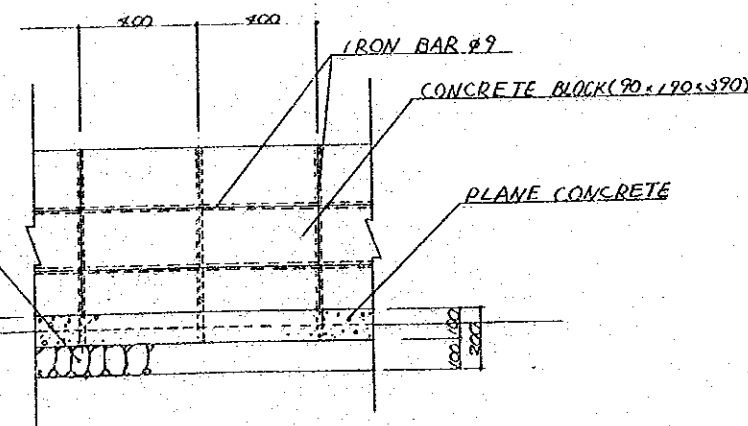
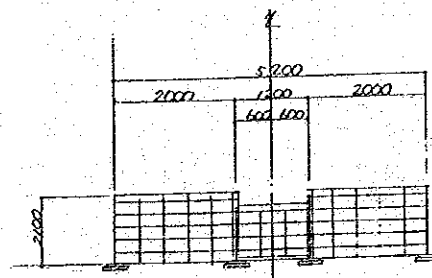
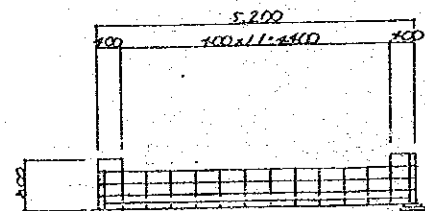
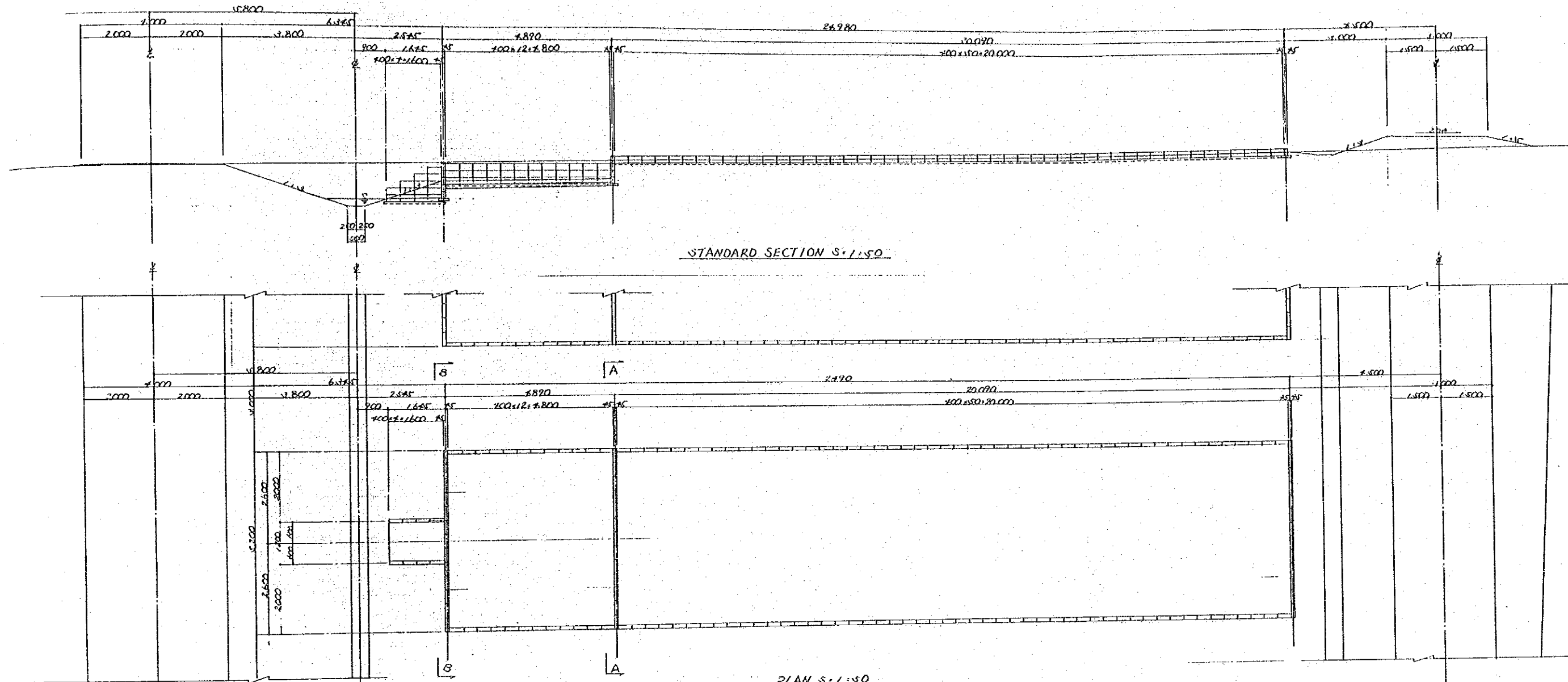


⑤--LINE

⑤--LINE



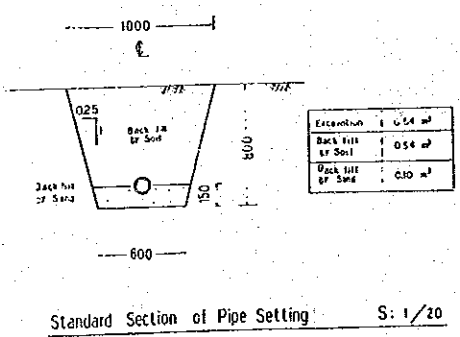
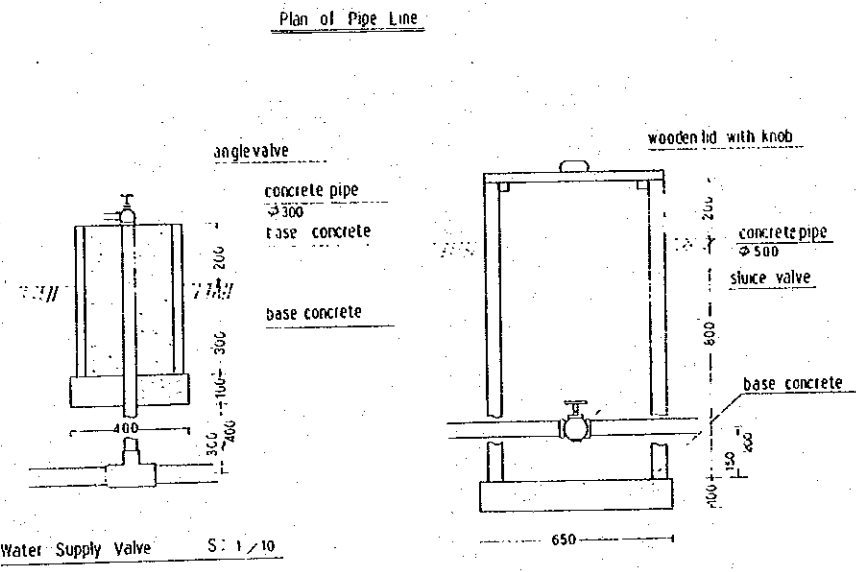
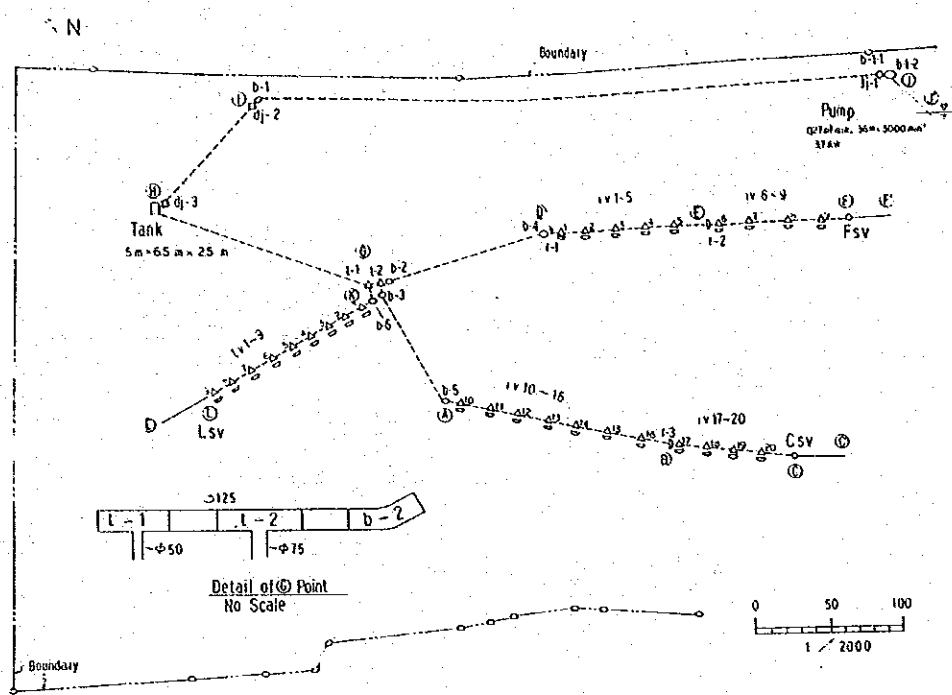
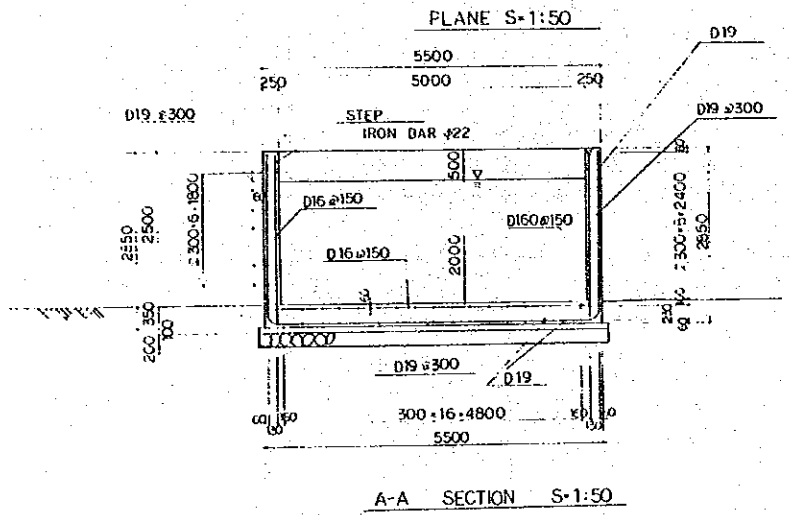
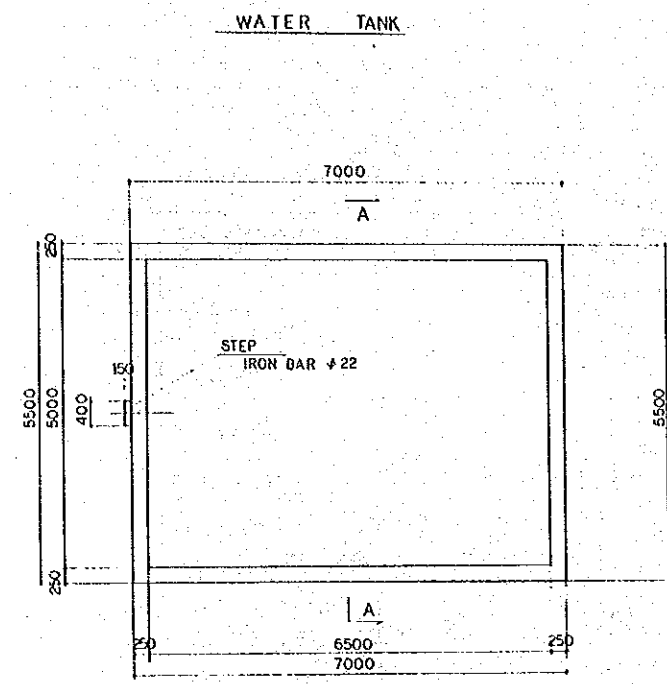
SCALE 1:50

SCALE 1:10

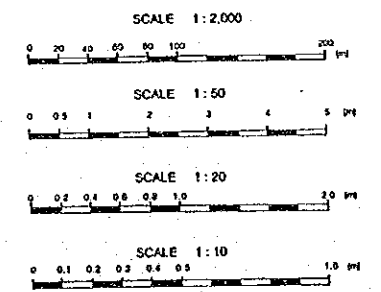
JAPAN INTERNATIONAL COOPERATION AGENCY  
 DETAILED DESIGN SURVEY FOR  
 THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT  
 PHASE II IN NORTHEAST THAILAND

