(業務参考資料)

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Scope of Work 集

昭和57年3月

国際協力事業団
農林水産計画調査部

(業務参考資料)

Scope of Work 集

昭和57年3月

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SCOPE OF WORKS

FOR

FEASIBILITY STUDY

ON

RICE MILL PROJECTS

IN

THE SOCIALIST REPUBLIC OF THE UNION OF BURMA

February 1979

1. INTRODUCTION

In response to the request of the Government of the Socialist Republic of the Union of Burma (hereinafter referred to as "the Government"), the Government of Japan has decided to undertake the feasibility study for the Rice Mill Projects (hereinafter referred as "the Project") as a part of the Government of Japan's technical cooperation programme. This scope of works for the survey of the Project is prepared describing the items to be surveyed, and services and facilities to be provided by the Government for the smooth execution of the survey. JICA will be the executing agency and carry out the survey with the cooperation of the Government.

The Agricultural and Farm Produce Trade Corporation will be the counterpart agency of the Government for the Project.

2. OBJECTIVES OF THE STUDY

2-1 To verify the feasibility of the Project.

2-2 To undertake on the job training of the counterparts in the course of the survey and study.

3. OUTLINE OF THE STUDY

3-1 Programme of the Study

The study will be conducted in two stages. At the first stage, the study will be made on the fundamental conditions in the fields of agriculture, production and marketing of rice milling industry/technology, etc. At the second stage, the study will be made on general situation in connection with the Project.

The study team will conduct field works in Burma and make home office works in Japan.

3-2 Field Works

The field works will be made on the following items of the works:

(1) to collect and analyze the necessary data and information including:

a. Production and marketing of rice
b. Rice milling industry and technology
c. Quality and grading systems of rice
d. Storage and drying of rice
e. Handling and transportation of rice
f. Other points to be necessary to formulate the Project

(2) to carry out reconnaissance survey of the Project sites.

(3) to select and delineate the Project sites based on the review of data and information and reconnaissance survey, and

(4) to carry out field works in the Project area including the following items:

a. Topography
b. Meteorology
c. Rice distribution
d. Transportation means of paddy
e. Milling capacity of each Project site
f. Building and structure of rice mills.
g. A unit cost of materials and supply conditions
h. Selecting suitable sites and study of land ownership
i. Optimum scale of rice mill
j. Others necessary to accomplish the Project

3-3 Home Office Works

Based on the results obtained by the field works, the home office works will be carried out for the study on the following items:

(1) to formulate the basic plan for the Project together with the preliminary estimation of construction costs and benefits,

(2) to prepare predesign of the Project,

(3) to determine a final layout of the Project,

(4) to estimate the costs and benefits of the Project,

(5) to make economic evaluation, and

(6) to prepare the implementation schedule of the Project.

4. WORK SCHEDULE

The study team will work in accordance with the schedule attached hereto.

5. REPORT

5-1 Interim Report

The team will make an interim report in English and submit 40 copies of it to the Government by the end of March, 1979.

5-2 Draft Report

JICA will make a draft report in English and submit 40 copies of it to the Government at the end of the home office works.

5-3 Final Report

JICA will make a final report in English and submit 80 copies of it to the Government at the middle of August, 1979.

6. UNDERTAKINGS OF THE GOVERNMENT

To facilitate smooth performance of the field work, the Government is required:

6-1 to provide the necessary data and information for the study and permit to bring them back to Japan for the home office works.

6-2 to arrange for the quick and smooth custom's clearance of the survey equipment and materials which the team members will bring in and back to Japan, and to exempt from any taxes and duties imposed on those survey equipment and materials brought by the team members.

6-3 to request the ministries and other governmental organizations concerned to cooperate with the team in smooth execution of the survey.

6-4 Counterpart personnel in the following fields should be appointed to cooperate and co-ordinate with the team so as to achieve the effective results in the study.

1. Agronomy
2. Agro-Economy
3. Rice Milling
4. Quality Control of rice
5. Storage and Drying
6. Building and structure
7. Electricity

The number of counterpart personnel and their respective assignment periods should be decided in consultation with the team before the commencement of the study.

6-5 to provide the team with accomodation and transportation at the Project area as well as in Rangoon.

6-6 The necessary arrangement should be made to obtain the permission of the authorities concerned for the team to conduct the study in the Project areas.

7. UNDERTAKINGS OF THE GOVERNMENT OF JAPAN

For the purpose of the survey, the Government of Japan will assist to the extent possible;

7-1 to send the Japanese expert team to conduct this survey,

7-2 to transfer the knowledge to the counterparts during the period of the survey and study.

(Than Myint)
Project Director
Agricultural and Farm Produce
Trade Corporation

(Reiichi Kuroba)
Leader,
Feasibility Study Team On
Rice Mill Projects

Appendix-1

RICE MILL PROJECTS

TENTATIVE SCEDULE

Year / Month / Items	1979							
	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG
1. Preparation of Survey (in Japan)	———							
2. Field Works	———	———	———					
3. Home Office Work			———	———	———	———	———	———
4. Preparation of Reports			——— Int. Report				——— Draft Report	——— Final Report
5. Draft Mission							———	

SCOPE OF WORKS

FOR

FEASIBILITY STUDY

ON

THE SOUTH NAWIN IRRIGATION PROJECT

IN

THE SOCIALIST REPUBLIC OF THE UNION

OF

BURMA

4 DECEMBER 1978

I. INTRODUCTION

In response to the request of the Government of the Socialist Republic of the Union of Burma (hereinafter referred to as "the Government"), the Government of Japan has decided to undertake the master plan survey for the Irrawaddy Basin Agricultural Integrated Development Project (hereinafter referred to as "the M/P Project"), and the South Nawin Irrigation Project (herein after referred to as "the Project") as a part of the Government of Japan's technical cooperation programme.

Accordingly, Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of the Government of Japan's technical cooperation programme dispatched a team to conduct the preliminary survey for about seven weeks from September 1977 and the first stage survey for about eight weeks from February 1978, in order to orientate the approach of the execution of the survey of the M/P Project.

The study for the Project will be conducted in order to verify the feasibility of the Project covering about 40,000 hectares of land in gross located at about 20 kilometers east of Prome in the M/P Project Area.

The scope of works for the survey of the Project is prepared describing the items to be surveyed, and services and facilitates to be provided by the Government for the smooth execution of the survey.

The Japan International Cooperation Agency will be the executing agency and carry out the survey under the cooperation of the Government.

Irrigation Department will be the Burmese Counterpart Agency for this Project.

II. OBJECTIVES OF THE STUDY

2-1 to verify the feasibility of the Project covering about 40,000 hectares in gross, and

2-2 to undertake on the job training of the counterparts in the course of the survey and study.

III. OUTLINE OF THE STUDY

3-1 Program of Implementation

The study is consisted of two stages, i.e. the first stage survey required a basic study in the fields of hydrology, geology, and agriculture, and the second stage survey to be implemented a over-all study.

The activities to be undertaken by the survey team will be divided as follows:

(1) Field works
(2) Home office works

3-2 Field Works

The field works will cover the following items of the works:

(1) to collect and review the relevant existing data and information including:

a. Meteorogy and hydrology
b. Geology
c. Soil
d. Irrigation and Drainage
e. Agriculture
f. Agro and regional economy and institution
g. Others

(2) to carry out reconnaissance survey for delineation of the Project area.

(3) to select and delineate the Project Area on the basis of review of data and information and reconnaissance survey, and

(4) to carry out field surveys in the Project Area including the following items:

a. Hydrological survey
b. Topographic survey
c. Geological survey for structure foundation and earth materials including laboratory analysis, if necessary

d. Soil survey with digging pits and laboratory analysis
e. Dam and irrigation and drainage facilities
f. Irrigation and drainage survey
g. Land reclamation survey
h. Agronomic survey
i. Agro-economic survey
j. Fisheries survey
k. Regional economic and institutional survey
l. Construction material and cost survey

3-3 Home Office Works

Based on the results of the field works, the Home office works will be carried out for the study of the following items:

(1) to formulate the basic development plan for the Project together with the preliminary estimate of construction costs and benefits,

(2) to prepare predesign of the Project,

(3) to determine a definite layout of the Project Area,

(4) to estimate the costs and benefits of the Project,

(5) to make economic evaluation, and

(6) to prepare the implementation schedule of the Project

3-4 Transfer of Knowledge Program

The transfer of knowledge program is on-the-job training of the counterparts in the course of the survey and study.

IV. WORK SCHEDULE

To carry out the services JICA shall provide the required expertise of the survey team as the work schedule attached.

V. REPORT

5-1 Plan of Operation

The team will prepare and submit to the Government twenty (20) copies of Plan of Operation (in English) at the commencement of the study.

5-2 Interim Report

The team will prepare and submit to the Government forty (40) copies of Interim Report (in English) at the end of the field survey.

5-3 Draft Report

The team will prepare and submit forty (40) copies of Draft Report (in English) at the end of the Home office works.

5-4 Final Report

The JICA will prepare and submit Eighty (80) copies of Final Report within two (2) months after Draft Report is submitted.

VI. UNDERTAKINGS OF THE GOVERNMENT

To facilitate smooth performance of the field work, the Government is requested:

6-1 The Government should provide the data and information necessary for the survey and should permit to bring them to Japan for the home office works.

6-2 The Government should arrange for the quick and smooth customs clearance of the survey equipments and materials which the team members will bring into the field and to exempt from any taxes and duties imposed by the Government for those Survey Equipments brought by the team members in Burma.

6-3 The Government should request the ministries and other governmental organizations concerned to cooperate with the team in smooth execution of the survey.

6-4 The counterparts personnel in the following fields should be designated to cooperate with the team in conducting the survey effectively.

1. General Planning
2. Irrigation and drainage
3. Soil
4. Geology
5. Hydrology
6. Surveying

7. Dam Engineer
8. Agronomy
9. Agro-economy
10. Economy
11. Fishery

The number of counterparts personnel and their respective assignment periods should be decided by prior consultation of the team with the authorities concerned to commencement of the survey.

6-5 The Government should set up the meteorological and hydrological equipments provided by the Government of Japan, if necessary.

6-6 The Government should provide the team with office space and accomodation at the Project site and only office space in Rangoon.

6-7 The necessary arrangement should be made to obtain the permission of the authorities concerned for the team to conduct the survey in the Project Areas.

VII. UNDERTAKINGS OF THE GOVERNMENT OF JAPAN

For the purpose of the survey, the Government of Japan will assist to the extent possible;

7-1 Sending the Japanese expert team to conduct the survey.

7-2 Transferring the knowledge to the counterparts during the period of the survey and study.

7-3 Providing the equipment necessary for the purpose of this survey.

9. 12. 18

(AUNG BA)
Director General
Irrigation Department

(RYOTARO SUDO)
Team Leader
Scope of Works for Feasibility Study
on
The South Nawin Irrigation Project

SOUTH NAWIN IRRIGATION PROJECT

TENTATIVE SCHEDULE

Item \ Year / Month	1978		1979												1980			
		DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
1. Preparation of Survey (in Japan)		———								———								
2. First Stage Survey			———	———	———													
3. Second Stage Survey								———	———	———	———	———	———					
4. Home Office Work						———	———	———	———					———	———	———	———	
5. Preparation of Reports			— P.O. Report										— Int. Report			— Draft Report	— Final Report	
6. Visits of Advisory Group			—					—					—			—		

MINUTES OF THE MEETING FOR FEASIBILITY STUDY OF SOUTH NAWIN IRRIGATION PROJECT, HELD AT THE OFFICE OF THE DIRECTOR GENERAL, IRRIGATION DEPARTMENT, RANGOON, BURMA ON 4 DECEMBER 1978 AT 10:00 HOURS.

Presence:

Japanese Mission

1. Mr. Ryotaro Sudo
   Team Leader
2. Mr. Takashi Tauchi
   Member
3. Mr. Tadashi Watanabe
   Member
4. Mr. Hidetoshi Yaoi
   Member
5. Mr. Jiro Obitsu
   Extra Chancelllor
   Embassy of Japan

Burmese Officials

1. U Aung Ba
   Director General
   Irrigation Department
2. U R. Hla Gyaw
   Director General
   Burma Survey Department
3. U Tint Hlaing
   Director General
   Fisheries Department
4. U Hla Khin Maung
   Director, Irrigation Department
5. U Maung Maung,
   Director, Aerial Survey
6. U Yi,
   Deputy Director,
   Irrigation Department
7. U Ba Aye
   Executive Engineer
   Irrigation Department

The following remarks are made in the Meeting on the scope of works for Feasibility Studies on South Nawin Irrigation Project.

3-2 (4) b Topo Survey for Dam Site in Scale 1 : 2400 and that for Reservoir Area in 1 : 6000 will be available at the commencement of field survey by the team.

Check survey should be done by the team in cooperation with the counterparts.

The Burma Survey Department will provides Topographic or Orthophoto maps of the irrigable tracks on scale of 1 : 5000

with 1/2 metre contour intervals with spot heights at every corner of 5 cm. square, in the flat areas.

These maps will be made available by the end of May 1979.

3-3 (2) Pre-design means feasibility design.

