

# **Chapter 3 Evaluation Results**

## **(Thailand)**

## Chapter 3: Study Results (Thailand)

### 3-1 Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin (F/S)

#### 3-1-1 An overview and background of the study project

##### (1) An overview of the development study

The development study under evaluation covers the irrigation area of 17,200ha in the Mae Klong River Basin with the objective of developing farm fields on the outskirts. The following is an overview of the development study.

1. Study implementation period: January 1979 – October 1979
2. Compilation of the final report: March 1980
3. Counterparts: Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives (MOAC)
4. Consultant for the development study: Sanyu Consultants Inc.

##### (2) Background of development study implementation: Development history of the Mae Klong River Basin and details of the development study

###### 1) Irrigated agriculture development projects of RID and the World Bank assistance

In 1903, RID embarked on a series of development projects in this basin for the purposes of irrigation, flood prevention, and power generation (the “Irrigated Agriculture Development Project”; performed on a small-scale from 1903 to 1960).

After the Second World War, the Thai government intended to make the country a major food supplier in Southeast Asia, and started an irrigated agriculture development project for the basin in 1964 with the assistance of the World Bank. The project initiated by the World Bank started with construction of the Vajiralongkorn Diversion Dam (1964), including the Mae Klong irrigation project area at Tha Muang (first-stage area: 1,075,000 rai; major canals completed in 1972), followed by construction of a first-stage regional water system on the left bank (started in 1975), a farm field development pilot project on the outskirts initiated by JICA in 1978 (400ha), construction of a second-stage water system on the right bank (completed in 1982), and F/S in the Malaiman region for which the study was completed in 1980. In the Malaiman region (175,000ha) on the left bank, an irrigation facility covering 12,000ha (1986 - 1995) and an irrigation facility for rice cultivation (canal construction, completed in 1987) were completed, along with a pilot project for sugar cane (1981). For the Khwae Yai River (covered in the second stage, 1,443,000 rai), irrigation facilities (Pa Chee Project and Lam Topern River Plain North of Kanchababuri) and dams (Khwae Noi River in Pa Chee & Khao Project, Khwae Yai River & Wang Maseng Reservoir) were constructed, resulting in a 25% increase in food production as of 1968.

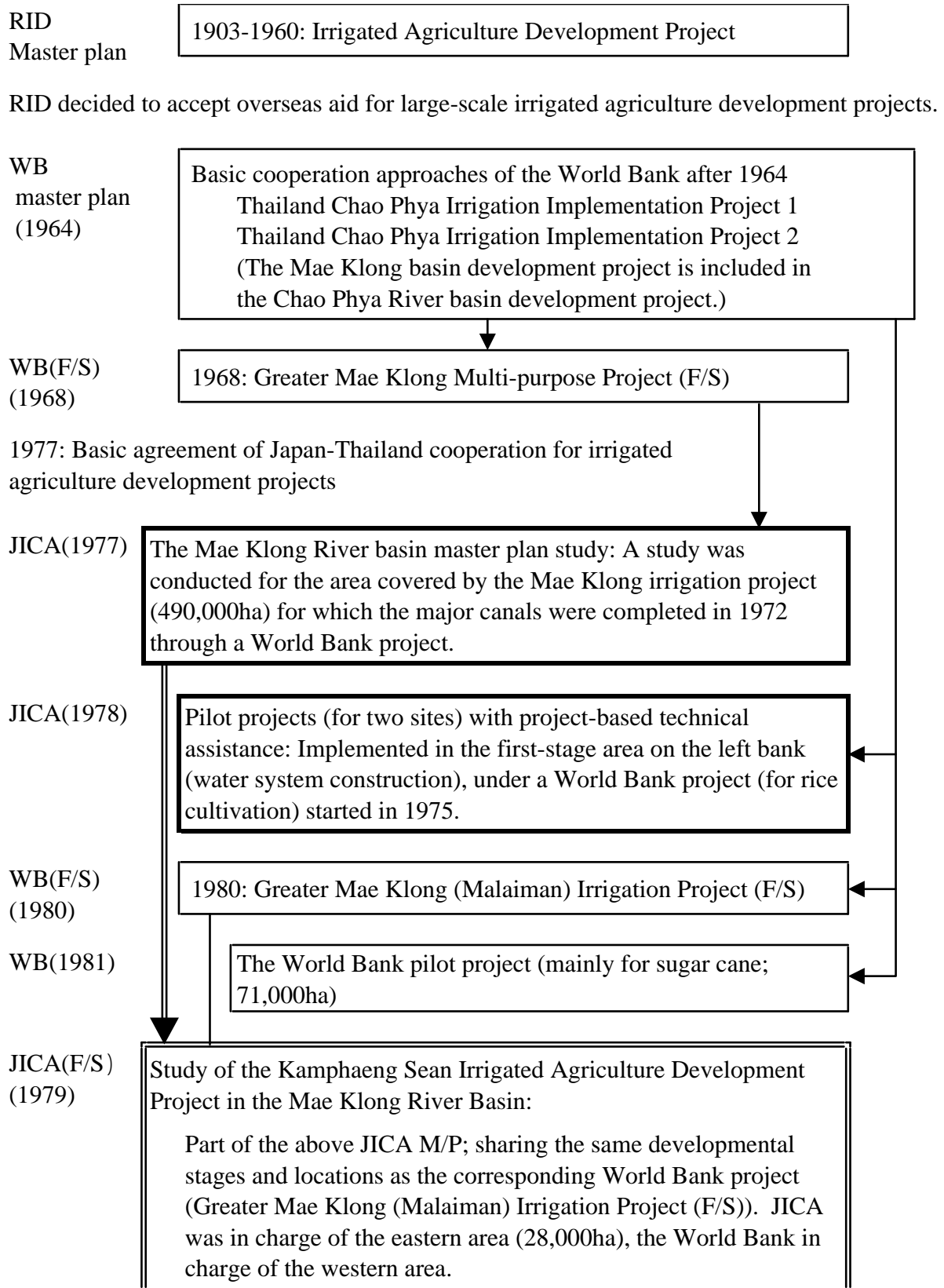
The irrigated agriculture development project conducted by RID/World Bank in the Mae Klong River Basin covered a combined area of 490,000ha, encompassing i) the Mae Klong irrigation project area and ii) the drainage project area, as mentioned above.

## 2) Cooperation policies of the World Bank

The cooperation provided by the World Bank for the basins of both the Chao Phya River and the Mae Klong River was planned to proceed along the following four stages, in accordance with three reports issued by the Bank (“Thailand Chao Phya Irrigation Implementation Project 1, 1972,” “Thailand Chao Phya Irrigation Implementation Project 2, 1972,” and “WB Staff Project Report, 1975”).

