin was formulated and prepared in 1970's, and some of those projects were implemented which irrigate 480,000 ha of vast land along Mae Klong River. With all those implemented irrigation projects, the area within the Lam Pa Chi River Basin was never been considered and benefited from any of those major project so far. These areas remained underdeveloped and show a considerable income disparities very much lower compared to those developed areas in the region. Much more, the occurrence of periodic monsoons brought serious damage in the area, particularly sedimentation at the riverbeds and erosion at riverbanks.

1.2 Objectives

The objectives of the Study are:

1. To formulate a rural and agricultural development master plan, whereby increasing the incomes of small-scale farmers, who are suffering from drought and/or flood, through Participatory approach.
2. To carry out technology transfer to the personnel in RID, TAO and other relevant organizations on the subjects of planning and surveying methods such as participatory method, with the aims to enhance institutional capabilities of such organizations.

1.3 Rationale of the Participatory Development

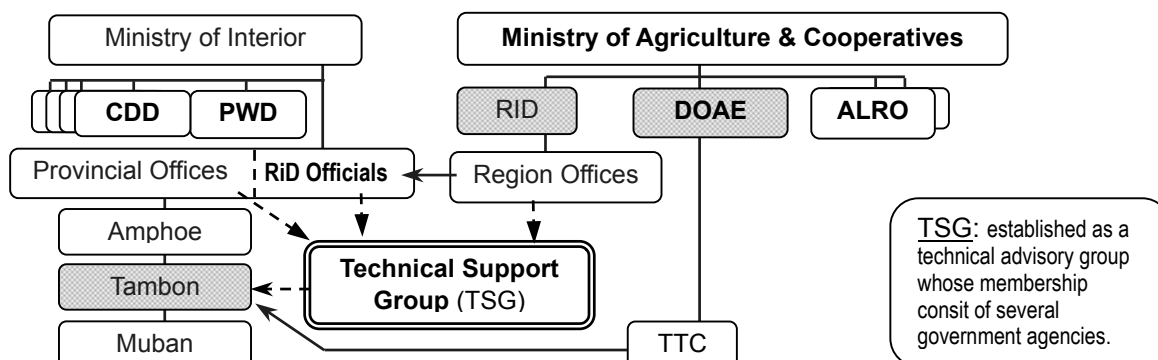
The 1997 enacted constitutions follow the principle of decentralization with the intention of introducing the participatory development approach in the Ninth National Social-Economic Development Plan. In this Study, it pursued the processes of participatory planning approach whereby communities involved participated in preparing and implementing the regional development plan and not the "Top-down" manner as what have been done before. The lessons learned in this process through its pilot projects shall be followed and implemented in succeeding formulation and realization of the appropriate community participatory development to complete the Master Plan.

1.4 Study Area

The Study Area is located 2,526.94km² in the areas of Lam Pa Chi River Basin. The Lam Pa Chi River is one of the tributaries of the Mae Klong River, which runs along the border of Myanmar to the gulf of Thailand. The study covers two provinces which are Ratchaburi which shares about 86% and Kanchanaburi with 14% of the study area respectively. The two provinces composed of 145 villages which lies in 16 Tambon located in 5 Amphoes. Population of the Study Area is 70,138.

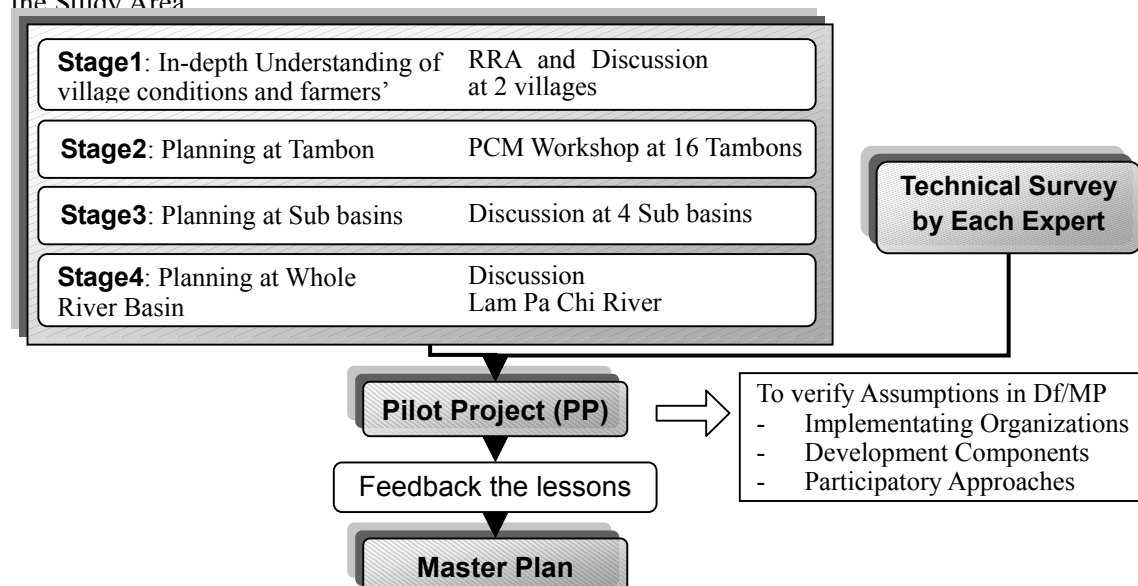
2. IMPEMENTATING ORGANIZATION

For success of the development of Lam Pa Chi River basin, collaboration among the government organizations is indispensable. It is highly expected that participating organization shall play its vital role not only in planning but in all aspects of implementation of the Master Plan, since it covers not only water resource development but also other fields necessary to solve the formers' problems. At the field level, Technical Support Group (TSG) is the key entity for collaboration.



3. PROCESS OF PARTICIPATORY DEVELOPMENT PLANNING STUDY

The Figure below shows the process of participatory development in formulating the Master Plan of the Study Area



4. CURRENT CONDITION IN THE STUDY AREA

4.1 River Discharge

The volume of rainfall and run-off in Lam Pa Chi basin as estimated by Land Department shows that the maximum monthly discharge occurred during October with 76.39 MCM and the minimum discharge occurs on January with an average mean run-off of 357.30 MCM/year which is about 11% of the Total.

4.2 Flood Damages

Most of the areas located downstream of confluence of Lam Pa Chi and Tha Khoei rivers suffer from erosion problem. It is reported that erosion advances by 4 to 5 meter after the occurrence of flood in severe places remarkably along Lam Pa Chi river, downstream basin in Kanchanaburi Province.

4.3 Sedimentation

The Annual suspended sediment yields of 3 watersheds in Mae Klong Basins are: 109.0 ton/ km²/year in Khwae Noi, 119.0 ton/ km²/year in Khwae Yai and 99.0 ton/ km²/year in Lam Pa Chi. Mean annual suspended sediment yield on Lam Pa Chi River (99 ton/ km²/year) shows a little bit less compared to the other basins of Khwae Noi and Khwae Yai.

4.4 Estimated Current Water Potential

Based on the 1,270 mm/year average rainfall, water balance in the Study Area is roughly estimated as shown in the table below. The Ratio of medium and small-scale dams and weirs constructed by RID is 51MCM or 13.6% and these facilities are the most important ones for current water resources for irrigation. As for the farm pond, almost all are around 1 rai and dried up during the dry season, it is therefore recommended to install intake facility to divert water into the ponds during rainy season as well as expand its area and depth more larger and deeper as of its present existence so that it could store water of about 306.5 MCM to be use available for irrigation purpose. On the other hand, current groundwater use of well are roughly estimated at 13 MCM. Finally 83 MCM of groundwater will still be possible to be developed in the Study Area

Water Balance in the Study Area

(Unit: MCM)

Item	Evaporation	Surface Runoff	Recharge	Total
Water Balance	2,736.7 86 %	357.3 11% (100%)	96.0 3%(100%)	3,190.0 100%
Current Water Use		50.5 (13.6%)	13 (14%)	
Availability (Balance)		306.5 (86.4%)	83 (86%)	

4.5 Agriculture

(1) Main Crops

Sugarcane, pineapple and cassava are main the crops in the Study Area. Pineapples are mostly found at the hilly area of the up stream basin where less water resources are available. Sugarcanes which are rainfed are primarily planted in the lower river basin. On the other hand, cassavas are widely plannted in whole river basin.

(2) Fishery and Livestock

Small-scale fisheries were well found throughout the study. Considerable numbers of farmers cultivate fish in their own farm ponds or public reservoir for home consumption and, in some cases, sell to local market. Less than 20% of total households in Lam Pa Chi River basin engaged in livestock production. Fowls and cows are most popular and share about 8% and 6% respectably. Typically, individual farmers raise a few cattle in their property where less pasture is available. Farmers often bring their cattles to common area or in their neighbors land for feeding.

(3) Marketing

There are two main wholesale markets in Kanchanaburi and Ratchaburi where farmers brought directly or indirectly their vegetables and fruit products. With regards to sugarcane, pineapple, and cassava, farmers brought their products, in any ways, to the factories, which are also located in Kanchanaburi and Ratchaburi province. The trend of the marketing price between sugarcane and pineapple are completely different since the stabilized price of sugarcane is being dictated by the government while the price of pineapple is usually fluctuating through times.

(4) Irrigation

There are medium to small-scale dams and weirs constructed by RID while other agencies constructed small weirs and ponds for irrigation purposes with the total combined irrigable area currently estimated at about 90,130 rai or 14,420 ha which is about 14 % of the whole cultivated land in the Study Area.

4.6 Existing Environment Conservation Activities in the Study Area

The Ratchaburi Environment Office is under the Permanent Secretary Office of MNRE and serves 5 provinces. The office is in charge of air and water pollution as well as soil erosion in these provinces. Any severe problems concerning these pollutions are not properly reported except those of soil erosion. The water quality is categorized into class 2 and 3 based on the Surface Water Quality Standard of 1992, which categorized water quality into 5 classes. The data shows that the water quality of the river is not so deteriorated.

4.7 Constraints

Constraints in the Study Area were revealed through the technical survey and agreed upon by the stakeholders through the participatory approach. Enumerated below are the major constraints in each specific field of the study.

(1) Water Resources

Surface Water Resource

- Limited water resources development, which have resulted to frequent flood and/or drought.
- Shortage of irrigation water and lack of knowledge for water control system.
- The downstream portion of the Lam Pa Chi River basin has recently been facing with a problem of polluted water due to release of certain poisonous chemicals by the upstream farmers for fishing purposes and heavy use of pesticides and insecticides.

Underground Water

- Almost all of the shallow wells are difficult to use for irrigation water during dry season because the groundwater level dropped during this time.
- Making a construction plan of wells becomes difficult because many government agencies such as DMR, PWD, ALRO, DH, etc. are engaged in the constructing wells on their own way.
- There are no monitoring records available where to observed the long term groundwater levels.

(2) Agriculture

- Low Productivity: Poor soil fertility, damages from diseases and insects
- High cost of agricultural inputs compared with the price of products

- Low price of product: Inappropriate relationship with middleman
- Lack of knowledge on farming: Unreliable extension services from the government
- Mono-crop plantationand: Lack of fund for agricultural investment

(3) Irrigation

- Currently the farmers have a tendency to developed irrigation water for their own use but, with limited resources, accordingly, the facilities are not highly efficient and effective.
- Farmers suffered from lack of funds to purchased small scale irrigation facilities (small scale pump with piped systems), especially at upstream and middle upstream basin.
- Due to shortage of water during dry season, farmers were not able to practice irrigation farming.
- Ponds less than 1 rai of size are not enough to stored water through a year for irrigation purpose.
- There are no regulations/rules for the use of water from ponds, weirs, etc. for irrigation purpose.

(4) Related Public Organizations

Decentralization

- With the current decentralization policies, the provincial governors have been given more authority for the development of their respective areas. With this development, the relationships between the RID and the provincial office are therefore changing, and at present, it is not yet clear in what way it influence agricultural development as well as what agencies take what responsibilities for the development.
- The TAOs have been given the responsibilities of planning and implementing small scale projects, including the management of its budgets. However, most of them are not yet capable for it.

TTC

- Many TTCs are not active because the number of extension officers and workers who are the key for the TTCs, are not yet capable and adequately equipped.
- Extension workers are not keen in promoting participatory or grass-root development.

Participatory Development

- The participatory development is still at the conceptual stage. The public agencies at the central as well as in the local levels are much not aware of what their tasks are. The roles and responsibilities of each implementing agencies are not clear.
- The officers and field workers are not skilled for implementing participatory development.
- Participatory development requires the changes of development process, which eventually requires organizational changes. It will generally encounter a lot of resistance in and outside of the organization and it would be easy to hit a setback.

(5) Community Organizations

- There is a little collaboration among the members within an organization. The reasons would be (i) most of the community organizations had been established by the agencies but not by the people, and (ii) group work is not traditionally exercised.
- The number of active members in an organization is very minimal.
- The negotiation power of the organizations against middlemen or agents of factories is still weak.
- There are various kinds of community organizations wherein some of which are established by the different agencies in a village with similar activities. In most cases, they are not linked or well coordinated.

5. PILOT PROJECT

5.1. The Objectives of the Pilot Project

The objectives of the Pilot Project were: 1) to transfer the technologies on participatory development to the community people and the Government officers, 2) to verify the recommended development approaches in the Master Plan, and 3) to obtain “lessons learned” from the implementation processes of the project. The results of the Pilot Project were reflected in the Master Plan.

5.2 Overall Implementation Schedule

The overall implementation schedule and participatory process for planning are shown in the table below.

	2003			2004				
	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May
Decision of the PP Site	▲							
Topographic Survey	■	■						
Detail Design		■	■					
Cost Estimate & Implementation Planning	■							
Procurement				■	■	■		
Implementation				■	■	■	■	■

5.3 Project Site

Two project sites were selected and approved by the Steering Committee in Ratchaburi and Kanchanaburi following the selection criteria suggested by the Study Team. The table below shows the outlines in each project site.

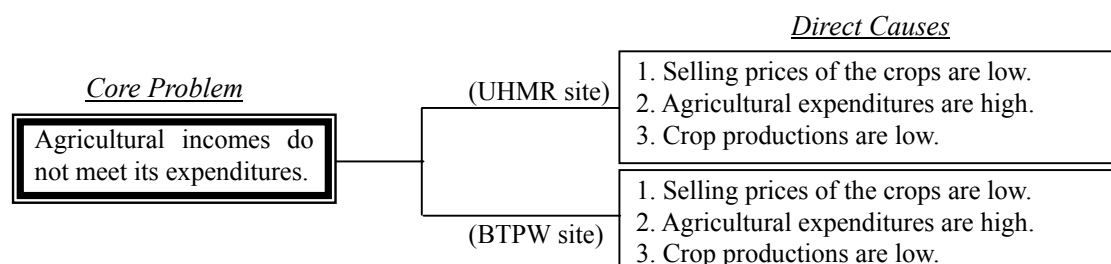
Upper Huai Mahad Reservoir (UHMR) in Ratchaburi Province, Nong Chok village: gravity irrigation					Ban Tha Phayom Weir (BTPW) in Kanchanaburi Province, Ban Tha Phayom village: pump irrigation				
Area (rai)	Agri. Are (rai)	Household	Population	Main Crops	Area (rai)	Agri. Are (rai)	Household	Population	Main Crops
9,200	4,459	158	653	S, P, M	3,950	3,900	129	620	S, SW, BC, V

Note; S: sugarcane, P: pineapple, M: mango, SW: sweet corn, BC: baby corn, V: vegetable

5.4 Project Design

(1) Project Approaches and Activities

Stakeholders discussed the problems and possible solutions of their agricultural production in the area, and selected the possible approaches to be included in the Pilot Project. Through the discussions, the relationships between the direct causes with the core problem was identified:



As shown above, the direct causes of the core problem are the same in two sites. The possible solutions and the approaches to be included in the Pilot Project were identified in the following ways:

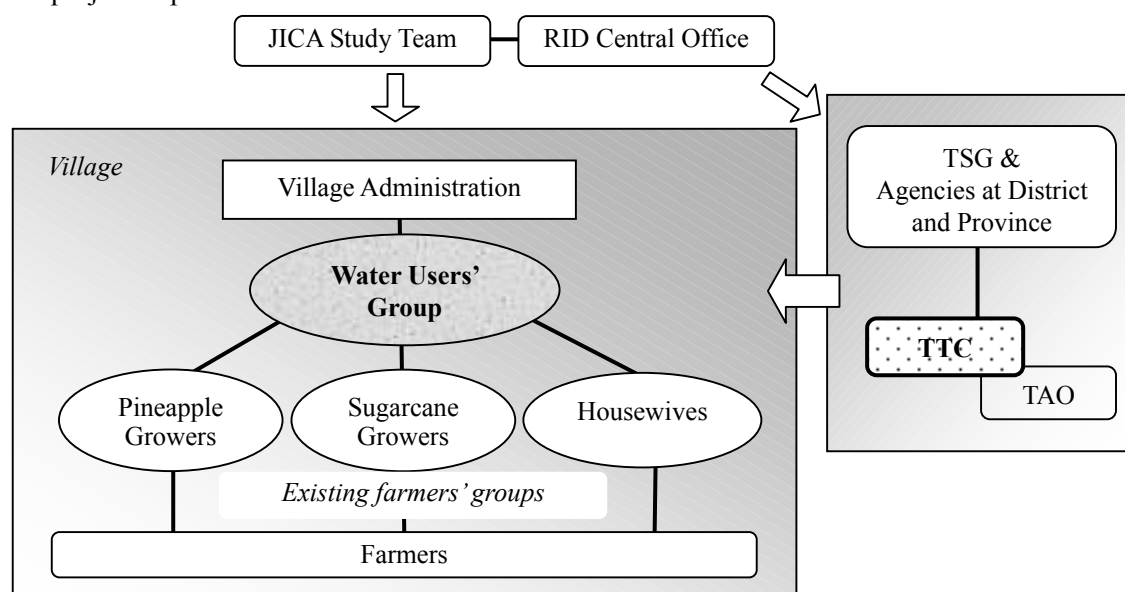
Causes	Solutions by the Pilot Project	Project Approaches
Selling prices of the crops are low		
	(1) Improvement of crop qualities	(a) Provision of agricultural extension services
	(2) Introduction of new cash crops	
	(3) Improvement of price negotiation power of the farmers	(c) Strengthening of farmers groups
Agricultural expenditures are high		
	(1) Improvement of usage of fertilizers and pesticides	(a) Provision of agricultural extension services
	(2) Introduction of organic fertilizers	
	(3) Promotion of group purchase of necessary inputs	(c) Strengthening of farmers groups
Crop productions are low		
	(1) Construction of pipeline irrigation system	(b) Provision of irrigation facilities
	(2) Improvement of farmers' knowledge on cropping and soil improvement	(a) Provision of agricultural extension services

The project was therefore designed to eradicate the core problem by applying the above three mentioned approaches. In addition, the project intends to strengthen the public supporting system for the farmers, focusing particularly on the TTCs and TSGs to ensure the smooth implementation of the project activities as well as the project sustainability. Through the workshop, the farmers, TSG members and the Study Team discussed and agreed to include the following activities in the project.

