

付 属 資 料

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1. Terms of Reference

Project Title : Integrated Plan for Inundation Mitigation and
Agricultural Land Conservation in Chao Phraya River Basin
Requesting Agency : Royal Irrigation Department
Ministry of Agriculture & Cooperation
Proposed Source of Assistance : JICA (under Development Study Program)
Duration : 18 months

BG:3076-2

(7 Feb. 1996)

1. BACKGROUND INFORMATION AND JUSTIFICATION FOR THE PROJECT

The Chao Phraya river basin has a total watershed area of 157,900 km² sharing almost 31% of the total land area of Thailand. It is divided into the upper and lower basins identified upstream and downstream of the Chainat dam-site. The upper has a watershed area of 120,700 km² which consists of the following five basins of the Nan, Yom, Wang, Ping and Sakae Khrang. While the lower is composed of the Pasak basin and the Chao Phraya delta including the Bangkok Metropolitan area and has a watershed area of 37,200 km².

Although annual average rainfall is 1,200 mm and average runoff at the Chainat dam-site is 22,200 MCM, due to unusually abundant rainfall, the runoff during the months of September and October in 1995 amounted 18,100 MCM and maximum discharge was 4,557 m³/s on 5 October 1995. Therefore, the lower Chao Phraya river basin, especially the Bangkok Metropolitan and vicinity areas along the Chao Phraya river, newly developed urban and industrial areas, and surrounding farmlands together with the municipal area of Ayuthaya, were inundated for a long period of time causing a serious damages to both urban residents and farm products. Based on such a condition, HM the King has suggested various mitigation measures including dredging of drainage canals, additional installation of pumping facilities and establishment of retention areas of flood water, etc.

On the other hand, in Thailand, historically the people has been living together with flood since ancient time because it brought natural nourishment on agricultural land and flowed away gradually. So, it is necessary to make due consideration for these flood contribution, not for just flush it away. The Chao Phraya delta is the most important area in Thailand which has a large agricultural sector of 1.6 million ha, with an irrigated area of 1.2 million ha (75%), and large population of 19.8 million. Recently the delta has faced serious water shortage not only in agricultural sector but also others. Insufficient water supply for the agriculture may bring an expanding income gap between the urban people and rural. The water demand of the delta is about 12,500 MCM at present and will increase to 18,700 MCM by 2006. These amount of water supply shall rely mostly on the surface water from the upper basins. Therefore, how to reserve the inundated water in the wet season is very important.

As RID has been taking a major role in the country's water resources development, and irrigation and drainage works, it is necessary for RID to proceed urgently to conduct studies and to formulate the plans for integrated agricultural land conservation and inundation mitigation so as to optimize water resources concerning the Chao Phraya river basin in close coordination with related agencies.

2. STUDY AREA AND OBJECTIVES OF THE STUDY

The study area covers the whole Chao Phraya river basin with a watershed area of 157,900 km² consisting of the upper and lower basins lying on the upstream and downstream area of the Chainat dam.

In order to mitigate inundation not only from agricultural field but also related urban area, the Integrated Agricultural Land Conservation and Inundation Mitigation Study will be taken and to optimize excess water for agricultural/industrial development as precious water resources. The study components are as follows :

- 1) To study the flood phenomena and drainage conditions in general in the whole basin.
- 2) To propose an urgent inundation mitigation plan especially in the lower Chao Phraya river basin.
- 3) To propose a long-term plan for basin-wide water management plan in the whole basin.
- 4) To set up a water management plan not only to control and mitigate the flood but also to use it effectively in the dry season.

3. BASIC CONCEPT OF THE STUDY

BG:3076-3

- 1) The basic concept of the study for the upper basin is :
 - (1) To mitigate the momentary discharge by proper water operation of the existing and proposed dams and swamps.
 - (2) To formulate the optimum reservoir operation rule of each dam taking into account not only the flood control but also effective use of reservoir water in order to achieve maximization for agricultural, urban and industrial use.
 - (3) To identify the specific feature of each downstream river from the Chainat-dam to the Chao Phraya downstream river, the Chainat-Pasak canal and the Tha Chin, etc..
 - (4) To monitor the discharge condition and to command the water operation manner by the Central O & M Office, and so on.
- 2) The lower basin is :
 - (1) To monitor and evaluate the inundation status at each sub-basin, including the Pasak river basin.
 - (2) To temporarily store the flood spilled out from the rivers and canals at the flood regulative areas such as swamps and low farm lands extending along the Chao Phraya river course.
 - (3) To guide the excess inundated water to the sea by rehabilitation of the existing drainage system and by the by-pass canals which will be newly proposed at the east and west areas of Bangkok Metropolis, if necessary.
 - (4) To improve the river course and canals by dredging sediment materials and constructing flood protection dikes, etc..
 - (5) To set up a special cropping calendar in order to avoid the inundation period from September to October, and so on.

4. SCOPE OF THE STUDY

Based on the above mentioned basic concept, the scope of the study shall be conducted in three parts.

- 1) Part 1 : General study on flood and drainage condition
 - (1) Data collection and compilation
 - (2) Analysis of the flood pattern and inundation situation through the ground survey and/or satellite imaging
 - (3) Study of the flood control, mitigation and drainage capacity
 - (4) Water operation study at dams and swamps, and preparation of the reservoir rule curve
 - (5) Identification of the flood regulative area and estimation of flood mitigation area and volume

- 2) Part 2 : Urgent drainage improvement plans under present condition at the lower Chao Phraya basin
 - (1) Selection and recommendation of the priority projects to implement urgently, such as the drainage system and flood protection dikes
 - (2) Setting up the drainage water management plan under present condition
- 3) Part 3 : Future plans for integrated agricultural land conservation and inundation mitigation
 - (1) Study on the integrated monitoring and commanding system
 - (2) Possibility to introduce the G.I.S. (Geographical Information System) to monitor and evaluate the land use variation, flood and inundation condition, etc.
 - (3) Recommendation on the land use regulation for conversion of farm land
 - (4) Selection and recommendation of the priority project
 - (5) Study on the preliminary design and cost estimate

5. STUDY SCHEDULE

The Study will be carried out in accordance with the following tentative schedule :