**RUNOFF PLOT  
 PLAN AND STANDARD SECTION**

PREPARED BY	DRAWING NO.
CHECKED BY	27



Qty	Item	Dimension	Location	Piece length	Note
	Steel Pipe	φ80 mm	(A)-(B)	430 m	
			(B)-(C)	100 m	
	PVC Pipe	φ125 mm	(D)-(E)	150 m	
		φ100 mm	(E)-(F)	110 m	
		φ75 mm	(F)-(G)	90 m	
		φ65 mm	(G)-(H)	85 m	
		φ50 mm	(H)-(I)	160 m	
		φ25 mm	(I)-(J)	10 m	
	Bend Pipe (steel)	φ80 mm	(K)-(L)	3 P	b-1, 2
		φ125 mm	(M)	1 P	b-2
	Bend Pipe (PVC)	φ100 mm	(N)	1 P	b-4
		φ75 mm	(O)	2 P	b-3, 5
		φ50 mm	(P)	1 P	b-6
	Reducer (steel)	φ80 mm	(Q)-(R)	3 P	1, 2, 3
		φ125-50	(S)	1 P	1-1
	T-type Joint	φ125-75	(T)	1 P	1-2
		φ50-25	(U)-(V)	9 P	1, 9
	Reducer	φ125-100	(W)	1 P	1-1
		φ100-75	(X)	1 P	1-2
	Angle Valve	φ75-65	(Y)	1 P	1-3
		φ25	(Z)	9 P	1, 9
		φ80	(AA)	5 P	1, 5
	Angle Valve	φ65	(AB)	4 P	1, 5, 9
		φ65	(AC)	7 P	1, 5, 9, 16
		φ50	(AD)	4 P	1, 17, 20
	Sand flash pipe	φ65	(AE)	30 m	
		φ50	(AF)	30 m	
		φ50	(AG)	30 m	
	Sand flash valve	φ65	(AH)	1 P	FSV
		φ50	(AI)	1 P	CSV
		φ50	(AJ)	1 P	LSV
	T-type Joint	φ100-80	(AK)	5 P	1, 5
		φ75-65	(AL)	4 P	1, 9
		φ75-65	(AM)	7 P	1, 5, 9
		φ65-50	(AN)	4 P	1, 17, 20

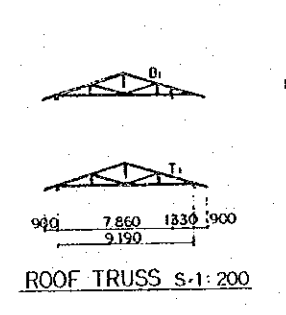
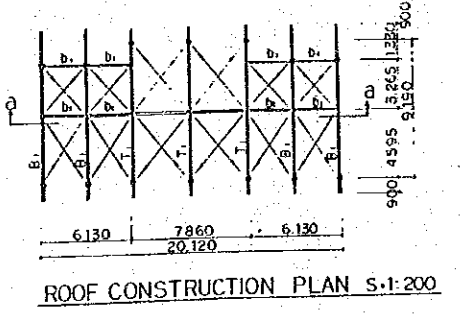
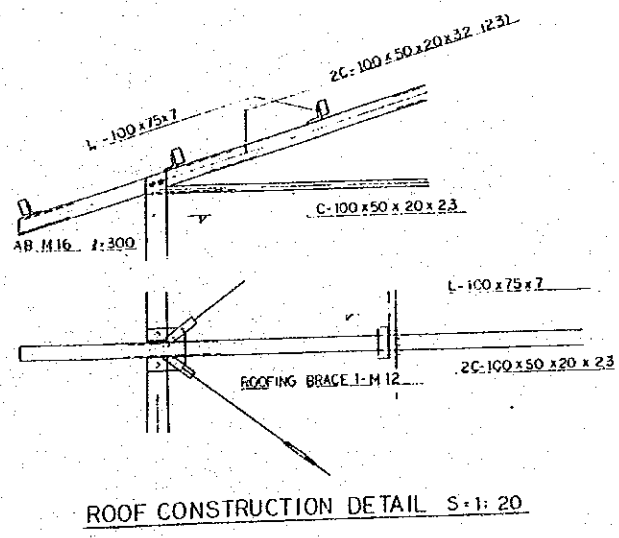
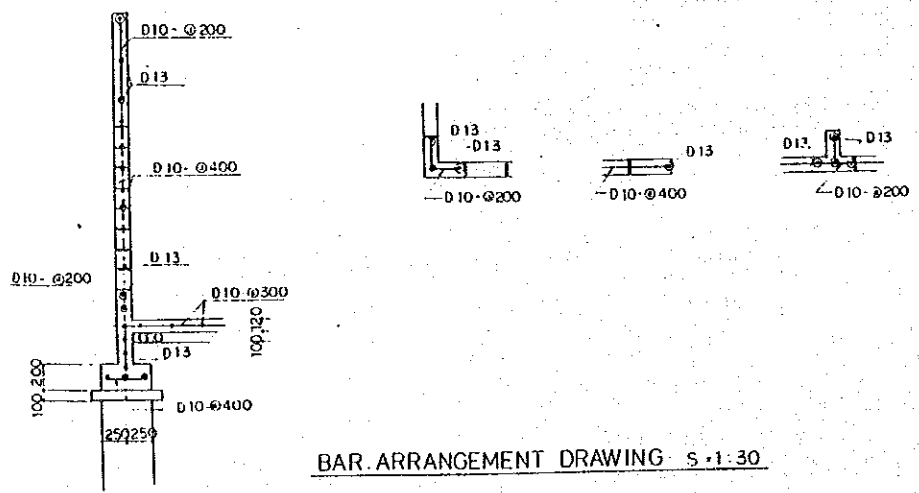
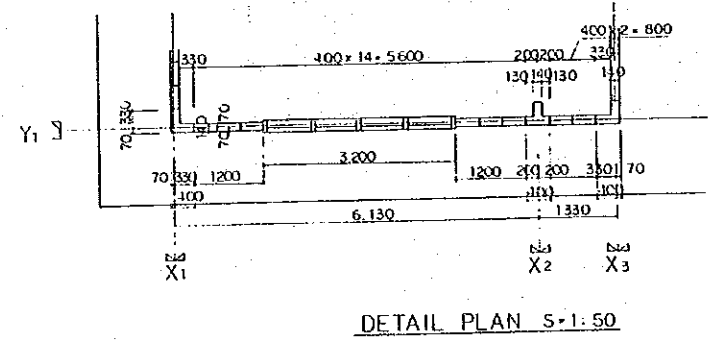
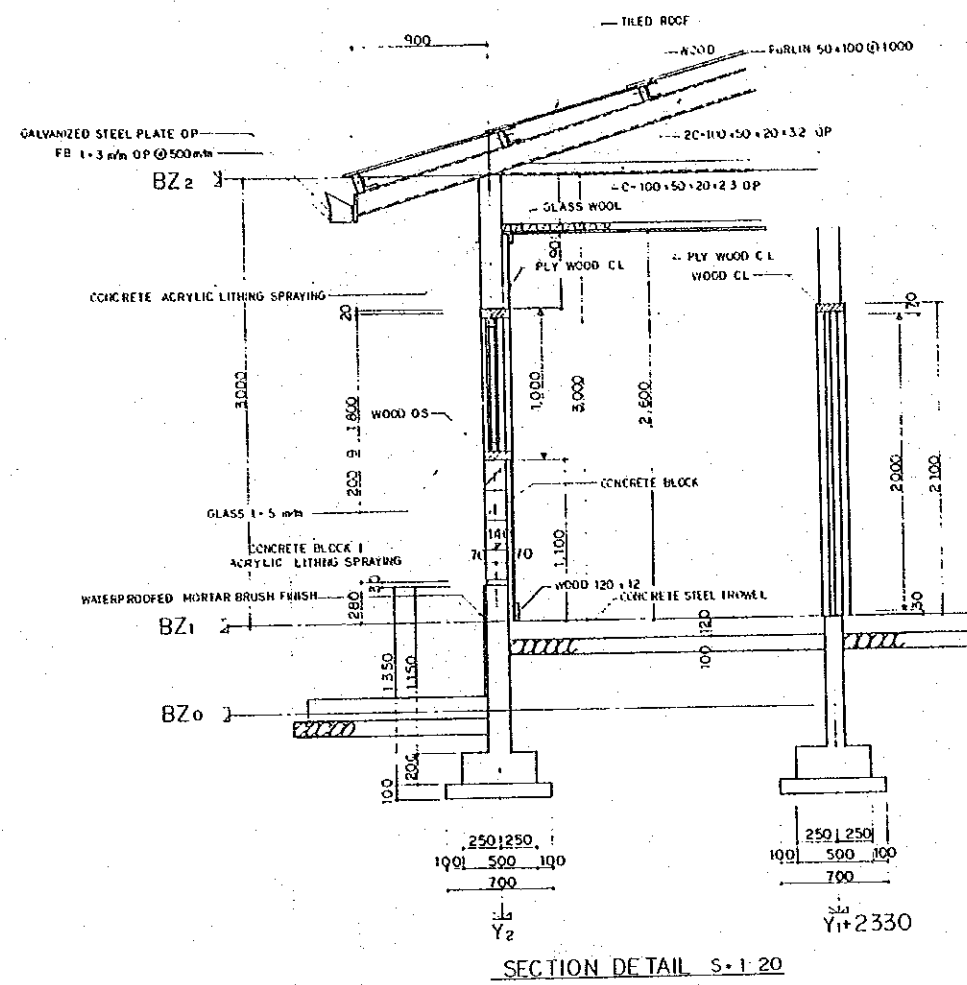
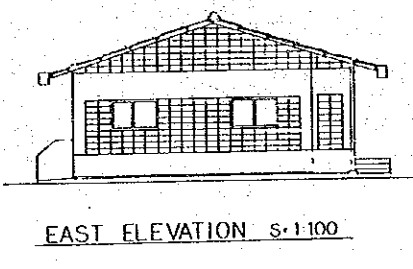
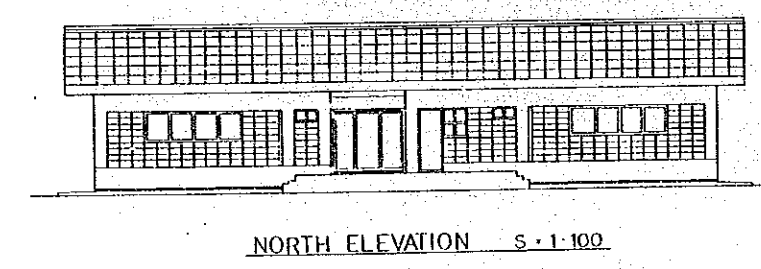
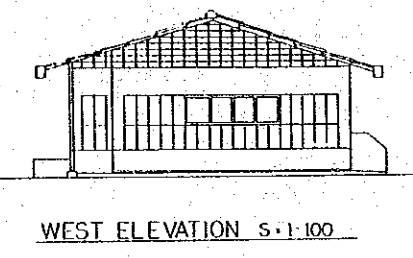
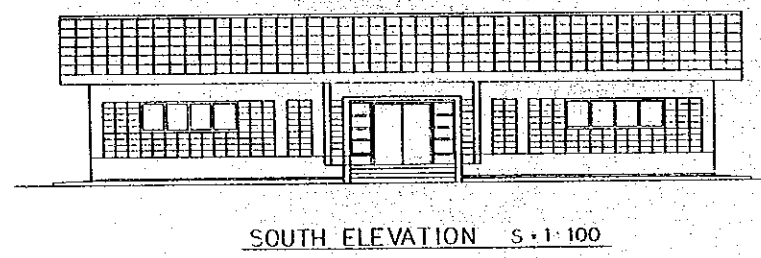
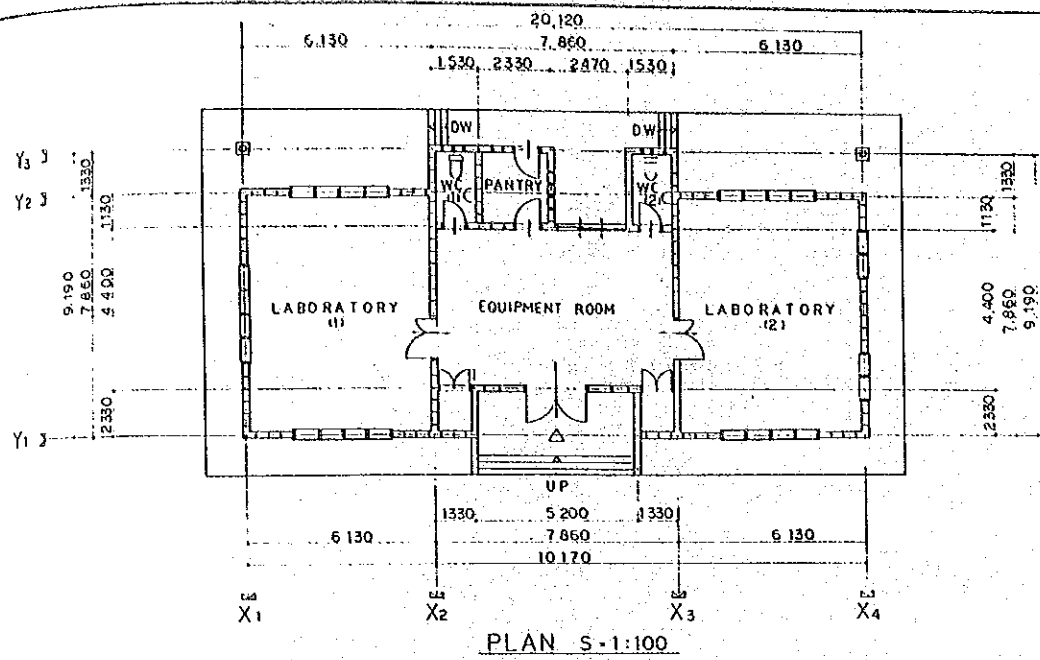