<u>Project Approaches</u>	<u>Project Activities</u>
(a) Provision of agricultural extension services	<ul style="list-style-type: none"> - Establishment of demonstration plots - Conduct of study tours - Provision of trainings on crop planning, quality and quantity improvement, introduction of new crops, use of fertilizers and pesticides, making of organic fertilizers and livestock rearing
(b) Provision of irrigation facilities (incl. WUG establishment)	<ul style="list-style-type: none"> - Establishment and provision of trainings to WUG (water users' group) on O&M of irrigation system and water management - Discussion on pipeline alignment - Survey, design and cost estimate on construction - Construction of irrigation facilities - Discussion and provision of trainings to WUG on group
(c) Strengthening of farmers groups	<ul style="list-style-type: none"> - Establishment and management of the WUG fund as a revolving fund, saving strengthening - Facilitation of group activities - Strengthening collaboration between WUG and other farmers groups
(d) Strengthening of the TSGs and TTCs	<ul style="list-style-type: none"> - Meeting with TSG and TTC members on project planning, monitoring and evaluation - Provision of Training of Trainers (TOT) on project management and institutional strengthening

(2) Implementation Structure

The project implementation structure was established as follows:



The project was implemented in collaboration with the villagers, government agencies and JICA Study Team. In the villages, the WUG, established by the project was responsible for coordinating and managing all the project activities under the supervision of the village administration.

5.5 Project Details and Outcomes

(1) Detailed Plans of the Responsible Agencies

According to the PO (1), the TSG prepared the detailed plan of each activity for which they are responsible. In the detailed plans, each of the agencies made clear who would be the persons in charge, steps to be undertaken, the expected number of participants, etc.

(2) Plans for Institutional Strengthening

In the Implementation Structure, TSG, TTC and the farmers' organizations were supposed to play the main roles for implementing each activity. To strengthen such organizations, some activities were planned as shown in the following matrix below:

<u>Objectives</u>	<u>Approaches</u>
For government agencies:	<ul style="list-style-type: none"> - Training on Trainers (TOT) for TSG - Training on Trainers (TOT) for TTC - TTC meeting
For grassroot level organization:	<ul style="list-style-type: none"> - Water Users Group (WUG) meeting
For coordination among the parties concerned	<ul style="list-style-type: none"> - TSG meeting (among government agencies) - Joint meeting with WUG and other farmers' group (among farmers groups) - Joint monitoring workshop (between government agencies and farmers groups)

(3) Achievements of the Pilot Project

1) Progress and Performances of the Project Activities

Almost all of the project activities proposed in POs (2) in UHMR and BTPW were completed by November 2004 as shown in Table below.

Progress of the Project Activities

Project	Completed	Not completed	Nothing is done	Total
UHMR	22	0	0	22
BTPW	20	1	0	21
Total	42	1	0	43

2) Institutional Strengthening

The Pilot Project facilitated establishment of open communication among the stakeholders by frequent workshops, meetings and discussions. Study tours are very much useful for building a team among and between farmers and extension workers of the government since it does not only focused on learning technical issues but also developed camaraderie by spending time together. Although the stakeholders had to spend a lot of their time in the project as it follows the nature of participatory approach, this was able to contribute largely in strengthen institutional ties.

3) Handing Over of the Irrigation Systems

Ownerships of the irrigation system projects both in UHMR and BTPW were tranfered from RID to the local organizations. The turnover of the completed Pilot Projects in short period of time is a remarkable achievement.

(4) Cost Sharing

The principles of the cost sharing among the stakeholders were set prior to the Pilot Project. The result of the cost sharing is summarized in the table below.

Stakeholders	Results
Farmers	<ul style="list-style-type: none"> - O&M of the irrigation system will be undertaken by TAO and WUG with support from RID. WUG will collect water fee for O&M. - Some farmers installed on farm level irrigation facilities and connected with secondary pipelines - Other farmers are yet to install: <ul style="list-style-type: none"> *Waiting for harvest of sugarcane and pineapple in UHMR *Waiting for the amount of electric fees to be actually paid - All the farmer beneficiaries provided their lands for construction of irrigation schemes
RID	<ul style="list-style-type: none"> - Topographic survey was conducted by RID - Detail design and cost estimation were conducted by RID - Detail design was revised as per farmers' requests in BTPW - Construction of irrigation facilities were completed by RID with the materials, labor and fuel supported by JICA - Pumps and supplemental materials were installed by contract basis - Training on water management was provided to the farmers - Demonstration plot was established
Private sector	<ul style="list-style-type: none"> - No loan was given by the private sector as part of the Pilot Project activities, there is too little incentive for sugar factory to invest in small scale project
Other related agencies	<ul style="list-style-type: none"> - A series of trainings were provided by DOAE, DOL, LDD, and DOCP - Artificial Breeding Center was established in BTPW - Additional training was provided
JICA	<ul style="list-style-type: none"> - Construction materials, necessary equipments for software components, labor and fuel were provided

(5) Impacts

The following 11 events were identified as the project impacts:

- (1) TAO Nong Phai Selected as the Best TAO in the Province for Two Years
- (2) Compost as One-Tambon-One-Product (OTOP)
- (3) Incorporated the Project Plan in the CEO plan (Ratchaburi)
- (4) Establishment of Artificial Breeding Center
- (5) DOAE's Intensive Area for Chemical-Free Vegetable Production in BTPW
- (6) DOAE's Support to Baby Corn Production in BTPW
- (7) RID's Support to Establish Sugarcane Demonstration Plot in UHMR
- (8) Gender Issues Concerned
- (9) Promotion of Environmental-friendly Agriculture
- (10) Link with an Advanced Farmer for Technical Advice & Marketing
- (11) Save the Farming Time with Irrigation

(6) Necessary Improvement on the Current Activities

Although the achievements and impacts of the Pilot Project had been recognized as mentioned above, there are some project activities that should be improved and these are the following:

- (1) Calculation and Agreement of Irrigation Fee for BTPW
- (2) Installation of Tertiary Pipes
- (3) WUG Strengthening
- (4) Reduction of Input Costs by Group Purchase
- (5) Planning of Crop Production
- (6) Institutional Strengthening

(7) Issues to be further Considered for the Next Steps

Although the Pilot Project was terminated, the project activities are supposed to be continued. As for the next step of the project, the following issues must be considered.

- (1) Marketing and Processing
- (2) Diversification of Crops in Nong Chok Village
- (3) Balance on the Use of Water from UHMR
- (4) Expansion of Direct Beneficiaries of Pump System
- (5) Effective Use of Irrigation Water
- (6) Soil Improvement in Nong Chok Village

(8) Project Sustainability

Although the Pilot Project was terminated, the project activities are expected to be continued and produce the desired outputs. There are, however, some key issues to be fulfilled in assuring the project sustainability as follows:

- (1) Collection of Irrigation Water Fee for BTPW
- (2) Budget Allocation for O&M of the Irrigation System
- (3) Collection of Fertilizer Fee for UHMR
- (4) Production and Selling of Compost for BTPW
- (5) Development of Marketing Strategies
- (6) WUG Remains as the Core Organization
- (7) Continuation of Support Systems

5.6 Project Justification

The implementation of the Pilot Project was justified from the following aspects:

- (1) Application of Participatory Development Approach
- (2) Compliance with the Policies/Strategies
- (3) Meeting with the Farmers' Needs
- (4) Effectiveness of the Project
- (5) Project Efficiency (Costs and Benefits)

5.7 Conclusions and Recommendations of the Pilot Project

(1) Whether the Development Plans Recommended in MP Can Meet the Farmers' Needs

Three approaches have been undertaken to tackle the direct causes in the Pilot Project. The outcomes of those project activities are summarized below:

- 1) As an overview, the farmers' needs, "increase in agricultural incomes and decrease in expenditures", can be met through the proposed approaches.
- 2) Agricultural extension services showed their effectiveness in various trainings. However, one of the direct causes, "selling prices of crops are low", have only been partly improved and therefore, further efforts are needed through trainings such as improvement of crop qualities and strengthening of farmers groups.
- 3) Since water fees generally increase farmers' expenditures, irrigation farming could not meet the farmers' needs unless its incomes surpass the expenditures. In order to address this issue, introduction of new cash crops, crop planning, market development, etc. have been recommended. The stakeholders need to collaborate more closely in supporting farmers in accomplishing those recommendations.
- 4) The WUG capability is insufficient to fulfill their responsibilities, thus they need to be reinforced furthermore through series of trainings. In particular, they left several tasks for the future such as i) an increase in selling prices of crops which would result to strengthening the capacity of negotiation power with the market including middlemen, ii) the formulation of crop production plans for the whole villages, etc.
- 5) Regardless whether or not the name of TSG will continue to exist, the commitment of government at the provincial level will remains strongly needed. It is expected from them to play a "realistic" role taking into account the lessons learned from the Pilot Project. To further strengthened the TSG, it is necessary that all agencies under the provincial governor should coordinate and collaborate in their activities in pursuing the common target - attainment of the CEO plan.
- 6) It would be difficult for TTC to be functional as "one stop service center" as the government expects it, if the current form of TTC continues to exists. Further review of its organizational structure and components to suite the form it was expected to perform by trail and error shall be needed.

(2) Technology Transfer of Participatory Development Approach

- 1) The project recipient must understand the importance and merits of the approach and accept the processes of the technology transfer to make it successful. In other words, whether the processes and methodologies used in any activity engaged long time, what matters most is the acceptability of stakeholders which is the key characteristic of the approach and can be justified by the parties concerned.
- 2) Due to the Public Administration Reform that the RID will no longer be engaged in development planning but concentrate on construction of the facilities in near future, RID therefore will no longer be an appropriate body as a recipient of technology transfer of participatory development.
- 3) After the commencement of the implementation, the officers at the provincial and lower levels increased sharply their participation. It indicates that they started to understand and embraced the significance and importance of participatory development and see the value of participation in the project since then.
- 4) During evaluation workshops, both the government offices and farmers concerned expressed their impressions that “a participatory approach is time consuming, but we have finally realized its value at this stage”. Thus, it can be expected that participatory development approach and necessary institutional strengthening will take root gradually as time pass by themselves.
- 5) The transfer of technology of participatory development approach to stakeholders had been difficult due to lack of incentives. But despite of its small scale implementation of the Pilot Project, it was very significant pursuing its purpose by transferring all the processes, methodologies and technology of participatory development approach to recipients as can be seen on their all out support to the project.
- 6) The above statement indicates an important lesson that the officers at the provincial and lower levels can be motivated to participate in the planning stage when they recognize “the plans they prepared are implemented.”
- 7) Stated below summarizes the lessons learned from the application of the participatory development approach regarding its advantages, its applicability to development, and the suggestions and recommendations for its effective use.
 - **RRA method:** Based from opinions of the RID staff and TSG member's, it can be said for the general understandings that RRA method is quick and effective method to understand deeply the situations, problems and needs of the farmers. In the Pilot Project, the RRA survey was conducted for five days in each village, and the duration is considered appropriate.
 - **PCM method:** The PCM method is considered effective in facilitating the process of discussion on problems as well as project plans by gathering a number of stakeholders at one place. The method was widely accepted by the farmers and officers, after seeing some positive outcomes in the Pilot Project. They had rarely made project plans together before they participated in this project. In addition, the PO prepared through the workshop became

the common tool among TSG, TTC and the farmers, and considered useful particularly for monitoring the progress of the project.

- **Discussions:** It was considered that a series of discussions in the Pilot Project was able to facilitate communication among the stakeholders, which have contributed in solving many problems and issues. One issue is that, some participants had never expressed themselves especially when the scale of the discussion is bigger. This was improved by giving an opportunity for those non-speakers to speak out by dividing the participants in smaller groups as far as time permits, or their opinions must be collected in advance

(3) Lessons learned to the Master Plan

1) Agricultural Production Improvement Plan

- Farmers' demand on composting was unexpectedly high for its effectiveness not only for improving soil fertility as expected in the plan but also for decreasing the expenditures by replacing expensive chemical fertilizer. Compost is gaining importance in the current policies. For example, compost has been selected as an OTOP for the Tambon, and its use had been promoted as one of the development strategies of Kanchanaburi province. Therefore, more active promotion of the production and use of compost should be included in the plan.
- Soil and water quality tests were carried out. The suitable compositions of compost, varieties of fertilizer, and pH of irrigation water are all necessary for soil improvement. Therefore, such tests should be included in the project activities.
- Although there was no specific plan for livestock development in DMP, an artificial insemination done by the livestock department was found to be effective and inexpensive. Since the artificial insemination center established by the department provided services to the farmers in several Tambons, this should be a part of the plan.
- It was already mentioned that the study tours were effective for the farmers to learn new technologies, therefore it should be emphasized as one of the project activities.

2) Micro-credit Plan

- The project provided a start-up-fund to the revolving funds, and then the farmers began to purchase fertilizers in bulk and compost making with the funds by group. Such activities reduced the expenditures for interest and agricultural inputs, and thus the farmers pay strong attention to the activities and the number of the participants has been increasing. As the profits generated from such activities should return to the funds, the amount and effect of the fund are expected to grow. Therefore, the micro credit plan should involve support to initiate micro enterprises as a group activity and to make them sustainable.

3) Other Items to Be Mentioned

- TOT was highly informative for them to learn how to consider agricultural development for their areas, how to act by themselves, and how to lead the other members through exchanging

ideas with the other participants.

- In the Pilot Project, the Study Team conducted monitoring and evaluation of the implementation of the project to confirmed its progress, discussed problems and constraints, and agreed on any revision of plan if necessary. It build awareness among the stakeholders that periodical monitoring is indispensable for carrying forward the project smoothly. Such monitoring is expected to be conducted by the government agencies for the future. In such monitoring, it is necessary to prepare “a guideline” which stipulates organizations and persons to be in charge of the monitoring, how to report the results, and how to respond to it. It should be underlined that such guideline be formulated at a provincial level and be strictly enforced.

6. MASTER PLAN

6.1 Needs from Inhabitants

The result of the PCM workshops and discussions reached to one core output that all of Tambon in the Study Area share the same type of issue shown at the top of the Problems Trees as “**High expenditure compare to income**” that was caused by 4 main problems namely 1) High cost for agricultural inputs, 2) Low productivities, 3) Damage on the products, and 4) Low market prices.

6.2 Direction of the Development Planing

In line with the results of participatory planning and with taking due consideration of the governmental policies, the goal of the Master Plan is defined as “**Agricultural incomes meet its cost.**” To achieve the goal, Master Plan was formulated in such way to produce the following outputs;

- | |
|---|
| 5. Cost of agricultural inputs should be lowered,
6. Productivities should be raised,
7. Farm gate prices for markets should be raised, and
8. Damages on products should be lessened. |
|---|

To attain the outputs, the Master Plan applies the following components and objectives which have been finalized through a series of participatory approaches in the Study.

Development Components and Objectives

Components	Objectives
1. Water Resources	Ensured sufficient water for production
2. Flood	Reduced damage on crops by flood.
3. Production System	Improved knowledge on farm account, farming technology, cropping plan, to obtain good seed & seedling, to produce good quality products, to introduce crop diversifications, and to promote farm processing
4. Soil	Improved soil fertility conditions
5. Farm Inputs	Farmers produced their farm inputs
6. Pest and Disease	Reduced damage on crops caused by pest and disease
7. Credit	Eased the access to credit with low interest rates
8. Marketing System	Lowered the purchase costs and reduce the use of inputs, by ensuring or raising the selling prices of products

6.3 Feedback from the Pilot Project

Lessons learned through the Pilot Project are integrated into three items such as:

- 1) Implementation Structure: roles of each agency concerned
- 2) Development Component: effectiveness, feasibility and farmers' needs on the components
- 3) Participatory Approach: process from planning to evaluation

Lessons on these issues were feedback to each item in the Draft Master Plan.