In addition, the “Greater Mae Klong Multi-purpose Project, WB 1968” (F/S report for stage II) states that development activity in the Mae Klong River Basin should be divided into two areas, i) the Tha Muang area (stage I) and ii) the Kwaie Yai River area (stage II); that an intensive irrigation development project ought to be implemented for the Tha Muang area (stage I); and that canals should be constructed in a five-year plan for Ban Tham at Petohabli.

**Fig. 3-1: Historical development of irrigated agriculture development in the Mae Klong River basin and operational assignments**



Areas to be evaluated in the “Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin (F/S)” are the Tha Muang district (Stage I) and East Malaiman on the left bank of the Mae Klong River.

3) Japan – Thailand technical assistance (Japan-Thailand cooperation for irrigated agriculture development projects)

In April 1977, a basic agreement was signed between the Japanese and the Thai governments on irrigated agriculture development in the Mae Klong River and the lower reaches of the Chao Phya River.

Following this basic agreement, JICA implemented the following:

- i) A study of irrigated agriculture development project on the west bank of Chao Phya in the lower reaches of the Chao Phya River (F/S, 1976-1977)
- ii) A study of the master plan for the Mae Klong River Basin (M/P, 1977-1979)
- iii) Initiation of pilot projects (project-type technical cooperation, 1977-1985) in one location of the Chao Phya River and two locations of the Mae Klong River

“Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin (F/S)” under evaluation in this document is part of the master plan study for the Mae Klong River specified in “ii)” above. The master plan study was initiated at the stage where Part B of the World Bank cooperative project was underway.

4) Differences in developmental methods between the World Bank and JICA

Although the study on the master plan for the Mae Klong River basin started at the same time and for the same areas as the plan proposed by the World Bank, the methods and approaches taken by the two are somewhat different.

The JICA study team reviewed the irrigation development policies in the master plan study for the Mae Klong River Basin for the following three methods:

- i) Type A; Ditches and Dikes method (limited to construction of ditches, dikes and farm roads)
- ii) Type B; Extensive method (construction of canals dividing lots, as required)
- iii) Type C; Intensive method (accompanied by land rearrangement and land exchange)

For Type A and Type B, a detailed F/S was provided in the “Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin (F/S),” considering the possibility of implementation in the Kamphaeng Saen district. As for Type B and Type C, the study team recommended that RID should implement the land consolidation with loans from the World Bank.

At the same time, the World Bank was implementing an irrigation project using Type C (“intensive”) methods. RID was also financially supported by overseas loans. Under these circumstances, the proposal for the master plan study for the Mae Klong River Basin was shelved.

### (3) Characteristics of the development study

Characteristics of this development study can be summarized as follows:

- i) This was an “early assistance” case in which JICA provided cooperation for Thailand in the area of irrigated agriculture development.
- ii) At that time, large-scale assistance was provided by the World Bank, which required JICA to coordinate with the World Bank.
- iii) Coordination took the form of harmonious coexistence, with the World Bank taking charge of large-scale development of the major areas while JICA took care of more detailed segments derived from the major projects.
- iv) Basic differences in principles were at work. The World Bank adopted American-style “intensive” methods suitable for large-scale agricultural developments while Japan was more comfortable using “extensive” or “ditches and dikes” methods. Furthermore, in Thailand, as indicated by the Ditches and Dikes Act established in 1964, and the Land Consolidation Act enacted in 1982, laws concerning development methods were formulated as if following actual implementations of irrigated agriculture development projects.

As stated earlier, this development study constitutes part of the master plan study for the Mae Klong River basin and is designed to be a feasibility study for the development of farm fields at the outskirts of the area for which major canals were completed in 1972 with the assistance of the World Bank.

The development project at Kamphaeng Saen, which corresponds to Part D of the cooperation policy of the World Bank, is subdivided into two projects, for the west and east districts. The project for the west district was proceeded with assistance from the World Bank. The east district was subject to the development study. According to an explanation from the director of Regional Office 10 provided to the evaluation study team during the survey, the development for the east district was supported by both overseas loans from the World Bank and national funds.

### (4) Conclusions derived from the evaluation study

The following conclusions can be obtained from comprehensive evaluations of the World Bank reports, time-line accounts and geographical descriptions of development projects at Kamphaeng Saen in the Mae Klong River basin, project-site surveys, and collected questionnaire answer sheets from Regional Office 10.

- i) From the time-line accounts and geographical descriptions of development projects in the Mae Klong River basin, based on reports of the World Bank, the areas covered by JICA development studies for both the “Master Plan Study for the Mae Klong River Basin” and the “Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin (F/S)” belong to the Tha Muang district (Stage I) and East Malaiman on the left bank of the Mae Klong River.
- ii) There is a canal that can be regarded as a major ditch in the eastern region of Kamphaeng Saen surveyed by the evaluation study team. However g this canal

was constructed in the 1990s, in accordance with Type B (Extensive method + overseas loans from the World Bank) action proposed by the “Master Plan Study for the Mae Klong River Basin.” There was no confirmation of any “Type A” activity, as suggested by the “Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin.”

#### (5) Others

In 1997, RID conducted the “Performance Evaluation of Kamphaeng Saen Irrigation Project, 1997” for the Kamphaeng Saen district. Regrettably, however, because this report does not distinguish the western and eastern regions, it cannot be utilized for measuring the effects of the “Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin.”

#### 3-1-2 Evaluation results using the evaluation criteria

During the study period, accurate information has not been acquired from interviews and questionnaires because former C/P members no longer work for RID.

##### (1) Efficiency

Except for verification of facts based on the final report, it is impossible to evaluate human input, technology transfers, and collected study data, etc.

2) As stated earlier, the coordinated flow is maintained from the World Bank project to JICA M/P studies.

3) The Pilot Project (part of JICA project-type technical cooperation) and this study are both based on the basic agreement between Japan and Thailand in 1977, but are separate and independent projects.

##### (2) Effectiveness

1) Although the proposal may be regarded as thoroughly reviewed in terms of the contents, scale, implementation conditions, and technical aspects, etc., the study failed to obtain any information about the former C/P.

2) The report briefly introduces descriptions about relationships with the Fourth National Social and Economic Development Plan and the World Bank projects, and touches on geographical descriptions. The report should also be constructed so that readers can easily recognize the importance of this development study.



### (3) Impact

It was impossible to confirm whether any specific proposals derived from this development study were employed in projects, even from the replies to questionnaires, hearings at regional offices, and project site surveys.

### (4) Relevance

- 1) The study policy adopted for the implementation of this development study properly coordinates with the Fourth National Economic and Social Development Plan.
- 2) The study was conducted in accordance with the development cooperation policies of the World Bank, as well as with the “Master Plan Study for the Mae Klong River Basin.”