JAPAN INTERNATIONAL COOPERATION AGENCY  
 DETAILED DESIGN SURVEY FOR  
 THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT  
 PHASE II IN NORTHEAST THAILAND  
**WATER TANK, PLAN OF PIPELINE  
 AND STANDARD SECTION OF  
 PIPE SETTING**  
 PREPARED BY \_\_\_\_\_ DRAWING NO. 28  
 CHECKED BY \_\_\_\_\_

INTERIOR FINISH SCHEDULE										
BUILDING NAME	ROOM NAME	FLOOR		BASE BOARD (WAINSCOT)		WALL		CEILING		REMARKS
		SUB FLOOR	FINISH	BASE	FINISH	BASE	FINISH	BASE	FINISH	
FIELD LABORATORY	LABORATORY (1)	/	CONCRETE STEEL TROWEL	/	WOOD	PLYWOOD	CLEAR LACQUER	PLYWOOD	CLEAR LACQUER	
	LABORATORY (2)	/	CONCRETE STEEL TROWEL	/	WOOD	PLYWOOD	CLEAR LACQUER	PLYWOOD	CLEAR LACQUER	
	EQUIPMENT ROOM	/	CONCRETE STEEL TROWEL	/	WOOD	PLYWOOD	CLEAR LACQUER	PLYWOOD	CLEAR LACQUER	
	PANTRY	/	CONCRETE STEEL TROWEL	/	WOOD	MORTAL STEEL TROWEL	EMULSION PAINT (ACRYLIC)	ASBESTOS CEMENT BOARD	EMULSION PAINT (ACRYLIC)	
	WATER CLOSET	/	CONCRETE STEEL TROWEL	/	MORTAL STEEL TROWEL	PLYWOOD	CLEAR LACQUER	PLYWOOD	CLEAR LACQUER	
	STORAGE	/	CONCRETE STEEL TROWEL	/	/	/	CAVITY CONCRETE BLOCK FINISHING	/	/	
SURVEY AND STORAGE HOUSE	PRELIMINARY SURVEY ROOM	/	CONCRETE STEEL TROWEL	/	CONCRETE STEEL TROWEL	/	CAVITY CONCRETE BLOCK FINISHING	/	/	
	FERTILIZER AND CHEMICAL STORAGE	/	CONCRETE STEEL TROWEL	/	CONCRETE STEEL TROWEL	/	CAVITY CONCRETE BLOCK FINISHING	/	/	
	PRODUCTS STORAGE	/	CONCRETE STEEL TROWEL	/	CONCRETE STEEL TROWEL	/	CAVITY CONCRETE BLOCK FINISHING	/	/	
	WATER CLOSET	/	CONCRETE STEEL TROWEL	/	CONCRETE STEEL TROWEL	/	CAVITY CONCRETE BLOCK FINISHING	/	/	
PUMP STATION	/	CONCRETE STEEL TROWEL	/	/	/	CAVITY CONCRETE BLOCK FINISHING	/	/		
MACHINERY STORE-HOUSE	/	CONCRETE STEEL TROWEL	/	/	/	/	/	/		
DRY YARD	/	CONCRETE STEEL TROWEL	/	/	/	/	/	/		

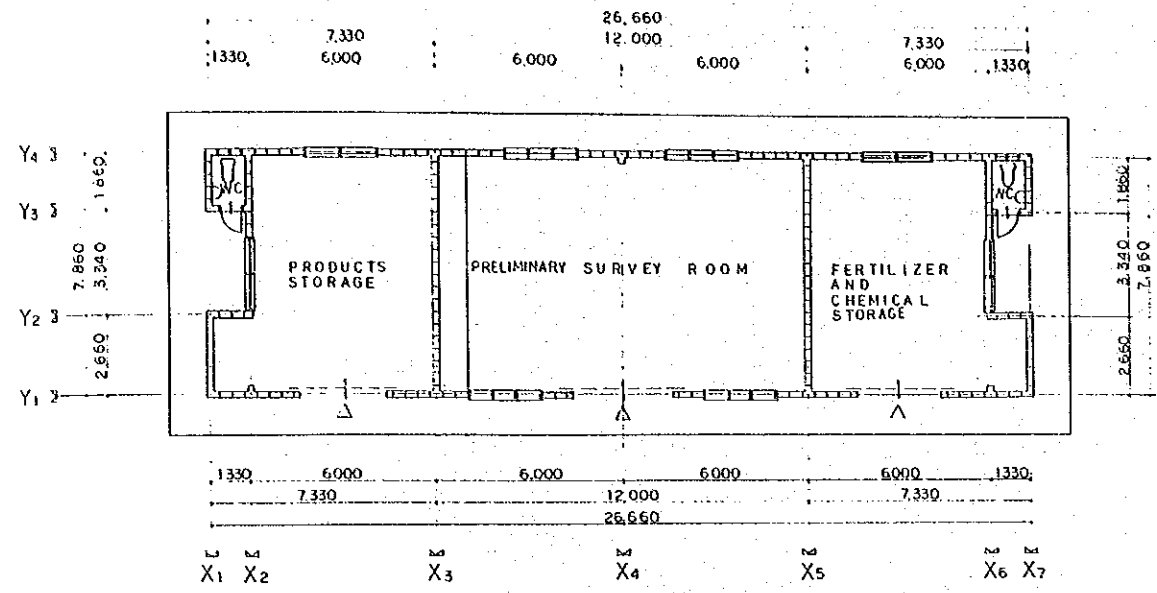
EXTERIOR FINISH SCHEDULE		
FIELD LABORATORY	ROOF	TILED ROOF
SURVEY AND STORAGE HOUSE	EXTERIOR WALL	CONCRETE ACRYLIC LITHING SPRAYING
PUMP STATION	WINDOWS, DOORS	WOODEN.
MACHINERY STORE-HOUSE		
ELECTRICAL INSTALLATION		
FIELD LABORATORY	FLUORESCENT LAMP 40W-2x18, RECEPTACLE x7	
SURVEY AND STORAGE HOUSE	FLUORESCENT LAMP 40W-2x14, RECEPTACLE x4	
PUMP STATION	FLUORESCENT LAMP 40W-2x1, RECEPTACLE x1	
MACHINERY STORE-HOUSE	FLUORESCENT LAMP 40W-2x1, RECEPTACLE x1	
PLUMBING INSTALLATION		
FIELD LABORATORY	WATER CLOSET x2, WASH BASIN x2	
SURVEY AND STORAGE HOUSE	WATER CLOSET x2, WASH BASIN x3	

JAPAN INTERNATIONAL COOPERATION AGENCY	
DETAILED DESIGN SURVEY FOR THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT PHASE II IN NORTHEAST THAILAND	
INTERIOR, EXTERIOR FINISH SCHEDULE ELECTRICAL, PLUMBING INSTALLATION	
PREPARED BY	DRAWING NO.
CHECKED BY	29

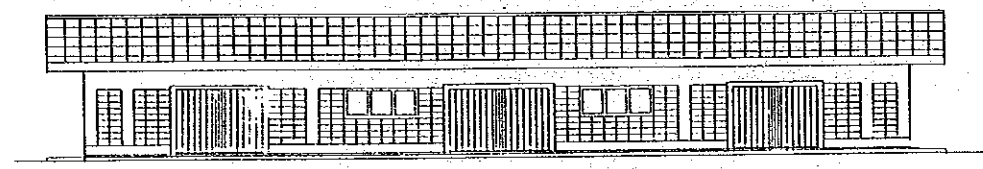


NOTE 1  
 T1 TOP CHOP 2LGC-100x50x20x32 (23)  
 BOTTOM CHOP LGC-100x50x20x23 EW  
 ANGLE WEB LGC-100x50x20x23 EW  
 B LGC-100x50x20x23 2-M16 (BOLT) R-45  
 B LGC-100x50x20x23  
 T LGC-100x50x20x23 1-M16 (BOLT) R-45  
 ROOFING BRACE 1-M12 (TURN BUCKLE) 2-M16 (BOLT) R-45

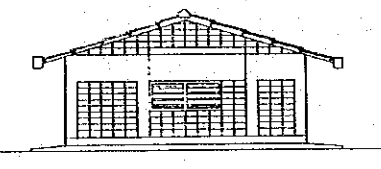
JAPAN INTERNATIONAL COOPERATION AGENCY	
DETAILED DESIGN SURVEY FOR THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT PHASE II IN NORTHEAST THAILAND	
<b>FIELD LABORATORY</b>	
PREPARED BY	DRAWING NO.
CHECKED BY	30