6.4 Development Plans

(1) Land Use Plan

In 1961 the forest area was 27.36 million ha or 53%, and was reduced to 17.12 million ha or 33% in 2000 in the whole country. Compared with the current situation of deforestation in the country, the Lam Pa Chi river basin shows 56.9% in the planning stage and has been conserved as the forest area to date. As for the agricultural zone, land use in sugarcane, pineapple and cassava which are main crops in the Study Area were proposed to rotate with three-year term followed by other upland crops such as leguminous ones in order to prevent land degradation or disease/pest to avail sustainable crop productivity.

(2) Potentiality for Water Resources Development in the Whole River Basin

Based on the RID Regional 13 office's plan, nine (9) medium dams have been proposed. It will be able to store about 285.MCM, which is about 4.6 times bigger than the current water storage volume of 32.65 MCM. In order to mitigate flood or drought damages, construction of the medium scale dams are essential and should be given first priority taking into considerations the community's consensus as well as the environmental aspects carefully. On the other hand, so many numbers of small-scale facilities, such as farm ponds, weirs and dams have been proposed by TAO. Since the construction cost of this facilities are low, effectiveness appears immediately and O&M of facilities are easy compared to the medium scale facilities. Construction of these facilities should be promoted actively for the time being.

(3) Irrigation

RID has proposed 34 small scale and two (2) medium scale irrigation development systems in the master plan that would be able to irrigate about 6,500 ha, which is about 2.6% of the whole cultivated area of 252,694 ha. in the Study Area. In addition, also 56 pump irrigation systems has been planed in the Study Area. Know How in Ban Tha Phyaom Weir pilot project for organization of the WUIG, O&M as well as collection of electricity fee, etc. will be usefull for these facilities. In order to use water effectively in the exsiting water resources facilities, dredging of swamp, ponds and canals are proposed actively.

(4) Mitigation of Flood Plan

According to the RID 13 Regional Office, riverbanks in mid-down to down stream including the pilot project area of Ban Tha Phyaom has been given the first priority project to protect from flood damages. StoneMasonry method for riverbank protection of 14.6km on the right bank and 11.8km on the left bank has been proposed and about 653.2 Milloin Bt has been estimated. The period of construction will take place about 3 years in the medium term plan.

(5) Agricultural Production Improvement Plan

- *Utilization and Production of Organic Fertilizer by Farmers:*

Utilization and production of organic fertilizer should be promoted at community level as a way to promote group participation. The needs and usefulness of the compost making was confirmed through the Pilot Project, hence, dissemination should be actively carried out.

- *Promotion of Livestock:*

Artificial breeding center, which was verified through the Pilot Project, should also be expanded throughout the Study Area and those that have work on it will act as counselors on livestock breeding.

- *Training Components:*

For trainees to gain maximum knowledge and experiences, a series of training activities must be conducted such as classroom and on-site training. Classroom training such as TOT is suitable for the leading farmers. Participants should teach what they learned to fellow farmers. On-site training, such as study tour, can demonstrate specific farm practices, farm equipments and their use; hence, farmers can directly gained new knowledge and skills and developed right attitude.

(6) Establishment of the Revolving Fund

As confirmed through the implementation of the Pilot Project, revolving fund works very well if profitable activities such as compost making and group purchasing are incorporated under good condition. Those mentioned above will be a good alternatives for the initial source of funds.

(7) Marketing Plan

- *Strengthening Farmers' Organization:*

Those who cultivated vegetables such as baby corn, sweet corn and string bean, mostly rely on credit from the middlemen and their negotiating power for crop price is nil. Targets to strengthened this farmers' groups are to create a power for (i) producing high quality farm products, (ii) negotiation and bargaining power in purchasing farm inputs and selling farm products.

- *Contract Farming System*

Contract farming system has been practiced in the Study Area for sugarcane, pineapple and asparagus. However, except sugarcane which is guaranteed by the government, the system contains many disadvantages for the farmers. To minimize risk of price fluctuation and production quantity, the contract may emphasize on marketing issues that cover price, quantity, quality of crops and time of delivery. Suitable crops for contract system are perishable crops such as vegetables and

fruits that needs prompt delivery to consumers or processing plants.

- *Agricultural Future Market System*

Agricultural future market is a place where buyers and sellers openly meet to bid or bargain and make a contract for future's delivery. Since the kind, quantity, quality, place and time of delivery is predetermined in this type of marketing system, farmers may face high risk. In this regard, goods suitable for negotiation in the future market are (i) Goods that can be classified according to the quality, (ii) Supply of goods must just be enough over the demand to prevent buyers' will to decide for its price, (iii) The goods should have a long shelf life, (iv) Bargaining and price demarcation should be free from the government control.

(8) Strengthening Plan for Relavant Organizations

- *Strengthening of Existing Farmers' Organization*

There were two plans proposed to strengthen existing farmers' organization. One is the provision of Training Program and two is the promotion of Active agricultural Extension Services and Institutional Development. In addition, through the implementation of the Pilot Project, it was found out that Study Tour is quite useful so as to learn new information and established linkages and networking among the participants. Futhermore, Training of Trainers (TOT) was also found to be a good tool for strengthening farmers' organizations as well as government agencies. Apparently, Study Tour and TOT was frequently and broadly considered and implemented.

- *Promotion and Establishment of New Farmers' Organization*

There is a need to establish new farmers' organizations in the Study Area to strengthen agricultural activities in areas where no organization exists. Given the lessons from the Pilot Project on the institutionalization, steps for farmers' organization establishment are proposed as (i) Conduct village forum to be attended by farmers having common interest to establish new organization for specific purpose, (ii) Identify objective(s) of the new organization, (iii) During meeting, leadership and key persons must be identified so that the organization committee can be formed, (iv) Collect data such as size of the production, area and number of households involved, and (v) Rules and regulations of the organization, including responsibility of the member and membership fee must be stipulated in their policies or constitution and by laws.

(9) Monitoring Plan for surface water and groundwater quality

The downstream portion of the Lam Pa Chi River basin is facing a problem of polluted water, due to heavy use of agri-chemicals in the upstream portion where the residues could also cause problems for underground water. In the Pilot Project, water and soil quality test were conducted and the results were reported to WUG which contributed to the establishment of compost making group. In this regard, quality tests should be conducted three to four times a year and the results should be reported to the agencies concerned.

7. IMPLEMENTATION PLAN

(1) Implementation Organization

In order to assure smooth and successful implementation of the project, several levels of coordination are necessary such as TAO level for action plan, provincial level among several agencies and central level for budgeting. Three levels of coordination committee and Field Working Group as recommended are shown in the box:

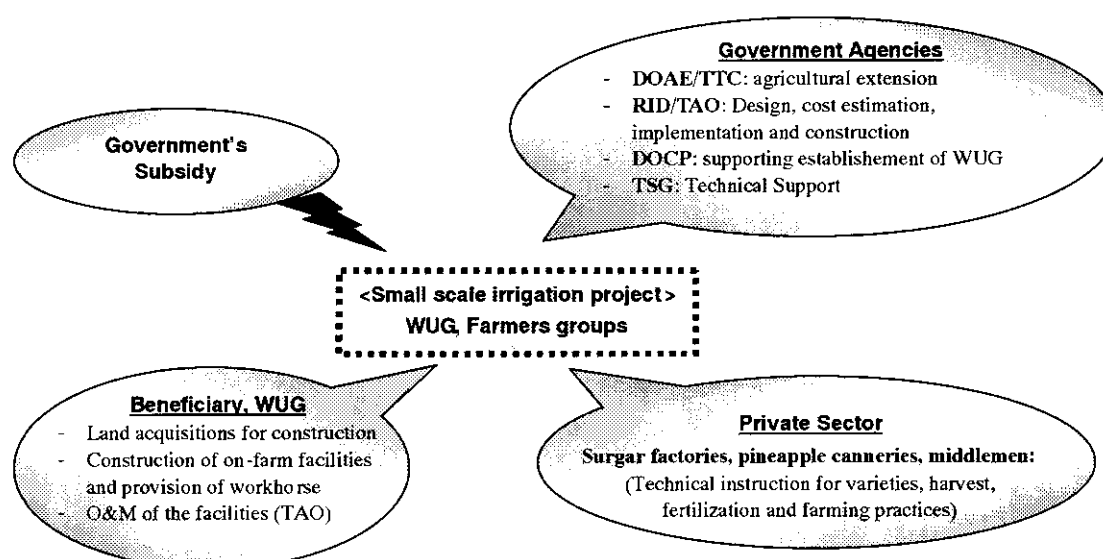
- 1) Steering Committee
- 2) Sub Steering Committee
- 3) Technical Support Group (TSG)
- 4) Field Working Group (TTC/District Officer)

(2) Implementation Schedule and Cost

First priority is given to projects with low cost and the effects could spread the fastest way which we called short term plan (3 years). On the contrary, high cost project such as medium scale dams and bank protection work for preventing flood are applied for medium to long term plan (4 to 20 years). Furthermore, policy issues such as price stabilization of the agricultural products, soil improvement, and quality improvement of agricultural products are included in the medium to long term plan. Based on the plans, total cost is estimated at about 4,514 million Bt, which consists of 1,608 million Bt for short term, 1,825 million Bt for medium term and 1,083 million Bt for long term project respectively.

(3) Cost Sharing

So as to improve the quality and quantity of sugarcane, sugar factories have much interest in supporting the farmers by introducing good variety and improvement of farming practices. Sugar factories may share the project costs only when the scale of the irrigation area is large enough. Hence, in order to have support from sugar factories and pineapple factories, TAO should support the farmers to scale up the planted area in Tambon level.

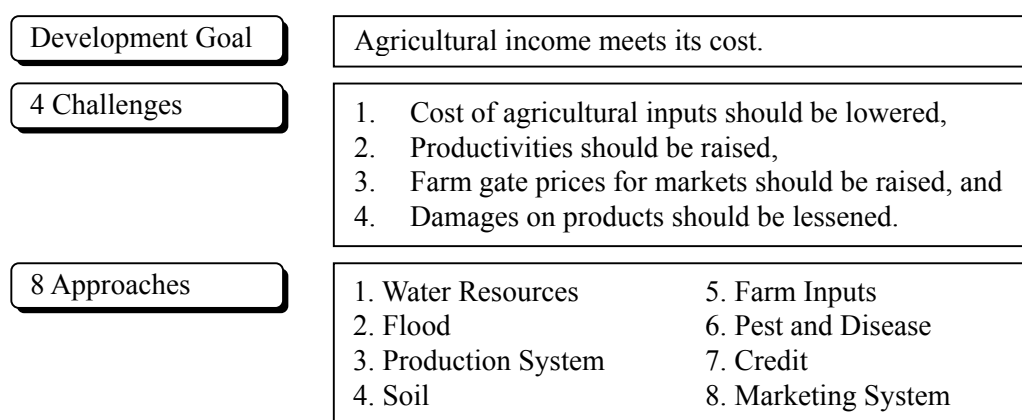


8. CONCLUSION AND RECOMMENDATION

(1) Conclusion

In formulating the Master Plan, series of participatory approaches such as RRA survey, PCM workshops at 16 Tambons and discussions at 4 sub-basins and whole basin were carried out. Through the process, many stakeholders deeply understood the necessity of participatory development. Particularly, the stakeholders learned a lot of precious lessons embodying the process of participatory approach and through the verification of the proposed system.

The figure below concludes the framework of the master plan, composed of the “goal,” “challenges” to achieve the goal and “approaches” to overcome the challenges. All of them are commonly understood and shared by all stakeholders participated in the Study.



The concept of participatory approach was applied all throughout concerning the Pilot Project. RRA survey and PCM workshops were carried out to identify problems to be solved. As a result, three approaches were proposed by the stakeholders such as 1) implementation of the irrigation; 2) strengthening of the existing farmer’s organizations; and 3) strengthening of the agricultural extension services. Accordingly, project components such as compost making, artificial breeding, revolving fund, transferring of irrigation facilities to TAO, cost sharing and study tours were implemented. All of them were proposed and materialized by farmers through their own efforts.

Various stakeholders participated in the process of formulating and establishment of Master Plan as well as Pilot Project. Through the process, each stakeholder realized their roles and responsibilities. Furthermore, since the idea that communication is essential for institutional strengthening, to maximized this, various workshops, meetings and discussions were frequently hold among the stakeholders. Although the stakeholders had to spend a lot of their time for the activities, such opportunities have contributed largely in strengthening institutional ties.

Local people tend to requested implementation of projects as shopping lists and likely to depend upon development aid lead by the Government. However, projects selected by the people themselves must

be able to be implemented by people themselves in cooperation with the Government agencies. As a good example, in the compost making implemented in the pilot project, the compost making group obtained the know-how through the study tour, and they have established the system by trial and error with support from the WUG and the TAO. As mentioned, the Study has achieved significant results in presenting precious opportunities for communities to show their initiatives in formulating their development with support of agencies staff during pilot project.

The master plan formulated in this report has been made with the concept that people themselves are main actors in the development. Based on the needs of people, the lessons derived from the pilot projects was feedback in the master plan. The plan also includes the construction of bank protection, medium dams, which are classified as public works and are not to be implemented by communitythemselves. Accordingly, Implementation of the projects formulated in the master plan were considered to contribute to the alleviation of the flood and/or drought damages as well as securing and improving peoples livelihood in the Study Area with a new framework of agricultural development.

(2) Recommendation

a) Justification of the process of participatory development planning

Through the Study, it has been confirmed that the participatory approach can grasp the people's needs and is effective in formulating the master plan which is more realistic than the top-down approach. Based on such experienced, the process of participatory planning is recommended to formulate watershed master plan in the future. On the other hand, some lessons learned for review have been noted as follows.

In the current situation, the officers at the lower level of bureacracy, the people and villages, are rarely involved in the decision making process. It is therefore recommended that the development planning and implementation process be institutionalized, and must stipulates that the project plans be made with the participation of people, and be given the highest priority for implementation. This would make the officers aware how important the project planning is, and be motivated in participating in the planning with the people.

In implementing projects in the future, participatory planning methods applied in the pilot project should be utilized making use of its lessons and served as a guideline. Member of TSG/TAO with the background of social development, and motivation and interest in village survey should be selected as facilitator to carry out the participatory planning method.

b) TSG's aggressively use and strengthening its function further.

It is necessary for rural development planning to consider both the top-down and bottom-up approach. However, at present, it is not clear which agency shall act as coordinating body among the various related agencies. While there are various requests from central or provincial level and villages or TAO levels, presently, selection of projects is usually made by the CEO Governor without sound evaluation.

In order to solve these problems, TSG has been established in the Study as a coordinator to act horizontally, which is the first attempt in Thailand. The significant achievement in the Study was the strengthening of relationship between and among related organizations in TSG. It is therefore, proposed that the TSG shall be the coordinator and in charge of screening the plans before handing down to the CEO Governor's judgment.

c) Budgetary allocation to realize the decentralization

It is essential to allocate proper budget to promote decentralization. The Government must exert more effort to increase funding sources as well as to transfer these rights to the province or TAO. Average annual budget of RID Regional Office and RID provincial offices in the Study Area are approximately 315million Bt and 90 to 100 million Bt, respectively. Judging from their present situation, these offices are capable to execute sustainable water resources development and irrigation projects continuously. On the other hand, an average annual budget of TAO in the Study Area in 2002 was approximately 90 to 100 million Bt. Although the Government has a policy to transfer all the small scale projects to TAOs, it is difficult for TAO to execute such projects without adequate budget allocation to TAO.

d) Institutional Strengthening

- TSG: (Technical Support Group)

The role of the TSG in the future should be as a coordinator among related agencies at provincial level. It is necessary that a mechanism and support to TSG shall be made so that TSG can hold discussions periodically and coordinate to materialize the plans proposed by TAO, district levels, etc.

- TAO: (Tambon Administration Office)

TAO should be the main actor in preparing the participatory development plan. TAO's staffs are the administrative officers with direct contact with the people in the front line, therefore, rural development plan should be promoted mainly by TAO in accordance with the needs of the people. At present, almost all the small scale irrigation facilities have been transferred to TAO and TAO is responsible in operation and maintenance of these facilities. The role of the TAO will become significant as a coordinator, from planning to the implementation stage as well as the operation and maintenance.

- TTC: (Technology Transfer Center)

Since most of TTC members work voluntarily without pay, they tend to have less commitment to their responsibilities. They faced difficulties of providing technical supports to the farmers due to the limited knowledge on agriculture. In the pilot project, training on agricultural extension services were executed by external resources and by such, external input shall be necessary in the future too. Although the role of TTC depends on the government policy, TTC should function as one-stop-service center and be supported by financial administration and technical assistance from external resources. In order to realize TTC ' s responsibility, members shall be paid by DOAE and TAO.