7-2 Irrigation Department wishes participation of the following counterparts in the design work at the Home Office :-

(1) Geology
(2) Hydrology
(3) Dam Design
(4) Irrigation and drainage

Aung 4.12.78

(Aung BA)
Director General
Irrigation Department

R. Sudo

(RYOTARO SUDO)
Team Leader
Scope of Works for Feasibility Study
on
The South Nawin Irrigation Project

中国农业部和日本国国际协力事业团
关于黑龙江省三江平原龙头桥典型区
会谈纪要

以日本国农林水产省构造改善局建设部部长中川稔为团长的日本代表团与以中国农业部农业工程局张庆海付局长为团长的中国代表团，就中国黑龙江省三江平原龙头桥典型区农业计划的调查实施细则进行了友好的真挚的协商，并同意了附件中所提的实施细则。

在协商中，中日两国一致认为龙头桥典型区必将成为三江平原开发计划的综合性农业基地。

另外当调查付于实施时，本着日中合作的精神，日本方面将带入先进的仪器设备和派遣技术人员，并在得到中国方面提供的相应人员

的协助下，制订农业开发规划设计。

中国方面对实施细则2之(1)条热烈希望日本方面提供气象、农业技术等必须的仪器设备。对此，日本方面表明在开发调查范畴内各种调查原则上由中国方面提供器材，如果中方提供有困难时，由日方考虑提供。

中华人民共和国农业部　　日本国国际协力事业团

张化海　中川馨

一九八一年七月六日于北京

关于北京将典空巳农业开发规划设计技術合作实施细则

根据日本国和中华人民共和国两国政府協商，日本国政府曾于1980年9月7日至9月18日及10月10日至10月23日，两次对北京将典空巳（以下简称典空巳）派遣过事前调查团。

日本国政府根据事前调查团的调查成果，决定与中国政府合作进行典空巳农业开发规划设计。两国政府于1981年5月30日就典空巳农业开发规划设计交换了文件。

根据换文第5条，日本国际协力事业团和典国农业厅，就合作的内容，范围及工作程序等方面两国政府到定了实施细则。

1. 合作的内容及范围：

(1) 日本方面：就编制典型区农业开发规划设计进行合作。具体地点是在黑龙江省东北部三江平原中部的挠力河流域（乌苏里江支流）为整治耕地牛方面的灾的防洪、供配、排水、垦荒、道路、居民点、造林、发电等的规划设计进行合作。

(2) 日本方面：在合作期间，时常加典型区规划设计的中国方面专家，按以下方法给予必积极的技术转让。

① 进行技术指导；

② 由日本技术人员在中国开展讲座；

③ 在日本给中国技术人员进修。

2. 规划设计内容：

分别由在中国和日本国进行的两部分组成：

(1) 在中国主要进行以下工作。

① 收集、整理、学习已有关农业开发方面的有关资料。

A. 气象、水文；

B. 地形图、航片；

C. 地质、土质；

D. 土壤；

E. 农业经营；

F. 旱、涝灾害；

G. 农业设施；

H. 现有水利设施；

I. 林业（水土保持 防风林等）：

J. 电力、电量、供电设施）：

K. 农业经济财产：

L. 文化财产：

M. 社会经济（包括居民点、回迁、移民等）：

N. 其它

② 时点空已及有关地区进行的下调查工作及资料个体：

A. 根据踏查，初定洪泛、淹水、登荡范围：

B. 气象收（包括洪水调查）：

C. 万分之一地形图补充测量：

D. 典型区内四、集系、建筑物的大比例尺地形图及代表断面图测量：

E. 土壤调查分析：

F. 植被调查：

G. 水质 水温调查：

H. 地下水勘测调查（利用老资料）：

I. 农业经营状况调查：

J. 农业经济调查：

K. 农村居民点现状调查与规划：

L. 农业经营规划及土地利用规划：

M. 填埋及大模块主要迁移物（包括残排干线）地质勘探与查实：

N. 填层岩性及地质调查：

O. 供排管系地质勘测调查及方案的动态：

P 整治规划：

Q. 造林.更代具体实施计划：

R. 土壤改良计划：

S. 造林材料的调查踏探、

T. 为编制工程预算的各种单价调查：

U. 苗圃试验.

V. 水土保持调查：

W. 其它：

(2) 在日本国主要进行以下工作：

① 编制组成委员会的章程和计划：

② 编制初步设计（相当日本的予备设计）：

③ 编制工程进度计划：

④ 工程收益、工程概算、

⑤ 与工程有关的经费、财务分析.

3. 合作期限及工作安排：

(1) 合作期限：为附表1. 即1984年7月至1984年3月为止. 三年内完成上述工作：

(2) 规划设计工作安排：

① 第一年度主要为编制规划设计计划. 进行必要的勘探. 测量. 试验. 收集. 已建小型氧基水文、土壤、农业经营资料. 初步圈定范围. 基本摸清. 进行试验站。

② 第二年在继续进行上述规划设计先决资料的调查的同时. 完成各种规划和分项规划

③ 第三年完成典型区及各项初步设计。

(3) 典型区规划. 设计中引进日本海涂开垦的主

业、人数、期限及去日本的中方技术人员进修计划等详细内容，实施每年工作计划之前，由国际协力事业团和农业部协商决定。

4. 报告书：

国际协力事业团向农业部提出以下报告书。

(1) 现地报告书（日文）

在各年的现地工作完了时提出30份。

(2) 中间报告书（日文、中文）

各年度在日本国内作业完成时，提出50份。

(3) 最终报告书（草案）（日文、中文）

最终年度在日本国内作业完成后，提出10份。

(4) 最终报告书（日文、中文）：

在征得中国方面对最终报告书（草案）的意见后，在三个月内提出100份。

5. 中国方面应接收的技术：

为了圆满地完成技术设计工作，由中国方面

致意如下措施。

(1) 就进行基础勘测调查时，分担附表二中的中国方面业务。

(2) 在必要区间或其附近，提供办公室及宿舍（但是，指在调查地点采用常规租用有困难时的提供）。

(3) 为开展现地勘测调查提供必要的中国志愿作业人员。

(4) 为开展勘测调查提供必要的口译人员。

(5) 为开展勘测调查联系必需的车辆及提供司机（但指在采用常规租用车辆有困难时的提供）。

(6) 为进行地质勘查、调查必需的许可及给予许可。

(7) 对于日本汇给调查团员的款项免征所得税等措施。

(8) 对于调查团员随身携带物品，包括为勘测设计所需的器材给予免税措施。

(9) 在中国国内履行任务过程中，由于发生了事故，应承担调查团员对此提出的赔偿权（但是，由调查团员的重大过失或故意造成的事故除外）。

(10) 在中国的调查团员生病、受伤时给办理入院、治疗手续。

(11) 在中国国内确保调查团员的安全。

(12) 负担其他经费和部分经费。

6. 日本方面应采取的措施：

(1) 日本在派遣调查团员时，应按照如下措施。

① 在进行勘测调查时，合理附表二中的日本方面的业务。

②负担从日本港口到达中国港口的勘测设计必需器材往复运费.

③编制日文及中文的报告书.

④根据需要，派遣为监督指导现地勘测设计及商讨工作进度安排预问团.

(5)负担除中国方面负担以外的日本的其他经费.

(二)在接受中国方面进修人员时，按表以下事项.

①实施三一(二)条中规定的进修计划.

②负担进修所需的经费.

7. 本合同未尽事宜，在今后工作中随时协商.

附表2 关于基础勘测调查工作的分工

工作项目		国际协力事业团	农业部	
地形图	1/5000地形图（整个规划区域）		提供现有成果	
	地名测量（现场及必要地点）	1. 有关测量范围、比例尺、精度与实施单位间的协商 2. 必要地点的选测/标测 3. 由现场向导（专家）作现地指导及操作 4. 与农业部共同制定其成果	1. 进行测量作业 2. 向国际协力事业团测量时提供协力	
现场调查	地质勘查	1. 确定勘查的范围、方法。 2. 由现场向导（专家）作勘查的现地指导及操作	1. 协同进行勘查 2. 提供现有地质图	
	地理探测	1. 制定探测范围及编写说明书 2. 派遣必需的现场向导（专家）作现地指导及操作 3. 带进必需的仪器 4. 分析资料。	1. 对探查的选定、修改、决定提供协助 2. 协同进行探测（包括附带测量） 3. 提供（随带测量台）现场 4. 协同分析资料。	
	钻探	1. 制定钻探范围及编写说明书。 2. 派遣必需的现场向导（专家）作现地指导及操作。 3. 带进必需的钻机。 4. 与农业部共同制定其成果。	1. 进行钻探作业	
	对有关资料的整理	1. 制定取样及调查规划，编写说明书 2. 派遣必需的现场向导（专家）作现地指导及操作 3. 分析资料。	1. 进行取样工作 2. 协同进行调查 3. 协同分析资料	

作业	项目	国际协力事业团	农业部
水文、气象观测、资料分析		1. 拟定观测规定(观测项目的选定等) 2. 收集、分析资料 3. 根据需要补充测试仪器	协同收集现有资料 各项观测
现地调查测量	现有灌水系统调查 灌水量调查 现有排水系统调查 排水量调查 土壤调查 地质调查 现有土地利用状况调查 农业经营状况调查 现有道路营运状况调查 现有聚落调查 现有树种调查 气象(特别风向、风速资料的收集) 电力状况调查 水质及地下水调查(化学分析 仪器监测点) 其他	1. 根据需要进行现地调查 2. 分析资料	1. 提供资料 2. 协同进行现地调查 3. 协同分析资料

会 議 議 事 録

日本国農林水産省構造改善局建設部　中川　稔　部長を団長とする日本側チームと 中国農業部農業工程局　張慶奇　副局長を団長とする中国側チームは中国黒竜江省三江平原竜頭橋典型区農業開発計画調査にかかる実施細則について友好的かつ真摯な協議を経て別添のとおりの実施細則に合意した。

協議の席上日中両国は竜頭橋典型区は三江平原農業開発計画の総合的先進的農業基地となるべきものであることを確認した。また、本調査の実施に当っては日中合作の精神に則り、日本側は先進的資機材の持ち込みと技術者の派遣を行ない、中国側より提供されたカウンターパートの協力を得つつ農業開発計画を作成するものとする。

さらに中国側は実施細則の２の(1)のロにおいて気象，農業技術等に必要な計器設備の日本側よりの提供につき強い要望があった。これに対し日本側より、開発調査の範囲に位置づけられる各種調査については原則として中国側が調達する資機材により実施するものとし、中国側で調達が不可能な資機材については日本側より送付することを検討する。

１９８１年７月６日

日　本　国
国際協力事業団
調　査　団　長

中華人民共和国
農　業　部
農業工程局局長

中華人民共和国黒龍江省三江平原龍頭橋地区農業開発計画技術協力に関する実施細則

1981年7月6日

龍頭橋地区農業開発計画技術協力に関する実施細則

日本国及び中華人民共和国の両国政府の合意に基づき、日本国政府は１９８０年９月７日から９月１８日まで及び１０月１０日から１０月２３日までの２度にわたり、龍頭橋地区（以下「本地区」という。）の農業開発計画に関する事前調査団を中国に派遣した。

日本国政府は、事前調査団の調査結果に基づき中国政府と協力して本地区の農業開発計画の調査を実施することを決定し、両国政府は１９８１年５月３０日本地区の農業開発計画に関する口上書を交換した。

この実施細則は、口上書の５に基づき、日本側国際協力事業団と中国側農業部との間で、協力の内容，範囲及びスケジュール並びに協力を進めるに当たって両国政府がとるべき措置の詳細について定めたものである。

1. 協力の内容及び範囲

(1) 日本側は、本地区の農業開発計画作成についての調査に協力を行う。具体的には、黒竜江省東北部三江平原のほぼ中央に位置する撓力河（烏蘇里江支流）中流域に約４万ha の農地を整備するため、灌漑，排水，開墾，道路及びこれと密接に関連する集落，緑化，治水，発電等の整備計画を作成する協力である。

(2) 日本側は、本調査の期間中、調査に参画する中国側専門家に対し、以下の方法により積極的に的に技術移転を行う

イ．現地調査業務を通じた技術指導

ロ．中国における日本側技術者による講義

ハ．日本における中国側技術者の研修

2. 調査の内容

調査は中国における現地調査と日本における国内調査より構成される。

(1) 現地調査においては、主として以下の調査を行う。

イ．本地区の農業開発計画に関する下記の既存資料，情報の収集，整理を行う。

(イ) 気象・水文

(ロ) 地形図・航空写真

(ハ) 地質・土質

(ニ) 土壌

(ホ) 営農

(ヘ) 洪水・干魃被害

(ト) 農業用施設

(ｲ) 既存水利施設

(ﾛ) 林業（流域保全，防風林等）

(ﾊ) 電力需給，発電・送電施設

(ﾆ) 農業に関する経済及び制度

(ﾎ) 灌漑制度

(ﾍ) 地域経済（集落，道路，昏りょう等を含む）

(ﾄ) その他

ロ．本地区内及び関連する地域内において以下の現地調査及びデータ分析を行う。

(ｲ) 現地踏査に基づく、灌漑区域，排水区域，開墾区域の設定

(ﾛ) 気象・水文調査（洪水痕跡調査を含む）

(ﾊ) 1／1万典型区地形図補充測量

(ﾆ) モデル地区の河川，用水路，排水路，構造物の大縮尺の地形図及び横断図

(ﾎ) 土壌調査（試抗堀り、土壌分析）

(ﾍ) 植生調査

(ﾄ) 水質・水温調査

(ﾁ) 地下水調査（排水，水質，利用）

(ﾘ) 営農状況調査

(ﾇ) 農業経済調査

(ﾙ) 農村集落整備状況調査

(ｦ) 営農計画の設定

(ﾜ) 土地利用計画の設定

(ｶ) ダム等主要構造物（かんがい排水幹線を含む）の設定及び地質調査

(ﾖ) ダム基礎地盤処理調査

(ﾀ) 用水，排水，道路計画の設定及び工種設定

(ﾚ) 開墾計画の設定

(ｿ) 植林・集落配置計画の設定

(ﾂ) 土壌改良調査

(ﾈ) 建設材料調査

(ﾅ) 事業費積算のための各種単価調査

(ﾗ) 凍上試験

(ﾑ) 流域保全調査

(ｳ) その他

⑵ 国内調査においては、主として以下の業務を行い、本地区の農業開発計画をとりまとめる。

イ．農業開発計画を構成する諸計画の作成

ロ．計画策定のため必要な各種施設の予備設計（中国での初歩設計に該当）

ハ．事業実施計画の作成

ニ．事業費，事業便益の積算

ホ．事業に係る経済分析，財務分析

3. 協力期間及び工程

(1) 協力の期間は、別表１のとおり１９８１年７月から１９８４年３月までのおおむね３年間とする。

(2) 調査の工程は、おおむね以下のとおりである。

イ．第１年度においては、主として計画作成のために必要な基礎調査を行うこととし、各種基礎資料の収集，整理，分析，新たな観測所の設置，気象，水文，土壌，営農，諸施設等についての現況把握調査，ダムサイトの選定、開発対象地域の概定等の調査を行う。