Items	2	4	6	8	10	12	14	16	18
1. Flood & Drainage Condition Study									
2. Urgent Drainage Improvement Plans									
3. Future Plans									

6. REQUIRED ENGINEERING STAFF FOR STUDY AND TRAINING

The required engineering staff will be as follows :

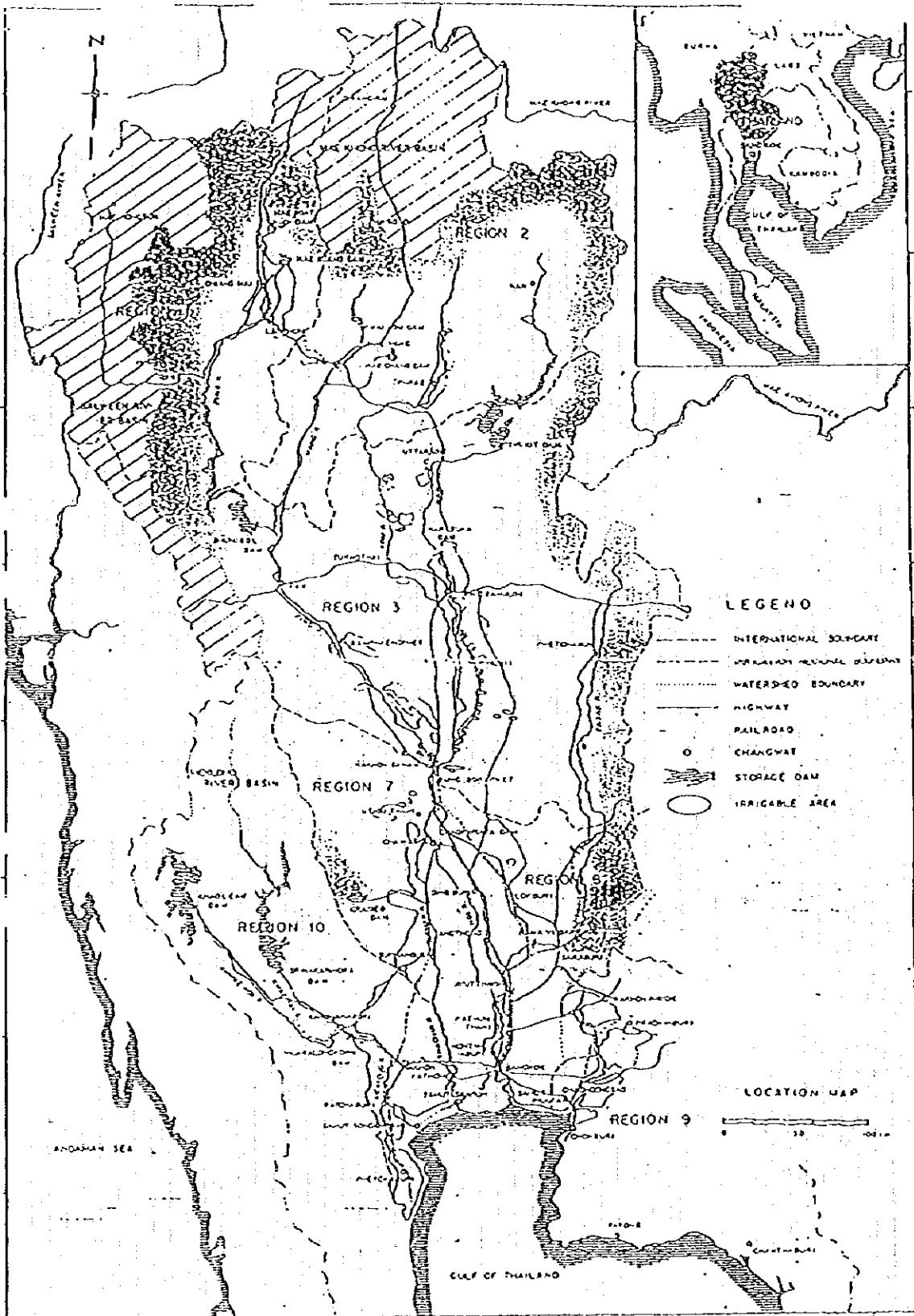
- 1) Team Leader
- 2) Hydrologist
- 3) Irrigation and Drainage Planner
- 4) Inundation prevention Planner
- 5) Integrated Water Management Planner
- 6) Telemetering System Planner
- 7) GIS Analyst
- 8) Socio-Economist
- 9) Environmental Expert
- 10) Estimator of Project Cost/ Benefit

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Counterpart training in Japan will be requested.