- WUG: (Water Users Group)

The role of WUG should be the “main body of the O&M of irrigation facilities.” Collection of the irrigation water fee, management and O&M of irrigation facility in cooperation with the TAO should be their primary responsibility. Also, WUG should be the facilitator among other farmers groups. WUG will play an important role in the future such as management of the revolving fund and allocation of the benefit to other activities. It is necessary that WUG shall be continuously supported by TAO, RID province as well as TSG.

- RID: (Royal Irrigation Department)

RID may not be regarded as an appropriate leader in formulating comprehensive agricultural development master plan in rural areas since they are agency primarily responsible for water resources development. Expected role of RID in the future should be concentrated in supporting and making plans for small scale water resources and irrigation projects implemented by TAO as well as to make plans and execute middle to large water resources development plan and operate and maintain those facilities.

- DOAE: (Department of Agriculture and Extension)

DOAE should be a supporter in agricultural technology when the province is the main actor of formulating agricultural development master plan in the rural area. It is therefore expected that the role of DOAE in the future should be a supporter both in the rural and agricultural development master plan at the provincial level, as well as the main implementing agency for soft component projects.

e) Necessity of the sustainable monitoring for the pilot project

The activities in the pilot project are expected to be continued to achieved the required outputs continuously. Since the Government agencies including TAO and the farmers have a strong motivation to continue the project activities, sustainability of the project was considered high. However, there are some key issues to be clarified in assuring the project sustainability. In order to address these issues, monitoring activities mainly by RID/DOAE in central and TSG/TAO in province shall be continuously carried out.

- (1) Collection of water fee for pump irrigation
- (2) Budget allocation for O&M of the irrigation systems
- (3) Production and selling of compost
- (4) Development of marketing strategies
- (5) WUG remains as the core organization

f) Expansion from spot to area <Expansion of the pilot project>

The pilot projects were implemented only to two (2) villages out of 145 villages in the Study Area. Since many small scale water resources development plans are established in the short term of the master plan, these projects shall be implemented in other villages incorporating the lessons learned from the pilot project,. It is recommended that the implementation of two (2) to four (4) projects within the next 3 years shall be in areas where no project is executed, and that is at the middle upstream basin and middle downstream basin of the Study area.

g) The role of the pilot project as the training place for neighboring countries

Many achievements and lessons learned were obtained through the implementation of the pilot project on institutional strengthening and improvement of farming practices. During the implementation of the project, trainees from other countries such as Sri Lanka visited the site. Considering the following aspects, it can be said that the pilot project sites are suitable as the training place:

- (i) It takes only 2 to 3 hours from Bangkok to the site.
- (ii) Cooperation systems between the Government agencies and the WUG or other farmers organization can be observed.
- (iii) Pilot project shows actual trials on the conversion of farmers use from chemical fertilizers and pesticides to organic fertilizer which is in accordance with the Government's agricultural policies professed as "Kitchen in the world."

h) Water Resources Development

According to the Regional 13 office of RID, construction of eight (8) medium scale dams have been planned. By the construction of such dams, it will be able to store 286MCM of water which is approximately 4.6 times bigger than the current stored water of 33MCM. In order to mitigate the flood damages as well as to reduce the drought damages and sedimentation in the existing water resource facilities, construction of the dams should be given first priority taking into careful consideration the communities consensus and the environmental aspects.

As for the development of groundwater, it can not be expected that many number of wells has to be constructed in the future, since 2,621 numbers of shallow wells and 2,203 numbers of deep wells have been already constructed up to date.

i) Flood Mitigations

The construction of flood protection dike between the middle down and down stream portion of the Lam Pa Chi River was given first priority by RID Regional 13 Office, as stipulated in the medium term plan with estimated cost of 653.2 million Bt. Before constructing the dikes, effects of water level of the Khwae Noi River to the Lam Pa Chi River during the flood season should be analyzed. Also the alleviation effect of flood damages by medium size dams shall be studied taking into due consideration the occurrence of flood itself. Damages occurred every year, thus, analyses on such issues should be made the soonest possible opportunity.

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Abbreviations

A	
ADB	Asian Development Bank
ALRO	Agricultural Land Reform Office
ARD	Office of Accelerated Rural Development
B	
BAAC	Bank for Agriculture and Agricultural Cooperatives
Bt	Thai Currency Baht
BOD	Bio-chemical Oxygen Demand
C	
CCS	Commercial Cane Sugar (Standard in Australia)
CDD	Community Development Department, MOI
CEO	Chief Executive Officer
D	
DEDP	Department of Energy Development and Promotion
DGR	Department of Groundwater Resources, MONRE
DH	Department of Health
DMR	Department of Mineral Resources
DO	Dissolved Oxygen
DOA	Department of Agriculture, MOAC
DOAE	Department of Agricultural Extension, MOAC
DOCP	Department of Cooperative Promotion
DOF	Department of Fisheries
DOL	Department of Land, MOI
DWR	Development of Water Resources, MONRE
E	
EC	Electric Conductivity
EIA	Environment Impact Assessment
EIS	Environmental Impact Statement
G	
GAP	Good Agricultural Product

I	
IEE	Initial Environment Examination
L	
LDD	Land Development Department, MOAC
M	
MCM	Million Cubic Meter
MOAC	Ministry of Agriculture and Cooperatives
MOF	Ministry of Finance
MOI	Ministry of Interior
MONRE	Ministry of Natural Resources and Environment
N	
NEB	National Environment Board
NESDB	National Economic and Social Development Board
NGOs	Non-governmental Organizations
O	
OTOP	One Tambon One Product
P	
PAM	Project Approach Matrix
PAT	Petroleum Authority of Thailand
PCM	Project Cycle Management
PRA	Participatory Rural Appraisal
PWD	Public Water Development, MOI
R	
RFD	Royal Forestry Department
RID	Royal Irrigation Department
RRA	Rapid Rural Appraisal
T	
TA	Technical Assistance
TAOs	Tambon Administration Organizations (Or Bor Tor)
TDS	Total Dissolved Solid
TOT	Training of Trainers
TTC	Technology Transfer Center

Part 1
~MASTER PLAN~

CHAPTER 1 BACKGROUND AND OBJECTIVES OF THE STUDY

1.1 Background and Objectives

(1) Background

From 1960's, the Kingdom of Thailand have accelerated the development through advancing the opportunities of some agricultural development projects especially at the areas located in vast and flat lowlands. In the other areas, however, people remain at under-developed condition and are still suffering from poverty. Income disparity between the developed and under-developed is very much pronounced. In 1970's, a large Scale Water Resources Development Plan in Mae Klong river basin had been conceived and a couple of projects in cooperation with Japan and the World Bank had been implemented. The output of such projects irrigated 480,000ha of the area, which is mainly located in Suphan Buri, Nakhon Pathom, and Phetchaburi provinces along with Mae Klong River.

Since only the lower area was targeted, middle and upper areas including Lam Pa Chi River Basin have never benefited from any major irrigation projects. This situation cause a considerable income disparities between the area developed and undeveloped in this region.

In addition, occurrence of periodic monsoons often brought serious damages by floods and drought to the fields and villages of Mae Klong River Basin. To overcome such serious situation, it is necessary to establish more stable agri-pastoral production system, which will be able to enforce the functions of soil-and-water preservation, including rehabilitation of the existing irrigation facilities.

Considering the development need as stated above, the Government of the Kingdom of Thailand (GOT) requested the Government of Japan (GOJ) on the execution of "the Study on Application of Participatory Planning in Rural and Agriculture Development Project in the Lam Pa Chi River Basin" on September 9, 2000. The Study had commenced in October 2002 and was completed after 30 months in March 2005. In the process of the Study, the pilot project at Kanchanaburi and Ratchaburi sites had been implemented from January 2004 to November 2004.

(2) Objectives of the Study

The objectives of the Study are:

1. To formulate a rural and agricultural development master plan, with the participation of the communities in the study area, to increase incomes of small-scale farmers who are suffering from drought and/or flood damages.
2. To carry out technology transfer to the personnel in RID, TAO and other relevant organizations on the subjects of planning and surveying methods such as participatory method, with the aims to enhance institutional capabilities of such organizations.

1.2 Rationale of the Participatory Development

The GOT stipulated the direction to delegate the power to local governance under the new constitution enacted in 1997 for the decentralization. Further, the GOT declared to embrace participatory development approach at the Ninth National Social-Economic Development Plan and has already proceeded with improvement of administrative system that would support and deals with the regional issues through community participation as well as decentralization on resources management. Considering such background, the backbone of the project should consist of the process preparing the regional development plan through the community participation but not by the “Top-down” manner on what have been planned and implemented. Also, through the pilot projects, it is intended to pursue such systems in order to contribute to the realization of the appropriate community participatory development and learn from those processes in order to complete the Master Plan.

1.3 Study Area

(1) Study Area

The Study Area is located in the areas of about 2,526.94 km² in the Lam Pa Chi River Basin. The Lam Pa Chi River is one of the tributaries of Mae Klong River, which runs from vicinity of the border with Myanmar to the gulf of Thailand (see the Location Map). There are two provinces a part of which are included in the study area namely; Ratchaburi and Kanachanaburi which shares about 86% and 14%, respectively. This covers 145 villages which lies in 16 Tambon located in 5 Amphoe of the two provinces. The population of the Study Area is 70,138.

(2) Classification of the Study Area

Based on the boundary of the province, Amphoe, Tambon and watershed, the Study Area is divided into four (4) sub basins, in order to establish countermeasures to solve problems in each sub basin by using the results of PCM workshop on 16 Tambons and the field survey involving constrains and problems. The following is the proposed basin division plan. Details are shown on Table 1.3.1 and Figure.1.3.1.

Table 1.3.1 Summary of Classification of the Study Area

No.	Province	Amphoe	Tambon	Area (rai)	Area (km2)
1	Upstream Basin (Ratchaburi)	Ban Kha	Ban Bueng	345,625.00	553.00
2		Ban Kha	Ban Kha	173,518.40	277.63
3		Suan Phueng	Ta Nao Si	126,343.75	202.15
4		Ban Kha	Nong Phan Chan	57,186.59	91.50
5		Pak Tho	Yang Hak	8,225.38	13.16
		Sub-Total		710,899.12	1,137.44
6	Middle Upstream Basin (Ratchaburi)	Suan Phueng	Suan Phueng	266,250.00	426.00
7		Suan Phueng	Tha Khoei	36,025.56	57.64
8		Suan Phueng	Pa Wai	121,375.00	194.20
		Sub-Total		423,650.56	677.84
9	Middle Downstream Basin (Ratchaburi)	Chom Bueng	Dan Thap Tako	107,820.00	172.51
10		Chom Bueng	Rang Bua	22,496.54	35.98
11		Chom Bueng	Kaem On	80,940.63	129.51
12		Chom Bueng	Boek Phrai	9,064.83	14.50
		Sub-Total		220,321.99	352.51
13	Downstream Basin (Kanchanaburi)	Dan Makham Tia	Nong Phai	36,250.00	58.00
14		Dan Makham Tia	Dan Makham Tia	97,500.00	156.00
15		Dan Makham Tia	Chorakhe Phuek	79,689.38	127.50
16		Dan Makham Tia	Klon Do	11,039.00	17.65
		Sub-Total		224,478.38	359.16
Total				1,579,350.06	2,526.94

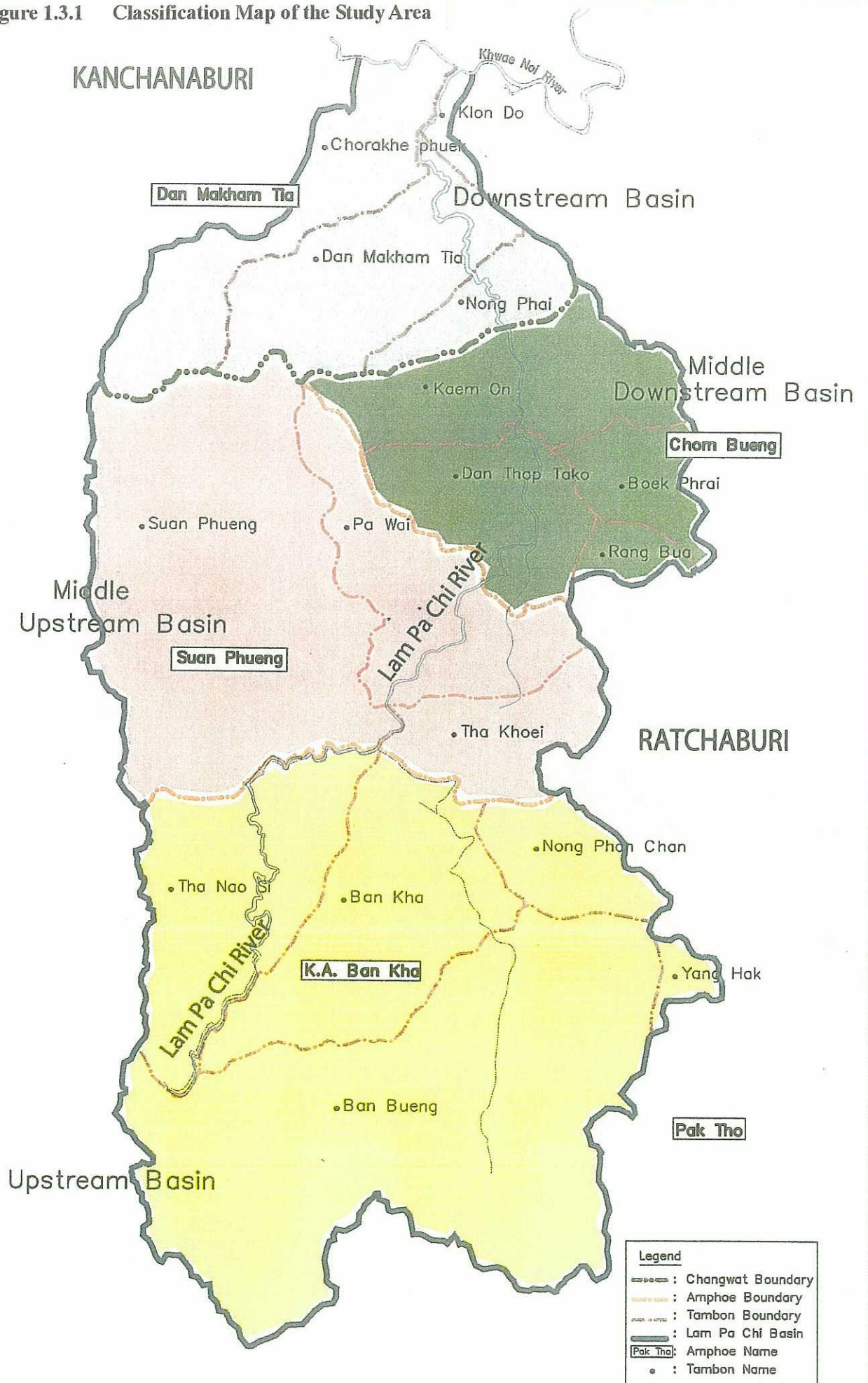
Sourced by Development Plan at each Tambon

Rang Bua*: Based on the 1/100,000 topography map, Tambon area is measured by The Study Team

1.4 Concept of the Pilot Project

The Pilot Project was proposed to be implemented both in Kanchanaburi and Ratchaburi. Objectives of the Pilot Project were: 1) to transfer the technologies on participatory development to the government officials and the community people, 2) to verify the development approaches proposed in the Draft Master Plan and 3) to obtain lessons learned during the implementation process. In formulating more realistic Master Plan, all the lessons learned from the implementation of the Pilot Project were feedback to the Draft Master Plan, which were established through the participatory approach. Details of the Pilot Project are shown in another part “Final Report Part II ~Pilot Project~.”

Figure 1.3.1 Classification Map of the Study Area



CHAPTER 2 CURRENT CONDITION OF PARTICIPATORY DEVELOPMENT

2.1 National Development Plan

(1) Ninth National Economic and Social Development Plan

In the Ninth National Economic and Social Development Plan, having a five (5) years life span during 2002-2006, several objectives have been stipulated. Those objectives are as follows:

- (a) To promote economic stability and sustainability. Measures are set up to strengthen financial sector and fiscal position of the country, along with economic restructuring, to create a strong and self-reliant economy at the grass root level.
- (b) Establishment of a strong national development foundation. This is to enable Thai people to meet the challenges arising from globalization and other changes. This includes human resource development, education and health system reforms. Priorities being implemented are to set up a social protection system. Popular participation in community and rural areas will be enhanced to create sustainable urban and rural development networks, improve management of natural resources and environment, as well as development of appropriate science and technology.
- (c) Establishment of good governance at all levels of the Thai society. Good governance will be fostered based on the principles of efficiency, transparency and accountability. Emphasis is placed on the reform of government management systems, the promotion of good corporate management in the private sector, and public participation in the development process.
- (d) Reduction of poverty and empowerment of Thai people. Thai people will be empowered through equal access to education and social services. Employment generation will be supported, leading to increases of incomes. Quality of life will be upgraded. Public sector reform will be undertaken to create an enabling environment for public participation.

In the 9th Plan, many strategies for action planning have been stipulated. Consistent strategy of all those action plan where the objectives of this Study was taken in the Restructuring of Management for Sustainable Rural and Urban Development that covers the following targets.