ロ．第２年度においては、上記の計画基礎調査を一部継続実施するとともに、計画構想を策定するための各種施設の配置計画、営農計画等を概定する。

ハ．第３年度においては、各種施設の設計，事業費の積算並びに経済効果の算定等を行うとともに、本地区農業開発計画の策定のための最終的とりまとめを行う。

(3) 調査の工程，日本側が派遣する専門家の分野，人員，期間及び日本における中国側技術者の研修計画等の詳細については、各年度の調査開始までに国際協力事業団と農業部両者が協議して定めるものとする。

4. 報 告 書

国際協力事業団は、下記の報告書を農業部に提出する。

(1) 現地報告書（日本語）

各年度の現地調査終了時点に３０部

(2) 中間報告書（日本語，中国語）

各年度の国内作業終了時点に５０部

(3) 最終報告書（案）（日本語，中国語）

最終年度国内作業終了後に５０部

(4) 最終報告書（日本語，中国語）

最終報告書（案）に対する中国側の意見等を受けた後２カ月以内に１００部

5. 中国側がとるべき措置

現地調査を円滑に実施するため、中国側は以下の措置を講ずる。

(1) 基礎調査の実施に当たって、別表２の中国側が分担する業務の実施

(2) 調査対象区域内又は近傍における作業所の提供及び宿舎のあっせん（但し、調査サイトにおいて通常の方法で借上げが困難な宿舎についてはその提供）

(3) 現地調査のために必要な中国側専門家及び作業員の提供

(4) 現地調査のために必要な通訳の提供

(5) 現地調査のために必要な車輌等の手配及び運転手の提供
（但し、通常の方法で借上げが困難な車輌等についてはその提供）

(6) 地質調査のために必要な火薬類の調達及びその使用の許可

(7) 日本から調査団員に送金される手当を含む給与に対する免税措置

(8) 調査団員の身の回り品，調査団員が持込む調査に必要な資機材に対する免税措置

(9) 中国国内において任務執行中に発生した事故により調査団員に対して提出された賠償請求（claims）についての負担（但し、調査団員の重大な過失又は故意に基づき引き起こされた賠償請求は除く）

(10) 中国国内において調査団員に病気，怪我が発生した場合の病院の手配

(11) 中国国内における調査団員の安全の確保

(12) その他軽微な資機材等一部経費の負担

6. 日本側がとるべき措置

(1) 日本側は、調査団員の派遣にあたって以下の措置を講ずる。

イ．基礎調査の実施にあたって、別表2のうち日本側が分担する業務の実施

ロ．日本から持ち込む調査に必要な資機材の日本の港から中国の港までの往復輸送費の負担

ハ．日本語及び中国語による報告書の作成

ニ．必要に応じ、現地調査の監理，指導並びに調査の実施スケジュール等の協議のための顧問団の派遣

ホ．中国側が負担するものを除く調査に必要なその他経費の負担

(2) 日本側は、中国側研修員の受入れにあたって以下の措置を講ずる。

イ．4.(3)で定められた研修計画の実施

ロ．研修にかかわる経費の負担

7. 本実施細則に定めてない事項については本調査期間中両者協議して定めるものとする。

MINUTES OF MEETING
OF
SCOPE OF WORKS FOR FEASIBILITY STUDY
ON
THE LANGKEMME IRRIGATION PROJECT
IN
THE REPUBLIC OF INDONESIA

The staff of Directorate General of Water Resources Development, Ministry of Public Works, and the Preliminary Survey Team of the Langkemme Irrigation Project (hereafter referred to as the Project), headed by Mr. Katsuhiko KIMURA, discussed and exchanged their views concerning the draft of Scope of Works for Feasibility Study on the Project prepared by the Preliminary Survey Team.

Both sides agreed the Scope of Works (refer to the Attachment 1), and main items of understanding are as follows :

1. Delineation of the Project Area.
   The benefited area of the Project should be decided based on the alternative study on the basis of the recommendation of the Master Plan, inclusive of the surrounding possible area.

2. Environmental Assessment.
   Water and land conservation and erosion control of the watershed for the Project should be studied as one of the environmental assessment, and an advisable land use in the watershed also be recommended.
   Canal alignment and benefited area should be carefully selected and decided including the consideration for the canal side inhabitants because of the importance of minimum security for rural living in dry area.

3. Specification for the Surveys.
Indonesian side will undertake the following surveys, and Japanese side is requested to prepare and submit the specifications of the surveys by the end of May 1980, aiming at the coordination with the coming Feasibility Study.

1) Geological survey.
2) Longitudinal and cross-sectional canal survey.
3) Soil survey and land classification.

4. Depth of Feasibility Study.
Indonesian side stressed that the study depth shall be sufficient enough for asking international finance for the Implementation Cost of the Project.

5. Draft Final Report.
Japanese side is strongly requested to make the draft final report in Indonesia within the end of 1980, emphasizing the collaboration and effective execution of on-the-job training and transfer of knowledge of the Indonesian counterparts and aiming at the acceleration to the next stage of the Project Implementation.

6. Program of Transfer of Knowledge.
Indonesian side requested that the training of the Indonesian counterparts should be also carried out in Japan during the survey and study period.

7. Bila and Sanrego Irrigation Project.
Indonesian side emphasized the urgent importance of the Bila and Sanrego irrigation projects recommended by the previous Master Plan, and requested again the Japanese cooperation for the both projects following after the Langkemme Irrigation Project.

Attachment

1) Scope of Works

2) Findings of Preliminary Survey for the Langkemme Irrigation Project.

3) Attendants.

Jakarta, February 28, 1980

Mr. KATSUHIKO KIMURA
Leader of the Preliminary
Survey Team for the
Langkemme Irrigation Project.

Ir. SARBINI RONODIBROTO
Director of the Directorate
of Planning and Programming.

Attachment 1

SCOPE OF WORKS

FOR

FEASIBILITY STUDY

ON

THE LANGKEMME IRRIGATION PROJECT

IN

THE REPUBLIC OF INDONESIA

FEBRUARY, 1980

SCOPE OF WORKS
FOR
FEASIBILITY STUDY
ON
THE LANGKEMME IRRIGATION PROJECT
IN
THE REPUBLIC OF INDONESIA

I. INTRODUCTION

In 1978 the Government of Japan dispatched the survey team to Indonesia to prepare the master plan for the Central South Sulawesi Water Resources Development Project. In this master plan, nine (9) development projects including irrigation, flood control, multipurpose dam and their compound projects are proposed to be implemented for national and regional economic development and raising public welfare for local people in the Central South Sulawesi. It is recommended in the plan that the Langkemme irrigation project (hereinafter referred to as "the Project") should be carried out in the first stage of implementation of the nine (9) projects.

In accordance with this recommendation, the Government of Indonesia (hereinafter referred to as "the Government") has decided to promote the realization of the Project under the Third Five-Year Development Plan (PELITA III) and requested the Government of Japan the technical cooperation for the feasibility study on the Project.

In response to the request of the Government, the Government of Japan has decided to offer the technical services of the Japanese Survey Team (hereinafter referred to as "the Team") for the feasibility study on the Project as a part of the technical cooperation of the Government of Japan.

Japan International Cooperation Agency (JICA), the government agency responsible for execution of the technical cooperation program, will be the executing agency for the feasibility study on the Project.

This document presents the Scope of Works for the feasibility study to be conducted by the Team in close cooperation with the authorities concerned of the Government.

II. OBJECTIVES OF THE STUDY

The objectives of the study will be :

1) to verify the feasibility of the Project, and

2) to undertake on-the-job training and transfer of knowledge of the Indonesian counterparts in the course of the survey and study.

III. OUTLINE OF THE STUDY

3.1 The Study Area

The Study Area covers about eight thousand (8,000) hectares in gross extending on the left bank of the Walanae River and is bounded with the Mario River and the Lawo River on the south and north respectively.

3.2 Scope of Works

The activities to be undertaken by the Team will be divided into the field works in the survey area and the office works in Indonesia.

3.2.1 Topographic map

The Government of Japan will prepare the topographic maps for about eight thousand (8,000) hectares on a scale of 1 to 5,000 with one (1) meter contour interval taking into consideration the maps prepared by the Government.

3.2.2 Field works in the study area

The field works will comprise the following :

(1) Further collection and review of the data relevant to the Project in addition to the data collected through the previous studies such as :

a. Hydrology and Hydraulics
b. Meteorology
c. Geology
d. Agriculture
e. Regional and Agro-economy and Institution, and
f. Others, if necessary.

(2) Execution of the field investigation and survey including :

a. Topographic survey
b. Soil survey
c. Agricultural survey
d. Agro-economic survey
e. Socio-economic survey
f. Irrigation and drainage survey
g. Geological and soil mechanical survey
h. Construction material survey
i. Environmental survey and
j. Other surveys if necessary

(3) Planning and study of the land use, irrigation, drainage and tertiary development including their possible alternatives.

3.2.3 Office Works

The office works will include the following :

(1) Preparation of the design of the irrigation, drainage and tertiary development including the drawings and cost estimation.

(2) Economic and financial evaluation for the Project including the estimate of the project benefits.

(3) Assistance for preparation of the implementation programme of the project.

3.2.4 Transfer knowledge program

The transfer of knowledge and technical know-how is done by on-the-job training of the Indonesian counterparts in the course of the survey and study.

IV. WORKING SCHEDULE

The working schedule is shown in the attached sheet.

To carry out the study, JICA will dispatch the experts in the following specialities.

(1) Project planning
(2) Irrigation and drainage planning
(3) Hydrology
(4) Structural design
(5) Geology
(6) Pedology
(7) Agronomy
(8) Agro-economy
(9) Environmental assessment
(10) Topographic survey

V. REPORTS

The follwoing reports will be prepared and submitted to the Government.

5.1 Inception Report
Thirty (30) copies in English within one month after the commencement of the field works.

5.2 Interim Report
Thirty (30) copies in English within four months after the commencement of the field works.

5.3 Draft Final Report
Thirty (30) copies in English at the end of the works in Indonesia.

5.4 Final Report
Fifty (50) copies in English within two (2) months after receiving the comments of the Government on the Draft Final Report.

VI. UNDERTAKINGS OF THE GOVERNMENT

For the purpose of the study, the Government is requested to :

(1) provide for the Team necessary entry and exit visa, resident and works permit, and travel permit for their stay in Indonesia and to arrange the usual procedure to the Kabupaten office,

(2) facilitate the customs clearance of any equipment, material and supply required for the field works and of the personal effects of the survey team members,

(3) exempt the members of the Team from income tax and any kind of charges imposed on the instruments, equipment and materials required for the field works and on the personal effects of the members,

(4) allow the Team to take all data and materials concerned including the photo films out of Indonesia according to the security regulation of the Government,

(5) provide for the Team suitable office space with equipment and utencils for the experts in Ujung Pandang and at the job site due to local condition,

(6) arrange the lodging facilities to accommodate the experts in Ujung Pandang and at the job site due to local condition,

(7) provide for the Team five (5) vehicles prepared by the Government of Japan for the previous studies and five drivers for them without charging any cost to the Team,

(8) provide for the Team the available documents such as drawings, maps, statistics, data and information concerning the study,

(9) provide the counterparts with their facilities (houses and vehicles) to cooperate and assist for the survey team during the study,

(10) provide for the Team other available equipment and materials required for the execution of the field surveys,

(11) carry out the following investigations and laboratory tests;

a. geological investigations of proposed and alternative intake sites,

b. chemical and mechanical analysis of the samples of soil and construction materials taken from the project area,

c. water quality analysis on the check items,

d. hydrological observation at the sites,

(12) establish bench marks for the leveling,

(13) arrange the required numbers of labourers for carrying out the field works,

(14) maintain security of the life and property of the Team during their stay in Indonesia within the Indonesian regulations,

(15) provide for the Team medical services during their stay in Indonesia, if necessary and

(16) undertake to bear claims, if any arises, against the Japanese team members engaged in the survey resulting from, occuring in the course of, or otherwise connected with the discharge of their official functions in the Republic of Indonesia, except for those claims arising from the willful misconducts or gross negligence of the Japanese team members.