### (5) Sustainability

The evaluation study failed to confirm whether any specific proposals derived from the development study were employed in projects.

Some information concerning the Kamphaeng Saen district, the target area, is provided below.

- i) The Mae Klong River basin, including the Kamphaeng Saen district, is under the jurisdiction of Regional Office 10. The Operation and Management Division is responsible for its maintenance and management. According to the information provided by the Operation and Management Division, farmers were organized into 296 Basic Groups (total acreage: 142,599rai, total number of owners: 9,953) and one Administration Group (total acreage: 5,145rai, total number of owners: 437) for irrigation in the Kamphaeng Saen district from 1990 through 1999.
- ii) In addition, judging from the change in the planted area from 1987 through 1999, for both the wet and dry seasons, the acreage for rice cultivation remains consistent, that for sugar cane decreased slightly, and that for vegetables, fruits, and fish/shrimp cultivation increased by three to five times.

## 3-2 Study of the Mae Kuang Irrigated Agriculture Development Project (F/S)

### 3-2-1 An overview and background of the study project

#### (1) An overview of the development study

The development study under evaluation covers an area of 20,000ha encompassing both Chiang Mai and Lamphun Provinces and designated for dam construction and irrigation development projects. The following is an overview of the development study.

1. Study implementation period: February 1981 – February 1982 (S/W signed in December 1980)
2. Compilation of the final report: March 1982
3. Counterparts: Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives (MOAC)
4. Consultant for the development study: Sanyu Consultants Inc.; Taiyo Consultants Co., Ltd.

#### (2) Background of development study implementation:

Development of the Mae Kuang River basin started in 1957 with the construction of a weir covering an area of 9,600ha. However, this project was not sufficient to counter water shortages in dry seasons and floods in wet seasons. In 1975, RID embarked on construction of a dam on the left bank, but was unable to solve certain construction-related difficulties and requested assistance from JICA, which led to implementation of this development study.

This development study covers an area of 20,000ha encompassing both Chiang Mai and Lamphun Provinces, and seeks to formulate an irrigation development project effective for both the wet and dry seasons by constructing a total of three dams (the main one and another on the right bank, and a third on the left that was attempted by RID), utilizing the reserved water in these dams, and providing water supply/drainage through newly constructed main and branch canals.

#### (3) Characteristics of the development study

This development study is characterized by the fact that immediately after the completion of a JICA development study in February 1982, the “Mae Kuang Irrigated Agriculture Development Project (MK AIDP)” proceeded to next-stage study (July 1982) with an overseas loan from OECF. Construction started in 1984. The process can be summarized as follows.

1. JICA development study: February 1981 – February 1982
2. OECF loan; the next-stage study: July 1982
3. OECF loan; the first-term construction: September 1984 (construction of the dam on the left bank)
4. OECF loan; the second-term construction: October 1985 (construction of the dam on the right bank)
5. OECF loan; the third-term construction: September 1987 (construction of the main canal on the left bank (68.6km), the branch canal on the left bank (99.0km), and 32 administration offices)
6. Completion of all construction: 1993

For the irrigation development project, after 1992, RID took responsibility for planning and implementing construction of the facilities using the “ditches and dikes” method (land consolidation methods were not adopted). Utilization of the irrigated land for other purposes has been restricted.

Compared with the area covered by JICA development study (20,000ha), actual irrigation area available for urbanization, reforestation, and inland fish cultivation, etc. was 13,613ha as of 1999.

#### (4) Conclusions derived from the evaluation study

The development study covered slightly less than 70% of the irrigated land that was initially planned, but project operations proposed in the development study were successfully implemented without delay. Subsequent operations involving RID projects (as part of accompanying projects) have been continuously performed.

Based on comments obtained at hearings with the individual experts currently dispatched as JICA senior volunteers, it was found that the total storage capacity of dams is insufficient for absolute demand levels.

### 3-2-2 Evaluation results and the five evaluation criteria

#### (1) Efficiency

- 1) This development study offers a very clear scope, i.e., construction of dams and formulation of irrigation development plans for the areas under evaluation. The final report clearly indicates that the development study was conducted for these objectives.
- 2) It is impossible to evaluate detailed study activities (Thai and Japanese inputs, including human input, communication, and data collection, etc.) due to the absence of older members of the study.

#### (2) Effectiveness

- 1) Judging from the OECF reports and RID activities that will be touched on later, the content, scale, implementation conditions, and technologies of the projects proposed through the development study all seem to have been thoroughly reviewed.
- 2) The report sufficiently reviews the basic project plans (including construction of dams) and formulation of irrigation development plans. Although it gives careful consideration in terms of technical analyses, those who read it later may find it difficult to derive an overall picture of irrigated agriculture development policies and water resources policies at that time, or of perspectives in agro-economics and socioeconomic impacts on communities.

#### (3) Impact

The development study proposals are supplemented with more detailed analyses in the subsequent next-stage study, and modified to be utilized in applications for OECF loans.

- 2) The development study proposals and the analyses done for them have the following impacts on the areas covered by the study after project operations:
  - i) Increased irrigation area: The irrigated land area has steadily increased through urban development, reforestation, inland fish cultivation, etc. to slightly less than 70% of the originally planned area.
  - ii) Flood prevention: The dams and weirs constructed can control a volume of water equal to 24% of total rainfall. This figure can be translated into 27,200,000 Baht in flood damage at 1998 price levels, indicating that this amount of economic loss was prevented.
  - iii) Land category: The land in the project area has become increasingly urbanized over the years. After irrigation development, traditional rice cultivation has been replaced by cultivation of red pepper, vegetables, and fruits, and by inland fisheries.
  - iv) Amounts of harvested crops: In Chiang Mai Province, a comparison of the 1992/93 and 1996/97 harvests shows no fluctuation for wet seasons. However, for dry seasons, harvests in planted area increased by 45.3%. Similarly, in Lamphun

Province, harvests in wet seasons increased by 29.2%, and in dry seasons by 78.6% (in planted area).

v) Inland fisheries: Fish catch increased by 120 tons at weirs and 150 tons at fish farms.

vi) Water User's Groups (WUGs), Water User's Association (WUA): In terms of water management organizations, there were 130 WUGs and 12 WUAs as of the end of 1999.

vii) Others: Reserved water in dams is provided not only for irrigation purposes. It is also supplied to the Doi Saket District in Chiang Mai Province at 11,500 cum./d = 0.13 cum/s; to Stage 1 in Chiang Mai Province at 52,800 cum./d = 0.61 cum/s; and to the Northern Industrial Estate in Lamphun Province at 15,000 cum./d = 0.17 cum/s.