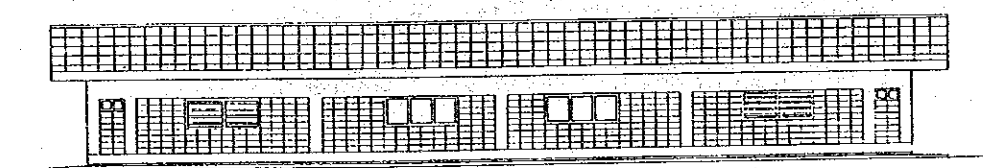
PLAN S=1:100



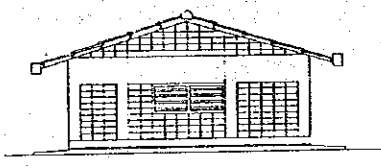
SOUTH ELEVATION S=1:100



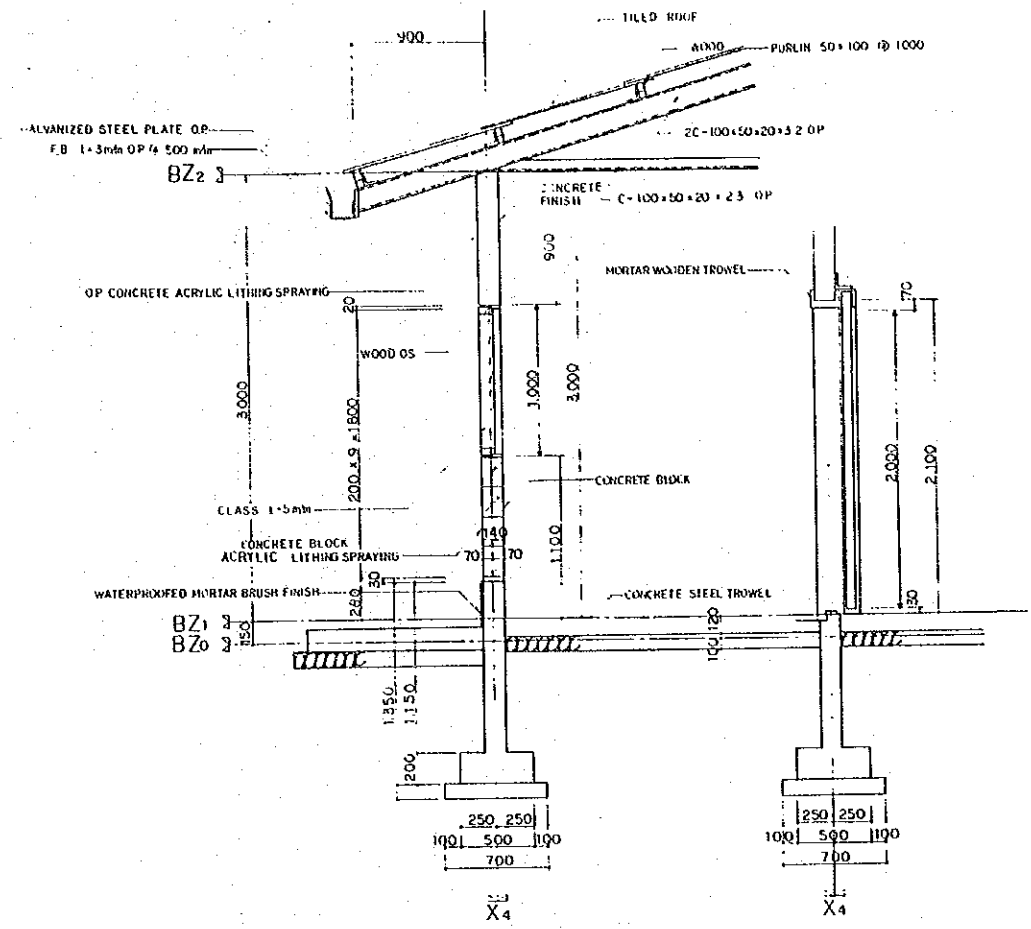
EAST ELEVATION S=1:100



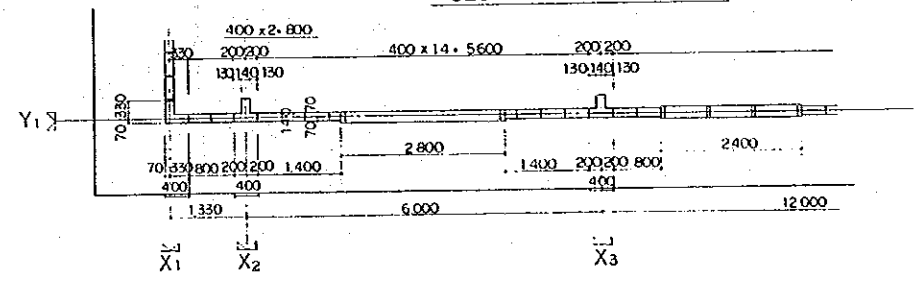
NORTH ELEVATION S=1:100



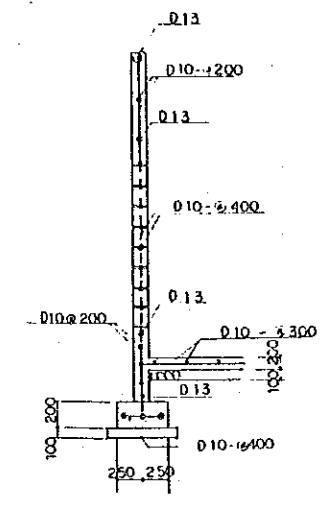
WEST ELEVATION S=1:100



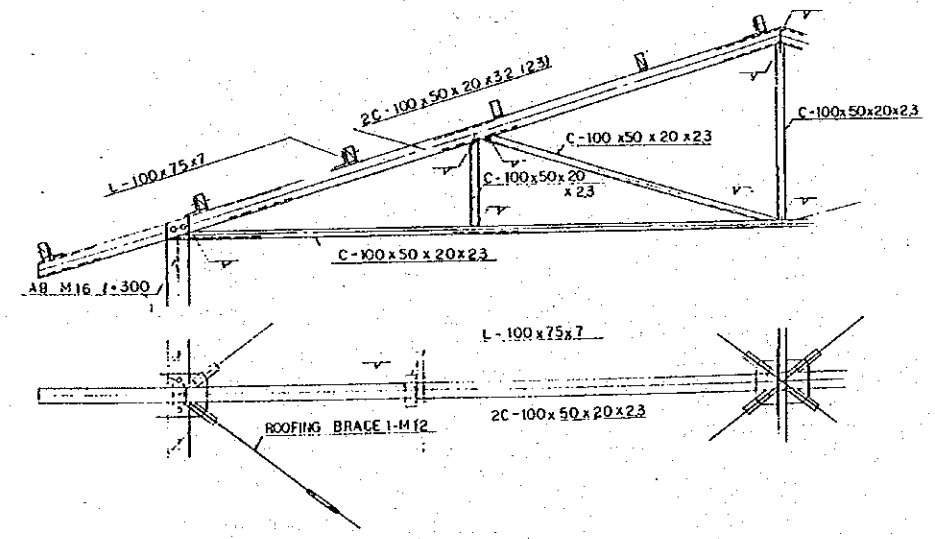
SECTION DETAIL S=1:20



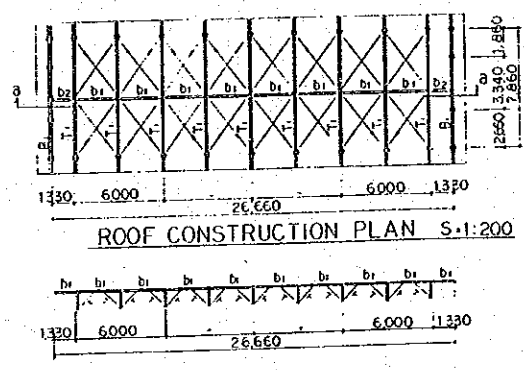
DETAIL PLAN S=1:50



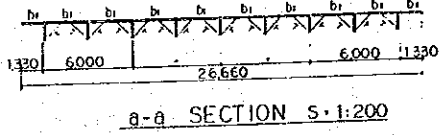
BAR ARRANGEMENT DRAWING S=1:30



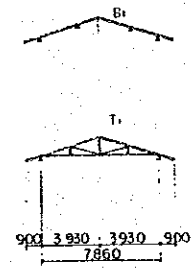
ROOF CONSTRUCTION DETAIL S=1:20



ROOF CONSTRUCTION PLAN S=1:200



a-a SECTION S=1:200

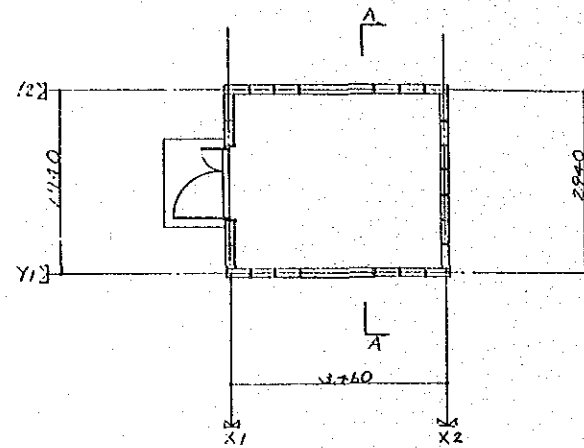


ROOF TRUSS S=1:200

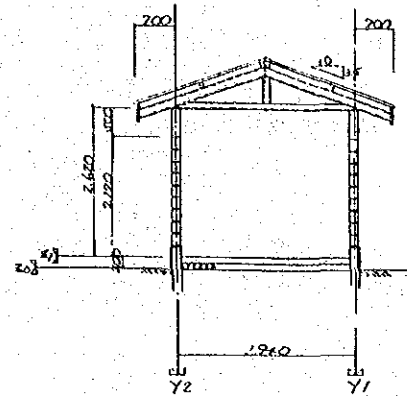
(NOTE)  
 T1 TOP CHORD 2LGC-100x50x20x23  
 BOTTOM CHORD LGC-100x50x20x23 EW  
 ANGLE WEB LGC-100x50x20x23 EW  
 b1, b2 LGC 100x50x20x23 2-M16 (BOLT) R-45  
 B, 2LGC 100x50x20x23  
 T LGC 100x50x20x23 1-M16 (BOLT) R-45  
 ROOFING BRACE 1-M12 (TURN BUCKLE) 1-M16 (BOLT) R-45

JAPAN INTERNATIONAL COOPERATION AGENCY	
DETAILED DESIGN SURVEY FOR THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT PHASE II IN NORTHEAST THAILAND	
SURVEY AND STORAGE HOUSE	
PREPARED BY	DRAWING NO.
CHECKED BY	31

PUMP STATION



PLAN S-1:50



A-A SECTION S-1:50



SOUTH



EAST



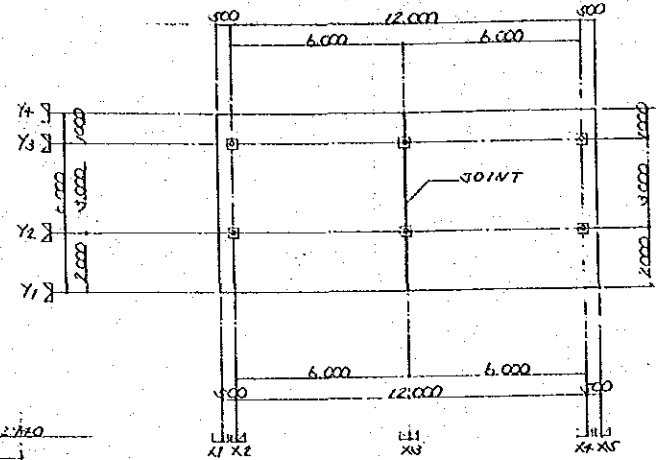
NORTH



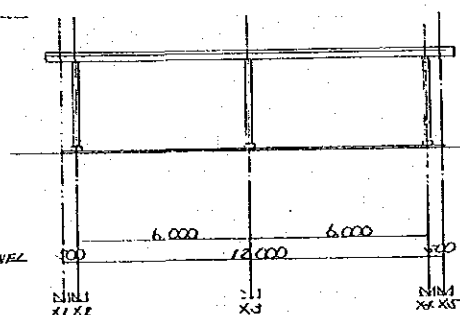
WEST

ELEVATION S-1:100

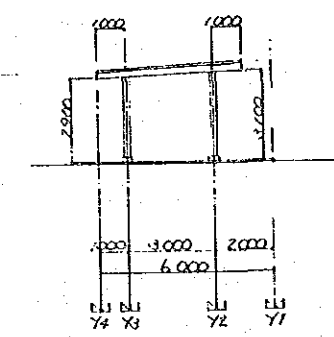
MACHINERY STORE-HOUSE



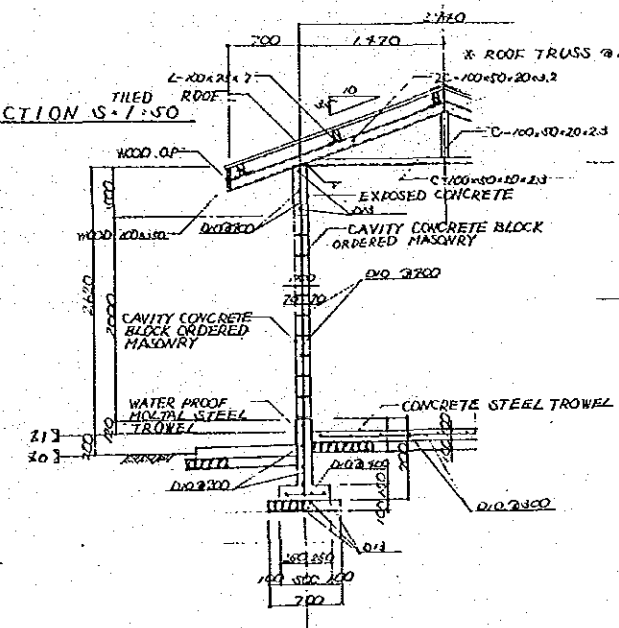
PLAN S-1:100



NORTH ELEVATION S-1:100

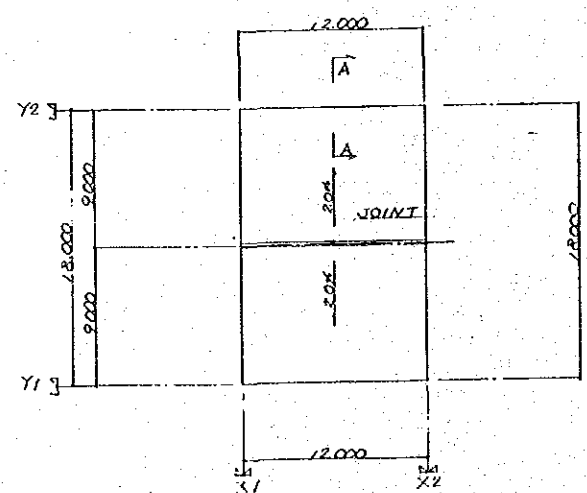


EAST ELEVATION S-1:100

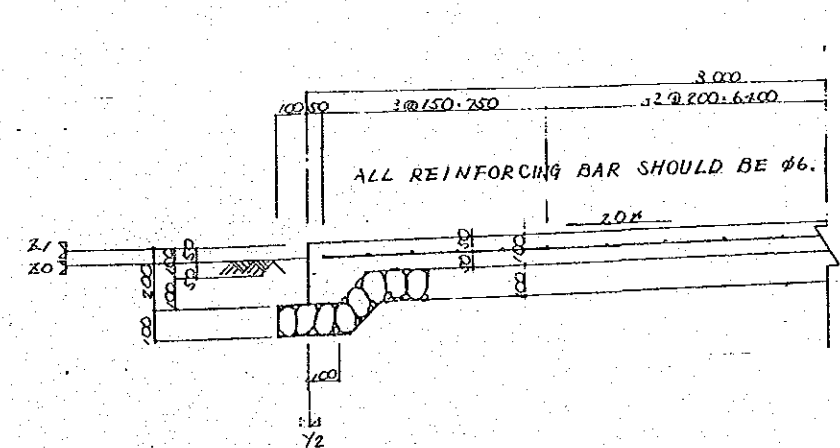


DETAIL S-1:30

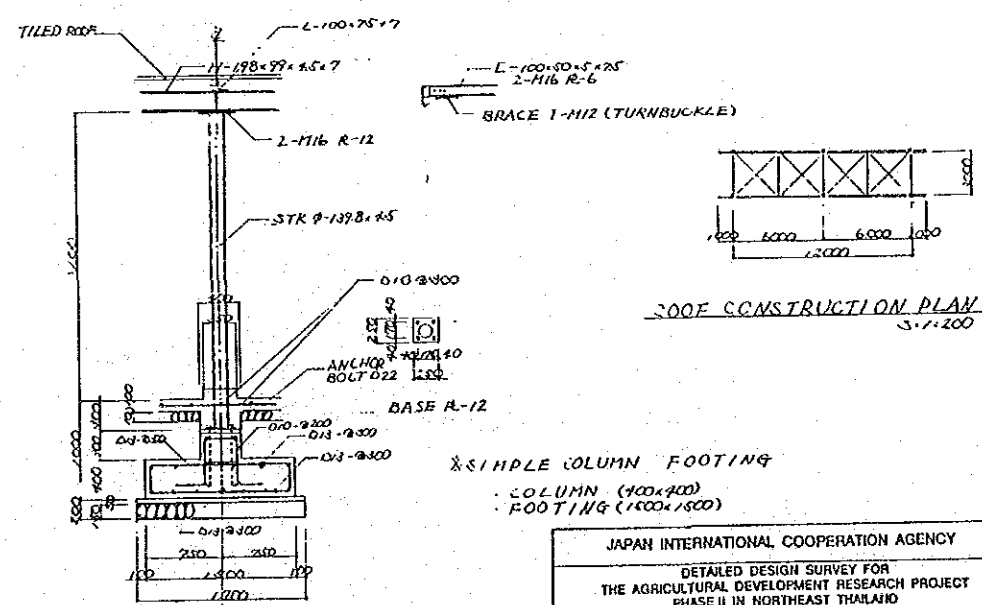
DRY YARD



PLAN S-1:100



A-A SECTION S-1:10



DETAIL S-1:30

\* SIMPLE COLUMN FOOTING  
 COLUMN (400x400)  
 FOOTING (1500x1500)