VII. UNDERTAKINGS OF THE GOVERNMENT OF JAPAN

For the purpose of the study, the Government of Japan will :

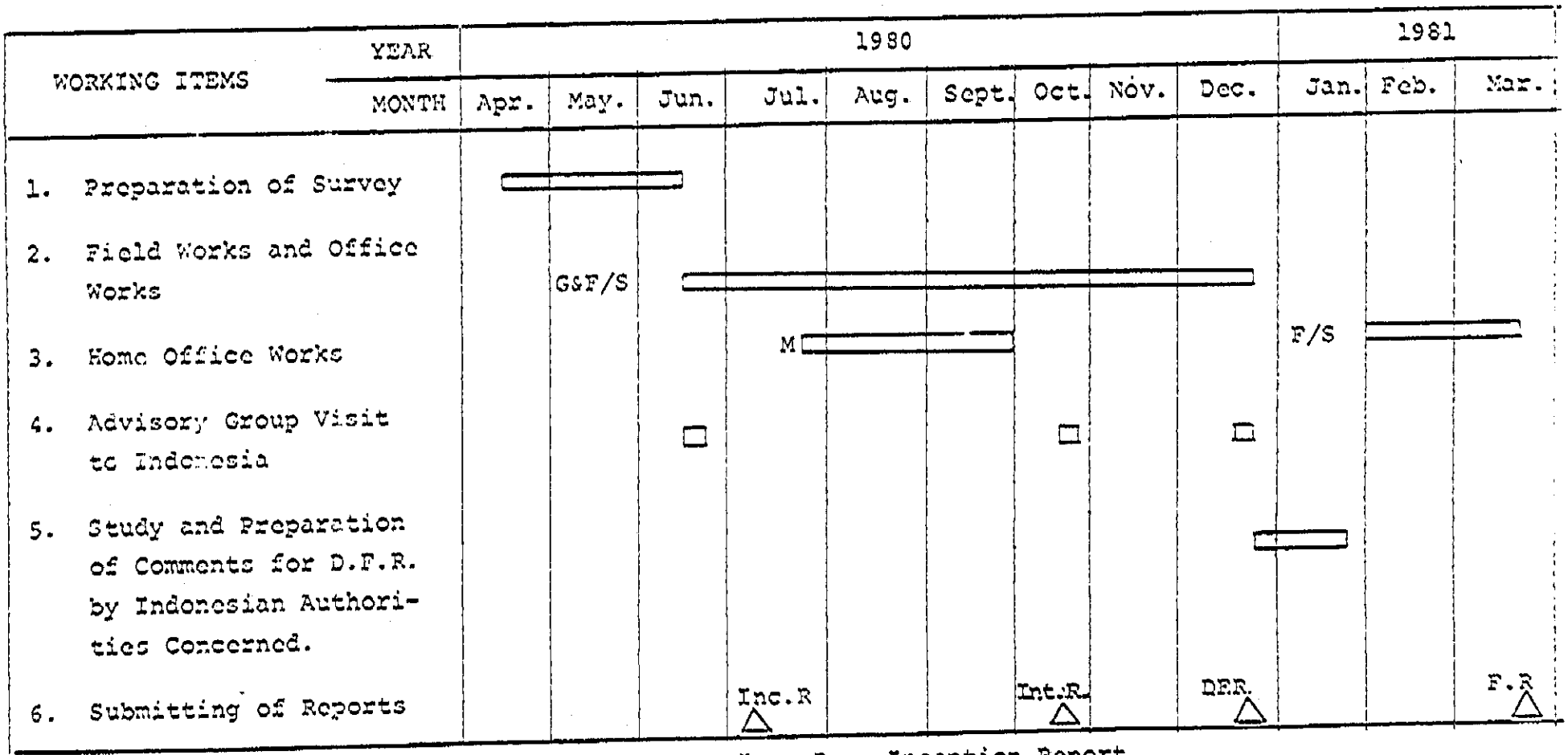
(1) provide the Team to conduct the study,

(2) undertake on-the-job training and transfer of knowledge of the Indonesian counterparts during the period of the survey and study,

(3) prepare the equipment necessary for the execution of the field works, and

(4) bear the charge of accommodation for the Team.

TENTATIVE WORKING SCHEDULE
OF
LANGKEMME IRRIGATION PROJECT



(Remarks) G : Ground Control
M : Mapping
F/S : Feasibility Study

Inc. R. : Inception Report
Int. R. : Interim Report
D.F.R. : Draft Final Report
F.R. : Final Report

Attachment 2

FINDINGS OF PRELIMINARY SURVEY
FOR
THE LANGKEMME IRRIGATION PROJECT
IN
THE REPUBLIC OF INDONESIA

February 1980

Japan International Cooperation Agency

Tokyo

C O N T E N T S

1. Member of the Preliminary Survey Team

Assignment	Name	Position
Leader	Mr. Katsuhiko KIMURA	Director, Land Improvement Engineering Service Center, Kinki Regional Agricultural Administration Office, Ministry of Agriculture, Forestry and Fisheries
Irrigation and Drainage	Mr. Juzo WAKISAKA	Water Utilization Planner, Division of Regional Planning, Department of Planning, Kanto Regional Agricultural Administration Office, Ministry of Agriculture, Forestry and Fisheries
Agro-Economy	Mr. Kunihiro OZAKI	Section Chief, 1st Section Division of Survey, Kisogawa Basin Integrated Agricultural Water Utilization Survey Center Tokai Regional Agricultural Administration Office, Ministry of Agriculture, Forestry and Fisheries
Coordination	Mr. Shigenari KOGA	Uchihara International Agricultural Training Center Japan International Cooperation Agency

2. OBJECTIVES

In response to the request of the Government of the Republic of Indonesia, the Government of Japan has decided to provide the technical services for the feasibility study on the Langkemme Irrigation Project as part of the technical cooperation programme of the Government of Japan.

Prior to the feasibility study, the Japan International Cooperation Agency, which is the governmental organization responsible for implementation of the above mentioned technical cooperation programme, has despatched the team to carry out the preliminary survey with the following objectives :

(1) To make reconnaissance survey on the project area.

(2) To confirm the proposed benefited area of the Project.

(3) To formulate the tentative schedule for the feasibility study.

(4) To prepare the scope of works for the feasibility study.

3. SCHEDULE OF PRELIMINARY SURVEY

Feb. 15 (Fri)	Arrived at Jakarta.
16 (Sat) 17 (Sun)	Prepared s/w (draft).
18 (Mon)	Visited to DPU for courtesy call and made discussion on the s/w (draft).
19 (Tue)	Made discussion and revision of the s/w (draft).
20 (Wed)	Left Jakarta for Ujungpandang. Visited to PU, P3SA office in Ujung-pandang for courtesy call and made discussion of field survey schedule with the technical staff.
21 (Thu)	Made collection of data and information. Left Ujungpandang for Watansoppeng. Made field survey on the Langkemme River down reach and observed possible intake site for the Project. Observed existing facilities for Desa irrigation and micro hydro-power station.
22 (Fri)	Separated two parties. Agronomy side made field survey in the proposed project area inclusive of surrounding area aiming at the study of cropping pattern and land use. Visited Dinas Pertanian, Keb. Soppeng. Engineering side made field survey on the intake and canal alignment. Observed Desa irrigation systems on the tributaries.

23 (Sat)	Visited the Bila and Boya area. Observed the intake site and dam site proposed by the Government of Indonesia on the Bila River. Observed existing intake weirs of the Bulu Cenrana and Saddang irrigation system. Arrived at Ujungpandang through Pare Pare from Sengkang.
24 (Sun)	Made discussion on the field survey result.
25 (Mon)	Visited Governers Secretariate office and P.U. office in Ujungpandang. Left Ujungpandang for Jakarta.
26 (Tue)	Made discussion with officials of D.P.U. on draft of s/w.
27 (Wed)	Made preparation of Minutes of Meeting.
28 (Thu)	Made Minutes of Meeting on s/w.
29 (Fri)	Left Jakarta for Tokyo.

4. FINDINGS OF PRELIMINARY SURVEY

1) Project area

The Project area should be studied and delineated on the basis of the recommendation of the Master Plan Study (M/P) inclusive of surrounding area considering the effective utilization of the limited water resources and arable land.

2) Intake site and Intake Water-level

2.1. The intake site (of case-1, or case-2) recommended by the M/P seemed to be difficult from the view points of structure construction due to the topographic condition of the cliff valley and strict accessibility, and the recommended intake water-level also seemed not always necessary to keep the high water level of 200 meters considering the relatively low benefited area.
A new possible site located around 4 to 5 km from the confluence with the Sero river, is recommended to be studied in the F/S, because of the favoured construction condition.

2.2. As for the intake water-level, the following alternative study would be made.
EL. 175-180 meter seemed to be sufficient height to drive irrigation water by means of a tunnel or open cut canal (about 400~600 meter length) at the suddle around the Desa Masumpu, Kec. Mario-riwawo.

3) Irrigation requirement of paddy field

Desa irrigation systems have been developed depending on the water sources from the tributary streams (Laja, Labempa, Parincong, Belo and etc.).

However the facilities are simple and primitive, but appropriate technics are skillfully applied to effective reuse of limited water.
Capable water in the Project are, irrigation requirement of paddy field and the terminal irrigation and drainage system should be studied assessing the above mentioned systems.

4) Environmental assessment

4.1. However the environmental conditions of the Langkemme river basin seemed to be fairly good by the ocular survey on the river color and distant view of the basin vegetation, water and land conservation and erosion control of the wahtershed concerned should be studied as one of the aspects and an advisable land use in the watershed also be recommended.

4.2. Irrigation water prepares the prerequisite not only for agricultural production but also for the minimum security of rural living of areal inhabitants in dry land. The delineation of the Project area and selection of the canal alignment should be carefully studied considering afore-mentioned mater.

5) Micro Hydro-power Station

The Cennae H.P.S.* is located at the down stream of the possible intake site and conflicts with the Project on available water.
A drop of about 20 meter would be found on the main canal in benefited area due to rather steep configuration slope.

---

* Max Capacity: 47 KW, Max Charge : 0.80 m3/s

The feasibility of the new micro-hydro power generation is recommendable to be studied applying the water head of drop inclusive of the substitutional plan for the Cennae station.

6) Hydrological Observation

Rainfall gauging stations and water gauging stations installed in and around the proposed project area are observed in well operations and good maintenance. The Hydrological data produced from the stations are indispensable for the coming feasibility study (F/S) and continuous further observation is recommended as well the other stations installed and utilized for the M/P study.

7) Preparation of Vehicles and Machinery

Five (5) vehicles and one boring machine set provided by the Japanese Government for the previous study of M/P are equipped and ready to the coming feasibility study.

8) Local Participation

Sufficient office space is already provided for the F/S Team in P3SA, P.U. in Ujungpandang and the counterparts participated to the M/P are also provided for the collaboration of F/S.
Local participation for the F/S seemed to be entirely ample.

9) Bila and Boya Projects

The Survey Team visited to the Bila and Boya irrigation project area and observed the proposed dam and intake site on the Bila river and existing Bulu-Cenrana intake weir on the Boya river. The fact of urgent necessity of irrigation water in the area recommended in the M/P was easily understood.

Attachment 3

A T T E N D A N T S

1st Meeting

Date : February 18, 1980

Time : 9:00 - 11:30

Attendants

Indonesian Side	Japanese Side
(Officials)	(Team)
Mashudi	Katsuhiko Kimura
Pranoto	Juzo Wakisaka
Edi Wahab	Kunihiro Ozaki
Hizbut Tauhid	Shigenari Koga
(C.P. Expert)	(Embassy of Japan)
Kiyoshi Yamashita	Takeo Yamazaki
Shingi Takahashi	(JICA Jakarta Office)
	Tadashi Shinoura

2nd Meeting

Date : February 26, 1980

Time : 10:00 - 12:00

Attendants

Indonesian Side

(Officials)

Mashudi

Edi Wahab

Rustam Sjarief

Aziz Bocking M.Sc.

Subandiyo

Ruchyat Kustomi

Sudiyanto

Sudiyanto

Hizbut Tauhid

(C.P. Expert)

K. Yamashita

M. Matsui

Busra

Japanese Side

(Team)

K. Kimura

J. Wakisaka

K. Ozaki

S. Koga

(Embassy of Japan)

T. Yamazaki

(JICA Jakarta Office)

T. Shinoura

3rd Meeting

Date : February 28, 1980

Time : 09.00 - 12.00

Attendants

Indonesian Side	Japanese Side
(Officials)	(Team)
Mashudi	K. Kimura
Edi Wahab	J. Wakisaka
Busra	K. Ozaki
Subandiyo	S. Koga
Sudiyanto	(Embassy of Japan)
Hizbut Tauhid	T. Yamazaki
(C.P. Expert)	(JICA Jakarta Office)
K. Yamashita	T. Shinoura
M. Matsui	

Attachment 1. Langkemme Irrigation Project

A. Project Area

1. The Langkemme Irrigation Project area lies in Kabupatch Soppen in the sourthern area of Lake Tempe.

2. The area is very long and narrow and is bounded with the Langkemme, the Lawo and the Laja Rivers on the north, south and east, respectively. The area is mainly composed of flat alluvial plain sloping at an average gradient of 1/500 toward north to northeast. The elevation of the area ranges from 200 m at the southern edge near the Langkemme River to 20 m at the northern edge.