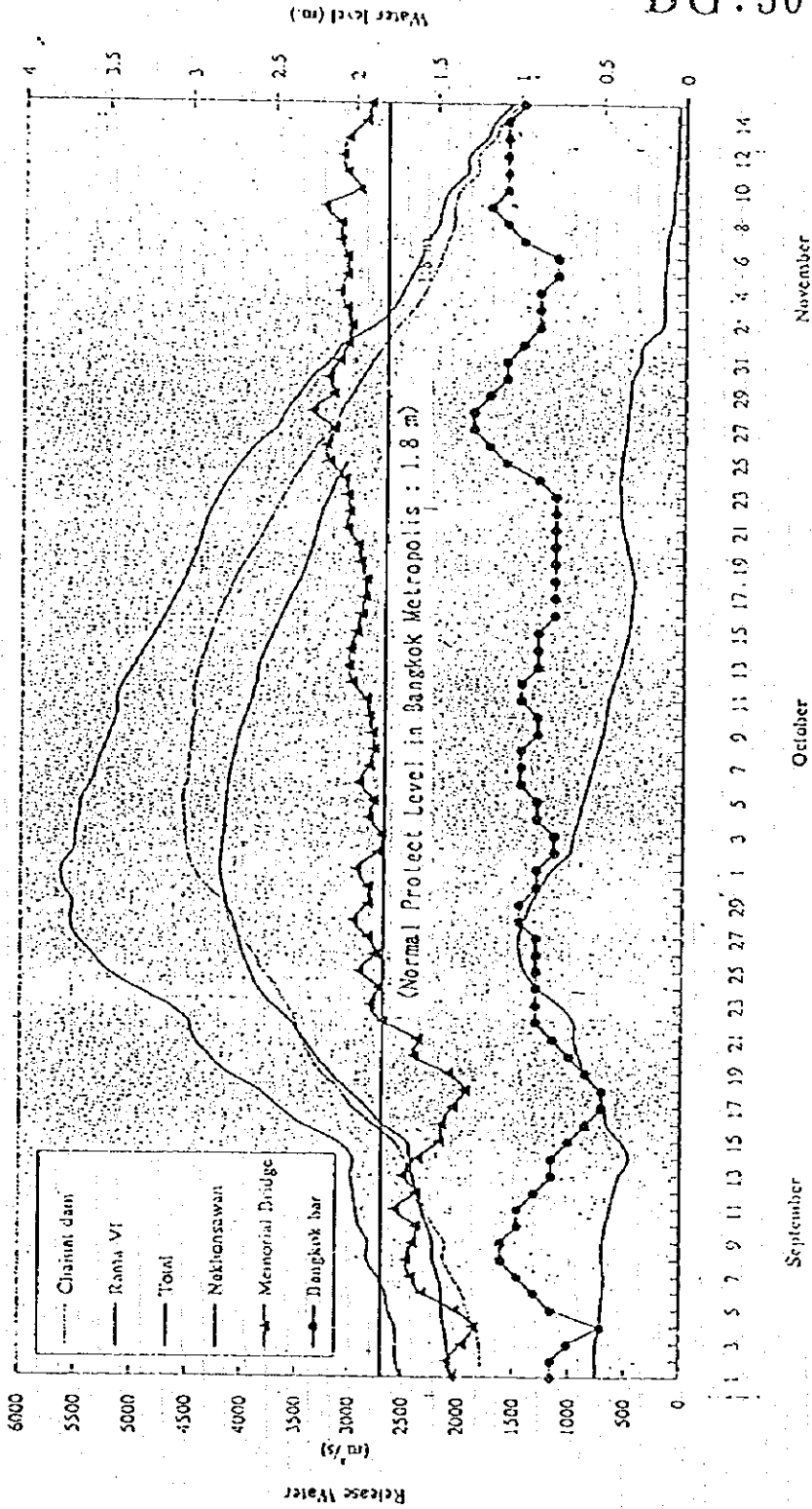
7. THE PERSONS WHO ARE RESPONSIBLE FOR THIS STUDY

- 1) Mr. Charoon Kamolratana, Deputy Director General
- 2) Dr. Siripong Hungsprueng, Director of Project Planning Division
- 3) Mr. Suwit Thanopanuwal, Acting chief of Project Planning Section 1.



BG:3076-5

Actual Flow Condition Data in Chao Phraya River
 (During Flood Period 1995)



2. Scope of Work

THE SCOPE OF WORK
FOR
THE STUDY
ON
INTEGRATED PLAN
FOR
FLOOD MITIGATION
IN
CHAO PHRAYA RIVER BASIN
IN
THE KINGDOM OF THAILAND

AGREED UPON BETWEEN
THE ROYAL IRRIGATION DEPARTMENT
AND
THE JAPAN INTERNATIONAL COOPERATION AGENCY

BANGKOK
SEPTEMBER 5, 1996

R. Chulajata

MR. ROONGRUENG CHULAJATA
DIRECTOR GENERAL,
ROYAL IRRIGATION DEPARTMENT,
MINISTRY OF AGRICULTURE
AND COOPERATIVES

大井英彦

MR. HIDEYOSHI OI
LEADER,
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY

(Witness)

Mana Noppun

DR. MANA NOPPUN
DIRECTOR GENERAL,
DEPARTMENT OF DRAINAGE AND SEWERAGE,
BANGKOK METROPOLITAN ADMINISTRATION

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I. INTRODUCTION

In response to the request of the Government of the Kingdom of Thailand (hereinafter referred to as "the Government of Thailand"), the Government of Japan has decided to conduct the Study on Integrated Plan for Flood Mitigation in Chao Phraya River Basin in the Kingdom of Thailand (hereinafter referred to as "the Study"), within the general framework of technical cooperation between Japan and Thailand, which is set forth in the Agreement on Technical Cooperation between the Government of Japan and the Government of Thailand signed on November 5, 1981.

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

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

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

1. to formulate the Integrated master plan for flood mitigation in Chao Phraya river basin taking into consideration flood damage, water use, agricultural land conservation, land use management, and so on,
2. to conduct a feasibility study on the urgent and/or priority project(s) identified in the master plan, and
3. to carry out technology transfer to the Thai counterpart personnel in the course of the Study.

III. STUDY AREA

The Study shall cover the Chao Phraya river basin of approximately 157,900km².



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IV. SCOPE OF THE STUDY

In order to achieve the objectives mentioned above, the Study will cover the following items.

Phase I : Formulation of the master plan

(1) Collection and review of existing data and information

- (a) Natural Condition (topography, meteorology, hydrology, etc.)
- (b) National and regional socio-economy
- (c) Flood and Inundation damage
- (d) Water use
- (e) Land use and ownership
- (f) Agriculture and inland fisheries
- (g) Existing facilities and measures related to flood control, drainage, and agricultural land conservation
- (h) Existing facilities related to river (dams, dikes, water intakes, etc.)
- (i) Irrigation facilities
- (j) Existing meteorological and hydrological monitoring system
- (k) Existing flood forecasting and warning system
- (l) Operation and maintenance practice
- (m) Environment
- (n) Laws, regulations, and institution related to the water management
- (o) Existing plans and studies on flood control, inundation mitigation, and agricultural land conservation in Chao Phraya river basin
- (p) Regional development plans and policies
- (q) Others

(2) Field reconnaissance

- (a) Topography
- (b) River and river basin
- (c) Existing facilities and measures related to flood control and drainage and agricultural land conservation
- (d) Existing facilities related to river (dams, dikes, water intakes, etc.)
- (e) Irrigation facilities
- (f) Flood and inundation mark , area and damage
- (g) Water use
- (l) Land use
- (g) Existing meteorological and hydrological monitoring system
- (h) Existing flood forecasting and warning system
- (i) Environment