ROOF CONSTRUCTION PLAN S-1:200

JAPAN INTERNATIONAL COOPERATION AGENCY	
DETAILED DESIGN SURVEY FOR THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT PHASE II IN NORTHEAST THAILAND	
MACHINERY STORE-HOUSE, PUMP STATION AND DRY YARD	
PREPARED BY	DRAWING NO. 32
CHECKED BY	



## 付属資料目次

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## 1 調査団の構成

氏名	担当	所	属
石田 哲	団長兼総括	農林水産省構造改善局事業計画課	
永井 和夫	業務調整	国際協力事業団農業開発協力部	
		農業技術協力課	
石山 茂 楨	圃場計画	日本技研株式会社	
近藤 兼一郎	施設設計	日本技研株式会社	

## 2 現地調査日程

現地調査は、1989年11月28日から1990年1月11日までの45日間にわたり実施された。  
その詳細は下表のとおりである。

日 順	月 日	曜 日	団 員	調 査 地	調 査 内 容
1	11/28	火	4	バンコク	日本出発
2	29	水	4	バンコク	大使館, JICA, MOAC 表敬・打ち合わせ
3	30	木	4	コンケン	現地踏査, ADRC協議
4	12/1	金	4	コンケン	資料収集
5	2	土	4	コンケン	団長レター作成
6	3	日	4	コンケン	前日と同じ
7	4	月	4	コンケン	ADRC協議
8	5	火	3	バンコク	団長レター作成
			1	コンケン	同上
9	6	水	3	バンコク	DLD協議
			1	コンケン	現地調査準備
10	7	木	3	バンコク	団長レターMOACへ提出 大使館, JICA報告
			1	コンケン	現地調査準備
11	8	金	2		団長, 調整員帰国
			2	コンケン	現地調査準備
12	9	土	2		団長, 調整員日本着
			2	コンケン	現地調査準備
13	10	日	2	コンケン	資料整理
14	11	月	2	コンケン	現況調査, 測量
?	?	?	?	?	
26	23	土	2	コンケン	同上
27	24	日	2	コンケン	資料整理
28	25	月	2	コンケン	計画立案, 実施設計
?	?	?	?	?	
33	30	土	2	コンケン	同上
34	31	日	2	コンケン	資料整理
35	1/1	月	2	コンケン	同上
36	2	火	2	コンケン	フィールドレポート作成
37	3	水	2	コンケン	同上



### 3 関係者リスト

本件調査に当り、下記の方々の御協力をいただいた。

#### 在タイ日本国大使館

一等書記官

平島 和男

#### JICAタイ事務所

所長

斎藤 勉

所員

山下 恭徳

#### 個別派遣専門家

農業協同組合省アドバイザー

川又 章

#### プロジェクト専門家

チームリーダー

八田 貞夫

業務調整

鎌田 和彦

作物栽培

岡 啓

作物育種

牛腸 英夫

土壌化学

和田 秀徳

土壌肥沃度

白石 勝恵

土壌分類

三浦 憲蔵

機材修理（短期）

藤本 秀光

農業協同組合省官房 (Office of the Permanent Secretary)

Mr. Sawad Wattanayagorn	Deputy Permanent Secretary
Mr. Pailoon Palayasoot	Inspector-General
Mr. Thavatchai Satrusajang	Chief, Foreign Relations Branch 3

同 土地開発局 (Department of Land Development)

Mr. Sitilarp Vasuvat	Director General
Mr. Boonraruk Suebsiri	Deputy Director General
Mr. Rungroj Puengpan	Director, Land Development Office Region 5
Mr. Terdsak Subhasaram	Soil Chemistry, -ditto-
Mr. Boonlom Havilui	Topographic Survey, -ditto-
Mr. Krienysak Junthotai	Soil Survey, -ditto-
Mr. Vijit Ekuru	Topographic Survey, -ditto-
Mr. Surapol Hirunwatsiri	Mechanics, Engineering Div.

東北タイ農業開発研究センター (Agricultural Development Research Center)

Dr. Pailoon Ponsana	Director, A D R C
Mr. Kasem Chompoonutrapa	Deputy Director, A D R C

カウンターパート

Mr. Chaiporn Vachirakornwatana	Engineering Div., DLD (Irrigation)
Mr. Wanchai Wongsa	Engineering Div., DLD (Agriculture)
Mr. Chartchai Poonpanich	Engineering Div., DLD (Mechanics)



#### 4 団長レター





JAPAN INTERNATIONAL COOPERATION AGENCY  
(JICA)  
DETAILED DESIGN SURVEY TEAM  
FOR  
THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT PHASE II  
IN  
NORTHEAST THAILAND

December 7, 1989

Permanent Secretary  
Office of the Permanent Secretary  
Ministry of Agriculture and  
Cooperatives  
Rajadamnern Ave.,  
Bangkok 10200

Dear Sir,

Re : The Pilot Infrastructure Improvement Works for the  
Agricultural Development Research Project Phase II

The Detailed Design Survey Team has been organized by Japan International Cooperation Agency (JICA) for the purpose of formulating detailed plan on the Pilot Infrastructure Improvement Works for the Agricultural Development Research Project Phase II.

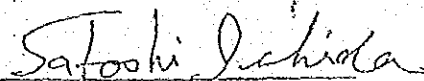
The Team has, so far, made a series of site reconnaissances and discussions with your staff concerned in order to determine the location and scale of the Demonstration Farm for Proper Land Use (hereinafter referred to as "the Farm") and its facilities. As the result, we would like to submit to you the tentative idea for designing of the Farm as per the attached.

Two team members, Mr. Ishiyama and Mr. Kondo, will proceed with your staff to conduct further field surveys and investigations at the site and make the detailed design on the basis of the result of those surveys. After the completion of the detailed design and assessment of its cost estimation, you will be informed of its result through the JICA Thailand Office.

For the timely commencement of the construction of the Farm, we would like to ask you to take the necessary formalities in due consultation with the JICA Thailand Office.

Lastly, we would like to express our appreciation for the kind cooperation of your staff during our stay.

Sincerely Yours,



Satoshi ISHIDA

Team Leader

Detailed Design Survey Team  
Japan International Cooperation Agency

- cc : Director General  
Department of Agriculture  
MOAC  
(Att : Dr. Thanongjit Wongsiri)
- cc : Deputy Director General  
Department of Land Development  
MOAC  
(Att : Mr. Boonyarak Seubsiri)
- cc : Dean, Faculty of Agriculture  
Khon Kaen University  
(Att : Dr. Taweasuk Saentaweasuk)
- cc : Chief of Japan Sub-Division  
Department of Technical and Economic Cooperation  
(Att : Mr. A-cha-ri Yooktanon)
- cc : Embassy of Japan

## 1. Objective

This survey is to carry out the detailed design on the Demonstration Farm for Proper Land Use (the Farm) which is to

- 1) undertake the experiment/trials to check the techniques, which were developed so far, on their adaptability to local conditions and
- 2) develop and demonstrate proper land use system to improve soil productivity under the conditions of typical topography of the Northeast.

The Farm, therefore, will play the important role for research and technology transfer to the farmers as a project activity of the technical cooperation.

The Farm will be managed by the Agriculture Development Research Center (ADRC), and composed of irrigation, soil erosion survey and land use demonstration fields which involve the construction of land consolidation, irrigation system, drainage canals, farm roads, pump station, water tank, reservoir and runoff plots, etc.

The Farm will also equip those facilities such as field laboratory, machinery store-house, survey and storage house and dry yard.

In light of the above, the Team conducted the surveys on selection of site, scale of farm, condition of power and domestic water supply and water right, and had preliminary discussions on the framework of the Farm.

## 2. Location and Scale

- (1) The location of the Farm is planned in consideration of following conditions :

- (a) soil type,
- (b) rainfall,
- (c) topographic features,
- (d) efficiency for demonstration.

Considering the above, the Farm is selected at the area in Khao Suan Kwang, about 40 kilometers north of Khon Kaen City, as shown in Fig.1.

- (2) The area of the Farm is about 25 ha including the facility yard as shown in Fig.2.

### 3. Components of the Farm

#### 3.1 Farm Fields

The Farm consists of the following fields and related constructions.

##### (1) Field

The area of the experimental and demonstration fields will be about 19 ha. The Farm consists of the following three kinds of field.

##### 1) Irrigation field

The irrigation field will be 6 plots (about 5.6 ha). This field will be used for experimental activities related to irrigation.

##### 2) Soil erosion survey field

The soil erosion survey field will be 1 plot (about 0.5 ha). This field will equip runoff plots for measuring soil loss and runoff water.

##### 3) Land use demonstration field

This field will be about 13 ha. In the field, the technology developed by the Project will be systematized for demonstration to the farmers.

##### (2) Runoff plots for measuring soil loss and runoff water

Eighteen (18) runoff plots for measuring soil loss and runoff water will be constructed in the soil erosion survey field. Size of the runoff plot will be 5 m width and about 20 m length.

##### (3) Irrigation water supply system (1,500 m)

Vinyl chloride or polyethylene pipe will be adopted for the water distributing pipeline. Valves will be installed in the pipeline system in order to regulate discharge and pressure of the irrigation water.

##### (4) Drainage canal (1,400 m)

Drainage canal will be constructed as the earth canal. Gabionates will be placed in the drainage canal to prevent the canal from scouring.

(5) Farm road (580 m)

Farm road will be constructed in the Farm for easy approach by machinery and for maintenance work. Main and sloping portion of the farm road will be paved with laterite.

(6) Reservoir (about 30,000 m<sup>3</sup>)

In addition to the existing pond capacity, the reservoir will be newly constructed in order to increase the storage capacity for the irrigation on the Farm.

(7) Pump and Pump station

Pump station will be installed on the site which will be suitable to intake the low water in the reservoir. Electricity will be considered as power for pump. (submersible pump ;  $\phi$ 80 mm)

(8) Water tank (50 m<sup>2</sup>)

Water tank will be cylindrical tank made of reinforced concrete, and installed on the highest portion of the Farm.

(9) Water supply pipeline (620 m)

Steel pipe will be adopted for the water supply pipeline connecting the pump station and the water tank. Valves will be installed in the pipeline in order to operate and maintain the water supply pipeline safely.

### 3.2 Farm Facilities

In order to conduct the experiment and the demonstration activities in the Farm, the following facilities will be constructed.

(1) Field laboratory (144 m<sup>2</sup>)

Field laboratory will equip those such as

- (i) laboratory for farming researches,
- (ii) laboratory for soil researches and
- (iii) equipment room.

The laboratory will be constructed with concrete block wall and slate roof.

(2) Machinery store-house (72 m<sup>2</sup>)

The machinery store-house will store agricultural machinery such as tractor, etc.

The house will be constructed with concrete pillar and slate roof, but without wall.

2

(3) Survey and storage house (192 m<sup>2</sup>)

The survey and storage house will equip those such as

- (i) preliminary survey room,
- (ii) fertilizer and chemical storage and
- (iii) products storage.

The house will be constructed with concrete block wall and slate roof.

2

(4) Dry yard (216 m<sup>2</sup>)

In order to dry the products such as cassava, cow pea, maize, mung bean, etc., the dry yard will be facilitated.

4. Necessary measures taken by Thai side

For the establishment of the Farm, following measures should be taken by Thai side.

1) Provision of land for the Farm

2), Management of the Farm

- a) Establishment of management system
- b) Assignment of farm manager and at least two assistants
- c) Budget allocation of the salaries for the employees and other expenses for management of the Farm

3) Supplementary construction works

- a) Gate and fence
- b) Electricity and domestic water supply up to the Farm

5. Others

The tentative schedule and procedure for the construction work of the Farm is shown in Table 1.