3. The climate of the area belongs to the pattern of the southern area of Lake Tempe. The rainfall distributes fairly evenly over a period of November to July. A shift of wet and dry season is not clear, annual rainfall averages to 1600 mm.

4. Among many small streams originating from the western mountainous slopes the Langkemme River is the biggest stream with a catchment area of 100 km^2 at the possible intake site for irrigation water supply.

5. The water levels of the Langkemme River are recorded at 0.8 km upstream site from the confluence of the Sero River. Generally, a high water season lasts from December to March and a low water season from August to October. Even in the high water season the riverflow fluctuales considerably to large extent. The annual mean monthly flow is 4.3 m^3/sec and the minimum monthly flow was 1.4 m^3/sec in September 1976.

6. The water of the Langkemme River has been unused and discharged to the Walanae River with the exception of lesser usage of the small village irrigation scheme and hydropower.

B. Scale of the Project

1. The potential irrigation area within the Langkemme area is delineated based on the topographic maps on a scale of 1 : 25,000 and on the results of soil and land capability investigations.

2. The gross and net irrigable lands are estimated at 5,500 ha and 5,000 ha respectively. To serve the irrigation water successfully to the area, the intake site is selected 5.5 km upstream of the confluence of the Sero River. The catchment area at the site is approximately 100 km^2.

3. In order to determine the prospective scale of the Langkemme irrigation project, the dependable water source of the Langkemme for 5,000 ha in net is assessed by means of water balance between the river flow and the irrigation water requirement for four years from May 1974 to February 1978.

4. The result indicates that the Langkemme River assures the complete irrigation during wet season for the irrigable area of 5,000 ha, however, the water supply during dry season is limited to 3,700 ha of about 74% of that in the wet season on an average.

5. The Langkemme River is very deep along the whole reach. In view of topography there is no suitable location to permit hydraulic structures for the water storage, to render more effective utilization of the river flow.

6. The two prospective intake weirsites are selected for the study, Site-1 and site-2. The topographic survey and geological investigation were carried out on each site.

7. The result of comparison indicates that the site-1 is more economical due mainly to the low cost resulted from a low intake weir. Consequently the intake structures will be constructed at the site-1 with a head reach, as below:

   Site-1: The site-1 is located in a valley 5.5 km upstream from the confluence of the Sero River. The river bed elevation is

205 m. The river bed is underlain by the base rock of cemented tuff breccia. The width of the river is very narrow, approximately 40 m. The location provides suitable topography and geology for a low fixed type intake weir for the project. Whereas, it needs to construct a head reach of 200 m in length on a steep slope, and the access to the site is very limited.

C. Proposed Project

1. Irrigation water of 5.8 m^3/sec at maximum is diverted from the Langkemme River at the proposed intake site into the project area of 5,000 ha, by the dirversion weir, the head reach and the canal system.

2. The diversion weir is a fixed type concrete weir founded on firmed bed rocks. The crest elevation is set at EL.207 m. The scouring sluice will be provided on the left side of theweir to control the sedimentation. The intake structure will be constructed just upstream of the scouring sluice. The head reach will be constructed along an access road with a concrete box culvert covered with earth.

3. The irrigation canal system consists of a main secondary and tertiary canals and a number of quaternary canals. The existing Cennal irrigation system of 240 ha is incorporated into the proposed irrigation system. The main canal runs along the skirts of the western slopes and reaches near Watan Soppeng, diverting the water to secondary canals on the way. The secondary canals serve irrigation blocks bounded by natural streams.

4. The natural stream bounded the irrigation blocks are used for drainage system. The tertiary drains in the tertiary system connect the natural stream with quaternary drains, which evacuate the excess water directly from the fields. The canal inspection roads are to be constructed so as to meet such requirement.

5. The proposed irrigation system of the project is presented in Fig. 1.

6. As the result of the Master Plan Study, the benefit of the Langkemme project is estimated as below:

1.	Increment of paddy production	27,200 ton/year
2.	Irrigation Benefit at Full Development	2,876 Million Rp/year
3.	Net Future Farm Income (Average Farm size)	360,960 Rp/unit

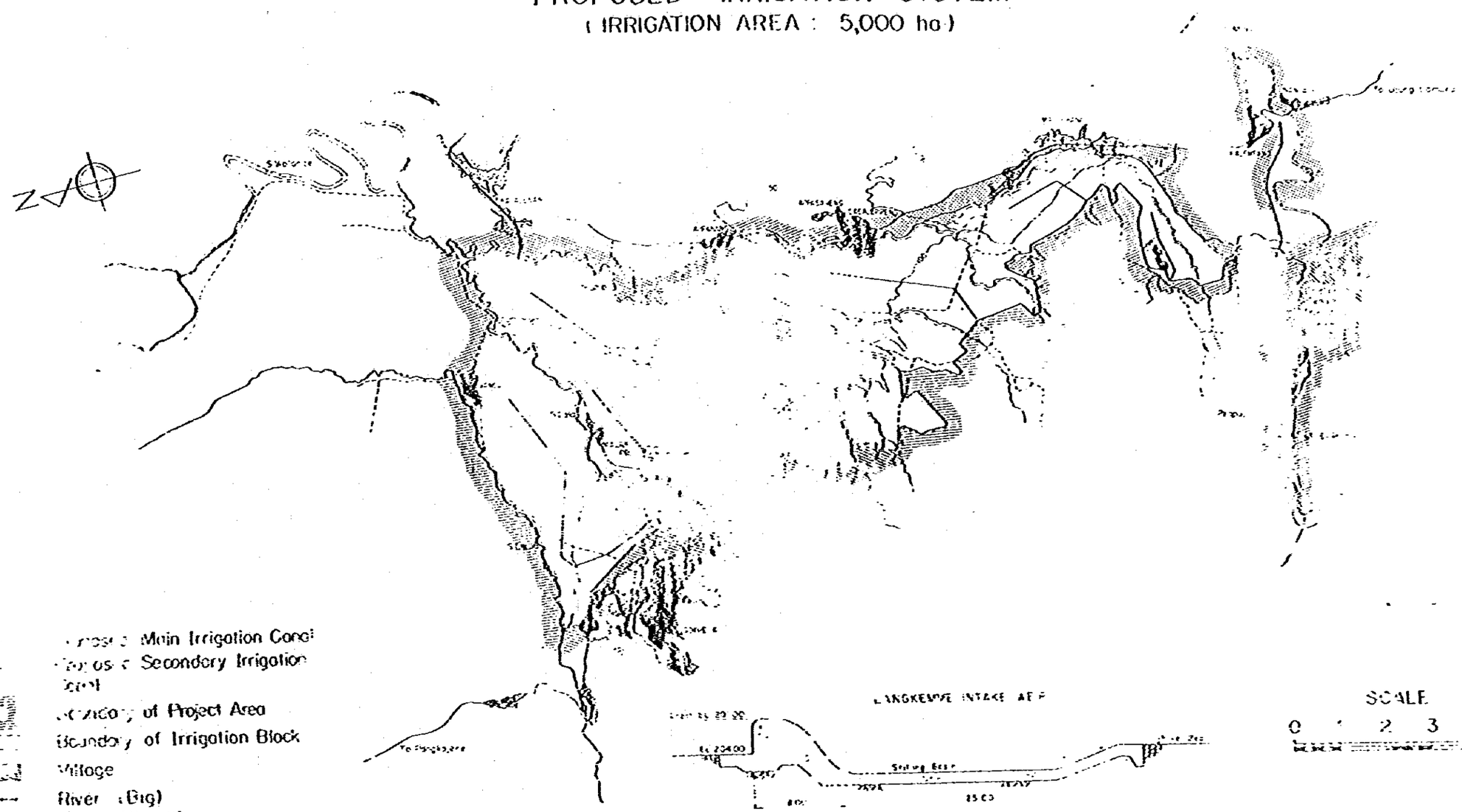
7. The construction cost of the project is estimated as below:

		1000 US $
1.	Preparation & Intake structure	1,480
2.	Main and Secondary canal 83 km	13,710
3.	Tertiary Development	1,250
4.	Drainage canal 32 km	190
5.	Replacement of Powerhouse	120
6.	Others	5,650
	Total	22,400

8. The economic internal rate of return of the project is calculated IRR = 13.5 %

PROPOSED IRRIGATION SYSTEM

(IRRIGATION AREA : 5,000 ha)



(Draft)

Scope of Works for the Study
on
The Rice Pest Forecasting and Control Project
in
the Republic of Indonesia

Japan International Cooperation Agency

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia (hereinafter referred to as "the Government") , the Government of Japan decided to undertake the study on the Rice Pest Forecasting and Control Project in Indonesia (hereinafter referred to as "the Study") based on the "Record of Discussions between the Japanese Group and the Indonesian Group on Cooperation for Increasing Rice Production in Indonesia" agreed on July 1st, 1981, within a framework of technical cooperation programs of the Government of Japan.

Accordingly, the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan, will carry out the Study in close cooperation with the Indonesian Authorities concerned. The Study is directed towards the improvement of rice protection activities in the Provinces of Aceh, South Sumatera, Lampung, South Kalimantan, South Sulawesi, West Java, Central Java and East Java. (hereinafter referred to as "the Objective Provinces).

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

(1) To prepare a general and integrated plan to decrease the rice pest damage in the Objective Provinces in collaboration with the Plant Protection Project (ATA162).

(2) To undertake on-the-job training to transfer the technology to the counterpart personnel in the course of the Study.

III. OUTLINE OF THE STUDY

The Study to be undertaken will comprise the following:

(1) Data Collection and Field Survey

Data collection and field survey on the following items will be carried out in Jakarta and the Objective Provinces, mainly in West Java, South Sulawesi, South Kalimantan and Lampung Provinces.

a) Meteorology and soil

b) Rice cultivation and farm practices

c) Existing pest forecasting system

i) organization

ii) staff

iii) facilities and equipments

e) Present pest control system

i) control measures

ii) use of pesticides

iii) facilities and equipments

iv) existing organization for pest control such as Plant Protection Brigade, Provincial organizations and Farmers' groups.

f) Social and agricultural economy

g) Domestic Cost of materials, equipments and labour

h) Governmental programs to strengthen rice pest surveillance and control activities.

i) Education, training and extension activities related to rice pest surveillance control activities

j) Others

(2) Office Work in Japan

Based on the results of the field survey and the data collected, the following office work will be carried out in Japan:

a) To formulate appropriate number of model systems for rice pest forecasting and control applicable in various agronomic conditions in Indonesia

b) To prepare the overall development plan of rice protection service in the Objective Provinces based on the model systems formulated above.

c) To make the training program for the staff and workers.

d) To make economic evaluation.

e) To prepare the implementation schedule of the project.

IV. WORK SCHEDULE

The work schedule is shown in the attached sheet.

V. REPORTS

The following reports will be prepared and submitted to the Government:

(1) Plan of Operation

Twenty (20) copies in English at the commencement of the field survey in Indonesia.

(2) Progress Report

Twenty (20) copies in English at the end of the field survey.

(3) Draft Final Report

Twenty (20) copies in English within one (1) month after the end of the office work in Japan.

(4) Final Report

Fifty (50) copies in English within two (2) months after receiving the comments of the Government on Draft Final Report.

VI. UNDERTAKINGS OF THE GOVERNMENT

To facilitate smooth performance of the Study, the Government will:

(1) provide the data and information necessary for the Study.

(2) arrange for the quick and smooth customs clearance of the filed survey equipment and materials required for the Study.

(3) exempt the Team members from any taxes and any kind of charges imposed on the instruments, equipment and materials required for the field survey and on the personal effects of the members.

(4) allow the Team to take all data and materials concerned including the photo films out of Indonesia according to the security regulation of the Government.

(5) provide the necessary entry and exit visa, resident and work permit, and travel permit for the Team.

(6) provide the office space for the Team with equipment and utensils in Jakarta and the Objective Provinces.

(7) provide the counterpart personnel to cooperate and assist for the Team during the field survey.

(8) make the necessary arrangement to obtain the permission of the Indonesian authorities concerned for the Team to conduct the field survey in the Objective Provinces.

(9) maintain security of the life and property of the Team during its stay in Indonesia within the Indonesian regulations.

(10) provide the medical services for the Team during its stay in Indonesia, if necessary.

(11) provide two (2) JEEPS or PICK-UPS with drivers for the Team to carry out the field survey in the Objective Provinces.