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(3) Field survey (if necessary)

- (a) Meteorology and hydrology
- (b) Geology and Soil
- (c) Water quality
- (d) Longitudinal profile and cross-section of the river
- (e) Morphology
- (f) Flood and inundation damage

(4) Study and Analysis

- (a) Study on the items mentioned above
- (b) Hydrological analysis
- (c) Run-off analysis
- (d) Clarification of flood and inundation mechanism
- (e) Clarification of drainage mechanism
- (f) Mechanism of flood discharge and associated disasters (inundated area and damage cost)
- (g) Regional development trend in the future (socio-economy, agriculture, water use, land use, etc.)
- (h) Clarification of targets of master plan

(5) Formulation of master plan

- (a) Formulation of integrated plan for flood mitigation
- (b) Structural measures
- (c) Operation and Maintenance plan
- (d) Non-structural measures
- (e) Cost estimation

(6) Initial Environmental Examination (IEE)

(7) Evaluation

- (a) Social and environmental impact
- (b) Economic and financial evaluation

(8) Formulation of implementation plan

(9) Selection of urgent and/or priority project(s)

Phase II : Feasibility study on the urgent and/or priority project(s)

(1) Supplemental data collection and field survey

(2) Preliminary design of facility(ies)



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- (3) Execution plan
- (4) Operation and maintenance plan
- (5) Cost estimation
- (6) Evaluation
 - (a) Environment Impact Assessment (EIA)
 - (b) Social impact evaluation
 - (c) Economic and financial evaluation
- (7) Implementation plan

V. STUDY SCHEDULE

The study will be carried out in accordance with the attached tentative schedule.

VI. REPORTS

JICA will prepare and submit the following reports in English.

1. Inception Report:
Forty(40) copies at the beginning of the work in the Thailand.
2. Progress Report(1):
Forty(40) copies at the end of the forth month after the commencement of the Study.
3. Progress Report(2):
Forty(40) copies at the end of the first work period in the Thailand.
4. Interim Report:
Forty(40) copies at the beginning of the second work period in the Thailand.
5. Progress Report(3):
Forty(40) copies at the end of second work period in the Thailand.
6. Draft Final Report:
Sixty(60) copies at the beginning of the third work period in the Thailand.
The Government of the Thailand will present its comments to JICA within one(1) month after the receipt of the Draft Final Report.
7. Final Report:
One hundred(100) copies within one(1) month after JICA's receipt of the said comments on the Draft Final Report.



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VII. UNDERTAKINGS OF THE GOVERNMENT OF THAILAND

1. To facilitate the smooth conduct of the Study, the Government of Thailand shall take necessary measures;

(1) to secure the safety of the Study Team in Thailand,

(2) to permit the members of the Study Team to enter, leave and sojourn in Thailand for the duration of their assignment therein, and exempt them from foreign registration requirements and consular fees,

(3) to exempt the members of the Study Team from taxes, duties, fees and any charges on equipment, machinery and other materials brought into Thailand for the conduct of the Study,

(4) to exempt the members of the Study Team from income tax and charges of any kind imposed on or in connection with any emoluments or allowances paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study,

(5) to provide necessary facilities to the Study Team for remittances as well as utilization of the funds introduced into Thailand from Japan in connection with the implementation of the Study,


(6) to secure permission for entry into private properties or restricted areas for the implementation of the Study,

(7) to secure permission for the Study Team to take all data and documents (including photographs and maps) related to the Study out of Thailand to Japan, and

(8) to provide medical services as needed. Its expenses will be chargeable on members of the Study Team.

2. The Government of Thailand shall bear claims, if any arises, against the members of the Study Team resulting from, occurring in the course of, or otherwise connected with, the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or willful misconduct on the part of the members of the Study Team.

3. The RID shall act as the counterpart agency to the Study Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

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4. The RID shall, at its own expense, provide the Study Team with the following, in cooperation with other organizations concerned:

- (1) available data and information related to the Study,
- (2) necessary number of counterpart personnel,
- (3) suitable office space with necessary equipment in Bangkok and project sites,
- (4) credentials or identification cards, and
- (5) necessary number of vehicles with drivers for field survey.

VIII. UNDERTAKINGS OF JICA

For the implementation of Study, JICA shall take the following measures;

1. to dispatch, at its own expense, the Study Team to Thailand, and
2. to pursue technology transfer to the Thai counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and the RID shall consult with each other with respect to any matter that may arise from or in connection with the Study.

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3. Minutes of Meetings

MINUTES OF MEETINGS
ON
THE SCOPE OF WORK
FOR
THE STUDY
ON
INTEGRATED PLAN
FOR
FLOOD MITIGATION
IN
CHAO PHRAYA RIVER BASIN
IN
THE KINGDOM OF THAILAND

AGREED UPON BETWEEN
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BANGKOK
SEPTEMBER 5, 1996

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MR. ROONGRUENG CHULAJATA
DIRECTOR GENERAL,
ROYAL IRRIGATION DEPARTMENT,
MINISTRY OF AGRICULTURE
AND COOPERATIVES

大井英臣

MR. HIDEFOMI OI
LEADER,
PREPARATORY STUDY TEAM,
JAPAN INTERNATIONAL
COOPERATION AGENCY

(Witness)

Mana Noppun

DR. MANA NOPPUN
DIRECTOR GENERAL,
DEPARTMENT OF DRAINAGE AND SEWERAGE,
BANGKOK METROPOLITAN ADMINISTRATION

I. INTRODUCTION

In response to the request of the Government of the Kingdom of Thailand (hereinafter referred to as "the Government of Thailand"), the Preparatory Study Team (hereinafter referred to as "the Team") of the Japan International Cooperation Agency (hereinafter referred to as "JICA") visited Thailand from August 25 to September 11, 1996 to discuss the Scope of Work (hereinafter referred to as "S/W") for the Study on Integrated plan for Flood Mitigation in Chao Phraya River Basin in the Kingdom of Thailand (hereinafter referred to as "the Study").

The Team carried out field surveys of the study area and held a series of discussions with the authorities concerned of the Royal Irrigation Department, the Ministry of Agriculture and Cooperatives (hereinafter referred to as "the RID"), and other organizations.