- (a) Empowerment of community and development of livable cities and communities. Emphasis is placed on the development processes that empower communities so that they can serve as strong foundation of society. Mobilizing participation of all stakeholders in community development is a priority target. Livable cities and communities will be achieved through the creation of enabling environments inductive to the development of a way of life which is peaceful, convenient, clean, safe and well disciplined. This development process will lead to the creation of clusters of knowledge that are consistent with local wisdom, as well as the development of strong grass root economics which are more self-reliant, and support sustainable development of livable cities and communities.

- (b) Alleviation of rural and urban poverty through the process of popular participation. Poverty alleviation efforts are holistic in approach and not just focused on income. Empowerment of the poor will be of a high priority. Legal and regulatory reforms are needed to provide the poor with access to government services, as well as to give them the opportunity to persistently utilize natural resources for their livelihood, without breaking the laws.
- (c) Establishment of linkages between rural and urban development. In order to distribute equitably the economic and social opportunities grassroots economies will be strengthened to provide sustainable incomes to rural people.
- (d) Management of integrated area-function-participation development. Capability building is very much needed to equip local administrative organizations with trained people and effective management systems in order to facilitate decentralization.

2.2 Ministry of Agriculture and Cooperatives

In the Ninth National Plan, policy for agricultural development is of dual strategy. Implementation of its components will be coupled between the main agricultural production line for competitiveness and economically sufficient production measure for self immunity for small scale farmers. In this regard, the MOAC has drawn four important visions.

(1) Vision for Agricultural Development

In the 9th Plan, visions for agricultural development have been drawn to place the goal on following issues.

- (a) Thailand be a leading producer of high quality food and agro-industry capable for global competitiveness
- (b) Agricultural production be on a basis of efficient and sustainable utilization of natural resources
- (c) Thai farmers are progressive, having good living standard and secured occupation and income, and farmers' organization be qualitatively strong having high integrity to be important mechanism for agricultural development
- (d) Public sector having efficient system will be able to smoothly correspond to the needs of the farmers

(2) Strategies for Agricultural Development in the Ninth Plan

In order to give an appropriate thrust to agricultural development in compliance with stipulated policy, vision, objectives and goal of the agricultural development plan, four main strategies for the development have been stipulated as follows.

1) Strategy for Strengthening Sufficiency Economy Measure

Under this strategy, five schemes have been stipulated as follows.

- (a) Implementing Royal Initiative Projects for agricultural development and for strengthening

farmer and community ability.

- (b) Research and development of local technology and local wisdom to conserve and strengthen knowledge potential derived from conserved local wisdom shall be utilized in the process of standard production, agricultural product and food processing, medicinal and health products.
- (c) Development of sustainable production for food and economic security, minimize dependence on off-farm factors, adopt sustainable agriculture for agricultural production system in a way that it relates and supports natural resources and each specific ecosystem. The sustainable production system should be able to produce at commercial scale, such as organic agricultural goods.

In the sustainable agriculture system, five different directions have been determined, which are:

- Natural Agriculture
 - Organic Agriculture
 - Integrated Agriculture
 - Agro-forestry
 - New Theory Agriculture
- (d) Development of production in line with sufficiency economy measure to extend agricultural production alternatives to farmer conforming to farm condition and their readiness without attention to agriculture formality. The system emphasized on minimizing off farm factors and cost, having sufficient living standard that will ultimately be developed to a commercial level.
 - (e) Strengthening economy of the community by concentrating on encouraging learning process and resource management for building up security, peacefulness and ecosystem of the community.

2) Strategy for Increasing Competitiveness Measure

Under this strategy, target groups are those who are able to produce at commercial scale and are prompt for a risk of price fluctuation according to market mechanism. Those farmers and farmers' groups are expected to be able to manage agro-business located in irrigated land and specific economic zones. There will be three types of agricultural goods produced under this strategy, which are:

- Group 1 Exporting goods, such as rice, rubber, cassava, sugarcane, pineapple, orchid, durian, longan, broiler chicken, and black tiger prawn;
- Group 2 Domestic use goods, such as field corn, oil palm, potato, swine, egged chicken, beef cattle and dairy cattle; and
- Group 3 Insufficient goods, such as soybean.

Under this strategy, five schemes for implementation have been stipulated as follows.

- (a) Research and develop innovative agricultural technology to strengthen potential in doing research and develop agricultural products to be able to be competitive in the world market and also for world food security program.
- (b) Increase production efficiency and minimize production cost by encouraging private sector to

produce good breeding stocks for high yielding ability.

This scheme will be implemented on all components of agricultural activities, viz. crop, livestock and fisheries.

- (c) Develop agro-industry to add value to agricultural goods and, furthermore, to put quality management to agricultural goods to meet market standard.
- (d) Improve quality and standard of agricultural products and agricultural goods to produce products and goods of marketed standard. The process will be controlled at the farm until dining table.
- (e) Increase potential of market management to develop rapid distribution and selling of agricultural goods both international and domestic markets.

3) Strategy for Developing Quality of Human Resource and Organization in Agricultural Sector

This strategy will place emphasis on farmer, farm labor, farmers' organizations and their members (non governmental organization assisting farmer) and government personnel.

There are seven implementation schemes under this strategy as follows.

- (a) Promote systematic and continuous learning and participatory processes for the farmer and farmers' organization by utilizing mechanism of Agricultural Technology Transfer Center to strengthen quality and potential of the farmer and farmers' organization in developing agriculture and managing natural resources.
- (b) Promote social security for farmer and farm labor by having thorough and fair access to social service system.
- (c) Solution to farmers' debt by assisting those who encountered natural disaster and poverty and usually lack capital for farm and off-farm business. This scheme will also emphasize on additional debt prevention.
- (d) Increase farmers' opportunity and capability to establish business in order to generate income and family economic security.
- (e) Increase saving potential in rural area to create capital for occupation development in order to be self-independent and minimize family debt.
- (f) Increase skill and capability of government personnel engaged in agricultural sector to be able to give advice on policy layout, implementation, monitoring and evaluation conforming with advanced technology.
- (g) Minimize risk and manage agricultural goods insurance very well to relieve and/or guarantee damage of agricultural production.

4) Strategy for Natural Resource Management

This strategy focuses on government personnel, farmer, civilian, community and local administrative organization. Under this strategy, there are four implementation schemes, which are:

- (a) Maintain existing natural resource condition and revive deteriorated natural resources.
- (b) Solve conflict and problem by formulating processes and utilization of natural resources among

stakeholders.

- (c) Natural resource administration and management that include forestry resource, water resource, basin and inland fishery, soil and land resource, marine and coastal resource and bio-diversity.
- (d) Improve land management by allocating equal opportunity to farm labor and farmer to have access to arable land.

It is obvious that the 9th Plan has given high attention to the development and improvement of well being and standard of living of the grass root farmers and sustainable development of agriculture and human resource, sustainable utilization of natural resource and revitalization of deteriorated environment which are consistent with the proposed MP.

2.3 Royal Irrigation Department (RID)

To evaluate achievements of RID in the 100 years of its history, present prosperity of the Chao Phraya Deltas, so-called “Rice Granary of the World” shall be specially noted. Today’s prosperity of the area is based on the contribution of the RID engineers entrusted with a mission as well as good tradition. Nowadays, however, such development in large scale which has been RID’s line has become rather difficult due to the change of social environments such as enlargement of the inhabitants’ consciousness, relocation problem in proposed reservoir areas etc., and main stream of development is gradually shifting to small scale development which is based on the development activities focusing certain locality of the area.

To achieve the small scale development, it is necessary to secure participation of the community people from the planning stage, privatization of the O & M (operation and maintenance) of facilities, coordination on the roles between communities, Local and Central Government. RID has full understanding of such necessities, much more would like to adapt it, however, emphasis of the majority of RID’s engineering groups is still on the topographic condition and technical aspects for the planning and design of construction facilities.

RID is now facing with the necessity to tackle those various problems such as manners and methods on planning, coordination of the organizations involved which may lead to confusion and hesitation in shifted social environment. As for the adoption of the participatory development methods, it can not be fully denied that good old tradition of RID may block such conscious change.

On the other hand, community’s consciousness is still dependent on the development initiated by the governmental administration. Their traditional consciousness is strong particularly on irrigation projects implemented by RID which the people think as “a Gift from the King”. A typical example is the SSIP, where part of the construction costs which should have been shared by the farmers was exempted due to the reasons not only of poverty problems but also by the political consideration especially in Northeast Thailand.

Through this participatory Study, it aims to ensure that the actors of the development will learn that inhabitants are the people who best understand their problems, and the community is a main body for development wherein inhabitants themselves shall solve their problems with their local originality. All stages shall be understood and process the lessons learned as eye opener for the awareness of the RID and inhabitants by revolutionizing their consciousness.

2.4 Organizational Structures and Their Functions

(1) Public Organizations

The organizational survey on the RID and other agriculture-related offices in Kanchanaburi and Ratchaburi has been done, mainly through interviews with the officials in those organizations. The objectives of the survey are to understand the current functions of major public organizations in agricultural development and their mutual links, and to obtain information for analyzing suitable structures and systems of participatory development in the sector. The organizations covered were the RID region 13 office, the provincial irrigation offices, provincial agriculture offices, TAO offices, community development office and land development office in Kanchanaburi and Ratchaburi.

(2) Community Organizations

The survey on community organizations conducted in Kanchanaburi was mainly through interviews with the core members in those organizations. The objective of the survey is to identify the characteristics of major agriculture-related community organizations, particularly for analyzing the opportunities and constraints for the development of the communities. The organizations covered were asparagus growers' organizations, sugarcane association, sugarcane groups under head quota men, agricultural cooperative, water users' groups, herbal group, saving group, women's group, livestock group, cremation group, and Bank for Agriculture and Agricultural Cooperative (BAAC) group. Those organizations are located in Tambons Dan Thap Tako, Dan Makham Tia, Chorakhe Phuek, Kaem On, and Boek Phrai.

(3) Technical Support Group (TSG)

The TSG was established at both Kanchanaburi and Ratchaburi provinces in December 2002 under this Project to technically support the activities of 16 TAO. The members consist of representatives of provincial RID office and other related agencies. The group responsibility is to offer technical advises on the needs of communities. The TSG is playing important roles in formulating project in cooperation with local peoples by giving technical advises as well as formulating solution to the problem. Members of Technical Support Group are shown in APPENDIX:
Organization setup for the project is shown in Figure 2.4.1.

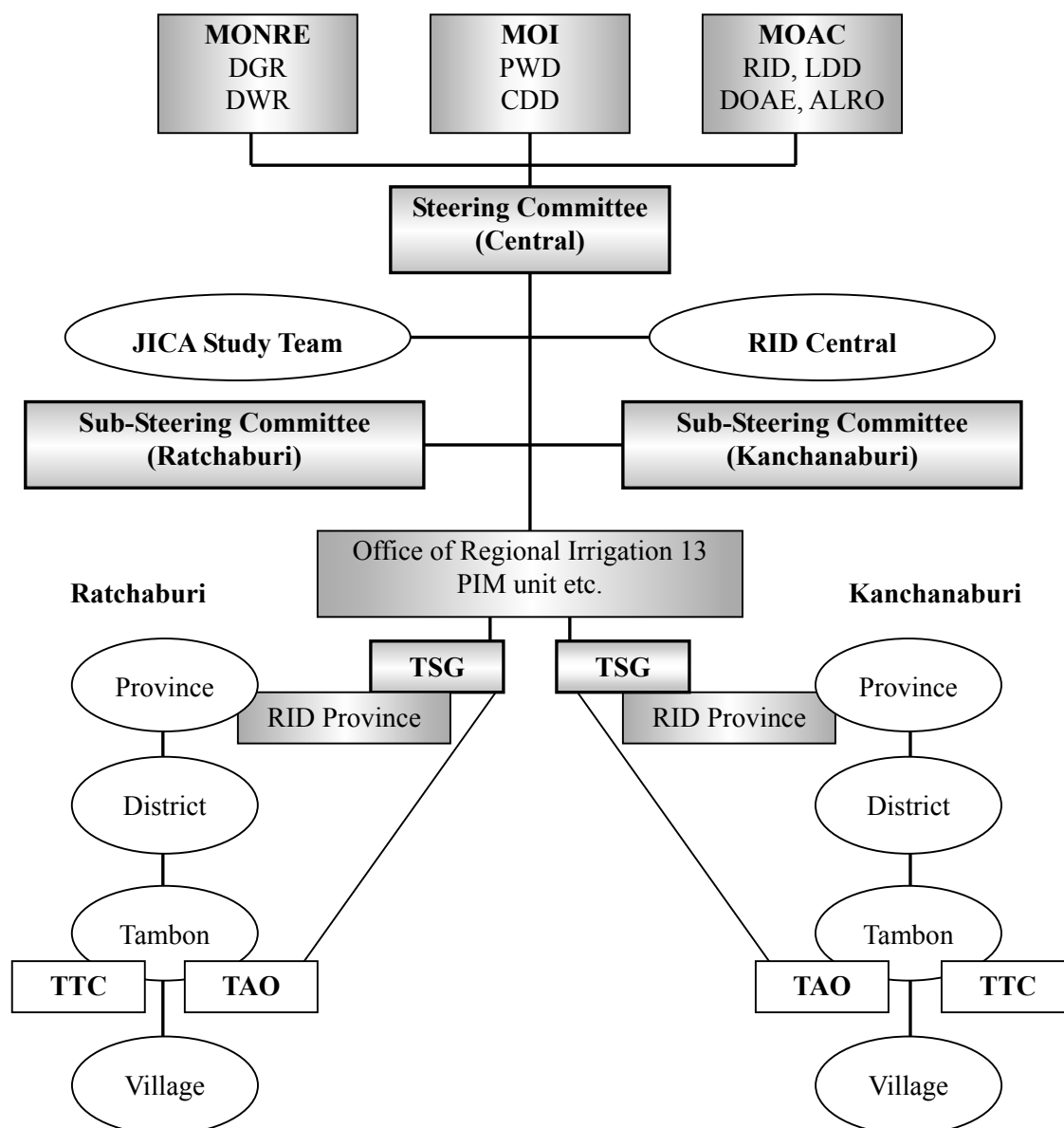


Figure 2.4.1 Organizational Setup for the Project

CHAPTER 3 PROCESS OF PARTICIPATORY DEVELOPMENT

3.1 Participatory Development for the Study

(1) Objectives of Participatory Development of the Study

The adoption of participatory development approach in the Study has two main objectives. One is to develop the capacities of the RID counterparts as well as the agriculture-related agencies on participatory development, and the other is to obtain the detailed information of the Study Area as well as the farmers in the Area directly from the inhabitants as the basis for the preparation of the Master Plan. The RID attempts now to follow the national policies urging the application of the ideas and methods of participatory development in its tasks, and therefore considers the Study as an important opportunity to practically learn participatory development.

(2) Steps of Participatory Development

Figure 3.1.1 indicates the five stages of participatory development composed of the set of the participatory methods such as RRA, PCM, and discussions.