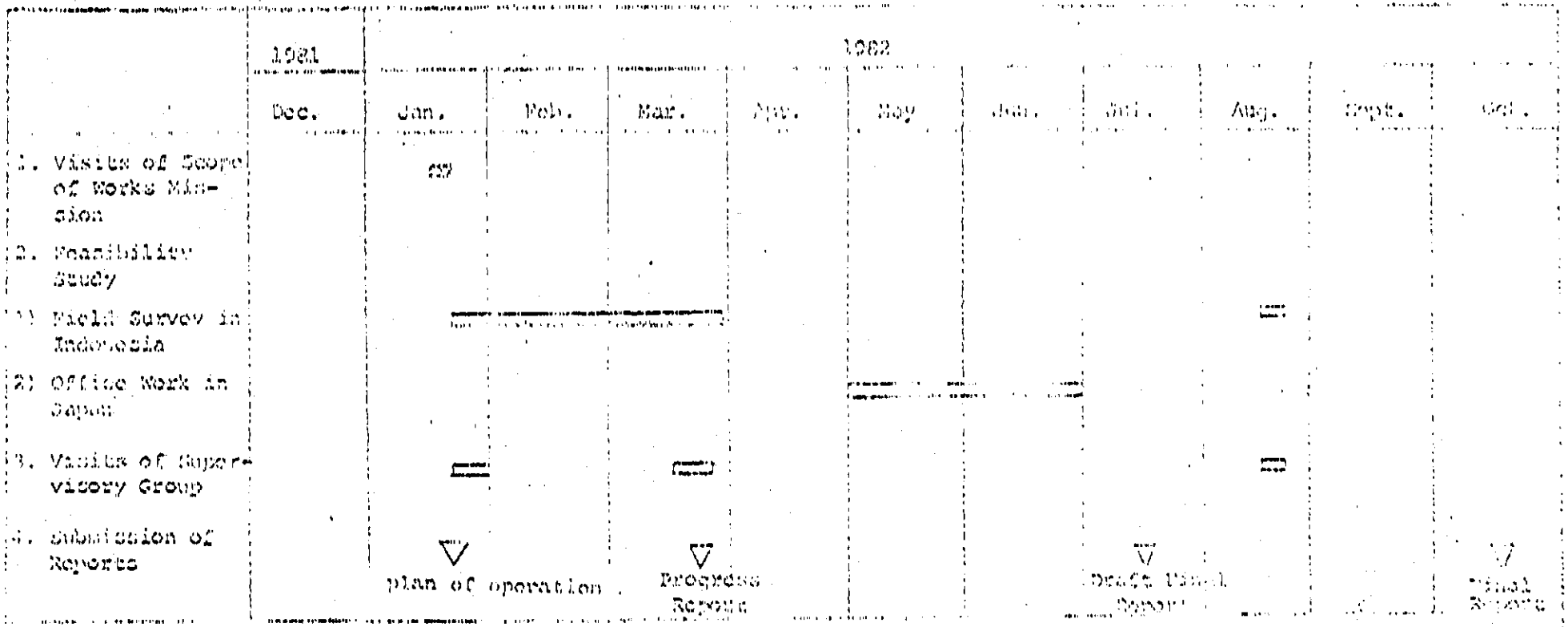
VII. UNDERTAKINGS OF THE GOVERNMENT OF JAPAN

To facilitate smooth performance of the Study, the Government of Japan will:

(1) dispatch the Team to conduct the Study.

(2) undertake on-the-job training and transfer of knowledge to the Indonesian counterpart personnel in the course of the Study.

TENTATIVE WORK SCHEDULE



MINUTES OF MEETING

FOR

THE SCOPE OF WORKS FOR THE FEASIBILITY STUDY

ON

THE RICE SEED PRODUCTION AND DISTRIBUTION PROJECT

IN

THE REPUBLIC OF INDONESIA

DECEMBER 12TH, 1981

Mr. KUNIO TAKEMASA

Leader of the Japanese
Scope of Works Mission
of JICA

Mr. JAFRI JAMALUDDIN

Signed for
Director General of Food
Crop Agriculture
Ministry of Agriculture

The Japanese Scope of Works Mission on the Rice Seed and Distribution Project (hereinafter referred to as "the Project") headed by Mr. KUNIO TAKEMASA, Chief Technical Adviser, Agricultural Production Bureau, Ministry of Agriculture, Foresty & Fisheries, and the Indonesian Government Officials responsible for the execution of the Project, headed by Ir. WARDOYO, Director General for Food Crop Agriculture, Ministry of Agriculture, discussed and exchanged their views on the draft of the Scope of Works for the Feasibility Study on the Project prepared by Japan International Cooperation Agency (JICA).

The discussion heve been held during the visit of the Mission in Indonesia from December 9 to 16, 1981, in the most friendly and cordial atmosphere.

Both sides agreed on the Scope of Works for the Feasibility Study on the Project attached.

SCOPE OF WORKS FOR THE FEASIBILITY STUDY ON THE RICE SEED PRODUCTION AND DISTRIBUTION PROJECT

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia (hereinafter referred to as "the Government"), the Government of Japan dispatched a survey team to Indonesia in October 1981 to carry out a preliminary survey for the Feasibility Study on the Rice Seed Production and Distribution Project (hereinafter referred to as "the Study"), in close cooperation with the Indonesian Authorities concerned.

As a result of the preliminary survey, the Government of Japan decided to conduct the Study in Lampung, South Sumatera and Aceh Provinces of Indonesia (hereinafter referred to as "the Objective Provinces") based on the "Record of Discussions between the Japanese Group and the Indonesian Group on Cooperation for Increasing Rice Production in Indonesia" agreed on July 1st, 1981, as a part of the technical cooperation program of the Government of Japan.

Accordingly, Japan International Cooperation Agency (JICA), the governmental agency responsible for the execution of the technical cooperation program, will be the executing agency for the Study.

The Scope of Works is prepared on the basis of the results of the preliminary survey, describing the items to be studied by the Japanese survey team (hereinafter referred to as "the Team"), tentative work schedule, reports to be submitted to the Government, and services and facilities to be provided by the Government for the smooth execution of the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are:

(1) to make a plan on production and distribution of rice seeds of recommended varieties in the Objective Provinces and, to verify the feasibility of the Rice Seed Production and Distribution Project from technical and economic point of view.

(2) to undertake on-the-job training to transfer the technology to the counterpart personnel in the course of the Study.

III. OUTLINE OF THE STUDY

The Study to be undertaken will comprise the following:

1. To collect the relevant data and information and to carry out the field survey in the Objective Provinces and Jakarta on the following items:

   (1) Paddy Cultivation in the Objective Provinces

      a. Present situation

         i) Harvested area
         ii) Yield and production
         iii) Type of rice
         v) Varieties
         vi) Cropping season

      b. Future prospects

         i) Intensification programs

            a) BIMAS
            b) INMAS

         ii) Development programs

            a) Irrigation
            b) Transmigration
            c) Rice field formation
            d) Resettlement
            e) Others, if necessary

   (2) Present Situation of Rice Seed Production and Distribution

   (3) Central and Main Seed Farms

      a. Location and environment

         i) Natural conditions
            a) Climate
            b) Topography

c) Soil
d) Others

ii) Social and economic conditions

a) Transportation
b) Electricity
c) Distribution of seed growers
d) Others

b. Present condition of seed farms

i) Buildings and facilities
ii) Machineries
iii) Fields
iv) Water supply
v) Staff

c. Governmental/provincial programs to upgrade the seed farms

(4) Seed Processing Centers

a. Location and environment

i) Natural conditions
ii) Social and economic conditions

b. Present situation of seed growers and training program for seed growers

c. Collection, storage and distribution plan of rice seeds prepared by the Government

(5) Central Seed Storage Center

a. Location and environment

i) Natural and social conditions

b. The demand for breeder seed by province

(6) Seed Control and Certification Service

a. Facilities and equipment
b. Staff
c. Government program to strengthen the service

(7) Training Program for the Staff of Seed Farms and Seed Growers

(8) Sampling-Survey on the Farmers' Response to Using the High-Quality Seeds

(9) Unit Costs of Materials, Machineries and Labour

(10) Other necessary items

2. Based on the results of the field survey, the following plans will be prepared:

(1) to estimate the demand for foundation seeds, stock seeds and extension seeds in the Objective Provinces, and to determine the location and the scale of the seed farms and the seed processing centers.

(2) to make the improvement and management plan for the central and the main seed farms.

(3) to make the establishment and management plan for the seed processing centers.

(4) to make the establishment and maintenance plan for the central and the regional seed storage centers.

(5) to make inventory on machineries and equipment to upgrade the seed control and certification service.

(6) to make the training program for the staff of the seed farms and the seed growers.

(7) to make the implementation schedule of the Rice Seed Production and Distribution Project.

3. To make economic and financial evaluation on the plans prepared above.

IV. WORK SCHEDULE

The work schedule is shown in the Annex I .

To carry out the Study, JICA will dispatch the required experts of the survey team in accordance with the work schedule attached.

V. REPORTS

The following reports will be prepared and submitted to the Government:

(1) Plan of Operation
Twenty (20) copies in English at the commencement of the field survey in Indonesia.

(2) Progress Report
Twenty (20) copies in English at the end of the field survey.

(3) Draft Final Report
Twenty (20) copies in English within one (1) month after the end of the office work in Japan.

(4) Final Report
Fifty (50) copies in English within one (1) month after receiving the comments of the Government on Draft Final Report.

VI. UNDERTAKINGS OF THE GOVERNMENT

To facilitate smooth performance of the Study, the Government will:

(1) provide the data and information necessary for the Study.

(2) arrange for the quick and smooth customs clearance of the filed survey equipment and materials required for the Study.

(3) exempt the Team members from any taxes and any kind of charges imposed on the instruments, equipment and materials required for the field survey and on the personal effects of the members.

(4) allow the Team to take all data and materials concerned including the photo films out of Indonesia according to the security regulation of the Government.

(5) provide the necessary entry and exit visa, resident and work permit, and travel permit for the Team.

(6) provide the office space for the Team with equipment and utensils in Jakarta and the Objective Provinces.

(7) provide the counterpart personnel to cooperate and assist for the Team during the field survey.

(8) make the necessary arrangement to obtain the permission of the Indonesian authorities concerned for the Team to conduct the field survey in the Objective Provinces.

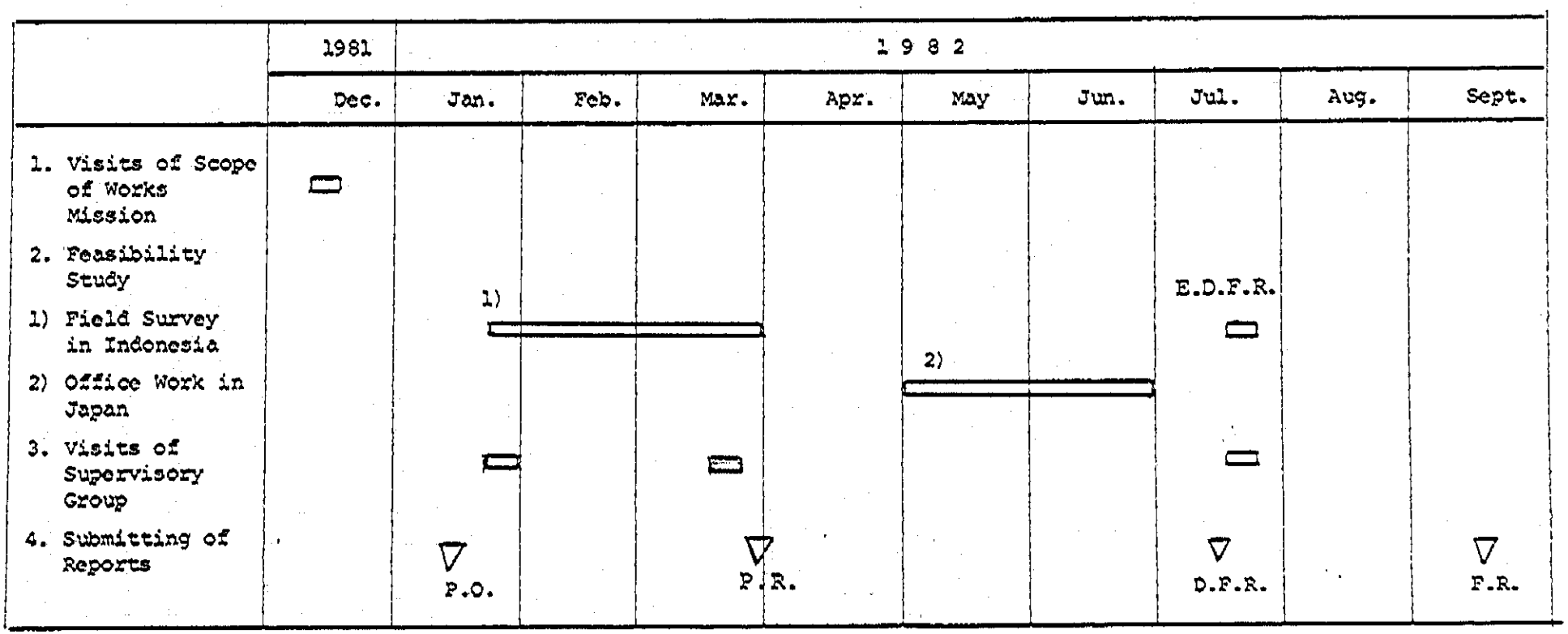
(9) maintain security of the life and property of the Team during its stay in Indonesia within the Indonesian regulations.

(10) provide the medical services for the Team during its stay in Indonesia, if necessary.

(11) provide two (2) JEEPS or PICK-UPS with drivers for the Team to carry out the field survey in the Objective Provinces.

ANNEX I

TENTATIVE WORK SCHEDULE



(Remarks) P.O. : Plan of Operation
P.R. : Progress Report
D.F.R. : Draft Final Report
E.D.F.R. : Explanation of Draft Final Report
F.R. : Final Report

SCOPE OF WORKS

FOR

FEASIBILITY STUDY

ON

THE RIAM KANAN IRRIGATION PROJECT

IN

THE REPUBLIC OF INDONESIA

MARCH 21, 1973

SCOPE OF WORKS

FOR

FEASIBILITY STUDY

ON

THE RIAM KANAN IRRIGATION PROJECT

IN

THE REPUBLIC OF INDONESIA

I. INTRODUCTION

In response to the request of the Government of the Republic of Indonesia (hereafter referred to as "the Government"), the Government of Japan dispatched a survey team to Indonesia in July 1977 to carry out the preliminary survey on the Riam Kanan Irrigation Project (hereafter referred to as "the Project"). As a result of preliminary survey, the Government of Japan decided to undertake the feasibility study on the Project as part of the technical cooperation program of the Government of Japan, in close cooperation with the Indonesian Authorities, Ministry of Public Works and Electric Power.