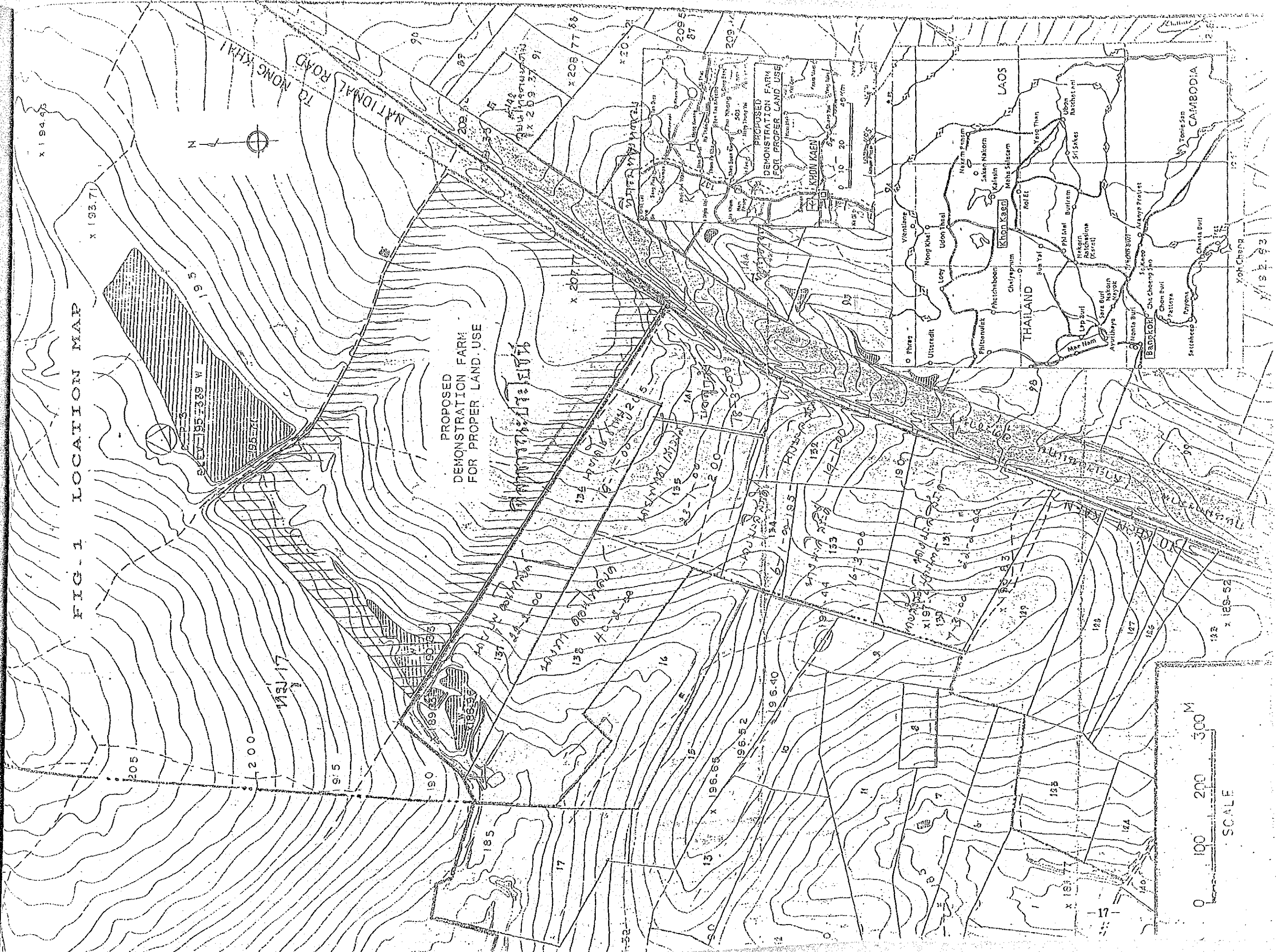
Table-1

OUTLINE OF THE TENTATIVE SCHEDULE  
ON  
THE PILOT INFRASTRUCTURE IMPROVEMENT WORK

	<u>Japanese Side</u>	<u>Thai Side</u>
1989 Nov.	Detailed design survey --Nov. 28 to Jan. 11, 1990--	To provide land for the Farm
Dec. 1990 Jan.	Detailed design work in Japan	
Feb.		
Mar.	Submission of final report	
Apr.		Request of construction work for the Farm (to JICA Thailand Office)
May	JICA HDQ ←	Submission of A1 form for supervising expert (to the Embassy of Japan)
	Signing of Supplementary Note on the Record of Discussion	
Jun.		
Jul.		
Aug.		
Sep.	Exchange of Note Verbale Dispatch of supervising expert Remittance of budget Contract for construction	
Oct.	Start of construction work	



FIG. 1 LOCATION MAP



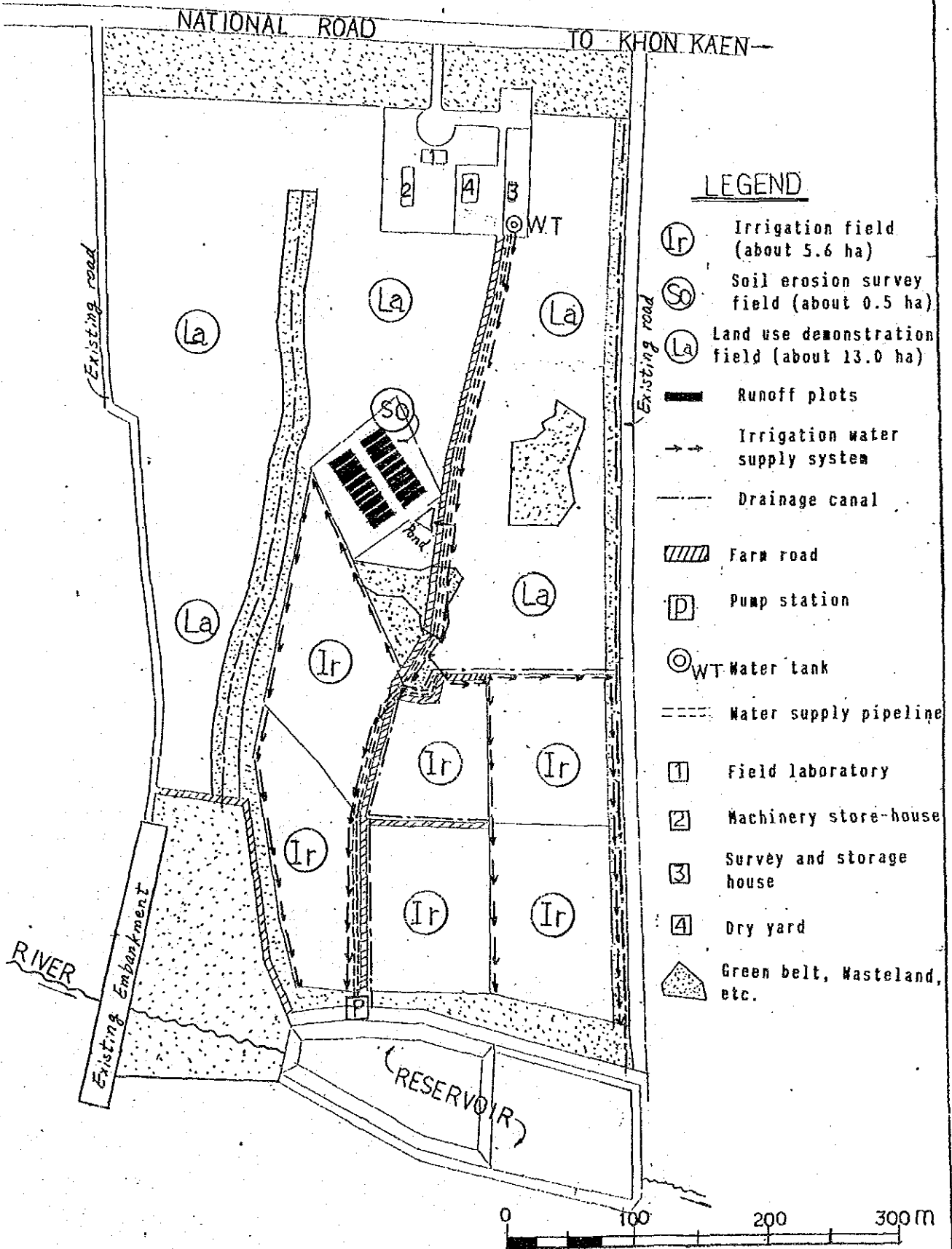
0 100 200 300 M  
SCALE



FIG. 2

DEMONSTRATION FARM  
FOR PROPER LAND USE

TOTAL AREA APPROX. 25 HA



LEGEND

- Irrigation field (about 5.6 ha)
- Soil erosion survey field (about 0.5 ha)
- Land use demonstration field (about 13.0 ha)
- Runoff plots
- Irrigation water supply system
- Drainage canal
- Farm road
- Pump station
- Water tank
- Water supply pipeline
- Field laboratory
- Machinery store-house
- Survey and storage house
- Dry yard
- Green belt, Wasteland, etc.



## 5 フィールド・レポート



THE KINGDOM OF THAILAND

DETAILED DESIGN SURVEY

FOR

THE AGRICULTURAL DEVELOPMENT RESEARCH PROJECT

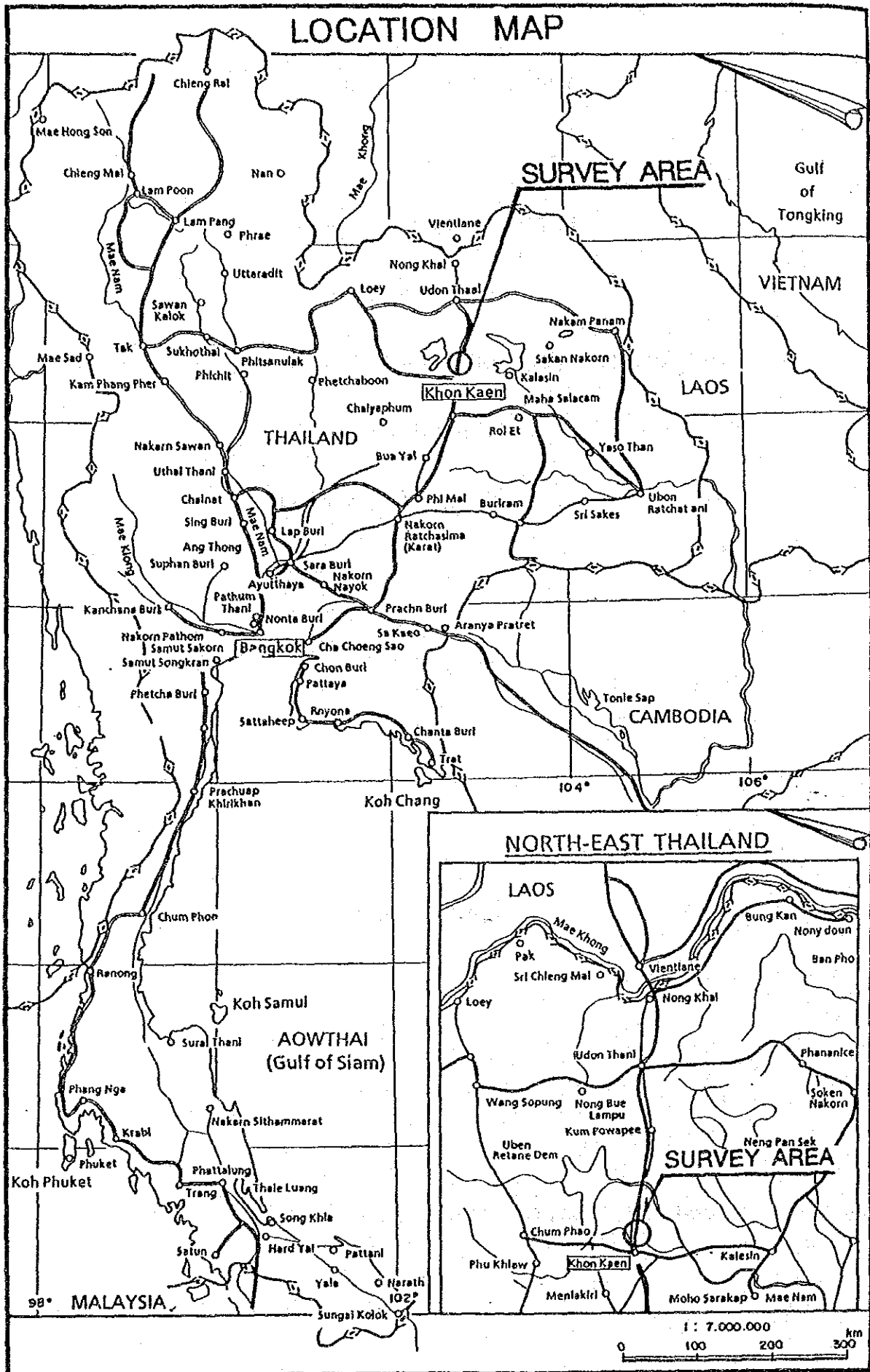
PHASE II

IN NORTHEAST THAILAND

FIELD REPORT

JANUARY 1990

JAPAN INTERNATIONAL COOPERATION AGENCY





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ANNEX-1 : LETTER OF TEAM LEADER .....	Refer to Previous Part 4.
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## 1. General

### 1.1 Background

The Agricultural Development Research Project in Northeast Thailand as the Japanese Technical Cooperation had been commenced based on the Record of Discussions signed on December 20, 1983 and completed on December 1988, after a cooperation period of five (5) years.