The list of attendants is shown in Appendix.

The Minutes of Meetings has been prepared for the better understanding of the Scope of Work agreed upon between the RID and the Team on 5th September, 1996, summarizing main points of the discussions made in the course of the preparation of the Scope of Work.

II. STUDY TITLE

Both sides agreed to use the title "the Study on Integrated plan for Flood Mitigation in Chao Phraya River Basin in the Kingdom of Thailand" for the Study.

III. TARGET AREA


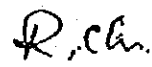
The Study will be carried out in order to mitigate flood damage in the inundation areas of Chao Phraya River basin in particular Chao Phraya Delta, the lower reach of Nan river and the lower reach of Yom river.

Among these target areas, the Chao Phraya delta including Bangkok Metropolitan area is given priority in view of the flood damage, social impact, and so on.

In order to mitigate flood damage in the target areas, basin-wide integrated approach will be pursued by proposing various measures to be taken in the upstream catchment, in the middle reaches and in the delta area as well.

IV. CONCEPT OF WATER CONSERVATION

The water shortage in dry season is also a serious problem in the Chao Phraya river basin. This issue will be taken into account in the course of the study for the purpose of water conservation

 
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V. INTEGRATION WITH OTHER STUDIES

There are some studies related to flood mitigation carried out prior to the Study by several agencies such as RID, Bangkok Metropolitan Administration (hereinafter referred to as "BMA"), Public Works Department of Min. of Interior (hereinafter referred to as "PWD"), National Economic and Social Development Board (hereinafter referred to as "NESDB") and so on. The Study will, therefore, carefully integrate these studies in the course of formulation of the Master Plan.

VI. FLOOD PROTECTION PLAN OF LOCAL MUNICIPALITIES

Flood problem is considerable also in the local municipalities such as Nakhon Sawan, Ayuthaya, and so on. Flood protection plans of these municipalities are now being made by PWD. So, the results of these plans will be integrated into the Master Plan of the Study and the Study will provide useful information to improve these plans.

VII. ALTERNATIVE MEASURES TO BE STUDIED

Various alternative measures have been already studied and proposed in the past. So, the Study will at first review and compare these alternative measures and then, if necessary, the Study will seek the new alternative measures to find out the best way to cope with flood problem.

VIII. DAMAGE ASSESSMENT

Damage assessment of flood in 1995 is required in order to evaluate the effectiveness of the counter measures and identify which areas should be studied more in detail.

Specification and study area of this damage assessment will be discussed at the meeting on Inception Report.

A full cooperation from Thai side is required.

IX. LAND USE

Uncontrolled expansion of urban area is one of the causes of worsening flood problem in the delta area. The Study will identify areas to be used for flood retention areas, to be protected against flood and areas which remain subject to flooding to some extent despite flood mitigation works proposed by the Study. Such classification is fundamental in the review / preparation of land use plan.

Planning of land use in each of the classified areas, however, should be done by authorities concerned and is not included in the scope of the Study.

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X. LAND SUBSIDENCE

The land subsidence should be considered in the course of the Study because its effect is not negligible.

The studies on land subsidence have been carried out by various agencies in the past and necessary data will be made available to JICA study team. Therefore, additional studies by JICA study team will no more be necessary.

XI. STUDY SCHEDULE

The Team proposed 12 months for the first phase and 9 months for the second phase as shown in the SW. The Thai side requested that Feasibility Study of urgent project should start as early as possible even in the Phase I of the Study. The Team will convey the request to JICA H.Q.

XII. COOPERATING AGENCIES

The Study will be carried out under close coordination among concerned agencies such as RID, BMA, DTEC, NESDB, PWD, etc..

To facilitate the coordination, Steering Committee will be established consisting of representatives from these agencies.

For the implementation of the Study, RID should be leading agency with full support from BMA.

XIII. UNDERTAKING OF JICA

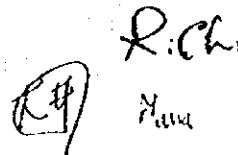
(1) The RID requested that JICA hold a seminar as a part of the technology transfer in the course of the Study. The RID also requested that JICA provide seminar materials in Thai for better understanding of the seminar. The Team recognizes this necessity and will convey this request to JICA H.Q. for positive consideration.

(2) The RID requested that JICA conduct counterpart training in Japan for the purpose of the smooth transfer of technology during the Study. The Team agreed to convey this request to JICA H.Q. for consideration within the framework of the Training Program of JICA. The training period, training field and selection of personnel shall be mutually discussed after the plenary study starts.

XIV. UNDERTAKING OF THE GOVERNMENT OF THAILAND

(1) The RID agreed to assign the necessary counterpart personnel for the smooth implementation of the Study. Furthermore, both sides agreed that the participation of the counterpart personnel from BMA is indispensable to the Study and the RID would make necessary arrangement to involve counterpart personnel from BMA.


In this connection, the RID strongly requested that JICA should consider hiring local consultants as supporting staff for JICA Study Team.

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(2) The Team requested that the RID provide sufficient numbers of vehicles with drivers, fuel, and cover the maintenance. The RID, however, expressed concern that such a request would be hard to accept to the full extent.

(3) The Team confirmed that the RID will provide suitable offices, each in Bangkok (within the RID) and project sites, equipped with electricity, water supply, telephones, desks, chairs.

R. Cho

 M. Cho

LIST OF ATTENDANTS

Thai Side

RID H.Q.