The Japan International Cooperation Agency (hereafter referred to as "JICA"), the government agency responsible to

implement the abovementioned technical ccoperation program, will be the executing agency, and carry out the study under the cooperation with the Government.

The area possible for agricultural development utilizing the water of the Riam Kanan Reservoir and other rivers in neighbourhood would be about 60,000 hectares of land in gross, which was confirmed by the preliminary survey team.
Out of the above 60,000 hectares, about 40,000 hectares of land in gross (about 20,000 hectares in net) would be covered by gravity irrigation system and have a top priority for agricultural development.

Based on the conception proposed by the preliminary survey team, the study will be conducted in order to verify the feasibility of the Project covering about 60,000 hectares of land in gross located at about 10 to 30 kilometers southeast of Banjarmasin, the capital of the South Kalimantan Province.

II. OBJECTIVES OF THE STUDY

The objectives of the study will be :

(1) to formulate the Project plan and verify the pre-feasibility of the Riam Kanan Irrigation Project,-covering 60,000 hectares in gross,

(2) to verify the feasibility of the Project,-covering 40,000 hectares in gross, and

(3) to undertake training of the Indonesian counterparts in the course of the survey and study.

III. OUTLINE OF THE STUDY

3.1 Plan of Approach

A program of data collecting, site surveying, and investigations designed to develop the irrigation system is executed as follows :

3.1.1 The Project Area

up to pre-feasibility level for 60,000 hectares

3.1.2 The First Stage Priority Area

up to feasibility level for 40,000 hectares

3.1.3 The Second Stage Priority Area

preparation of recommendation and program for 20,000 hectares for further activities

3.2 Implementation Program

The activities to be undertaken by the survey team will be divided into the field works, the office works, and home office works.

3.2.1 Field Works

The field works will cover the following items of the works :

1) to collect and review the relevant existing data and information including :

   a. Meteorology and hydrology
   b. Geology

c. Soil
d. Irrigation and drainage
e. Agriculture
f. Agro and regional economy and institution
g. Operation of the Riam Kanan Dam
h. Investigation of the condition of urban and rural domestic water supply

2) to carry out reconnaissance survey for delineation of the Project Area,

3) to select and delineate the Project Area on the basis of review of data and information and reconnaissance survey, and

4) to carry out field surveys in the Project Area including the following items :

a. Hydrological survey including the condition of salinity intrusion

b. Topographic survey for the major structure sites and the main canal, and the mapping of the second stage priority area, if necessary

c. Geological survey for structure foundation and earth materials including laboratory analysis

d. Soil survey with digging pits and laboratory analysis

e. ,Irrigation and drainage survey

f. Land use survey
g. Land reclamation survey
h. Agronomic survey
i. Agro-economic survey
j. Regional economic and institutional survey
k. Social and environmental survey
l. Construction material and cost survey
m. Domestic water supply survey in urban and rural area

3.2.2 Office Works

Based on the results of the field works, the office works will be carried out for the study of the following items:

(1) to formulate the basic development plan for the Project (60,000 hectares) together with the preliminary estimate of construction costs and benefits,

(2) to determine a definite layout of the first stage area (40,000 hectares),

(3) to prepare pre-designs of the first stage area (40,000 hectares),

(4) to estimate the costs and benefits ofthe first stage area (40,000 hectares),

(5) to make economic and financial evaluation of the first stage area (40,000 hectares),

(6) to prepare the implementation schedule of the first stage area (40,000 hectares),

(7) to recommend preliminary development plan for irrigation development and further study of the second stage area (20,000 hectares).

3.2.3 Home Office Works

The home office works in Japan are as follows:

(1) Revision and preparation of the final report,

(2) other home office works, if necessary.

3.3. Program of Transfer of Knowledge

The program of transfer of knowledge and technical know-how is as follows :

3.3.1 On-The-Job Training

On-the-job training of the Indonesian counterparts is carried out in the course of the survey and study.

3.3.2. Training in Japan

Training of the Indonesian counterparts is also carried out in Japan in order to facilitate smooth execution of the survey and study.

IV. WORK SCHEDULE

To carry out the services JICA shall provide the required expertise of the survey team as follows :

(1) One irrigation engineer as the team leader
(2) One irrigation planning engineer
(3) One irrigation design engineer
(4) One land reclamation engineer
(5) One soil scientist
(6) One hydrologist
(7) One agronomist
(8) One engineering geologist
(9) One topographic surveyor
(10) One agro-economist
(11) Specialists as required
(12) One liaison officer

The work schedule is shown in the ATTACHED sheet.

V. REPORT

5.1 Inception Report

The team will prepare and submit twenty five (25) copies of Inception Report (in English) to the Government one (1) month after the commencement of the study.

5.2 Interim Report

The team will prepare and submit twentyfive (25) copies of Interim Report (in English) to the Government three (3) months after the commencement of the study.

5.3 Draft Final Report

The team will prepare and submit thirty (30) copies of Draft Final Report (in English) to the Government at the end of the office works in Indonesia.

5.4 Final Report

The JICA will prepare and submit fifty (50) copies of Final Report to the Government within three (3) months after Draft Final Report is submitted.

Final version of the reports submitted to the Government and all relevant data such as maps, diagrams, plans, statistics and supporting materials compiled in performing the study shall be the property of the Government.

VI. UNDERTAKING OF THE GOVERNMENT

To facilitate smooth performance of the field work, the Government is requested :

(1) to provide for the team necessary entry and exit visas, residence and work permits, and travel permits if required for their stay in Indonesia,

(2) to facilitate prompt clearance through customs of any equipment, materials and supplies required for the services and of the personal effects of the team member,

(3) to provide the following counterpart staff to cooperate and assist the team during the survey and study without charging any cost to the team,

Speciality	Required Staff (No)
Team leader of counterpart	1
Irrigation engineer	2
Irrigation structural engineer	1
Soil scientist	1
Hydrologist	1
Geologist	1
Agronomist	1
Agro-economist	1
Topographic surveyor	2
	11

(4) to provide labourers for carrying out the field work,

(5) to arrange for the team six (6) JEEPS or PICK-UP and one (1) boat with drivers,

(6) to provide for the team permission to enter, dig and peg in the Project Area,

(7) to provide for the team suitable office space with equipment and utensils for twelve (12) team members in job site during the survey and study,

(8) to arrange the lodging facilities to accommodate twelve (12) personal which will consist of twelve (12) private rooms with beds, water and other necessary utilities,

(9) to provide available documents, such as drawings, maps, statistics, data and information relating to the study, and allowing under certain conditions to be sent to Japan,

(10) to arrange for the additional geotechnical investigations of proposed and/or alternative intake site, if necessary,

(11) to provide for the analysis of soil samples taken from the Project Area without charging any cost to the team,

(12) to arrange for the team any other available facilities that may be required for the execution of the survey and study,

(13) to maintain security of life and property of the team during their stay in Indonesia, and

(14) to provide the medical services for the team during their stay in Indonesia, when necessary.

VII. UNDERTAKING OF THE GOVERNMENT OF JAPAN

For the purpose of the study, the Government of Japan will assist to the extent possible :

(1) to send the Japanese survey team to conduct the survey,

(2) to transfer the knowledge to the Indonesian counterparts during the period of the survey and study,

(3) to provide the equipment necessary for the purpose of the survey and study,

(4) to bear the charge for six (6) vehicles and one (1) boat required by the team, and

(5) to bear the charge of accommodation for the team.

(ATTACHED SHEET)

WORK SCHEDULE
OF
RIAM KANAN IRRIGATION PROJECT FEASIBILITY STUDY

Items \ Year / Calender Month	1978 JUN.	JUL.	AUG.	SEP.	OCT.	NOV.	DEC.	1979 JAN.	FEB.	MAR
1. Preparation of Survey										
2. Field Survey and Office Work in Indonesia										
3. Home Office Work in Japan										
4. Visit of Advisory Group to Indonesia										
5. D.F.R. Study by Indonesian Authorities Concerned										
6. D.F.R. Discussion in Indonesia										
7. Preparation of Comments										
8. Preparation of Reports	Inc.R.			Int. R.			D.F.R.			F.R.
(Remarks)	Inc. R. : Inception Report Int. R. : Interim Report						D.F.R. : Draft Final Report F.R. : Final Report			

SCOPE OF WORKS

ON

FEASIBILITY STUDY FOR TRENGGANU TENGAH AGRICULTURAL

DEVELOPMENT PROJECT

IN

MALAYSIA

Agreed

Between

ECONOMIC PLANNING UNIT

And

JAPAN INTERNATIONAL COOPERATION AGENCY

Dated: 4th Aug. '77

(RUSLI BIN HAJI HUSSEIN)

Director
of
Area Planning Division
Economic Planning Unit

(MASAO MORIKAWA)

Leader
of
Scope of Works Mission
for
Trengganu Tengah Swamp
Area Agricultural Development
Project

SCOPE OF WORKS
ON
FEASIBILITY STUDY
FOR
TRENGGANU TENGAH SWAMP AREA
AGRICULTURAL DEVELOPMENT PROJECT

I. INTRODUCTION

In response to the request of the Government of Malaysia (hereinafter referred to as "the Government"), the Government of Japan has decided to conduct a study on Trenggganu Tengah Swamp Area Agricultural Development Project (hereinafter referred to as "the Project") in accordance with laws and regulations in force in Japan, and the official agency responsible for the implementation of technical cooperation programme of the Government of Japan, will carry out the study.

The present document sets forth the scope of works in regard to the above-said study which is to be carried out in close cooperation with the Government and authorities concerned.

II. OBJECTIVES OF STUDY

For the purpose of the agricultural development in the swamp area in Trenggganu Tengah, it is of importance to study on the overall development under the National Development Plan.

Based on the results of the preliminary survey, this study will be conducted in order to establish the master plan, and evaluate the feasibility of the agricultural development in BUKIT BAUK AREA as a pilot project.

The objectives of the study will be:

2-1. to carry out the feasibility study on BUKIT BAUK AREA.

2-2. to produce topographic maps at a scale of 1:5,000 which will be used in the survey to draw up the feasibility study.

2-3. to establish the master plan for the area extending southward from the right bank of the Trenggganu river.

2-4. to transfer the knowledge to the Malaysian counterparts in the course of survey and study.

III. OUTLINE OF STUDY

The activities to be undertaken by the study team will be divided into the field works in Malaysia and the home works in Japan.

3-1. Feasibility study in BUKIT BAUK AREA

(1) Field works

a) Field investigation
b) Supplemental data collection
c) Topographic survey
d) Bench mark survey for the production of topographic maps at a scale of 1:5,000
e) Soil, geological and canal alignment survey
f) Irrigation and drainage survey
g) Surveys on agriculture and agro-economy
h) Surveys on regional economy and institution
i) Selection and delineation of the project area on the basis of review of data and information obtainable from reconnaissance survey

(2) Home works

Based on the results of the field survey in the BUKIT BAUK AREA, the home works will be carried out for the study of the following items:

a) Determination of definite layout of the project
b) Drawing works of topographic maps at a scale of 1:5,000 including aerial triangulation, plotting and drawing, checking and correction of existing topographic maps, and fine drawing and printing
c) Preparation of basic designs of the project
d) Preparation of an implementation schedule of the project
e) Estimation of the costs and benefits of the project, and

f) Economic evaluation

3-2. Master plan study

(1) Field works

a) Field investigation

b) Supplemental data collection

c) Soil, geological and hydrological survey

d) Plan formation for irrigation, drainage and water management scheme

e) Agricultural survey

f) Agro-economic survey

g) Socio-economic survey

h) Forestry survey

i) Livestock farming survey

j) Aquaculture (fresh water pisciculture) survey

(2) Home works

a) Formation of a long-term estimate on population, demand-supply situation of foods, agricultural structure and distribution channel for determination of the kind and yield of crops to be grown, taking Trengganu State as a single economic unit

b) Clarification of soil conditions in swamp areas based on the results of soil survey for the selection of suitable crops

c) Clarification of drainage possibility of each swamp area through hydrological analysis

d) Study on socio-economic conditions in each swamp area

e) Calculation of project cost for each type of swamp

f) An overall evaluation of each swamp for the determination of the priority order of development on the basis of Item b) - e) above

g) Implementation of a model farm management plan in a selected area for making the chart of the future courses of agricultural development in Trengganu Tengah

h) Preparation of a master plan incorporating the outcome of Items a) - g)

IV. REPORTS

The following reports for both Feasibility Study and Master Plan Study shall be submitted to the Government;

4-1 Interim Report

The Interim Report (English version) in thirty (30) copies should be submitted at the end of the field survey period.

4-2 Draft Final Report.

The Draft Final Report in thirty (30) copies will be prepared and submitted by the JICA. The comments on the said Draft Final Report will be issued by the Government within one (1) month after receipt of the Report.

4-3 Final Report

The Final Report in fifty (50) copies will be prepared and submitted by the JICA within one (1) month after receipt of comments.

4-4 Final Products.

The following products will be submitted to the Malaysian Government by the JICA.