This project was intended to strengthen the research activities which was directed towards the development of agricultural technology adaptable to the Northeast Thailand, and to propel the development of the Northeast Thailand. The main subjects were i) assessment of natural environment and natural resources, ii) improvement of crop performance and iii) soil conditions and its improvement. The research activities were performed at the Agricultural Development Research Center (ADRC) and its Annex and at the Khon kaen Field Crop Research Center (FCRC).

For promoting the further agricultural development suitable for Northeast Thailand with its characteristics environment, the Agricultural Development Research Project Phase II in Northeast Thailand has started based on the Record of Discussions signed on December 16, 1988 for a cooperation period of five (5) years until December 1993. The Tentative Schedule of Implementation for the Phase II was signed on August 17, 1989 containing research and cooperation of i) classification of agro-ecological zones and land use planning, ii) development of farm management system and iii) development of low-input technology.

In the course of the Phase II, the Royal Thai Government (RTG) planned the Demonstration Farm for Proper Land Use (the Farm) and requested the Government of Japan (GOJ) to provide the cooperation for the plan. In response to the request, the GOJ has decided to implement the Farm by the Pilot Infrastructure Improvement Works and conduct the Detailed Design Survey (the Survey).

### 1.2 Objective of the Survey

The objective of the Survey is to execute the Detailed Design Survey for the construction of the Farm, including land consolidation, irrigation and drainage facilities, farm roads, reservoir, farm facilities, etc. The Survey is to perform the data collection and field survey necessary to the planning, detailed design and cost estimation during the stay in Thailand, and to work up the planning and detailed design etc. into reports and prepare the tentative contract documents at the home office in Japan.

### 1.3 Members of the Survey

#### (1) JICA Survey Team

<u>Name</u>	<u>Speciality</u>	<u>Organization</u>
Mr. Satoshi ISHIDA	Team Leader	Deputy Director, Project Planning Division, Agricultural Structure Improvement Bureau, MAFF
Mr. Kazuo NAGAI	Coordinator	Deputy Director, Technical Cooperation Div., Agricultural Development Cooperation Dept., JICA
Mr. Shigeki ISHIYAMA	Land Consolidation Plan	Nippon Giken Inc.
Mr. Ken-ichiro KONDO	Facility Design	Nippon Giken Inc.

#### (2) Counterparts

<u>Name</u>	<u>Speciality</u>	<u>Organization</u>
Mr. Chaiporn Vachirakornwatana	Irrigation	Engineering Div., DLD
Mr. Wanchai Wongsa	Agriculture	Engineering Div., DLD
Mr. Chartchai Poonpanich	Mechanics	Engineering Div., DLD

#### 1.4 Work Schedule in Thailand

The Survey in Thailand was conducted for 45 days from November 28, 1989 to January 11, 1990.

No.	Date	Day	Member	City	Work Schedule
1.	11/28	Tue.	4	Bangkok	Departure from Japan
2.	29	Wed.	4	Bangkok	Courtesy call at JICA, Embassy of Japan and MOAC
3.	30	Thu.	4	Khon Kaen	Field reconnaissance and discussion meeting at ADRC
4.	12/1	Fri.	4	Khon Kaen	Data collection
5.	2	Sat.	4	Khon Kaen	Preparation for letter of team leader
6.	3	Sun.	4	Khon Kaen	-do-
7.	4	Mon.	4	Khon Kaen	Discussion meeting at ADRC
8.	5	Tue.	3	Bangkok	Preparation for letter of team leader
			1	Khon Kaen	-do-
9.	6	Wed.	3	Bangkok	Discussion meeting at DLD
			1	Khon Kaen	Preparation for Survey
10.	7	Thu.	3	Bangkok	Submission of letter, reporting to JICA and Embassy of Japan
			1	Khon Kaen	Preparation for survey
11.	8	Fri.	2		Lv. Bangkok
			2	Khon Kaen	Preparation for survey
12.	9	Sat.	2		Ar. Tokyo
			2	Khon Kaen	Preparation for survey
13.	10	Sun.	2	Khon Kaen	Data arrangement
14.	11	Mon.	2	Khon Kaen	Investigation of present conditions
15.	12	Tue.	2	Khon Kaen	-do-
16.	13	Wed.	2	Khon Kaen	-do-
17.	14	Thu.	2	Khon Kaen	-do-
18.	15	Fri.	2	Khon Kaen	-do-
19.	16	Sat.	2	Khon Kaen	-do-
20.	17	Sun.	2	Khon Kaen	-do-
21.	18	Mon.	2	Khon Kaen	-do-
22.	19	Tue.	2	Khon Kaen	-do-
23.	20	Wed.	2	Khon Kaen	-do-
24.	21	Thu.	2	Khon Kaen	-do-
25.	22	Fri.	2	Khon Kaen	-do-
26.	23	Sat.	2	Khon Kaen	-do-
27.	24	Sun.	2	Khon Kaen	Data arrangement
28.	25	Mon.	2	Khon Kaen	Planning and detailed design
29.	26	Tue.	2	Khon Kaen	-do-
30.	27	Wed.	2	Khon Kaen	-do-

No.	Date	Day	Member	City	Work Schedule
31.	28	Thu.	2	Khon Kaen	-do-
32.	29	Fri.	2	Khon Kaen	-do-
33.	30	Sat.	2	Khon Kaen	-do-
34.	31	Sun.	2	Khon Kaen	Data arrangement
35.	1/1	Mon.	2	Khon Kaen	-do-
36.	2	Tue.	2	Khon Kaen	Preparation of field report
37.	3	Wed.	2	Khon Kaen	-do-
38.	4	Thu.	2	Khon Kaen	Reporting to ADRC
39.	5	Fri.	2	Khon Kaen	Data arrangement
40.	6	Sat.	2	Bangkok	Office closing, etc.
41.	7	Sun.	2	Bangkok	Data arrangement
42.	8	Mon.	2	Bangkok	Reporting to MOAC
43.	9	Tue.	2	Bangkok	Additional data collection
44.	10	Wed.	2	Bangkok	Reporting to JICA and Embassy of Japan
45.	11	Thu.	2		Lv. Bangkok

## 2. Location and Scale of the Farm

The Farm site is located immediately to the west of the Khon Kaen-Udon Thani Highway, about 40 km north of Khon Kaen. The Farm lies within Changwat Khon Kaen, Amphur Khao Suan Kwang, Tambon Khao Suan Kwang administratively.

The scale of the Farm is about 25 ha including the facility yard.

## 3. Major Works Performed in the Survey Period

### 3.1 Topographic Survey

Topographic survey at the Farm site was performed on the following items, based on the existing topographic map of 1/1000 scale;

- (i) traverse surveying along the boundary of the Farm,
- (ii) drainage canal route surveying,
- (iii) farm road route surveying,
- (iv) profile and cross sectional leveling at the reservoir site, and
- (v) contour line check surveying, etc.

### 3.2 Water Quality Survey

Water quality was investigated on the following three (3) test items;

- (i) electrical conductivity (EC),
- (ii) pH, and
- (iii) total dissolved solid (TDS).

Two (2) water samples from existing reservoir and test pit (TP.1) were analysed.

### 3.3 Soil Survey

Soil survey was carried out by excavating two (2) test pits (STP.1 and STP.2). Soil profile and soil analysis were executed.

### 3.4 Soil Mechanics and Foundation Survey

Soil mechanics and foundation survey was carried out as a basis of the design and construction plan of the reservoir. This survey was performed as follows;

- (i) Three (3) test pitting (TP.1, TP.2, and TP.3) and
- (ii) seven (7) auger boring (AH.1 to AH.7).

Foundation profile, underground water table measurement and soil sampling were executed.

### 3.5 Intake Rate Survey

Intake rates were measured using the double ring infiltrometer on the Farm site. The measurements were executed on the four (4) points (IR.1 to IR.4).

### 3.6 Data Collection

Data collection on soil, geology, meteorology and hydrology, etc. was carried out. Major collected data list is attached in ANNEX-2.

### 3.7 Construction Cost Survey

Data and information on the construction materials, equipments and labour, etc. were collected in the field survey period.

### 3.8 General Layout of the Farm

General layout of the Farm was designed during the field survey period. This layout had been drawn up based on the due consideration of locations and sizes of all facilities.

### 3.9 Land Consolidation Plan

Proposed area of the Farm is gentle slope with gradient of 2° to 3°. The Farm fields consist of three (3) kinds of field, such as (i) irrigation field; (ii) soil erosion survey field, and (iii) land use demonstration field. Land consolidation plan of these fields are as follows;

#### (1) Irrigation field

Irrigation field has been designed to uniform gradient within each plot.

#### (2) Soil erosion survey field

This field equip runoff plots for measuring soil loss and runoff water. Gradient of these runoff plots has been designed to 3° and 5°.

#### (3) Land use demonstration field

In this field, contour bands have been designed.

### 3.10 Irrigation Facilities Plan

#### (1) Irrigation area

Irrigation area consists of (i) irrigation field, (ii) runoff plots and (iii) a part of land use demonstration field. Total irrigation area will be about 6.8 ha.

#### (2) Reservoir

Storage capacity of existing reservoir has been surveyed to be about 6,000 c.m. Additional storage capacity from the excavation has been estimated at about 21,000 c.m. Therefore, the reservoir will have a capacity of 27,000 c.m. This capacity is not enough to irrigate whole irrigation area during the dry season.

#### (3) Water supply system

Pumping system has been planned, because the reservoir is located at the lowest portion of the Farm area. In this system, installation of water tank is desirable, especially for the upland irrigation. With this consideration, the water tank has been planned on the highest portion of the Farm.

#### (4) Water distributing system.

In order to utilize the pumped irrigation water and

water head effectively, the closed type pipeline system has been planned.

#### (5) Irrigation method

Perforated pipe irrigation method would be suitable, taking account of effective head and operation and maintenance.

### 4. Home Office Work

Home Office Work will be undertaken by the Detailed Design Survey Team for about one month in succession for the field survey. The contents of the Home Office Work are described in this chapter.

#### 4.1 Detailed Design and Drawings

Major items of detailed design and drawings will be as follows:

- (1) General layout of the Farm (containing locations of all facilities)
- (2) Layout of land consolidation
- (3) Estimation of water requirement
- (4) Reservoir designing
- (5) Pump and pump station designing
- (6) Water tank designing
- (7) Water supply and distributing pipeline designing
- (8) Drainage canal designing
- (9) Farm road designing
- (10) Field laboratory, survey and storage house and machinery store-house designing
- (11) Dry yard designing
- (12) Runoff plots for measuring soil loss and runoff water designing.

#### 4.2 Construction Plan and Cost Estimation

Appropriate construction plan will be formulated in accordance with the site conditions based on the Survey. Construction cost estimation will be carried out based on the unit cost of labour, materials and machinery applicable to the site, being clarified through the Survey. Final construction cost will be decided by the JICA.

#### 4.3 Tentative Contract Documents

Following tentative contract documents will be prepared in English as a basis of placing the order:

- (1) FORM OF CONTRACT
- (2) TERMS AND CONDITIONS OF CONTRACT
- (3) TECHNICAL SPECIFICATIONS



(4) BILL OF QUANTITIES

4.4 Report

The draft final report will be explained to the JICA at the end of the Home Office Work, the middle decade of March, 1990.

The Final Report will be submitted within 20 days after the explanation of the draft final report, the last decade of March, 1990.

## ANNEX-2

### COLLECTED DATA

#### 1. Soil

- 1.1 "Outline of Soils of the Northeast Plateau Thailand", Technical Paper No.1, ADRC, December 1986.
- 1.2 "Upland Soil of Thailand, Their Characterization and Capability Evaluation", ADRC, March 1986.
- 1.3 "Compilation Report on Soil Fertility in Northeast Thailand", Technical Paper No.2, ADRC, April 1987.
- 1.4 "Improvement of the Soil Moisture Regime for the Stabilization of Field Crop Production in Thailand", Tropical Agriculture Research Center, MAFF and Department of Agriculture, MOAC, February 1983.

#### 2. Geology

- 2.1 "Geological Map of Thailand 1:500,000", Northeastern Sheet, 1983 Edition.

#### 3. Meteorology

- 3.1 "Climatological Data of Thailand, 30-year Period (1956-1985)", Meteorological Department, Ministry of Communications.
- 3.2 "Meteorological Data of Khon Kaen Meteorological Stations", Meteorological Department, Ministry of Communications, 1983-1988.
- 3.3 "Monthly Report of Weather Station", ADRC, 1985-1989.
- 3.4 Monthly Rainfall, Nam Pong, 1976-1987.

#### 4. Hydrology

- 4.1 "Study on Soil Erodibility by Using Rainfall Simulator", Report of Short Term Expert (15), ADRC, October 1987.
- 4.2 Hydrological Characteristics in Klong Yang Watershed, Nakhonratchasima Province.