Mr. Roongrueng Chulajata	Director General
Mr. Charoon Kamolratana	Deputy Director General
Mr. Vudhichai Chullakesa	Senior Expert for Water Resources Planning & Development Division
Mr. Siripong Hungspreug	Director, PPD
Mr. Suwit Thanopanuwat	Chief, Project Planning Branch PPD
Mr. Thanar Suwattana	Civil Engineer 7, PPD
Mr. Chatchai Boonlue	Senior Engineer, PPD
Mr. Phonchai Klinkhachorn	Hydrologist
Mr. Piphat Salhiaupantarit	Irrigation Engineer
Mr. Virat Khaouppatum	Chief, O&M Branch, O&M Div.
Mr. Koichi Yamazaki	JICA Expert

Regional Irrigation Office 3, RID

Mr. Suphorn Rugcharoen	Director
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Regional Irrigation Office 7, RID

Mr. Soontorn Rungrongtanin	Director
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
BMA

Dr. Mana Noppun	Director General, Department of Drainage and Sewerage
Mr. Somsak Klanpoj	Director, Drainage System Development Div., Department of Drainage and Sewerage
Mr. Vichai Somboon	Engineer, DDS
Mr. Hisaya Sawano	JICA Expert

DTEC

Mr. Nipon Sirivat	Chief, Japan Sub-Div., External Cooperation Div. I
Mr. Wichai Choowisetsuk	Senior Program officer, Japan Sub-Div.
Ms. Kanistha Tharoot	Staff

R.C.

 Name

NESDB

Ms. Wilaiporn Liwgasemsan Director, Economic Project Div.
Ms. Suwannee Arunchokeehai Policy and Plan Analyst

EGAT

Mr. Paiboon Thepmongkon Director, Bumipol Dam

The World Bank Study Team

Dr. Suphat Vongvisessomjai Prof., Asian Institute of Technology
Mr. Greg J. Browder The World Bank
Mr. Alasdair Macdriald Danish Hydraulic Institute

Japanese Side

Embassy of Japan

Mr. Tatsuo Arakawa Second Secretary

JICA Thailand Office

Mr. Eiryō Sumida Resident Representative

Mr. Yushi Saitō Deputy Resident Representative

Mr. Takashi Kawaguchi Assistant Resident Representative

Preparatory Study Team

Mr. Hidetomi Oi Team Leader

Mr. Atsushi Iwasaki Member

Mr. Takashi Sunakawa Member

Mr. Izumi Oba Member

Mr. Hiroyasu Kobayashi Member

Mr. Yukihiko Ejiri Member

Mr. Kazuhiro Tambara Member

Mr. Nobuyuki Okabe Member

Mr. Takashi Inoue Member

Mr. Kazumitsu Tsumura Member

R. Ch.

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4. 主要面会者リスト

主要面談者氏名

RID H.Q.

Mr. Roongrueng Chulajata	Director General
Mr. Charoon Kamolratana	Deputy Director General
Mr. Vudhichai Chullakesa	Senior Expert for Water Resources Planning & Development Division
Mr. Siripong Hungspreug	Director, PPD
Mr. Suwit Thanopanuwat	Chief, Project Planning Branch PPD
Mr. Thanar Suwallana	Civil Engineer 7, PPD
Mr. Chatchai Boonlue	Senior Engineer, PPD
Mr. Phonchai Klinkhachorn	Hydrologist
Mr. Piphat Salhiaupantarit	Irrigation Engineer
Mr. Virat Khaouppatum	Chief, O&M Branch, O&M Div.
山崎 紘一	JICA Expert

Regional Irrigation Office 3, RID

Mr. Suphorn Rugcharoen	Director
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Regional Irrigation Office 7, RID

Mr. Soontorn Rungrongtanin	Director
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Irrigation Engineering Center

堀井 潔	チームリーダー
小関 嘉一	
田口 正文	

BMA

Dr. Mana Noppun	Director General, Department of Drainage and Sewerage
Mr. Somsak Klanpoj	Director, Drainage System Development Div., Department of Drainage and Sewerage
Mr. Vichai Somboon	Engineer, DDS
澤野 久弥	JICA Expert

DTEC

Mr. Nipon Sirivat	Chief, Japan Sub-Div., External Cooperation Div. I
Mr. Wichai Choowisetsuk	Senior Program officer, Japan Sub-Div.
Ms. Kanltha Tharoot	Staff
沼田 道正	JICA Expert

NESDB

Ms. Wilaiporn Liwgasemsan Director, Economic Project Div.

Ms. Suwannee Arunchokeehai Policy and Plan Analyst

EGAT

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在タイ日本国大使館

荒川 辰雄

二等書記官

JICAタイ事務所

隅田 栄亮

所長

斉藤 祐巳

次長

川口 隆司

5. タイ国ローカルコンサルタント一覧

5. タイ国ローカルコンサルタント一覧

項目	創立年	資本金 (1,000Baht)	売上高 1990年 (1,000Baht)	職員数 (人)	地質土質						水理/水文			環境			測量		農家総取備	考
					ボーリング	室内試験	強性級試験	深層ボーリング	電磁探査	岩試験	流量調査	堆積調査	水文解析	水質	自然環境	社会環境	地形図作成	河川測量		
会社名																				
1 Agre Consultants Co., Ltd.	1982	2,000		50																RID受注
2 Asdceon Co., Ltd.																				
3 Asian Engineering Consultants Co., Ltd.	1980	3,000	132,700	340																
4 ATT Consultants Co., Ltd.	1990																			
5 Chula Unisearch, Chulalongkorn University	1983	4,400	60,000	200																
6 Consultants of Technology Co., Ltd.	1993			150																
7 Index International Group Co., Ltd.	1965		35,400	210																
8 K. Engineering Consultants Co., Ltd.																				
9 Midas Agronomics Co., Ltd.																				
10 National Engineering Consultants Co., Ltd.	1978	1,000	22,200	110																
11 Pat Consultants Co., Ltd.	1975	12,000		90																RID受注
12 Panya Consultants Co., Ltd.	1990	5,000	25,000	80																RID受注
13 Pre-Development Consultants Co., Ltd.																				
14 Quality Team Consultants Co., Ltd.																				
15 Roge and Associates Co., Ltd.																				
16 Siam Tone Co., Ltd.																				
17 Sindhui Praisivoc Consultants	1966	10,000	117,000	137																
18 Soil testung sam Co., Ltd.																				
19 STS Engineering Consultants Co., Ltd.	1966	15,000		486																
20 TEAV Consulting Engineers Co., Ltd.	1978	12,000	157,600	300																RID受注
21 Technological Consultants Co., Ltd.																				
22 Thai Consultant Engineering Co., Ltd.	1979	3,500		22																
23 Thai DCI Co., Ltd.	1974	1,000	72,000	120																
24 Thai Engineering Consultant Co., Ltd.	1961	4,000	87,800	240																
25 Tigee Consultants Co., Ltd.																				
26 Visuddhi Consultants Co., Ltd.																				
27 What Co., Ltd.																				
28 Yonikit Engineering Development Ltd., Part																				