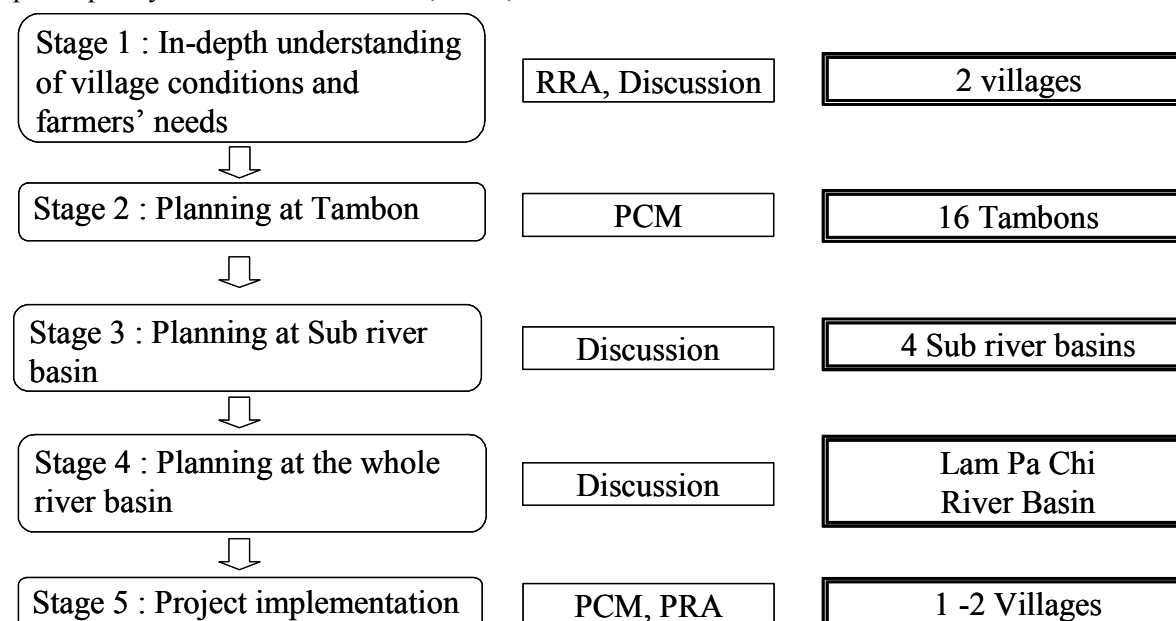


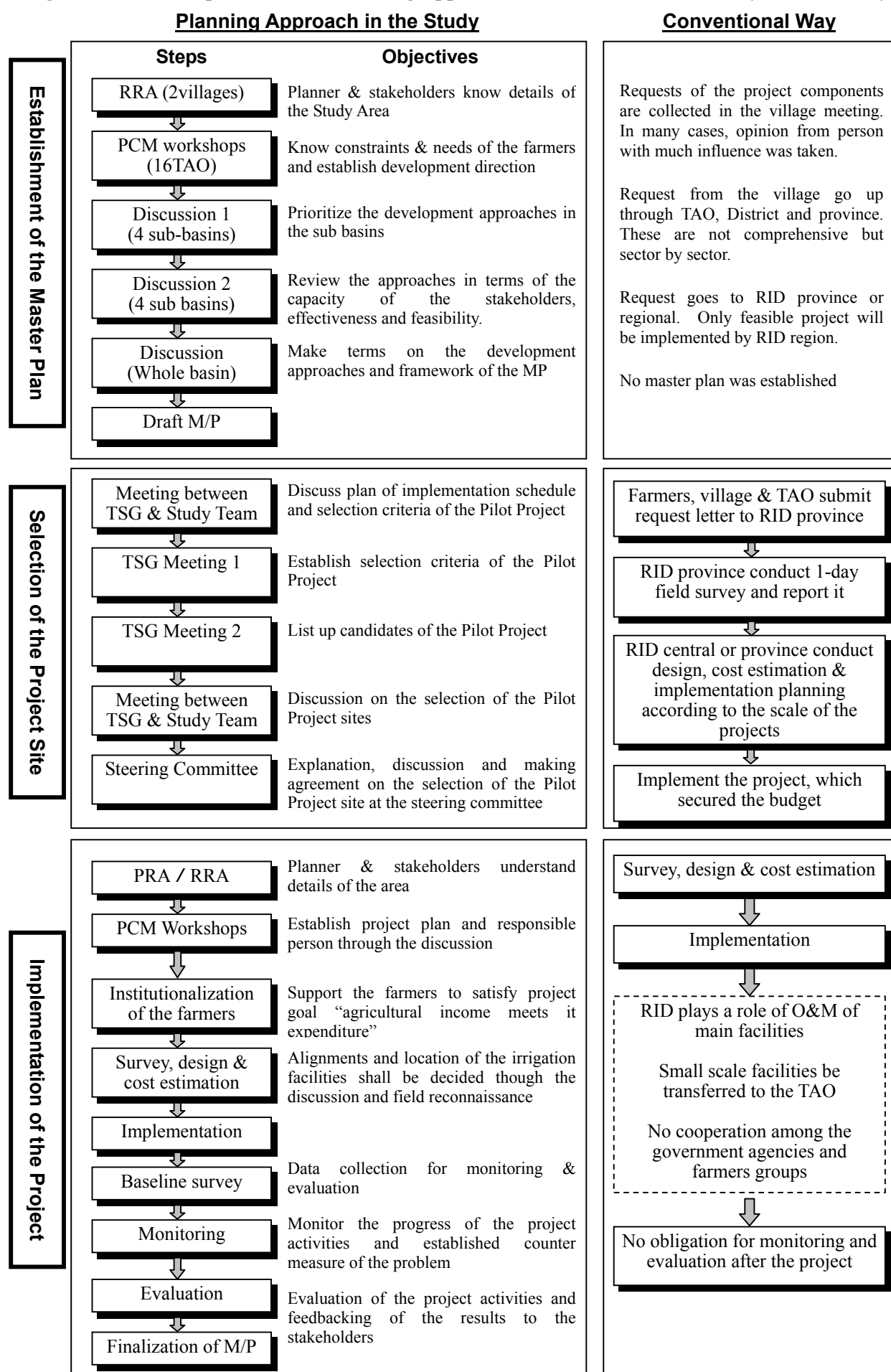
Figure 3.1.1 Five Stages of Participatory Development

The steps stated above which have been taken in the Study are discussed below as follows.

- Stage 1-1: RRA survey in 2 villages selected each from the upper and lower river basins (November 13 to 23, 2002)
- Stage 1-2: Feedback on the results of the RRA survey from the survey team to the villagers (December 19, 2002)
- Stage 2: PCM workshops at 16 Tambons (December 23, 2002 to January 24, 2003)
- Stage 3-1: Discussion on the result of the PCM workshops with the farmers at 4 sub basins – priorities of the farmers' needs (February 18 to 21, 2003)

- Stage 3-2: Discussion on the result of the PCM workshops with the farmers and TSG members at 4 sub basins – needs vs. realities (May 20 to 23, 2003)
- Stage 4: Confirmation on the result on the PCM workshops at the Whole River Basin (August 14, 2003)
- Stage 5-1: RRA and PCM workshop for preparation of the plan of the pilot project at 2 villages (October 24 to November 24, 2003)
- Stage 5-2: Monitoring and evaluation of the pilot project (January to November 2004)

Figure 3.1.2 shows the difference between conventional ways of planning that had been practiced in Thailand and the one proposed and executed in the Study.

Figure 3.1.2 Comparison of the Planning Approach between Conventional Way and the Study

3.2 Baseline Survey

Prior to the above steps of participatory development, the Baseline Survey was carried out to grasp the characteristics of the Study Area, and select suitable areas and participants for the conducts of the RRA and other participatory surveys. The Baseline Survey consists of literature review and survey at the field level. The following describes its details and the results obtained.

(1) Literature Review

Literature review was conducted to obtain socio-economic and agricultural information in the Study Area as well as to prepare plan for the Baseline Survey at the field. The information was obtained mainly from the following literature:

- ✓ Khor Chor Chor data
- ✓ Summary of Tambon Profile

Khor Chor Chor data is composed of information at Tambon and village levels. Part of Tambon information was missing and therefore was obtained and compiled from the village level. The village information is shown in Table 3.2.1. This information was later analyzed and compiled at the sub basin level by the Study Team. The summary of Tambon Profile is shown in Table 3.2.2.

The results of the literature review were used also for the followings:

- ✓ Selection of Tambons, villages, and number of the samples for conducting the Baseline Survey at the field
- ✓ Selection of villages for RRA survey

The following describes the main socio-economic condition in the Study Area.

Table 3.2-1 (1/4) Conclusion of Khor Chor Chor data

Subbasin Tambon		Upstream Basin					Middle Upstream Basin				
		01	02	03	04	05	Subtotal	06	07	08	
Item	(unit)	Ban Bueng	KA Ban Kha	Tha Nao Si	Nong Phan Chan	Yang Hak		Suan Phueng	Tha Khoei	Pa Wai	Subtotal
0. Number of Muban (within Lam Pa Chi River Basin)		12	12	7	9	8	48	8	13	9	30
1. Population		12	12	7	9	1	41	8	12	9	29
1.1 Household	(no)	1,320	1,348	802	1,106	130	4,706	933	982	821	2,736
1.2 Population	(no)	5,287	5,926	3,692	4,741	535	20,181	3,457	4,337	3,230	11,024
2. Domestic use water											
2.1 Dug well		66	109	83	53	-	311	52	67	190	309
2.1.1 Private Function	(no)	33	86	79	31	-	229	35	49	183	267
2.1.2 Public functioning	(no)	33	23	4	22	-	82	17	18	7	42
2.2 Borehole well		51	24	12	19	5	111	7	27	20	54
2.2.1 Private functioning	(no)	-	-	7	8	-	15	1	2	4	7
2.2.2 Public functioning	(no)	51	24	5	11	5	96	6	25	16	47
2.5 Sufficient clean drinking water	(no)	931	1,270	730	1,022	130	4,083	766	979	821	2,566
2.6 Sufficient domestic use water	(no)	885	1,348	802	1,106	130	4,271	933	974	793	2,700
4. Public services in Tambon											
4.1 Hospital (Number of muban says "exist")		-	1	-	-	-	1	1	13	-	14
4.2 Secondary school(Number of muban says "exist")		12	11	-	-	-	23	6	-	9	15
5. Not having electricity	(no)	119	47	71	93	28	358	154	44	44	242
7. Store											
7.1 Market	(no)	-	9	-	-	-	9	1	1	-	2
7.2 Collection point	(no)	-	-	-	-	-	-	-	-	-	-
8. Type of fuel	(G/E)										
9. Agricultural											
9.1 Rice mill	(no)	32	-	-	-	-	32	-	-	1	1
9.2 Farmers	(Y/N)	1,001	1,093	660	961	125	3,840	753	753	587	2,093
9.3 Mixed plantation famers	(Y/N)	19	-	13	-	-	32	35	1	5	41
10. Occupation											
10.1 Having other than farming	(no)	1,010	920	802	876	115	3,723	656	615	436	1,707
10.2 Farming only	(no)	310	418	-	230	15	973	52	372	385	809
10.3 Labor wages	(Bt./day)	111	83	106	123	120	109	100	100	103	101
11. Paddy											
11.1 Area of paddy field	(rai)	120	-	-	-	-	120	160	18	477	655
11.2 Household	(no)	-	-	-	-	-	-	-	-	-	-
12. Upland crop											
12.1 Area of short-term crop	(rai)	330	3,390	4,706	977	150	9,553	5,573	401	647	6,621
12.2 Household	(no)	37	334	572	149	15	1,107	423	44	55	522
12.4 Area of long-term crop	(rai)	27,425	34,133	1,499	25,313	30	88,400	5,786	12,283	10,592	28,661
12.5 Household	(no)	792	1,102	200	763	2	2,859	316	469	232	1,017
13. Fruit											
13.1 Area of Cultivation	(rai)	1,946	2,500	859	987	750	7,042	3,124	2,005	1,515	6,644
13.2 Household	(no)	92	144	77	165	84	562	251	151	135	537

Source: Kor Chor Chor data 2001: Calculated from Muban level data.

Note: There are some lack of muban data in some Tambon: Mu1 in Suan Phueng, Mu1,2,3 in Dan Thap Tako, Mu10,11 in Chorakhe Phuek, and Mu11 in Klon Do

Table 3.2-1 (2/4) Conclusion of Khor Chor Chor data

[2/4]

Item	Subbasin Tambon	Middle Downstream Basin					Downstream Basin					Total
		09	10	11	12	Subtotal	13	14	15	16	Subtotal	
0. Number of Muban (within Lam Pa Chi River Basin)	(unit)	20	14	15	9	58	6	11	9 or 11	11	28	164
		20	6	15	7	48	6	11	7 or 8	2	19	137
1. Population												
1.1 Household	(no)	1,375	617	1,835	713	4,540	704	1,335	1,664	188	3,891	15,873
1.2 Population	(no)	6,168	2,722	7,961	2,678	19,529	3,205	6,994	8,273	932	19,404	70,138
2. Domestic use water												
2.1 Dug well		496	50	214	331	1,091	127	357	95	13	592	2,303
2.1.1 Private Function	(no)	460	29	150	317	956	113	332	75	8	528	1,980
2.1.2 Public functioning	(no)	36	21	64	14	135	14	25	20	5	64	323
2.2 Borehole well		206	16	339	58	619	446	228	91	23	788	1,572
2.2.1 Private functioning	(no)	156	2	287	25	470	435	186	60	16	697	1,189
2.2.2 Public functioning	(no)	50	14	52	33	149	11	42	31	7	91	383
2.5 Sufficient clean drinking water	(no)	1,157	617	1,721	713	4,208	704	1,395	1,626	174	3,899	14,756
2.6 Sufficient domestic use water	(no)	1,198	617	1,829	698	4,342	670	1,395	1,590	174	3,829	15,142
4. Public services in Tambon												
4.1 Hospital (Number of muban says "exist")		-	-	1	-	1	-	10	-	-	10	26
4.2 Secondary school (Number of muban says "exist")		17	14	14	8	53	5	10	9	11	35	126
5. Not having electricity	(no)	138	-	3	-	141	2	60	55	13	130	871
7. Store												
7.1 Market	(no)	-	2	1	3	6	4	4	-	-	8	25
7.2 Collection point	(no)	-	-	-	-	-	-	-	-	-	-	-
8. Type of fuel	(G/E)											
9. Agricultural												
9.1 Rice mill	(no)	2	2	-	-	4	-	1	-	-	1	38
9.2 Farmers	(Y/N)	1,006	465	1,664	398	3,533	576	1,148	542	163	2,429	11,895
9.3 Mixed plantation farmers	(Y/N)	5	11	65	-	81	16	51	-	-	67	221
10. Occupation												
10.1 Having other than farming	(no)	806	433	1,498	458	3,195	509	1,018	1,347	124	2,998	11,623
10.2 Farming only	(no)	579	184	337	158	1,258	195	377	317	64	953	3,993
10.3 Labor wages (Bt./day)		99	120	112	120	113	117	115	106	100	109	432
11. Paddy												
11.1 Area of paddy field	(rai)	1,795	15,795	1,330	2,940	21,860	465	1,420	1,790	250	3,925	28,560
11.2 Household	(no)	-	-	-	-	-	-	-	-	-	-	-
12. Upland crop												
12.1 Area of short-term crop	(rai)	4,718	100	2,750	1,000	8,568	800	1,200	6,595	325	8,920	33,662
12.2 Household	(no)	301	48	311	77	737	232	163	315	32	742	3,108
12.4 Area of long-term crop	(rai)	11,555	2,100	27,105	13,240	54,000	17,629	26,095	41,020	3,920	88,664	259,725
12.5 Household	(no)	520	195	1,256	332	2,303	462	877	898	108	2,345	8,524
13. Fruit												
13.1 Area of Cultivation	(rai)	1,504	37	440	40	2,021	20	150	150	-	320	16,027
13.2 Household	(no)	133	12	79	9	233	4	10	30	-	44	1,376

Source: Kor Chor Chor data 2001: Calculated from Muban level data.

Note: There are some lack of muban data in some Tambon: Mu1 in Suan Phueng, Mu1,2,3 in Dan Thap Tako, Mu10,11 in Chorakhe Phuek, and Mu11 in Klon Do

Table 3.2-1 (3/4) Conclusion of Khor Chor Chor data

[3/4]

Subbasin Tambon		Upstream Basin					Middle Upstream Basin					
		01	02	03	04	05	Subtotal		06	07	08	Subtotal
Item	(unit)	Ban Bueng	KA Ban Kha	Tha Nao Si	Nong Phan Chan	Yang Hak			Suan Phueng	Tha Khoei	Pa Wai	
14. Vegetable												
14.1 Area of Cultivation	(rai)	823	1,493	394	1,925	30	4,865		404	314	1,124	1,842
14.2 Household	(no)	135	374	103	225	15	852		100	76	195	371
15. Flower												
15.1 Area of Cultivation	(rai)	1	74	-	-	-	75		30	72	6	108
15.2 Household	(no)	-	32	-	-	-	32		11	18	1	30
16. Rubber												
16.1 Area of Cultivation	(rai)	1	-	-	-	-	1		-	-	400	400
16.2 Household	(no)	-	-	-	-	-	1		-	-	1	1
17. Perennial crop												
17.2 Area of Cultivation	(rai)	2,683	3,220	-	1,705	-	7,608		6,747	5,481	11,168	23,396
17.3 Household	(no)	54	41	-	121	-	216		89	137	96	322
18. Other crop												
18.1 Household	(no)	1	-	-	5	-	6		-	22	3	25
18.3 Area of Cultivation	(rai)	-	-	-	80	-	80		-	32	15	47
19. Cropping in dry season												
19.1 Area of cultivation	(rai)	427	1,493	361	2,922	30	5,233		220	190	797	1,207
19.3 Household	(no)	58	374	99	268	15	814		65	47	124	236
20. Livestock												
20.1 Household	(no)	-	-	-	-	-	-		-	-	-	-
21. Fishery												
21.1 Household (sea)	(no)	-	-	-	-	-	-		-	-	-	-
21.2 Household (inland)	(no)	-	-	-	-	-	-		-	-	-	-
22. Aquatic												
22.1 Household (brakish)	(no)	-	-	-	-	-	-		-	-	-	-
22.2 Household (inland)	(no)	6	-	-	-	-	6		-	-	-	-
23. Household Industry												
23.1 Household	(no)	-	33	104	-	20	157		57	5	-	62
26. Right of land holding												
26.1 Total area of Mu-ban	(rai)	218,032	92,152	104,072	61,919	23,895	500,070		226,021	43,621	55,747	325,389
26.3 for agriculture	(rai)	68,606	44,900	28,310	47,030	4,712	193,558		54,120	30,474	43,049	127,643
29. Training												
29.1 Villagers received occupation training	(no)	218	215	405	50	20	908		415	105	79	599
29.2 Villagers received education training	(no)	343	107	333	5	10	798		130	168	100	398
29.3 Villagers received moral & citizenship tra	(no)	94	187	250	55	100	686		78	75	11	164
29.4 Villagers received sanitation training	(no)	121	310	360	50	50	891		480	230	76	786
43. Labour												
43.1 Nos. of HH working outside Tambon	(no)	-	-	-	-	-	-		-	-	-	-
43.2 Nos. of population working outside Tamt	(no)	-	-	-	-	-	-		-	-	-	-

Source: Kor Chor Chor data 2001; Calculated from Muban level data.