#### (4) Relevance

- 1) As stated in the background of this development study, the study is considered to be valid in Thailand.
- 2) In the development study, coordination with the existing area in Mae Kuang Irrigated Agriculture Development Project (MKIADP) is not necessarily considered, which, however, does not negate the study's relevance.
- 3) Regional offices of RID in charge of the areas perform activities related to irrigation development, including organizing farmers.

#### (5) Sustainability

- 1) Sustainability is supported primarily by RID, but in practice, managed by regional offices of RID as activities of Mae Kuang Operation and Management Project (MKOMP).
- 2) As for WUGs and WUA, refer to the comments given at "impact." The roles of WUGs and enhancement of their responsibility are activities of MKIADP Office. MKIADP is organized as follows:

- i) Administrative Division
- ii) Engineering Division
- iii) Water Management Division
- iv) Mechanical Division
- v) Four O&M Sections

As of 1995, MKIADP was composed of 124 staff members, among whom there were 66 O&M staff members, 22 of whom were in charge of water management, controlling an area of 1,300ha and 31.3km of canals.

- 3) To sum up, after implementation of this development study, this region has steadily been making efforts for sustainable development of projects by establishing offices, under the

guidance of MKIADP and MKOMP.

### 3-3 Study of the Sakae Krang River Basin Irrigation Project (F/S)

#### 3-3-1 An overview and background of the study project

##### (1) An overview of the development study

The development study under evaluation covers an area of 6,300 km<sup>2</sup>, encompassing the Sakae Krang River basin located in the northwest of the central Chao Phraya plain, intended to review the water resource development plan for the Sakae Krang River Basin, to select dams that should be operated in projects, and to formulate irrigation development plans (pre-F/S and F/S). This basin is located about 250km to the north of Bangkok. The following is an overview of the development study.

1. Study implementation period: September 1984 – March 1986
2. Compilation of the final report: March 1986
3. Counterparts: Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives (MOAC)
4. Consultant for the development study: Nippon Koei Co., Ltd., Kyowa Engineering Consultants Co., Ltd., and Nippon Giken Co., Ltd.

##### (2) Background of development study implementation:

This study can be divided into two parts: a first-stage study for preliminary feasibility study (selection of possible project candidates; Pre-F/S) and a second-stage study for feasibility studies of the top-priority projects derived from Pre-F/S and for formulation of irrigation development projects. Both groups of studies were implemented in accordance with the national objectives of 1) enhancing major production categories, including agriculture; 2) developing underdeveloped regions and eliminating absolute poverty; and 3) improving living standards in farm villages and equitable distribution of incomes, as stipulated in the Fifth National Economic and Social Development Plan (1982 - 1986). Emphasis is placed on enhancing productivity in agriculture through new water resources and irrigated agriculture developments so that the target for agricultural development (annual development rate of 4.5%) can be attained.

##### (3) Characteristics of the development study

This development study focuses on development and the environment. This is because solving environment-related problems is crucial to project operations as proposed in the development study. Unless this requirement is met, no projects can be implemented.

The relationship between this development study and The environment should therefore be considered from the following perspectives:

- 1) Are environmental assessments included in the scope of this development study in the first place?
- 2) How should the environmental studies be allotted?
- 3) What kind of factors (conditions) should be satisfied relative to environmental problems (for possible project operations), and what kind of efforts have been made to solve these problems?

- 1) Are environmental assessments included in the scope of this development study in the first place?

As stipulated by the S/W of this development study, three environmental specialists participate in the study team. As for RID, our counterpart, a document stipulates that RID should invite “environmental specialists” from relevant organizations at the expense of RID.

The gist of the implementation plan for environmental study (work allotments) subsequently submitted by the JICA study team to RID is as follows:

- i) The environmental study covered by the development study is targeted at the top-priority dam project and the environmental impacts of irrigation developments.
- ii) The environmental impact standards should be based on the General Guideline of the National Environmental Board (NEB).
- iii) As for the study approaches required by NEB, three points need to be noted: I) for those approaches that have already been included in S/W, additional data should be collected and provided by the JICA study team; and II) for those that have not yet been included in S/W, additional data should be collected and provided by RID; and III) the JICA study team should provide assistance to studies of some areas.
- iv) The deadline for RID’s environmental study and its work plan (i.e., the portions already performed by the study team and those to be performed by RID) should be clarified.

From these accounts in the final report, it is apparent that environmental issues had been a study theme from the very beginning of this development study.

- 2) How should the environmental studies be allotted?

The overview of the environmental-study implementation plan provides a breakdown of the environmental-study items to be performed by JICA study team and RID. The “Ecological Resource (= Forests)” study is assigned to the JICA study team; RID is supposed to be in charge of resident transfers in the target areas and impacts on residents.

Subsequently, RID independently requested the Chiang Mai University to conduct environmental studies in January 1991 (the “Environmental Impact Assessment Study”) and in



February 1994 (“Environmental Impact Mitigation Plan”). These were preparations for the following request for a 20th OECF loan. Upon request from the Thai government, OECF conducted a SAPROF study in 1995.

3) What kind of factors (conditions) should be satisfied relative to environmental problems (for possible project operations), and what kind of efforts have been made to solve the problems?

i) Environmental Guidelines

(a) During the implementation of the development study, the target was defined as satisfaction of the environmental guidelines specified by NEB (Environmental Impact Assessment: EIA) (refer “1) – (ii)” above).

(b) After the development study and until project implementation, the EIA became quite strict, which required further studies (refer to “2” above).

ii) Public hearings and investigations on residents’ awareness

(a) Simultaneously, as stipulated by the law, public hearings (by the Ministry of Agriculture and Cooperatives under the direction of NEB, directly supervised by the Office of the Prime Minister) and investigations on residents’ awareness are conducted for project operations. RID compiles materials for, and submits them to, these public hearings.

iii) Approvals for project applications

(a) Projects can be officially approved for implementation by satisfying EIA and obtaining an NEB’s approval (decision).

(b) However, it took time to obtain official approval for this case due to the priority given to formulation of consensus at public hearings (notably in the form of NGO approval).

(4) Conclusions derived from evaluation study

As stated above, projects proposed in the development study still face the dual challenge of “development vs. environment.” Although, as evidenced in the implementation of the SAPROF study by OECF, fund-providing partners used to be relatively easy to find at the early stages, no project has yet been implemented despite the earnest efforts of RID to solve environmental problems. According to a staff member of a former counterpart still engaged in this case, the Mae Wong Project was the first instance in which environmental concerns have appeared at the forefront in Thailand.