注：無記入分は不明 ○：調査経験の有無

6. 主要収集資料リスト

資料リスト (収集資料)

地域	東南アジア	調査団員又は 専門家氏名	タイ王国チャオプラヤ川流域洪水対策 総合計画調査	調査の種類又は 指導科目	事前調査SW協議 平成8年8月25日-9月11日	作成部課	社会開発2課
題名	タイ	配属機関名	農業調査組合 王室灌溉局	現地調査機関 又は派遣機関	担当者氏名	担当	一位
番号	資料の名称			版数	紙張 ページ数	フォーマット	取得区分
1	THAILAND IN FIGURES (POCKET), 1996			ポケット	360	オリジナル	購入
2	THAILAND EXPORT FOCUS (POCKET), 1995			ポケット	360	オリジナル	購入
3	THAILAND IMPORT FOCUS (POCKET), 1995			ポケット	360	オリジナル	購入
4	IRRIGATION SYSTEMS MANAGEMENT IN THAILAND			A5	303	オリジナル	寄贈
5	1994年洪水と1995年洪水の要因と対策			A4	6	コピー	寄贈
6	CHAOPHRAYA BASIN WATER RESOURCE MANAGEMENT. TOR			A4	13	コピー	寄贈
7	CHAOPHRAYA BASIN FLOOD MANAGEMENT REVIEW. TOR			A4	22	コピー	寄贈
8	THAILAND TRAVEL MAP. S=1:1,500,000			A0	1	オリジナル	購入
9	BANGKOK CITY MAP. S=1:15,000 / 1:75,000			A1	1	オリジナル	購入
10	現況土地利用図 (チャオプラヤ・デルタ)			A1	1	オリジナル	寄贈
11	土壌分画図 (チャオプラヤ・デルタ)			A1	1	オリジナル	寄贈
12	計画土地利用図 (チャオプラヤ・デルタ)			A1	1	オリジナル	寄贈
13	GEOLOGICAL MAP OF THAILAND. S=1:2,500,000			A2	1	コピー	寄贈
14	INDEX FOR TOPOGRAPHIC MAPS. S=1:50,000			A0	1	コピー	寄贈
15	INDEX FOR TOPOGRAPHIC MAPS. S=1:250,000			A4	1	コピー	寄贈
16	NATURAL HAZARDS & NATURAL DISASTER REDUCTION IN ASIA & THE PACIFIC			A4	912	オリジナル	寄贈
17	ANNUAL REVIEW OF DAMAGED BY FLOODS, DROUGHT & TROPICAL CYCLONES (1995)			A4	10	コピー	寄贈

番号	資料の名称	紙型	ページ数	オリジナル コピーの別	部数	収発先名称又は 発行機関	寄贈・購入 の別	取扱区分	附属表示
18	AGRICULTURAL STATISTICS OF THAILAND, CROP YEAR, 1985/1986	A5	258	コピー	1	Ministry of Agriculture & Co-operatives	購入		
19	AGRICULTURAL STATISTICS OF THAILAND, CROP YEAR, 1994/95	A5	271	コピー	1	Ministry of Agriculture & Co-operatives	購入		
20	THE TWENTY-EIGHTH SESSION OF THE TYPHOON COMMITTEE, DEC. 1995	A4	22	コピー	1	Meteorological Department	寄贈		
21	タイ国・中・北部流域地図	A0	1	オリジナル	1	Royal Irrigation Department	寄贈		
22	三室灌溉局組織図	A4	1	コピー	1	Royal Irrigation Department	寄贈		
23	排水・下水道組織図	A3	1	コピー	1	Bangkok Metropolitan Administration	寄贈		
24	FLOOD MODELING IN NAN RIVER BASIN SECOND TRAINING COURSE, SUMMARY REPORT, APRIL 1996	A4	27	コピー	1	Asia Institute of Technology	寄贈		
25	NAN RIVER BASIN TECHNICAL NOTE NO. 1. RAINFALL & EVAPORATION DATA CHECKING	A4	16	コピー	1	Asia Institute of Technology	寄贈		
26	NAN RIVER BASIN TECHNICAL NOTE NO. 2. WATER LEVEL & DISCHARGE DATA CHECKING & DEVELOPMENT OF RATING CURVES	A4	44	コピー	1	Asia Institute of Technology	寄贈		
27	NAN RIVER BASIN TECHNICAL NOTE NO. 3. CHARACTERISTICS OF NAN RIVER BASIN & CALIBRATION OF THE NAN MODEL	A4	30	コピー	1	Asia Institute of Technology	寄贈		
28	GEOLOGY, ATLAS OF THAILAND (Scale 1:2,500,000)	規格外	1	オリジナル	1	Royal Thai Survey Department	購入		
29	SEASONAL STORM TRACKS 1961 - 1970	規格外	1	オリジナル	1	Royal Thai Survey Department	購入		
30	CLIMATIC REGIONS OF THAILAND, ATLAS OF THAILAND (Scale 1:4,000,000)	規格外	1	オリジナル	1	Royal Thai Survey Department	購入		
31	VEGETATION, ATLAS OF THAILAND (Scale 1:2,500,000)	規格外	1	オリジナル	1	Royal Thai Survey Department	購入		
32	TOURIST MAP OF THAILAND, ATLAS OF THAILAND (Scale 1:2,500,000)	規格外	1	オリジナル	1	Royal Thai Survey Department	購入		
33	タイ国経済概況 (1994/1995年版)	B5		オリジナル	1	バンコク日本人商工会議所	購入		
34	タイ王国経済概況 (経産統計を中心に) 1995年版	A4		オリジナル	1	バンコク日本人商工会議所	購入		
35	タイ王国の環境	B5		オリジナル	1	バンコク日本人商工会議所	購入		
36	LIST OF RAINFALL STATIONS IN DSM DATABASE	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
37	CLIMATOLOGICAL DATA FOR PERIOD 1961-1990, NAKHON SAWAN	A4	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		