Note: There are some lack of muban data in some Tambon: Mu1 in Suan Phueng, Mu1,2,3 in Dan Thap Tako, Mu10,11 in Chorakhe Phuek, and Mu11 in Klon Do

Table 3.2-1 (4/4) Conclusion of Khor Chor Chor data

[4/4]

Item	Subbasin Tambon	Middle Downstream Basin					Downstream Basin					Total		
		09	10	11	12	Subtotal	13	14	15	16	Subtotal			
													Dan Thap Tako	Rang Bua
14. Vegetable	(unit)													
14.1 Area of Cultivation	(rai)	4,589	27	3,150	-	7,766	10	2,127	2,720	-	4,857	19,130		
14.2 Household	(no)	493	15	254	-	762	3	440	210	-	653	2,638		
15. Flower														
15.1 Area of Cultivation	(rai)	-	-	-	-	-	3	4	-	-	7	190		
15.2 Household	(no)	-	-	-	-	-	1	2	-	-	3	65		
16. Rubber														
16.1 Area of Cultivation	(rai)	-	-	-	-	-	-	-	-	-	-	401		
16.2 Household	(no)	-	-	-	-	-	-	-	-	-	-	1		
17. Perennial crop														
17.2 Area of Cultivation	(rai)	4,435	55	240	15	4,745	1,430	4,829	3,580	-	9,839	45,588		
17.3 Household	(no)	76	7	7	2	92	23	107	85	-	215	845		
18. Other crop														
18.1 Household	(no)	-	-	-	34	34	-	-	-	-	-	65		
18.3 Area of Cultivation	(rai)	-	-	-	200	200	-	-	-	-	-	327		
19. Cropping in dry season														
19.1 Area of cultivation	(rai)	2,759	10	1,850	-	4,619	480	355	150	-	985	12,044		
19.3 Household	(no)	329	5	139	-	473	99	99	28	-	226	1,749		
20. Livestock														
20.1 Household	(no)	-	-	-	-	-	-	-	-	-	-	-	-	
21. Fishery														
21.1 Household (sea)	(no)	-	-	-	-	-	-	-	-	-	-	-	-	
21.2 Household (inland)	(no)	-	-	-	-	-	-	-	-	-	-	-	-	
22. Aquatic														
22.1 Household (brakish)	(no)	-	-	-	-	-	-	-	-	-	-	-	-	
22.2 Household (inland)	(no)	-	-	-	-	-	-	16	-	-	16	22	22	
23. Household Industry														
23.1 Household	(no)	-	55	-	-	55	-	16	-	10	26	300	300	
26. Right of land holding														
26.1 Total area of Mu-ban	(rai)	68,204	26,540	53,624	29,990	178,358	33,010	50,406	143,360	9,600	236,376	1,240,193		
26.3 for agriculture	(rai)	64,292	16,440	46,930	23,280	150,942	28,560	37,397	58,925	6,820	131,702	603,845		
29. Training														
29.1 Villagers received occupation training	(no)	20	160	60	80	320	96	111	60	30	297	2,124		
29.2 Villagers received education training	(no)	481	20	181	95	777	121	284	101	25	531	2,504		
29.3 Villagers received moral & citizenship tra	(no)	3	31	25	18	77	95	198	110	-	403	1,330		
29.4 Villagers received sanitation training	(no)	38	100	465	77	680	120	140	97	20	377	2,734		
43. Labour														
43.1 Nos. of H/H working outside Tambon	(no)	-	-	-	-	-	-	-	-	-	-	-	-	
43.2 Nos. of population working outside Tamb	(no)	-	-	-	-	-	-	-	-	-	-	-	-	

Source: Kor Chor Chor data 2001; Calculated from Muban level data.

Note: There are some lack of muban data in some Tambon: Mu1 in Suan Phueng, Mu1,2,3 in Dan Thap Tako, Mu10,11 in Chorakhe Phuek, and Mu11 in Klon Do

Table 3.2.2 Profile of Tambon Administration Offices (TAO)

Province	TAO.	Class	Year of Establish	Area (km. ²)	Population			Village	Member of TAO Assembly			TAO Administration Committee			Income (Bt)		Total Expenses (Bt)	
					Male	Female	Total		Male	Female	Total	Budget of FY 2000	Others					
Kanchanaburi																		
	Dan Makham Tia	5	1999	58	2,013	1,937	3,950	6	9	3	12	2	1	3	2,508,140	1,311,740	N/A	
			5	1996	146	3,633	3,450	7,083	12	18	6	24	3	-	3	10,250,484	2,303,948	9,916,464
		Chorakhe Phuek	5	1995	297	4,908	4,743	9,651	9	17	1	18	3	-	3	4,818,036	2,658,436	N/A
		Klon Do	4	1996	112	4,034	4,096	8,130	11	20	2	22	3	-	3	4,918,494	3,652,394	3,875,180
Ratchaburi																		
Chom Bueng	Dan Thap Tako	5	1996	172.51	3,311	3,286	6,597	19	37	1	38	6	1	7	3,695,071	2,097,971	2,447,000	
	Rang Bua	4	1995	95.18	3,846	3,694	7,540	14	26	2	28	3	-	3	4,276,029	2,985,429	3,620,231	
	Kaem On	5	1996	129.51	5,530	5,548	11,078	13	21	4	25	6	1	7	3,515,647	2,076,847	3,350,340	
	Bock Phrai	5	1996	105.60	2,543	2,567	5,110	6	11	1	12	7	-	7	3,764,865	1,646,765	2,399,395	
Suan Phueng	Suan Phueng	5	1996	426.26	4,821	3,979	8,800	8	12	2	14	7	-	7	5,506,320	3,395,020	3,531,459	
	Ta Nao Si	5	1997	213.4	2,768	2,239	5,007	6	11	1	12	7	-	7	2,874,073	1,280,374	3,717,684	
	Tha Khoei	5	1997	107	2,727	2,623	5,350	12	20	4	24	6	1	7	3,231,517	1,916,917	2,553,980	
	Pa Wai	5	1996	289	1,620	1,511	3,131	8	14	2	16	7	-	7	4,421,981	2,090,048	3,303,137	
K. A. Ban Kha	Ban Kha	5	1996	281	3,480	3,251	6,731	12	21	3	24	5	2	7	3,817,650	1,899,150	5,453,570	
	Ban Bueng	5	1995	553	3,898	3,630	7,528	12	21	3	24	2	1	3	4,620,842	2,079,442	4,458,651	
	Nong Phan Chan	5	1996	143	2,829	2,766	5,595	8	14	1	15	7	-	7	3,527,911	1,962,011	4,248,596	
Pak Tho	Pak Tho	5	1997	34.65	1,982	2,154	4,136	7	12	1	13	6	-	6	2,194,500	1,113,500	2,171,880	

Source: Development Plan of Each TAO 2001 (Original Data)-- Land area in each Tambon is to be recalculated by the Study Team later.

(2) Baseline Survey at Field Level**1) Procedures**

The Study Team led the Baseline Survey at the field with full cooperation of the RID counterparts. Firstly, the Study Team prepared the original plan including questionnaire, Tambons to be surveyed, number of samples, etc. The Study Team then had several discussions on the plan with the government officers as well as with the representatives from Tambon for reviews and revisions. The procedures of the Survey are shown in Table 3.2.3.

Table 3.2.3 Main Procedures of the Baseline Survey

Steps			
	Participants	Location	Remarks
1. Preparation of the Questionnaires			
	Study Team	---	Agriculture and other sectors are included in the questionnaire.
2. Finalizing the Questionnaires			
	Study Team RID counterparts	RID Central	RID counterparts reviewed and partly amended the draft questionnaire based on their practical knowledge.
3. Setting the Number of Tambons, Villages and Samples			
	Study Team RID counterparts	RID Central	Study team and RID counterparts discussed how to set the numbers of samples, villages and Tambons, and decides the tentative numbers.
4. Selection of the Tambons			
	Study Team RID counterparts RID regional officers Chiefs of Tambon Local consultants	RID regional office (Kanchanaburi and Ratchaburi)	The participants had meeting in both provinces with the representatives of each Tambon. It was suggested by the Tambon leaders from Kanchanaburi that the survey should cover all the Tambons in Kanchanaburi. It was agreed by the participants, and a total of 10 Tambons were selected.
5. Selection of the Villages			
	Study Team RID counterparts RID regional officers Chiefs of Tambon Local consultants	RID regional office (Kanchanaburi and Ratchaburi)	Dependent upon the advices from Tambon leaders, target villages were selected according to the characteristics of and accessibility to the villages. Total 24 villages were selected.
6. Selection of the Households			
	Study Team RID counterparts Local consultants	At the fields	Local consultants collected the list of households at every selected village, and the Study Team picked up the households randomly. Total 120 samples were selected.
7. Carrying Out of Interviews			
	Local consultants	At the fields	Local consultants conducted the survey simultaneously done by three surveying teams. When nobody was at the target household, another household listed next to the original target was interviewed.
8. Analyzing and Tabulating of the Results			
	Study Team Local consultants		Local consultants tabulated the results of the survey and the study team analyzed and finalized it.

The Baseline Survey was conducted at the following 24 villages:

Table 3.2.4 List of the Villages for the Baseline Survey

Sub basin	Amphoe	Tambon	Village
Upstream Basin	K. A. Ban Kha	Ban Kha	Lam Phra Bueng Tai Lam Pratai Phu Keelek Nuer
	Suan Phueng	Ta Nao Si	Suan Pueng Nong Ta Dang
Middle Upstream Basin	Suan Phueng	Suan Phueng	Pha Pok Huai Klume
		Pa Wai	Thung Sala Nong Tonsai
Middle Downstream Basin	Chom Bueng	Dan Thap Tako	Thung Kra Thin Thung Hieng Lam Sai Yai
		Kaem On	Thung Jaeng Phu Muang Khu Ta Kian Sun Don
Downstream Basin	Dan Makham Tia	Nong Phai	Nong Pak Dong Din Daen
		Dan Makham Tia	Poeng Nok Tha Plub
		Chorakhe Phuek	Tha Sadet Chorakhe Phuek
		Klon Do	Thung Makham Thao

2) Outcomes from the Baseline Survey

a) Profile of the Interviewees

Interviewees had an average age of 47.7 years. Of the total, male constituted 73.3%. Almost all of the interviewees (95.8%) were farmers; the remainders engage in such other minor occupations as wage labors and merchants. All the interviewees were of Thai nationality and 91.2% of them were Buddhist.

b) Land Holding and Land-use

Most of the interviewees have their own lands, with the land holding sizes varying from 1 to 60 rais. The lands are used in both wet and dry seasons. However, land productivity in the dry season was found relatively low due to the lack of irrigation water. At present, there are only small reservoirs/ponds and weirs which are available only in some villages (about 40% of the villages under survey). Furthermore, there is neither irrigation (distribution) system nor water utilization organization in the survey area. Because of this, only the households, which are located nearby the ponds or the weirs, have an access to water by small pumping or other means.

c) Crops

Most of the interviewed households grow upland crops, such as, maize, cassava, sugarcane, pineapple and asparagus. Other crops found were fruit trees (e.g., longan, tamarind, pomelo, etc.) and vegetables (e.g., turnips, egg plant, peas, etc.). Crop calendar in the Study Area is shown in Figure4.4.1.

In addition to the lack of irrigation water, problems related to agriculture that were found in the survey area includes insects and pests, high production cost (especially the costs of fertilizers and chemicals) and the lack of funds (credit) for investment. On marketing aspect, most of the agricultural products sold to local merchants were collected directly at the villages by themselves. This has resulted in uncertainty of production prices, which were determined basically by the merchants.

3) Infrastructures in Community

The following is the common characteristics of the survey area:

- ✓ Potable water: General households use water from natural rain and shallow wells.
- ✓ Water for general uses: Waterworks in the village represents a major source.
- ✓ Hospital: Normally, there is a health care center at the village level, with an average travel distance (between individual households and the center) of about 3-10 km.
- ✓ Telephone: Public telephone is available in only some villages. Some better-off households, however, have their own mobile phones.
- ✓ Electricity: All the households have an access to electricity.

4) Household Economy

Most of the interviewed households have income just sufficient for living. For those which do not have enough income, they will normally apply and receive credit from the Saving Cooperatives (with annual interest rates of 2-5%) and the Agricultural Cooperatives (with annual interest rates of 7-10%) to cover their production activities and/or household expenses. Repayments are made after harvesting and it was noted that most of the households were capable in making their repayments on time.

According to Table 3.2.5 and 3.2.6 which shows household income and household expenditure respectively, it can be told that average household income of 120 samples scattering over the Lam Pa Chi river basin was 340,476 Bt/year, while average expenditure was 204,483 Bt/year. Taking into consideration the Sub basin wise view, household in lower Lam Pa Chi river basin obtained the highest income of about 515,598 Bt/year. On the other hand, household in upper middle basin obtained the lowest income of about 181,251 Bt/year. 91.67 % of the interviewees gained this income from agricultural sector, while only 1 interviewee gained income from fishery sector. More than fifty percent of samples took their income from loan or credit. Households in lower Lam Pa Chi river basin also got the highest expenditure of about 297,032 Bt/year and households in upper middle basin spent the lowest expenditure of about 109,625 Bt/year. The main expenditures occurred from agricultural sector, the second and third were repayment of debt and livestock rearing respectively. The least expenditure was tax.

5) Agricultural Extension in Community

Most of the households received advices and guidance from the government sector/agencies, such as Kaset Tambon (Village Agriculturist/Extension Officer) and Land Development Officers who provide the farmers with knowledge/advice on various subjects, such as:

- ✓ New farming technology
- ✓ Appropriate uses of chemicals and fertilizers;
- ✓ New potential crops to replace the existing ones, including fruit trees; and
- ✓ Land conservation methods.

However, most of the farm households are still in need of other assistance, such as, good seeds for a higher yield/production.

6) Irrigation System in the Study Area

As stated, irrigation system is not currently available in the survey area. Most of the households use water from natural rainfall and shallow wells for their consumption as well as agriculture purposes.

7) Farmers' Opinions on Irrigation System

Most of the interviewees shared a common view that there should be irrigation system to improve their agricultural productivity, e.g., for about 50-100% over the existing level. They expressed their readiness to pay for management fees, although without specifying any definite rate. However, they expected a rate that assures appropriateness and equitability, which may be determined by the project authority.

8) Membership of Organizations

Normally, individual farmers are members of organizations/institutions which they involved themselves in one way or another, such organizations as the following:

- ✓ Pineapple-growers
- ✓ Asparagus-growers
- ✓ Cassava-growers
- ✓ Housewives group (to do processing of farm products, etc.)

With regards to the water user organization/association, it is not yet established in the survey area and because of this, a problem of competition for the use of available water in the dry season emerged during the last 2-3 years in some villages, such as, at Ban Pong-Nok of Tambon Ban Dan Makham Tia, Dan Makham Tai District, Kanchanaburi Province.

9) Farmers' Opinions on How to Increase Income

Some of the interviewed households expressed their needs to have supplementary occupations/activities with a view to increase household income. Activities of interest include fish culture and livestock rearing. However, major constraints that made them unable to implement their ideas includes the lack of investment funds (credit) and the lack of knowledge required for the purpose.