3-3-2 Evaluation results by five evaluation criteria

(1) Efficiency

1) The C/P member at that time holds the following expectations for technology transfers:

i) First, conditions should be adequately coordinated so that the JICA study team and the

Thai team can collaborate full-time. Specifically, operations performed by the JICA study team in Japan may sometimes be too demanding for their Thai counterparts. It is thus expected that the scheduled study activities can be performed entirely in Thailand.

ii) Next, RID cannot fully respond to the requirements of the development study. It is thus necessary to improve conditions, so that Thai local consultants can be effectively involved in the study. Involvement of local consultants will be beneficial not only for the Thai team but also for human resources development in the private sector and technology transfer to the private sector.

2) During the development study, the Thai team conducted data collection, simultaneous interpretation, and field studies, and participated in discussions based on reports at each stage. There was no problem in communications in English. Participation and communication in the study was evaluated as “Sufficient.”

3) The Thai team states that they have been able to acquire knowledge and skills concerning planning for water resource development and for irrigation and drainage through meetings and discussions, as part of implementation of the development study.

## (2) Effectiveness

1) In order for proposals derived from the development study to be applied to projects, efforts to solve environmental problems have been made.

2) Next, a comparison between OECF and SAPROF study reports in 1995 has revealed that project content, scale, implementation requirements, and skills, etc. are not beyond RID’s capabilities and have been sufficiently reviewed.

3) The reports are appropriately structured, deliver proper content for a F/S development study, and facilitate readers’ understanding. One matter to note is that, as with reports on other development studies covered by the current evaluations, the original or primary objectives of the development study and the secondary or derivative issues in related matters should be clearly distinguished.

4) As for “environmental evaluation,” as is apparent from the fact that the final report contains S/Ws and many M/Ms, it may be assumed that considerable discussions were held with the Thai side about how to prepare an environmental evaluation and the degree to which the JICA study team should be involved. Findings from public hearings suggest that the environmental study was not much emphasized in the original plan, but attained sufficient importance afterwards that environmental specialists were subsequently added. Ultimately, this environmental study has turned out to be quite a rewarding and pioneering endeavor.

### (3) Impact

- 1) A former counterpart member still works at the same department as when the development study was implemented. According to the collected questionnaire answer sheets, RID conducted an Environmental Impact Assessment Study after implementation of the development study and completed environment-related procedural work.
- 2) Furthermore, in 1995, the SAPROF study by OECF was completed and preparations for loan requests were also finished.
- 3) Still, public hearings are currently held to obtain NGO support for projects.

### (4) Relevance

- 1) The relationship between the policies of the development study and the National Economic and Social Development Plans is as stated at the outset. No inconsistency has been detected between the two.
- 2) Interviews were conducted with locals during the development study. The results indicate that many of them would like to increase their income through irrigation development, and favorably accept the development efforts.
- 3) RID requested loans for project operations from OECF, in response to which OECF implemented the SAPROF study in 1995. Furthermore, it still participates in public hearings and seminars for project operations. From these facts, the proposals of the development study are still considered relevant.

### (5) Sustainability

Because preparations for putting the projects into operation are in progress, their sustainability cannot be determined.

## 3-4 Study of the Water Management System and Monitoring Program in the Chao Phya River Basin (M/P)

### 3-4-1 Overview and background of study projects

#### (1) An overview of the development study

The development study under evaluation is aimed at formulating long-, medium-, and short-term project implementation plans for effective and appropriate management of water resources in the entire basin of the Chao Phya River. The following is an overview of the development study.

1. Study implementation period: January 1987 – March 1989 (S/W signed in May 1986)
2. Compilation of the final report: March 1989
3. Counterparts: Royal Irrigation Department (RID), Ministry of Agriculture and Cooperatives (MOAC)
4. Consultant for the development study: Sanyu Consultants Inc.; Taiyo Consultants Co., Ltd.

#### (2) Background of development study implementation: Water resource management in Thailand

##### 1) Water resource and agricultural development policies in Thailand

This development study under evaluation was conducted in accordance with the following principles stipulated in the Sixth National Economic and Social Development Plan (1987 - 1991).

- i) Internal measures for water management (utilization plan and operational techniques)
- ii) External measures for water management (improved productivity of water resources and appropriate management of local environment and social capital)

Water resource policies in Thailand were changed drastically in the preceding Fifth National Economic and Social Development Plan (1982 - 1986), shifting from the traditional emphasis on expansion of cultivated areas to agricultural development through improved productivity, i.e., enhancement of irrigation facilities based on the assumption that land area is limited. Specifically, the Chao Phya River Basin requires effective utilization of farmland through improved production processes, i.e., through formulation of an effective water distribution system for the area. This concept was inherited in the Sixth National Economic and Social Development Plan and in subsequent plans.

These changes in water resource policies have been prompted by urgent social and economic requirements, such as increased demand for industrial and domestic water supplies. At the same time, some response is needed to the depletion of national resources caused by large-scale irrigated agriculture development. In other words, water resources have evolved from a free good to an economic one, making their effective utilization an important item on the political agenda. At the same time, increases in agricultural production have become less profitable from

a national policy perspective because international supply-and-demand relationships have become more balanced. Under these circumstances, it becomes possible to move away from policies based on large-scale irrigated agriculture development intended to increase the food supply (promoted until the Fourth National Economic and Social Development Plan) and toward support for small-scale irrigation projects.