番号	資料の名称	型式	ページ数	オリジナル コピーの別	部数	収集先名称又は 発行機関	寄贈・購入 の別	取扱区分	利用表示
38	Monthly Rainfall, Nakhon Sawan	B4	2	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
39	Maximum Rainfall, Nakhon Sawan	B4	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
40	年雨量の等雨量線	A4	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
41	LOCATION OF HYDROLOGIC OBSERVATION STATIONS AND RIVER BASINS	規格外	1	オリジナル	1	ROYAL IRRIGATION DEPARTMENT	購入		
42	LIST OF STREAM GAGING STATION IN THAILAND	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
43	HYDROLOGICAL YEARBOOK, WATER YEAR 1993, VOLUME 36	B5		オリジナル	1	ROYAL IRRIGATION DEPARTMENT	購入		
44	Monthly Rainoff, Nakhon Sawan (C2)	B4	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
45	ANNUAL STREAMFLOW DATA, Nakhon Sawan (C2)	A4	2	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
46	GAGE HEIGHT & DISCHARGE, Nakhon Sawan (APRIL 1, 1983 TO MARCH 31, 1984)	A4	2	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
47	GAGE HEIGHT & DISCHARGE, Nakhon Sawan (APRIL 1, 1995 TO MARCH 31, 1996)	A4	2	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
48	RATING CURVE AND RATING TABLE, Nakhon Sawan	A4	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
49	DIAGRAM SHOWING ANNUAL MAXIMUM WATER LEVEL GAUGED AT AYUDHIA	規格外	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
50	CROSS SECTION OF RIVER AT GAGING STATIONS	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
51	TADE TABLES, 1996	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
52	1995年洪水時の氾濫区域図 (Nakhon Sawan上流域)	規格外	1	コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
53	1995年洪水に関する新聞記事のスクラップ集 (The Bangkok Post & The Sunday Post)	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
54	Flood Modeling Programme in Thailand (Second Training Course, 1995) における教材	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
55	向上における配布資料 (MIKE 11 VERSION 3.01. REFERENCE MANUAL)	A4		コピー	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
56	Royal Irrigation Department のパンフレット	A4		オリジナル	1	ROYAL IRRIGATION DEPARTMENT	寄贈		
57	PASAK RIVER BASIN DEVELOPMENT PROJECT のパンフレット	規格外		オリジナル	1	(株) アイデアワークス	寄贈		

番号	資料の名称	版数	ページ数	オリジナル コピーの別	収録先名称又は 発行機関	寄贈・購入 の別	取扱い区分	利用表示
58	Danish Hydraulic Institute (DHI)のパンフレット	A4		オリジナル 1	(株) 株式会社	寄贈		
59	DHI 開発のソフト (MIKE SHE) のパンフレット	A4		オリジナル 1	(株) 株式会社	寄贈		
60	DHI 開発のソフト (MIKE 11) のパンフレット	A4		オリジナル 1	(株) 株式会社	寄贈		
61	DHI 開発のソフト (MIKE 21) のパンフレット	A4		オリジナル 1	(株) 株式会社	寄贈		
62	DHI 開発のソフト (MOUSE) のパンフレット	A4		オリジナル 1	(株) 株式会社	寄贈		
63	DHI 開発のソフトの価格表	A4		コピー 1	(株) 株式会社	寄贈		
64	Thailand in Figures (1995-1996)	A4	1032	オリジナル 1	Alpha Research Co.,	購入		
65	HUNTRIA RICE EXPERIMENT STATION: Rice Research Institute のパンフレット	B4	2	コピー 1	Department of Agriculture	寄贈		
66	LANDSAT IMAGE	規格外	4	コピー 1	RID	寄贈		
67	IRRIGATION WATER MANAGEMENT IN THAILAND: FOCUSING ON 1994 DROUGHT	A4	6	コピー 1	RID	寄贈		
68	WATER MANAGEMENT IN THE CHAO PHRAYA RIVER BASIN	A5	11	コピー 1	RID	寄贈		
69	Development of Hydrological Information System in the Chao Phraya River Basin	A6	8	コピー 1	RID	寄贈		
70	Actual Flow Condition Data in Chao Phraya River (1995年 9月~10月)	A7	3	コピー 1	RID	寄贈		
71	地理情報システム	A8	14	コピー 1	RID	寄贈		
72	衛生リポートセンシングによるタイ中央平原の水害地形分析 国立防災科学技術センター研究連絡第83号 (1989.3)	B5	25	コピー 1	RID	寄贈		
73	150,000 のデジタルマッピング作成区画図	A3	1	コピー 1	RID (Royal Thai Survey Dept.)	寄贈		
74	PHITSANULOK IRRIGATION PROJECT パンフレット	A5	15	オリジナル 1	RID	寄贈		
75	EGAT (1994-1995) パンフレット	A5	23	オリジナル 1	EGAT	寄贈		
76	BHUMIBOL DAM AND HYDRO WATER PLANT (リーフレット)	規格外	2	オリジナル 1	EGAT	寄贈		
77	FLOOD ROUTING AND CONTROL ALTERNATIVES OF CHAO PHRAYA RIVER FOR BANGKOK	A4	107	コピー 1	AIT	寄贈		

番号	資料の名称	原題	ページ数	オリジナル コピーの別	部数	取集先名 発号	又は 発号	寄贈 の別	取込区分	利用表示
78	URBAN FLOODLOSS PREVENTION AND MITIGATION	A5	12	コピー	1	ESCAP		寄贈		
79	GEOLOGY AND URBAN DEVELOPMENT	A6	19	コピー	1	ESCAP		寄贈		
80	PROCEEDINGS OF THE EXPERT GROUP MEETING ON IMPROVEMENT OF FLOOD LOSS PREVENTION SYSTEMS BASED ON RISK ANALYSIS AND MAPPING	A7	54	コピー	1	ESCAP		寄贈		
81	DIAGRAM SHOWING ANNUAL MAXIMUM WATER LEVEL OF CHAO PHRAYA RIVER AT AYUDHIA (1831-1947)	A2	1	コピー	1	RID		購入		

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