## 5. Others

- 5.1 "The Study on Agricultural Land Conservation for Integrated Rural Development in the East, Progress Report (No.2)", JICA, March 1988.
- 5.2 "Rainfed Agriculture Pilot Project", August 1981.
- 5.3 "Agricultural Development Research Center in Northeast Thailand (ADRC)-Activities and Research Highlights 1984-1988", ADRC.
- 5.4 "Exploitation of Promising Crops in Northeast Thailand", ADRC, December 1987.



## 6 技術資料

- (1) 土壌
- (2) 土質及び基礎
- (3) 気象及び水文
- (4) インテークレート
- (5) 工事費積算資料



(1) 土壤

LIST OF TABLES

TABLE S-1	SOIL PROFILE SURVEY (STP. 1)
TABLE S-2	SOIL PROFILE SURVEY (STP. 2)
TABLE S-3	RESULTS OF SOIL ANALYSIS

No. \_\_\_\_\_

Date \_\_\_\_\_

## SOIL SURVEY

Soils of the area can be divided into four main groups.

1. Very deep loamy soils.

They occur on the top of the undulating terrain where the

slopes range from 1-3%. The A horizon is about 15-20 cm. with sandy loam

texture over lying the argillic B horizon which there is strong brown to yellowish

red. or red. texture is sandy clay loam, no ironstone within

150 cm.

2. Moderately deep and deep loamy soils with sandy loam and/or

loamy sand surface texture.

They occur on the upper part of the side slopes of

undulating terrain, slopes range from 3-5%, they have loamy

sand and/or sandy loam surface layer. but the depth of the loamy sand

is not more than 50 cm. from the surface, the B horizon has a

8mm



No.

Date

sandy clay loam texture with ironstone more than 35% of volume between the depth of 50-150 cm. The color is strong brown to red.

3. Sandy overloamy - moderately deep to deep soils.

They occur on the lower part of undulating terrain and have sand or loamy sand texture between the depth of 50-80 cm. lower lying by the sandy clay loam texture with ironstone between the depth of 50-150 cm.

4. Skeletal and/or shallow soils

They occur on side slopes of undulating terrain especially where the more erosion take place. The soils have ironstone or bed rock of sandstone within 50 cm. of the surface

8mm

No. ....

Date .....

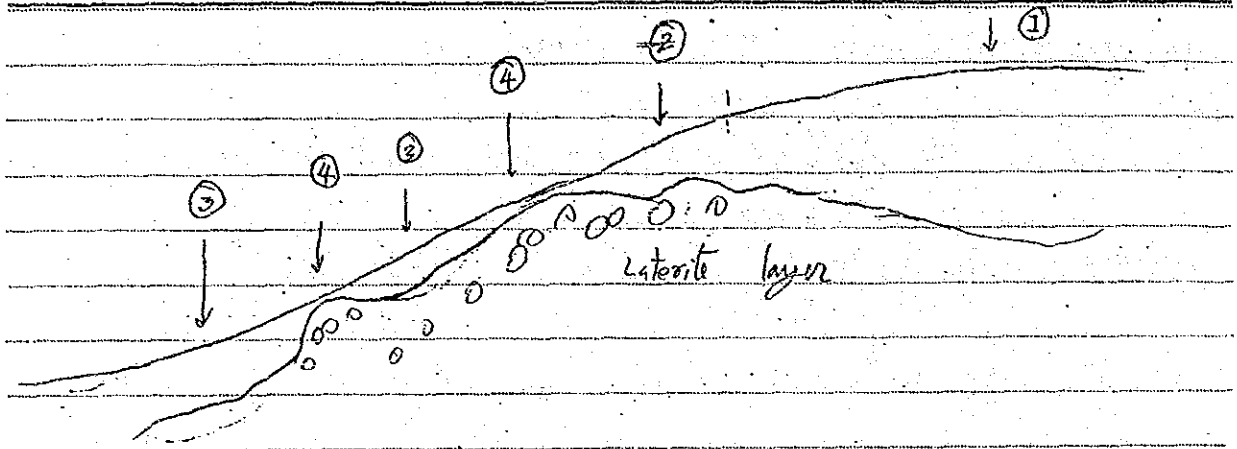


Fig. I Soils that occur along the topography of the area

	①	②	③	④
Cm.		Cm.	Cm.	Cm.
0	sl.	sl, ls.	s, ls	
50	sl. ↓ scl.	scl.		
100		ironstone	ironstone	
150				sandstone or ironstone

Fig. II Diagram showing the four main soil groups.

( sl = sandy loam ; ls = loamy sand ; s = sand )

8mm

TABLE S-1 SOIL PROFILE SURVEY (STP-1)

Soil Name	Vasechon - gravelly and overland phase	Field Symbol	Yt-g-ow	PROFILE CODE NO.	STP-1
Described by	Juthitai, K.	Area	Demonstration Farm for proper land use project.	FIELD NO.	
Date	December, 15, 1969	Ban	Khum Sombut	No.	Coord. 203118
Classification (National)		Amphoe	Khao Sun Kung	Ship.	NO
Physiography	Relief Undulating	Sheet Name of Topography Map	Amphoe Nakhon Phanom	Parent Material	old alluvium
Drainage	well drained	Permeability	medium	Elevation	~ 200 m.
Flooding: Depth		Duration		Ground Water Depth	> 2m.
Climate Type	Ki/Kon Aw	Annual Rainfall	~ 1960 mm/y	Frequency	
Natural Vegetation or Land Use	used for summer plantation			Mean Temperature	26.8°C
Other					

Lab. No.	Horizon	Depth (cm.)	Description
	A <sub>p1</sub>	0-15/20	Dark grayish brown (10YR 4/2) loamy sand; weak fine subangular blocky structure breaking to single grains; nonsticky, nonplastic; common fine roots; medium acid (field pH 6.0); gradual, waxy boundary.
	A <sub>p2</sub>	15/20-40	Dark grayish brown (10YR 4/2) and light brown (10YR 6/4) loamy sand; weak fine subangular blocky structure breaking to single grains; nonsticky, nonplastic; few fine roots; medium acid (field pH 6.0); gradual, waxy boundary.
	B <sub>w</sub>	40-55/63	Strong brown (7.5YR 5/6) sandy loam; weak fine subangular blocky structure, nonsticky, nonplastic; fairly thin clay coatings in pores; few fine roots; strongly acid (field pH 5.5); clear, waxy boundary.
	B <sub>tc1</sub>	55/63-76/100	Yellowish red (5YR 5/2) very gravelly sandy clay loam; few thin clay coatings in pores; very few fine roots; gravels composed of quartzite and ironstone diameter about > 0.1-1 cm and have about 60% by volume; strongly acid (field pH 5.5); gradual, waxy boundary.
	B <sub>tc2</sub>	76/100-140	Red (2.5YR 5/3) very gravelly clay loam; common moderately thick clay coatings in pores; gravels is the same kind of the above horizon about 70% by volume; very strongly acid (field pH 5.0).

TABLE S-2 SOIL PROFILE SURVEY (STP. 2)

Soil Name <i>Yasothon - gravelly phase</i>	Field Symbol <i>Y-2</i>	PROFILE CODE No. <i>STP. 2</i>
Area <i>ADAC</i>		FIELD No.
Described by <i>Junilatai, K</i>	Field Experiment Project <i>Tambon</i>	
	Bar <i>Kham Sumbat</i>	<i>Khao Suan Kany</i>
	Amphoe <i>Khao Suan Kany</i>	<i>KHON KAEN</i>
	Sheet Name of Topography Map <i>Amphoe Nua Sa-at</i>	No. <i>SS42 I</i> Coord. <i>7°2' 62.1</i>
Date <i>12/14/89</i>	Air Photo Mission	Slip. No.
Classification (National)	(USDA)	Parent Material <i>old alluvium</i>
Physiography <i>high terrace</i>	Relief <i>undulating</i>	Elevation <i>~200 m.</i>
Drainage <i>well drained</i>	Permeability <i>moderate</i>	Ground Water Depth <i>&gt; 2 m.</i>
Flooding: Depth	Duration	Frequency
Climate Type <i>Koffon As</i>	Annual Rainfall <i>176.7</i>	Mean Temperature <i>26.8°C</i>
Natural Vegetation or Land Use <i>old banana field</i>		
Other:		

Lab. No.	Horizon	Depth (cm.)	Description
	<i>Ap<sub>1</sub></i>	<i>0-26</i>	<i>Dark brown (10YR 3/3) sandy loam; weak fine subangular blocky structure. breaks to single grains; friable; nonsticky, many fine roots; strongly acid (field pH 5.5); gradual, smooth boundary.</i>
	<i>Ap<sub>2</sub></i>	<i>26-36</i>	<i>Dark brown (10YR 3/3) and yellowish brown (10YR 5/6) sandy loam; weak fine subangular blocky breaking to single grains; friable, nonsticky, nonplastic; common fine roots; strongly acid (field pH 5.5); gradual, smooth boundary.</i>
	<i>B<sub>1</sub></i>	<i>36-97</i>	<i>Strong brown (7.5YR 3/6) sandy clay loam; weak fine subangular blocky structure; friable, slightly sticky slightly plastic; few fine roots; very strongly acid (field pH 5.0); gradual, smooth boundary.</i>
	<i>B<sub>2</sub></i>	<i>97-59/70</i>	<i>Yellowish red (5YR 5/6) coarse sandy clay loam; moderate fine and medium subangular blocky structure; friable, sticky, plastic; patchy thin clay coatings on ped faces and in pores; few fine roots; very strongly acid (field pH 5.0); clear, wavy boundary.</i>
	<i>B<sub>3</sub></i>	<i>59/70-120</i>	<i>Red (2.5YR 5/6) very gravelly clay loam; common moderately thick clay coatings in pores; few fine roots; gravels are quartzite (diameter ~1-2 cm) and ironstone about 70-80% by volume; very strongly acid (field pH 5.0).</i>

TABLE S-3  
RESULTS OF SOIL ANALYSIS

รายงานผลการวิเคราะห์ดิน  
ฝ่ายวิเคราะห์ดิน สำนักงานพัฒนาที่ดินเขต 5

จังหวัดบึงกาฬ ..... ชื่อโครงการ .....  
 หน่วยงาน..... 10 ไร่..... สถานที่ / จังหวัด: Kao Suan Kwang  
 Soil Series ..... Date Reported .....

		STP.1					STP.2				
Lab. No.		2419	2420	2421	2422	2423	2424	2425	2426	2427	2428
Sender's Code No.	KONDO	10-15'	15/30 -	40 -	53/63 -	78/100	0-21	24-36	31-47	47 -	57/70
Depth / Horizon (cm)	depth (cm)	30	40	53/63	78/100	140				59/70	120
pH (1:1 H <sub>2</sub> O)		5.95	5.70	5.20	5.15	5.00	5.90	5.60	5.45	4.95	5.10
pH (1:1 IN KCL)											
EC (1:1) (mmho/cm)											
EC (1:5) (mmho/cm)											
E <sub>Ce</sub> 25° C (mmho/cm)											
Line Requirement (Kj/rai)											
Organic Matter (%)		0.85	0.28	0.21	0.19	0.20	0.59	0.39	0.21	0.29	0.23
Phosphorus (P), Bray II. (ppm)		2.76	2.93	2.95	4.44	5.55	3.09	2.29	3.99	5.19	6.94
K (ppm)											
Ca (ppm)											
Al <sup>+++</sup> (me/100g)		0.049	0.049	0.195	0.976	2.14	0.194	0.488	0.683	2.15	3.32
Exchangeable Cations											
Na <sup>+</sup> (me/100g)		0.031	0.035	0.139	0.041	0.242	0.043	0.051	0.038	0.039	0.042
K <sup>+</sup> (me/100g)		0.052	0.075	0.071	0.062	0.154	0.073	0.052	0.070	0.099	0.236
Ca <sup>++</sup> (me/100g)		1.28	0.98	0.54	0.55	0.74	0.93	0.75	0.89	0.78	0.48
Mg <sup>++</sup> (me/100g)		0.31	0.26	0.24	0.34	0.37	0.31	0.28	0.33	0.31	0.37
CEC by NH <sub>4</sub> OAC IN pH 7.0 (me/100g)		2.07	1.40	1.05	2.09	4.19	1.54	1.54	2.05	3.42	4.21
Base Saturation Percentage											
Saturation Percentage											
C/N ratio											
Particle Size											
Sand > 2.00-0.05 mm (%)		83.41	82.46	78.40	67.85	61.75	83.89	79.09	74.50	68.89	57.01
Silt > 0.05-0.002 mm (%)		13.90	13.46	15.70	15.08	8.46	11.73	16.11	13.78	8.02	6.18
Clay < 0.002 mm (%)		3.21	4.08	5.89	17.08	29.80	4.39	4.80	11.72	23.10	36.80
Textural Class		LS	LS	LS	SL	SCL	LS	LS	SL	SCL	SCL
Moisture Retention											
1/10 bar (%)											
1/2 bar (%)											
3 bar (%)											
15 bar (%)											
Permeability Coefficient (K) cc/hr											