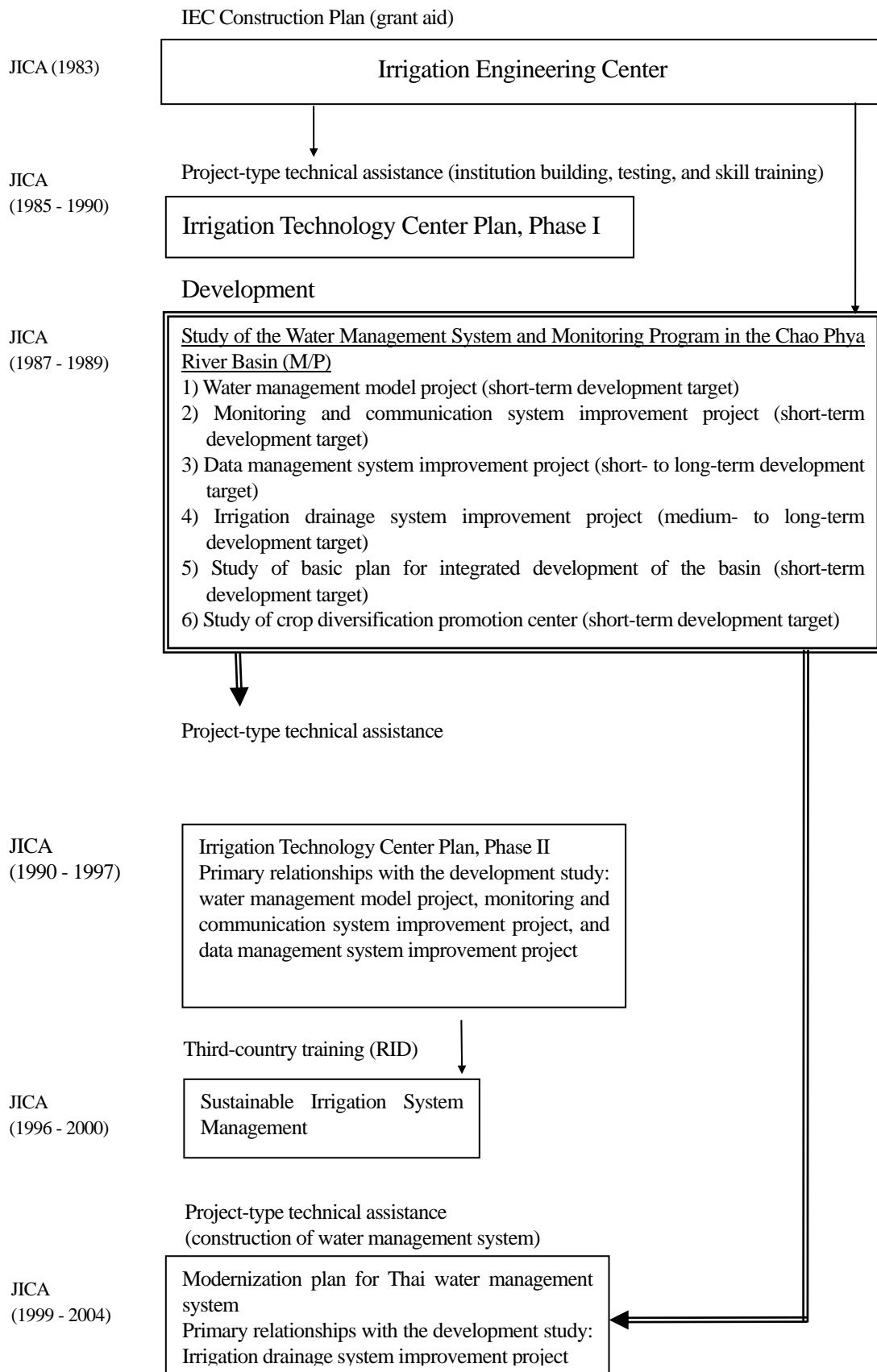
2) Water resource management and JICA cooperation (pioneering examples of intellectual-assistance-types of development study and promotion of collaboration)

JICA cooperation on water resource management was initiated prior to implementation of this development study. As indicated in the following chart, “The Irrigation Engineering Center (IEC) Project and This Development Study,” JICA provided cooperation for IEC construction, through grant aid to RID, as early as 1983 (the second year of the Fifth National Economic and Social Development Plan). This cooperation was intended to help cultivate ties between irrigated agriculture development and water resource management. Upon completion of IEC construction, JICA began training RID staff for institutional construction, testing, and skill improvements through project-type technical assistance cooperation (the “Irrigation Technology Center Plan”), in order to improve staff ability levels. Based on these improvements, which were a prerequisite for support for the IEC project, this development study has been implemented.

This development study is the only M/P-type development study among the four cases covered by the current type of evaluation studies; more specifically, it can be classified as a technology transfer- (intellectual assistance-) type of development study. Furthermore, while this development study was implemented, the “Study of the Chao Phya River Basin Flood Forecast System Plan” was also implemented by the Social Development Study Department. It should be pointed out that coordination and balance were maintained between the two efforts.

In 1990, after implementation of this development study, the “Irrigation Technology Center Plan, Phase II” was introduced as a way of implementing the “water management model projects,” etc. proposed in the development study. A monitoring system was experimentally introduced, which connected the four unsteady-flow monitoring stations at the northern region, Bang Sai, Bang Pakong, and the Memorial Bridge to the IEC headquarters by telephone line. In addition, based on implementation experiences with an improvement project of this monitoring system, RID has undertaken JICA’s third-country training, “Sustainable Irrigation System Management” since 1996.

**Fig. 3-2: Irrigation Engineering Center (IEC) Project and this development study**



### (3) Characteristics of the development study

This development study has the following characteristics:

- 1) It can be regarded as a technology transfer- (intellectual assistance-) type of development study, as well as a pioneering study promoting coordination, based on the following factors:
  - i) It was an M/P development study coordinated using JICA's technical assistance scheme, including grant aid and project-type technical assistance, etc.
  - ii) In addition, the "Study of the Chao Phya River Basin Flood Forecast System Plan" was simultaneously implemented by the Social Development Study Department of JICA. Coordination and balance were maintained between the two operations, and some synergies were even detected.
- 2) In this sense, the report of this development study can also be regarded as contributing to the compilation of a project plan for the "Irrigation Technology Center Plan, Phase II," a subsequent project-type technical assistance. More precisely, this development study is more like an F/S-type than an M/P-type.
- 3) Judging from the characteristics of this development study, it was not affected by the policy change from large-scale irrigation development to small-scale irrigation development, unlike other development studies implemented at that time.

### (4) Conclusions derived from evaluation study

As may be naturally apparent, this case under evaluation constitutes a part of a series of JICA cooperation projects, and thus yielded very good evaluations as outlined below.

For the IEC Project, JICA is continuing its cooperation in dispatching experts, providing equipment, and implementing development studies for particular C/P's or themes as part of efforts extending over 20 years, from initial grant aid in 1983 until 2004 (planned) when the "Modernization plan for the Thai water management system" will be completed.

#### 3-4-2 Evaluation results using the five evaluation criteria

##### (1) Efficiency

- 1) The C/P member who arranged a hearing recognizes that technology transfer is comprised of exchanging opinions between the Japanese study team members and Thai C/P members to pinpoint problems and find the best solutions for them. He also points out that it is important to request participation of many relevant departments in order to define problematic points and possible solutions, and to discuss matters thoroughly between both parties.
- 2) During implementation of the development study, the Thai team acted as guides for the

locations to be studied, explained current conditions on the Thai side, and provided necessary data and information. Study progress was checked by reviewing draft reports. Participation in the study and communication were evaluated as “moderate.”

- 3) Through implementation of the development study, the Thai team was able to acquire knowledge and skills about operations (water balance and water release), uses of irrigation water (in both wet and dry seasons), and conditions of irrigation/drainage facilities (design criteria for facilities maintenance) through meetings and discussions.
- 4) As stated earlier, this development study was coordinated with JICA technical assistance schemes, including past grant aid and ongoing project-type technical assistance.