Table 3.2.5 Household Income

Items	Upper Basin			Upper Middle Basin			Lower Middle Basin			Lower Basin			Total		
	No.	%	Average	No.	%	Average	No.	%	Average	No.	%	Average	No.	%	Average
Number of Interviewees	30	100.00	314,407	20	100.00	181,251	35	100.00	278,685	35	100.00	515,598	120	100.00	340,476
1. Agriculture	30	100.00	217,513	15	75.00	145,145	34	97.14	157,176	31	88.57	377,443	110	91.67	234,066
2. Domesticated animals	4	13.33	139,250	2	10.00	61,000	5	14.29	87,080	0	0.00	0	11	9.17	101,309
3. Fishery	0	0.00	-	1	5.00	1,000	0	0.00	-	0	0.00	0	1	0.83	1,000
4. Product from forest	1	3.33	15,000	1	5.00	4,200	0	0.00	-	0	0.00	0	2	1.67	9,600
5. Farm labor	3	10.00	3,533	2	10.00	60,000	8	22.86	10,200	8	22.86	17,875	21	17.50	16,886
6. Wage labor in other sectors	9	30.00	33,380	10	50.00	39,874	7	20.00	28,714	12	34.29	27,775	38	31.67	32,459
7. Business/commerce	5	16.67	58,000	2	10.00	90,000	3	8.57	188,667	7	20.00	53,657	17	14.17	83,035
8. Working in other region	2	6.67	42,000	2	10.00	66,000	4	11.43	51,000	1	2.86	14,400	9	7.50	48,267
9. Income from loan/credit	20	66.67	57,850	11	55.00	37,273	18	51.43	86,500	21	60.00	234,048	70	58.33	114,843
10. Others	3	10.00	164,467	3	15.00	26,633	2	5.71	682,500	4	11.43	140,975	12	10.00	208,517

Source: Baseline Survey conducted by the Study Team

Table 3.2.6 Household Expenditure

Items	Upper Basin			Upper Middle Basin			Lower Middle Basin			Lower Basin			Total		
	No.	%	Average	No.	%	Average	No.	%	Average	No.	%	Average	No.	%	Average
Number of Interviewees	30	100.00	165,370	20	100.00	109,625	35	100.00	199,664	35	100.00	297,032	120	100.00	204,483
1. Agriculture	29	96.67	85,281	16	80.00	67,457	35	100.00	94,308	34	97.14	160,671	114	95.00	108,036
2. Livestock rearing	6	20.00	57,410	6	30.00	19,000	6	17.14	80,750	0	0.00	0	18	15.00	52,387
3. Education	22	73.33	15,945	14	70.00	6,358	23	65.71	31,578	23	65.71	25,070	82	68.33	21,252
4. Food	30	100.00	22,923	19	95.00	24,538	35	100.00	20,861	33	94.29	18,107	117	97.50	21,210
5. Medicine	19	63.33	3,256	17	85.00	1,137	19	54.29	1,061	21	60.00	1,911	76	63.33	1,862
6. Tax and others	24	80.00	291	13	65.00	150	26	74.29	429	26	74.29	551	89	74.17	387
7. Energy	25	83.33	7,334	14	70.00	8,553	28	80.00	11,725	27	77.14	6,997	94	78.33	8,727
8. Repayment of debt	20	66.67	29,443	7	35.00	19,979	24	68.57	47,123	22	62.86	148,079	73	60.83	70,101
9. Social activities	28	93.33	5,804	18	90.00	5,456	33	94.29	4,323	29	82.86	5,055	108	90.00	5,092
10. Clothes and commodities	28	93.33	3,211	18	90.00	3,261	35	100.00	2,160	31	88.57	2,513	112	93.33	2,697
11. Fees for water use	14	46.67	826	9	45.00	687	14	40.00	2,694	16	45.71	1,538	53	44.17	1,511
12. Others	0	0.00	-	0	0.00	-	0	0.00	0	2	5.71	4,480	2	1.67	4,480

Source: Baseline Survey conducted by the Study Team

3.3 Rapid Rural Appraisal (RRA) Survey

(1) Activities

The RRA survey aimed to understand fully the present situations of the farmers and the villages in the Study Area. In particular, an exposure of the RID counterparts to the rural people was intended so that the workshops in the later stage may be implemented effectively. The RRA survey was conducted for five days in a village (10 days in total) basically with the following itinerary:

- | | |
|----------------------|---|
| 1 st day: | Courtesy call and briefing to village chiefs
Key informant interview (village officials)
Selection of households for household interviews |
| 2 nd day: | Group interview (traditional leaders)
Site visit with villagers |
| 3 rd day: | Household interviews (including ambush interviews) |
| 4 th day: | Household interviews (including ambush interviews) |
| 5 th day: | Household interviews (including ambush interviews) |

The RRA Report was prepared which covered discussions on the socio-economic conditions of the selected villages, the problems and needs of the farmers, and the expected directions for development. The Report also contains the feedback from the RRA survey team, some of which are mentioned below.

(2) Lessons Learned

After the RRA survey was conducted, the team members were requested to discuss how the RRA method could be incorporated into the RID's common work procedures. The following is the summary of the opinions:

- (a) The survey team should be composed of the experts in multi-sectors, RID staff in the local offices, local people, etc. It should be better if RID has the implementing section of RRA/PRA in its organizational structure.
- (b) The survey is suitable particularly when a project is planned; when something has happened unexpectedly and when monitoring and evaluation are done.
- (c) The survey should be conducted with baseline surveys, PCM workshops etc. to mutually supplement the information.

After the survey, the team members observed/learned the following:

- Their interview skills have been improved.
- They have understood the current situations of agriculture in the area better.
- The participatory approach gave them a lot of works and made them exhausted.

3.4 Project Cycle Management (PCM) Workshops

(1) Activities

The PCM workshops were conducted at 16 Tambons all in the Study Area. The participants were the representatives of the villages in the Tambon. The objectives of the workshop were to (i) identify the major stakeholders for agricultural development in the area and their links with the farmers, (ii) discuss the problems and needs with the farmers, (iii) identify the possible development approaches, and (iv) prioritize with time frame. The first workshop was moderated by JICA Study Team, assisted by local consultants and the RID staff. For and after the second workshop, the RID staff and local consultants were the main moderators, assisted by the Study Team.

The PCM Report was prepared for each Tambon with the following contents: (i) the summary of major problems and needs of the farmers, priorities and major characteristics, (ii) major stakeholders of agricultural development, and (iii) the outputs of the workshops, such as problem tree, objective tree, project selection and project activity matrix (PAM). The Report also contains lessons from the PCM team as follows.

Example of PAM

Approaches	2-3 years	> 5 years	5 years <
Investment funds/credit	- The state issued the land document of right - Setting up farmer's group - Procuring loan with low interest	- Cooperatives establishment	
Water	- Weir - Distribute system - Pond - Transmission pipe - Electrical Pumping Station	- Transmission pipeline system	- Medium Reservoir
Soil	- Expert gives advice/knowledge - Forming a group for distribute knowledge about soil	- Soil conservation	
Flood prevention	- Dredging sediment in creek - Construct drainage channel - Raise forest preservation consciousness	- Grows elephant grass - Afforestation	

(2) Lessons Learned

The PCM team members discussed regarding how RID can use the PCM or other workshop-style methods in its normal work. The following summarized the discussion:

1) Advantages

All the PCM team members shared a common view that it should be used further by RID as a tool for development planning. Advantages of this method are mentioned as follows:

- ✓ PCM is a tool that promotes a participatory approach in which the prospective beneficiaries could have a good opportunity to participate in the development planning for their own areas;
- ✓ PCM workshop is a means/venue in which all the key stakeholders from the Central (Government) to the community levels (the farmers/villagers) can participate, using the people as a base/focus of the planning;
- ✓ PCM as an effective step for securing the first hand information/input for the planning;
- ✓ PCM enables the villagers/farmers to understand better the work of the planning/implementing of RID and other related agencies;
- ✓ PCM facilitates a collaborative work among the government agencies concerned (integrated approach);
- ✓ PCM enables the parties concerned to learn experiences from each other;

- ✓ PCM produces useful information that can be used not only by RID but also by other offices/agencies involved which is a good basis for promoting development projects/activities;
- ✓ PCM leads to better understanding among the stakeholders on any critical subject matter, and helps to reduce pressure from possible conflict of interest.

2) Disadvantages

Some members, however, believe that the following are the disadvantages to the RID, which need further consideration:

- ✓ This method requires lots of time and resources and accordingly may not be appropriate for a large-scale project;
- ✓ This method requires expertise of multi-disciplinary nature, and therefore, to be effective, a unit/division responsible for this work should be institutionalized/established within;
- ✓ This method involves a long working process and may not be able to comply with any immediate requirement for problem solving of the local people. This could worsen further the feeling of unhappiness and dissatisfaction among the villagers/farmers.

3) Expected PCM team members

From the field experiences, it was observed that the development problems and needs as expressed by the villagers/farmers were in most cases diversified. In this connection, the PCM team members being established by RID should comprise a number of experts/specialists in different fields. According to an experience from the present project, usefulness of the creation of the Technical Support Group (TSG) comprising representatives from the various government offices at the provincial level was recognized. However, a well-elaborated Terms of Reference for this Group is necessary. For example, it is suggested that members of TSG participate in all the PCM meetings/workshops, to facilitate the meetings and/or to take note of the needs of the people.

4) Expected participants and duration

It was a common opinion from the PCM team members that the “workshop” style of meetings is useful, although it is new to most of the farmers/villagers. In addition to the village leaders, the number of representatives from each village in the Study Area should not exceed 2 persons. In this connection, to be effective, the total number of participants in each workshop, if at Tambon level, should be between 30 and 50 persons. It was also pointed out that time constraints on the side of the farmers should be fully taken into consideration. Each workshop, therefore, should not be longer than 3 days. According to the experience from the PCM workshops, most of the farmers this time are not ready to participate in the exercise for long duration.

3.5 Discussion at Sub basins

One-day discussion was conducted at each of four sub river basins. The purposes of the discussions were to confirm the major problems and constraints for development and to discuss the possible direction of the development in each area. Prior to the discussions, the outputs of the PCM workshops at the Tambon level, such as the problem trees, objective trees and the project activities matrix (PAMs) were integrated at the sub river basin level. The Study Team, the RID counterparts, the RID local staff and the representatives of each Tambon then discussed the common and main problems at the sub river basin and the possible solutions. All the activities included in the PAMs were finally prioritized. The results of the discussions are described below.

(1) Discussions at sub basins (1st session)

1) Activities

Based on the draft PAM at the sub basin level, open discussion was conducted place at each sub basin in order to discuss what the common problems of sub basins are and, how to solve the problems in terms of rural and agricultural development. Furthermore, to assess the draft PAM if the problems represent the whole sub basin and if proposed activities are realistic.

The Study Team made presentation on problem tree, objective tree and PAM at the sub basin level which were all prepared by the Study Team based on the results of the PCM workshops. Then, the participants gave comments on them and revised the PAM after discussion. From the original plan, it was expected to make the Plan of Operation (PO) at this stage. Since the proposed approaches were still somewhat unrealistic, it was decided however to prepare the PO at the implementation stage of the pilot project.

“Needs” or “Realities?”

At the discussions at sub basins (1st and 2nd sessions), participants, mainly composed of farmers, were encouraged to consider the reality on implementation of each approach proposed in the PAM. They were also asked to prioritize them according to the timeframe of “short,” “medium” and “long” terms. However, farmers tended to consider the feasibility of the approaches/activities optimistically, and, therefore, some were hardly realistic.

For instance, farmers thought it's possible the Government issues land title within three years. As a result, most of the efforts during the discussions were made on identifying the realistic development approaches and activities. It can be said it is not easy to let farmers think realistically or practically.

2) Outcomes (Outputs/Results)

The following were the outputs at this stage:

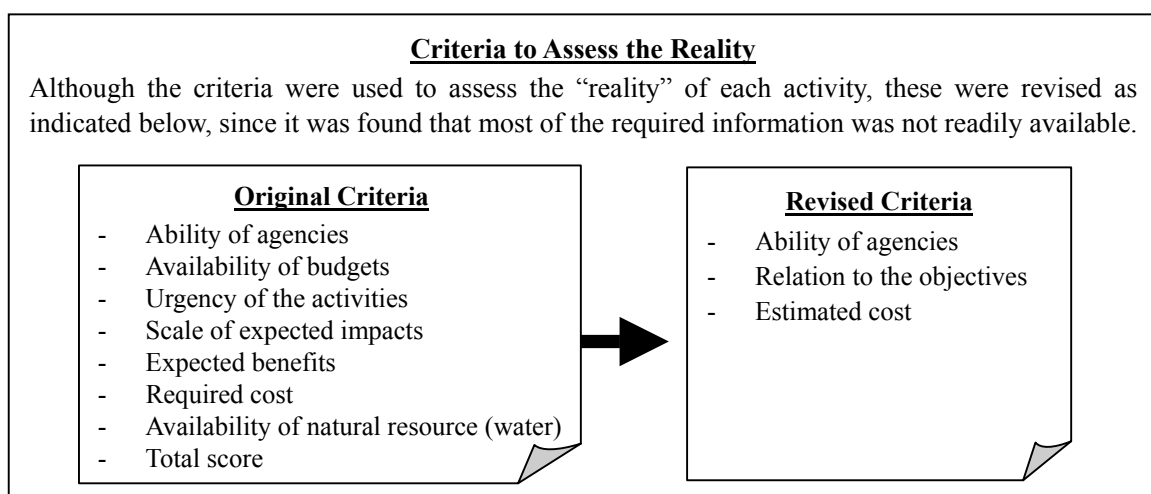
- ✓ Problem tree, objective tree, and PAM were reviewed and finalized at each sub basin.
- ✓ Participants shared their ideas on development direction of the sub basins.
- ✓ Since participants were mainly composed of representatives of the TAOs, who are mostly the farmers and hoped to realize all their needs, revised PAMs are still unrealistic.
- ✓ Participation of TSG members was not high.
- ✓ Although TSG members were supposed to provide technical opinions to assess the reality of each proposed activity, it was mostly not adequate. Possible reasons were as follows:

- TSG members were not familiar with some technical topics, especially those which are not relevant to their backgrounds
- They were not stimulated to participate actively
- Their participation was low

3) Lessons Learned

Lessons learned from the Study at this stage are shown below:

- ✓ It is important to make the plans feasible to provide technical advice, or, the plans would be just a collection of farmers' needs.
- ✓ TSG participation is therefore indispensable.



(2) Discussions at sub basins (2nd session) ~Enhancement of “reality” of the approaches ~

1) Activities

At this stage, the approaches mentioned in the PAM were assessed, their realities with the criteria such as ability of agencies and relevance to the development goals. Participants, through free discussion, suggested ideas/opinions to each approach according to the criteria, and then, reflected into the Priority Matrix. RID requested TSG members to more actively participate in the discussions.

2) Output & Achievement

- ✓ PAM was finalized.
- ✓ TSG's participation was improved but still not enough.

3) Lessons Learned

- ✓ It appeared difficult for the participants composed of TSG members, RID Central and Province staff, and farmers, to assess the reality of each activity. The main reason is the lack of technical capabilities.
- ✓ TSG members were not comfortable to give critical comments on the farmers' needs.
- ✓ The idea to have two sequential meetings, one for confirming the farmers' “needs” and the other for assessing their “reality”, is good to identify the possible ways to achieve the development goals.

3.6 Discussions at Whole River Basin ~Coordination of plans at whole river basin ~

(1) Setting the Implementation Schedules--- ~Embodiment of the development activities ~

Based on the results of the previous stage, the Study Team prepared Implementation Schedule (first draft) at sub basin level. The implementation schedules of each activity were proposed with the time frame of short, middle and long terms. These were translated into Thai and sent to RID and TSG members prior to the Study

Implementation Schedule (example)

Activities	Shor			Mid					Long Term											
Sub activities	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
3. Loans with low interest rate become available.																				
3-1 Necessity of policy change is appealed to the authorities concerned.																				
3-2 Policy is changed to provide loan with lower interest rates.																				
3-3 Policy is changed to issue land title deeds.																				
3-4 Loans with low interest rate are provided.																				

Team's visit to Thailand in August 2003. Then, RID and TSG members reviewed them technically, financially and politically.

(2) TSG Meeting--- ~Enhancement of Technical Cooperation from TSG ~

1) Activities

To accelerate the TSG members' participation to the Study and to finalize the Implementation Schedules, one-day discussion was undertaken. During the discussion, the Implementation Schedules were finalized according to technical comments given by TSG members. The Implementation Schedules were considered as the "Simplified Plans of Operation".

The representative of JICA Headquarters participated in the discussion and urged TSG members to be actively involved in the Study.

2) Outcomes

- ✓ Implementation Schedules were finalized as the plans of operation (POs).

(3) Discussions at Whole River Basin--- ~Coordination of the plans at whole river basin ~

1) Activities

To confirm the PO revised by TSG and also to explain basic idea of the Pilot Project, discussion at whole River Basin level was held in Kanchanaburi. Representatives from all TAOs in the Study Area were invited to the discussion further to understand the proposed directions of rural and agriculture development in the whole River Basin. The discussion also aimed to identify how to select the pilot project sites. Given the presentation on the PO by the Study Team, the participants gave some comments, and the Study Team finalized the PO accordingly. As for the Pilot Project, the representative of RID Provinces in Kanchanaburi and Ratchaburi made power point presentations on the proposed sites and main components of the projects. The criteria for selection of the sites and rough estimated costs of each proposed site were suggested by the Study Team.

2) Outcomes/ Outputs

- ✓ The planning process taken from the 1st to 4th stages and the intensions of the POs were reviewed.
- ✓ The proposed POs were finalized and confirmed.
- ✓ Objectives and procedure of the implementation of the Pilot Project were confirmed.
- ✓ Some representatives of TAO in Ratchaburi were not able to participate because of the difficulty of transportation.

3) Lessons Learned

- ✓ In a big meeting with nearly a hundred participants, active discussion hardly happens.
- ✓ For the people who live in remote area, it is better to provide transportation or select a place accessible to all the participants.

3.7 Draft Master Plan

Taking into consideration the communities' needs identified through the series of workshops and discussions as well as the government policies, the goal of the Master Plan was defined as "Agricultural incomes meet its cost." To achieve the goal, four problems such as "reduction of the agricultural inputs cost," "improvement of agricultural productivities," "improvement of farm gate prices" and "reduction of the damages on products from flood and/or disease" should be solved. In order to overcome the above problems, eight (8) development components have been proposed namely: 1) water resources development, 2) flood mitigation, 3) improvement of agricultural production system, 4) soil improvement, 5) improvement of farm inputs, 6) pest & disease control, 7) micro credit and 8) improvement of marketing system.

3.8 Implementation of the Pilot Project

To verify the feasibility of the Draft Master Plan and to transfer the technology of the participatory development to the related agencies concerned, implementation of the Pilot Project at two sites in Kanchanaburi and Ratchaburi provinces has been approved by the Steering Committee on 11th November 2003. The RRA survey and PCM workshop were conducted at each site to deeply understand the situation at the project area and to make a project plan. TSG members were strongly involved in these activities. The RRA survey also aimed to obtain baseline information necessary for monitoring and evaluation of the project performances during and after the construction of the project facilities. The implementation of the Pilot Project was started on January 2004. In the Pilot Project, the functions of the TSG and linkages/coordination among the agencies concerned have been verified.