## (2) Effectiveness

- 1) As will be indicated later, all proposals from the development study have been implemented. It is thus possible to surmise that project content, scale, implementation conditions, skills, etc. have been sufficiently reviewed. JICA also provided equipment. Some comment that certain aspects that would not have been realized single-handedly due to lack of budgeted funds and human resources, have actually been implemented.
- 2) The report indicates that the development study is a technology transfer- (intellectual assistance-) type and M/P-style development study. The following characteristics can be noted:
  - i) First of all, “formulation of IEC project contents” is targeted.
  - ii) After IEC policy targets are reviewed, actual projects have been formulated together with short-, medium-, and long-term plan targets.
  - iii) In addition, for some projects, including “water management model projects,” the contents are currently reviewed.
  - iv) One big feature is the technology transfer in the development study performed in collaboration with counterparts.

## (3) Impact

- 1) Some questionnaire answer sheets indicate, specifically, that impacts were palpable in water management and river development in the Pitsamulok district, along the middle reaches of the Chao Phya River; and in surveillance of rainfall, water volume in the river and in irrigated districts, and drainage improvements in the lower delta regions.
- 2) For the six projects proposed in the development study, the following replies were obtained through questionnaires and interviews:
  - i) For the water management model project, project-type technical assistance was provided through the “Irrigation Technology Center Plan, Phase II,” as stated above. (C/P was the Office of Hydrology and Water Management.)
  - ii) For monitoring and communication system improvement projects, results included new management of RID facilities (i.e., the four observation stations for which JICA



provided equipment), reduction of mechanical failures, and adequate responses to communications systems (the Water Management Division).

For the irrigation drainage system improvement project, construction work is ongoing in Kampling as a flood prevention measure (Kampling Project, "Drainage in the lower delta area," Water Management Division; supported by World Bank loans).

iv) The data management system improvement project is included in "i)" above.

v) The basic plan for comprehensive development of the basin was implemented under the title "Water Management Study in Chao Phraya Basin" (the Project Planning Division), which had an impact on drought countermeasures for the irrigated areas (i.e., development of new water resources and environmental management).

vi) For the study of the Crop Diversification Promotion Center, the program has already been completed as an extension project (planning to expand the cultivation areas that can allow cultivation of crops other than rice in dry seasons by 200,000 rai/year  $\times$  5 years = 1 million rai) (the Corp Diversification Program, Department of Agricultural Extension).

#### (4) Relevance

- 1) The relationships between the development study policies and the National Economic and Social Development Plans are as stated at the outset. There is no inconsistency between them, since no policy change took place between the Fifth and Sixth National Economic and Social Development Plans.
- 2) This development study overlaps to some degree with the "Study of the Chao Phya River Basin Flood Forecast System Plan" implemented by the Social Development Study Department, in terms of implementation schedule and areas to be studied. To support data and information collection, coordination and balance were maintained with the study team, an approach leading to harmonious project operations.
- 3) The project-type technical assistance cooperation, "Irrigation Technology Center Plan," designed for IEC and this development study relate to each other as indicated in the above figure; each constitutes part of the entire IEC project.
- 4) Implementation of proposals from the development study has been outlined above. Some replies indicate that both irrigation development and water resource development are important issues, and that efforts are made to shift maintenance and management responsibilities for small-scale irrigation systems to the relevant local authorities. Furthermore, judging from the fact that JICA's project-type technical assistance, "Modernization Plan for the Thai Water Management System," and similar efforts have been implemented, the framework proposed by this development study can be regarded as satisfying current needs.

#### (5) Sustainability

- 1) Some comment that continuous collaboration from JICA has enabled RID to develop accumulated knowledge for understanding water management as a whole.

- 2) RID has become capable of studying an irrigation drainage system improvement project (Kamplang Project) independently.
- 3) On the other hand, some comment that more knowledge and know-how should be accumulated concerning new themes such as the environment, development methods in which residents can participate, and how to organize local communities, etc.
- 4) In JICA's third-country training (entitled "Sustainable Irrigation System Management"), not only Thai professors but also RID staff members have been capable of giving lectures.
- 5) As stated above, irrigation development and water resource development are still important issues for RID, and efforts are being made to shift maintenance and management responsibilities for small-scale irrigation systems to the relevant local authorities.

### 3-5 Macroscopic evaluation of the four cases

~ Policies for agriculture sector in the National Economic and Social Development Plans ~

The four development studies under evaluation were implemented in the 1970s and 1980s. While these four cases should still be emphasized, this section will be an attempt to discuss national economic and social development plans and agricultural policies.

There are certain time lags between implementation of a development study and the study's proposed plan or project (or project completion). A proposal from a JICA development study might be implemented at all (even if not immediately after implementation of the development study itself). However, policy directions in the National Development Plan concerning the development- study implementation stage and the project operational stage are not necessarily identical. One lesson that can be derived is that it may be less significant to determine the degree of linkage between a development study and the goals of National Development Plan.

Table 3-1 summarizes the four projects under evaluation in their relationships with the National Development Plans.

**Table 3-1: Four projects and National Economic and Social Development Plans**

The Fourth National Economic and Social Development Plan (1977 - 1981)	The Fifth National Economic and Social Development Plan (1982 - 1986)	The Sixth National Economic and Social Development Plan (1987 - 1991)	The Seventh National Economic and Social Development Plan (1992 - 1996)
Study of the Kmaphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin (F/S) (Study period)			
Study of Mae Kuang Irrigation Agriculture Development Project (F/S) (Study period)			
Study of the Sakae Krang River Basin Irrigation Project (F/S) (Study period)			
Study of the Water Management System and Monitoring Program in the Chao Phya River Basin (M/P) (Study period)			

\* A gray bar on the right of the implementation period of a development study project indicates the period in which the project is operated.

**Table 3-2: Characteristics of National Economic and Social Development Plans and development studies**

The Fourth National Economic and Social Development Plan (1977 - 1981)	The Fifth National Economic and Social Development Plan (1982 - 1986)	The Sixth National Economic and Social Development Plan (1987 - 1991)	The Seventh National Economic and Social Development Plan (1992 - 1996)
<p>1) Policy changes from growth by expansion of farmland to growth by improved agricultural productivity</p> <p>2) Crop (production) diversification for increased agricultural income (specifically exportable products).</p> <p>3) Annual agricultural growth-rate target: 5%</p> <p>4) Encouragement of on-farm irrigation (including financial assistance)</p> <p>5) Effective utilization of natural resources due to reconsideration of rapid deforestation to increase farmland</p> <p>6) Presentation of environmental guidelines</p> <p>7) However, the policies inherit those of the Third Plan.</p>	<p>1) Policy changes from growth by farmland expansion to growth by agricultural productivity improvement</p> <p>2) Elimination of poverty in disadvantaged areas</p> <p>3) Annual agricultural growth-rate target: 4.5% Annual productivity increase target: 4%</p> <p>4) Improvement of irrigation systems for effective utilization of limited farmland</p> <p>(1) Increased availability of lift pumps</p> <p>(2) Securing small-scale water sources</p> <p>(3) Collection of fees from water users</p> <p>5) Effective utilization of limited natural resources by improving production processes; specifically, formulation of adequate water distribution systems in the Chao Phya River basin.</p> <p>6) Presentation of environmental policies and guidelines</p>	<p>1) Shifting from increasing Agricultural production Volumes to quality Improvement of products</p> <p>2) Development of poverty-stricken farming areas</p> <p>3) Annual agricultural growth-rate target: 2.9%</p> <p>4) Water resource management by irrigation to improve production efficiency</p> <p>(1) Water resource management and effective utilization of major river basins</p> <p>(2) Securing groundwater and small-scale water sources</p> <p>5) Development of natural resources</p> <p>(1) Preservation of natural resources</p> <p>(2) Development of areas with higher precipitation for securing water sources</p> <p>6) Environmental effect analyses on project levels</p>	<p>1) Improvement in production efficiency and high-value added agricultural production</p> <p>2) Development of poverty-stricken farming areas and promotion of farmland reforms to improve farmers' ownership of land</p> <p>3) Annual agricultural growth-rate target: 3.4%</p> <p>4) Improvement in irrigation efficiency; and development and diffusion of supply systems</p> <p>(1) Adjustment of water supply, distribution, and maintenance</p> <p>(2) Establishment of water Utilization groups</p> <p>(3) Collection of fees from water users</p> <p>5) Development of natural Resources</p> <p>(1) Preservation and designation of protected forests</p> <p>(2) Improvement of farmland</p> <p>(3) Securing water resources</p> <p>6) Enhancement of environmental/natural resources protection</p>
Economic background	Economic background	Economic background	Economic background
<p>1) Departure from recession</p> <p>2) Stabilizing prices of agricultural products</p>	<p>1) Changes in economic structures; increasing use of water due to industrialization prompted an overall review of proper water distribution to agriculture and other industries</p> <p>2) More balanced international supply and demand in major agricultural products, and resulting sluggish prices</p> <p>3) Production restraints of rice after 1984</p>	<p>1) Export enhancement</p> <p>2) Reduced production rate in traditional products due to a decline in export prices</p> <p>3) Marketing enhancement and agriculture</p>	<p>1) Continued stable economic growth</p> <p>2) Structural adjustment plan for agricultural production system</p>

The Fourth National Economic and Social Development Plan (1977 - 1981)	The Fifth National Economic and Social Development Plan (1982 - 1986)	The Sixth National Economic and Social Development Plan (1987 - 1991)	The Seventh National Economic and Social Development Plan (1992 - 1996)
Development study	Development study	Development study	Development study
<p>Mae Klong/Kamphaeng Saen</p> <ol style="list-style-type: none"> <li>1) Improved irrigation functions</li> <li>2) Improved drainage conditions</li> <li>3) Improved agricultural roads</li> <li>4) Completion of farm field facilities</li> </ol> <p>Mae Kuang</p> <ol style="list-style-type: none"> <li>1) Basic designs and plans for construction of dams and weirs</li> <li>2) Expansion of irrigated areas and additional supply of water</li> <li>3) Securing drainage</li> </ol>	<p>Sakae Krang</p> <ol style="list-style-type: none"> <li>1) Selection of candidates for construction of priority dams</li> <li>2) Basic designs and plans for construction of dams and weirs</li> <li>3) Expansion of irrigated areas and additional supply of water</li> <li>4) Securing drainage</li> </ol>	<p>Chao Phya</p> <ol style="list-style-type: none"> <li>1) Internal measures for water Management</li> <li>2) External measures for water Management</li> </ol>	Not applicable for this study

Sources: compiled by IDCJ, based on the Five Year Economic and Social Development Plan (the Fourth - Seventh), and development study reports prepared by NESDB and JICA.

3-5-2 The relationship between national economic and social development plans and agricultural policies is as follows:

The Fourth National Development Plan from 1977 to 1981 emphasized expansion of agricultural production and productivity, and promoted irrigated agriculture development projects. The “Study of the Kamphaeng Saen Irrigated Agriculture Development Project in the Mae Klong River Basin” and the “Study of the Mae Kuang Irrigated Agriculture Development Project” were development studies conducted against this historical background. However, at that time, people started to realize 1) the importance of management of basic resources and environment to counter random development of farmland (reconsideration of rapid deforestation and farmland expansion) and 2) the fact that expanded farmland does not necessarily improve productivity for farmers, or rather increases their debts, forcing more farmers to lose land. During the implementation period of this Plan, the environmental guidelines were also presented.

The Fifth National Development Plan from 1981 to 1986 corresponds to the transition period of “economic structures,” in which the national economy led by the agricultural sector shifted to that led by the industrial sector. As for agricultural policies, the following drastic changes took place.

- 1) From growth by farmland expansion to growth by agricultural productivity improvement
- 2) Elimination of poverty in disadvantaged areas
- 3) Improvement of irrigation systems for effective utilization of limited farmland (shifting from large-scale to small-scale irrigated agricultural developments)
- 4) Formulation of adequate water resource distribution systems, including domestic and industrial water
- 5) Presentation of environmental policies and guidelines

These policies represent a drastic change from the preceding Fourth National Development Plan. In addition, environmental commitments were crystallized in “presentation of environmental policies and guidelines.” The “Irrigation Plan in the Sakae Krang River Basin” was implemented during this period.

The Sixth National Development Plan from 1987 to 1991 further emphasized the necessity of water resource development. Due to export promotion policies by industrialization accelerated after the Plaza Accord and the need to secure more industrial water, priorities were placed on thorough water resource management and development of regions with high precipitation. At the same time, stricter environmental management was required for natural resources development and preservation, including environmental impact analyses on project levels. The “Study of the Water Management System and Monitoring Program in the Chao Phya River Basin” was conducted during this period.

As may be apparent from the above, in the agricultural sector, drastic policy changes took place at the Fifth National Development Plan. Significant points are 1) priority on small-scale irrigation

development, 2) effective distribution of water resources, and 3) emphasis on environment concerning development efforts. These points are further subdivided as the Plan progresses.