(1)	Original of topographic map (drawn with black ink on polyester of plastic base)	1 set
(2)	Report of field survey and other data	1 set
(3)	Report of aerial triangulation	1 set
(4)	Print including index map	10 sets

V. IMPLEMENTATION SCHEDULE OF STUDY.

The implementation schedule of the study is attached hereto as Annex 1.

VI. UNDERTAKING BY THE GOVERNMENT OF MALAYSIA

To facilitate smooth performance of the field survey, the Government shall undertake the following:-

(1) to provide necessary entry visas and permits required for the team's assignment in Malaysia,

(2) to facilitate prompt clearance through customs of any equipment, materials and supplies required for the study and of the personal effects of the team members,

(3) to provide one set of positive film, one set of contact prints and two kinds of enlarged photos as follows:-

a) one set of positive film (32 sheets)

Name of Course	Number of Photo	Amount
F55-L10SN (taken in '74)	77 - 85	9
F55-L104S (taken in '74)	9 - 15	7
F232-L103S (taken in '75)	135 - 142	8
F54-L103N (taken in '74)	186 - 193	8
		32

b) one set of contact prints (32 sheets)
same as the above positive film

c) two kinds of enlarged photos

(i) enlarged photos of quintuple (CH) as follows:

Name of Course	Number of Photo	Amount
F55-L104S	10 - 12	3
F232-L103S	137 - 140	4
		7

(ii) enlarged photos of twice (32 sheets)
same as the above positive film

(4) to assist the team during the field survey in the following fields,

1) General planning
2) Irrigation
3) Drainage
4) Soil
5) Geology
6) Hydrology
7) Surveying
8) Fisheries (fresh water)
9) Forestry
10) Structure
11) Estimate (Construction cost)
12) Agronomy
13) Agro-economy

(5) to provide labours for carrying out the field survey,

(6) to arrange for transportation to asssist the survey team in their work,

(7) to provide for the team permission to enter, dig and peg in the Project area,

(8) to provide for the team suitable office space with equipment and utensils,

(9) to arrange lodging facilities,

(10) to provide available documents, such as drawings, maps statistics, data and information relating to the study,

(11) to arrange for analysis of soil samples taken from the Project area,

(12) to arrange for the team any other available facilities that may be required for execution of the survey and study,

(13) to provide necessary security arrangement to ensure the safety of the team members and their property while undergoing field inspections in connection with the study,

(14) to provide free medical services (but not dental) for the team during their assignment in Malaysia, when necessary, and

(15) to nominate counterpart personnel for training in Japan.

VII. UNDERTAKING BY THE GOVERNMENT OF JAPAN

For the effective implementation of the survey and study, the Government of Japan will assist the Government of Malaysia to the extent possible extent possible as follows:

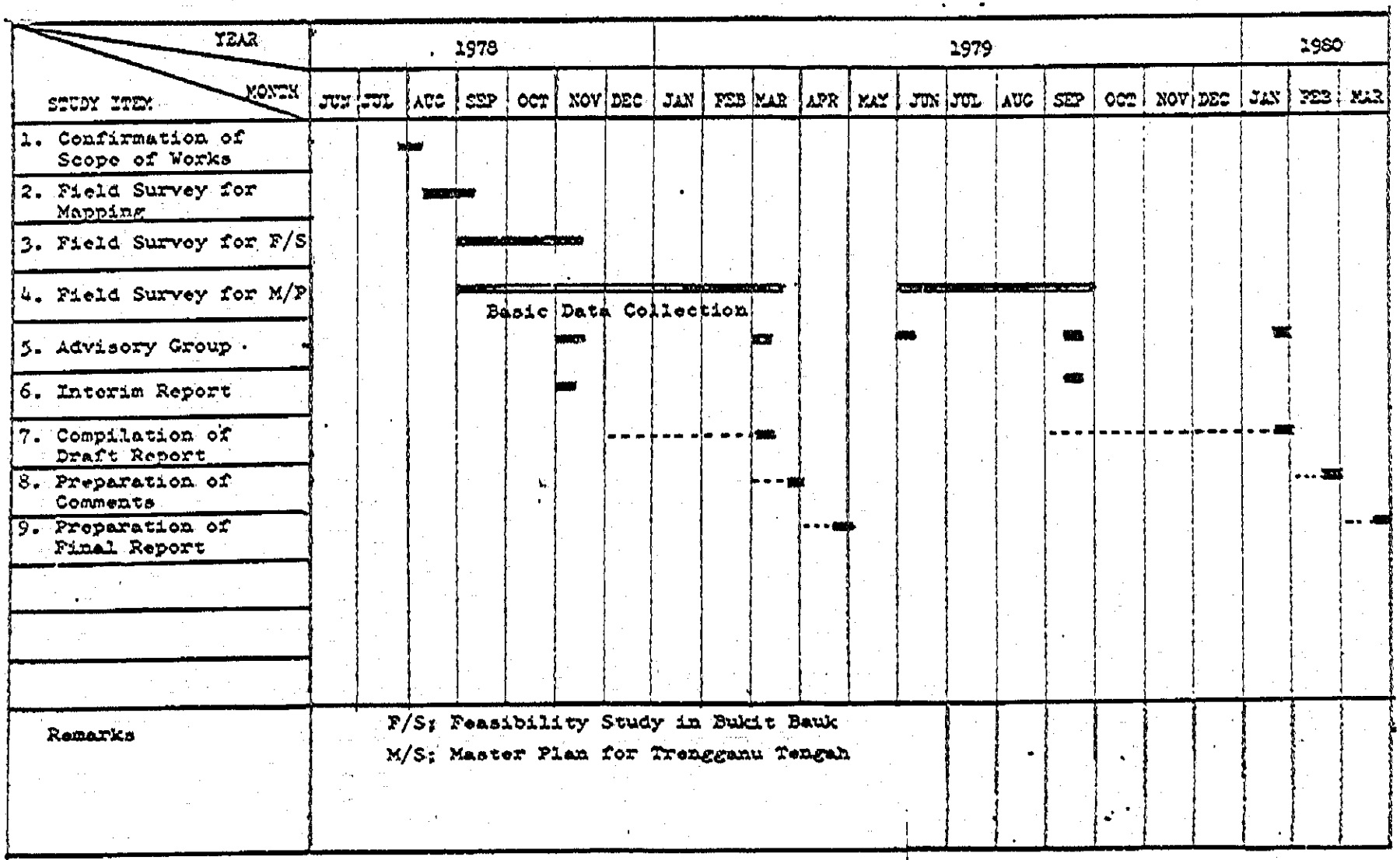
(1) to send a Japanese team to conduct the survey and study,

(2) to bring the equipment necessary for the purpose of the survey and study,

(3) to bear the expenses for the accomodations of the team, and if necessary, for soil analysis, transportation and mapping, and

(4) to sponsor counterpart personnel from Malaysia for training in Japan.

TENTATIVE SCHEDULE



SCOPE OF WORK

FOR

THE FEASIBILITY STUDY

ON

CULTURAL DEVELOPMENT PROJECT

WITH

OPENING OF PAT FEEDER CANAL

IN

THE ISLAMIC REPUBLIC OF PAKISTAN

BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY

GOVERNMENT OF JAPAN

AND

MINISTRY OF FINANCE, PLANNING AND ECONOMIC AFFAIRS

GOVERNMENT OF PAKISTAN

AT ISLAMABAD

ON JANUARY 23, 1982.

I. INTRODUCTION

1. In response to the request of the Government of Pakistan for technical assistance in conducting a comprehensive study to formulate the Agricultural Development Project with Widening of Pat Feeder Canal (hereinafter referred to as " the Project"), the Japanese Government has decided to carry out the Feasibility Study on the Project(hereinafter referred to as " the Study ") through providing the engineering services of the Japanese Study Team (hereinafter referred to as " the Team ").

2. Japan International Cooperation Agency (JICA), which is the governmental organization responsible for the implementation of the Japanese technical cooperation programmes, will be the executing agency for the Study. Whilst, the counterpart agency on Pakistani side will be Water and Power Development Authority (WAPDA), and Irrigation and Power Department, Government of Baluchistan (IPD).

3. According to the PC-1 Proforma prepared by WAPDA in 1979, the envisaged outline of the Project is as follows: (refer to Location map, Annex I):

   1) Location : the area is situated in the central south eastern part of Baluchistan Province, in Nasirabad District.

2) Culturable Commanded Area:

a) Phase-I (Irrigation by gravity flow): 612,000 acres

b) Phase-II (Irrigation of upland by pumping up): 159,000 acres (at present not part of PC-1).

3) Objectives: The principal purpose of the Project is to increase agricultural production in the area by more effective use of Indus River flows available at the existing Guddu Barrage which may be assigned to the Pat Feeder Canal, whereby improving the general standard of living in the area.

4) Development Plan : In Phase I, the following works are to be included:

a) Widening of the Pat Feeder Canal System and remodelling/construction of related structures and so on, and

b) Strengthening agricultural supporting services in the area.

II. OBJECTIVES OF THE STUDY

1. The objectives of the Study are as follows:

1) to carry out a detailed feasibility study and update/modify the PC-1, and

2) to undertake transfer of related technology in the course of the Study, to the extent possible.

2. The Study will be centered on Phase I of the Project, mentioned in para 3 of I (assuming availability of water of 6,700 cusecs and 8,200 cusecs, without going into the question of distribution of water).

However, water requirement(2,000 cusecs)for Phase II of the Project should also be taken into account while examining the capacity of the Pat Feeder Canal System.

III. OUTLINE OF THE STUDY

1. The activities of the Team will be divided in two stages as mentioned below:-

   1) Field Works in Pakistan

   2) Home Office Works in Japan

2. Field Works

   The field works will cover the following aspects:

   1) to collect and review the relevant existing information and data on the subjects listed below (the data collected by the preliminary survey team should be utilized as much as possible):

      a) Topography,

      b) Meteorology and hydrology,

      c) Soil and geology,

      d) Present land use,

      e) Existing irrigation and drainage facilities, including water management practices,

      f) Salinity and Waterlogging,

      g) Materials and costs for construction works,

      h) Cultivation methods and livestock farming,

      i) Agricultural supporting services,

      j) Agricultural economy,

      k) Agro-based industry, and

      l) Infrastructure, such as roads,transportation, domestic water supply.

2) to carry out the field survey in and/or around the project area to confirm the results obtained through the above-mentioned study and to carry out additional survey which would include the following activities:

a) Checking the longitudinal section of the main canal, i.e. Desert-Pat Feeder Canal and Pat Feeder Cannal,

b) Checking the cross sections at some representative points along the main canal and its distributaries,

c) Discharge measurement at suitable sections, and

d) Soil survey with digging pits, sampling and laboratory tests.

3) to determine the following basic ideas or strategy for the Project, based on the results obtained by the study and survey mentioned above:

a) Project boundary and acreage,

b) Proposed land use,

c) Proposed cropping pattern and intensity,

d) Water requirement for crop and domestic use,

e) Layout of irrigation and drainage system and facilities in the Project area,

f) Construction method for widening of the canal system,

g) Method for operation and maintenance of irrigation and drainage system, and

h) Method for strengthening agricultural supporting services.

3. Home Office Works

Based on the field survey, the Team will prepare the project feasibility study report in the home office which should include the following:

1) An overall irrigated agricultural development plan,
2) A design of related structures,
3) Bills of quantity and estimate of costs and benefits,
4) An economic evaluation, and
5) An implementation schedule.

IV. REPORTS

The following reports written in English will be prepared and submitted to the Government of Pakistan in the manner as specified hereunder.

1 Plan of Operation

Twenty(20) copies at the beginning of the Study.

2. Interim Report

Twenty (20) copies at the completion of the field works.

3. Draft Final Report

Twenty(20) copies at the completion of the home office works. The Government of Pakistan will be requested to provide JICA with its comments within two months after receipt of the above-mentioned draft final report.

4. Final Report

One hundred (100) copies within one month after receipt of the comments by the Government of Pakistan.

V. WORK SCHEDULE

The time span required for the survey, study and preparation of report is as shown in Annex II.

VI. UNDERTAKING BY THE GOVERNMENT OF PAKISTAN

For the smooth implementation of the Study, the Government of Pakistan will undertake the following:-

1. to provide the Team with available relevant data, information and materials necessary for the execution of the Study.
2. to provide required equipment, if available, to the Team.
3. to provide the services of a Liaison Officer, who should be a senior irrigation engineer, to assist the Team, throughout the period of field works, in respect of all local arrangements.
4. to assign the following counterparts to assist the Team, as and when required, for the purpose of the Study.
   a) Irrigation engineer
   b) Structural engineer (specialized in hydraulic structure)
   c) Soil scientist
   d) Hydrologist
   e) Agronomist
   f) Agro-economist
   g) Topographic surveyor
5. to exempt the Team from any taxation or duty on the income and any other emoluments as well as equipment, materials and personal effects

which are to be brought into Pakistan in connection with the Study.

6. to provide the following facilities and conveniences to the extent possible, for the Team whose members may be ten(10)at the most:

a) Office accommodation both in Quetta and in Dera Murad Jamali(or Jhat Pat) with adequate floor space and necessary office equipment.

b) Necessary lodging accommodation with adequate floor space, with lighting and water supply, in the project area.

c) 4 units or more of 4-wheel-drive vehicles with drivers, a motor-boat and a boat.

d) Permission for the Team to use wireless telephones necessary for carrying out the field survey.

e) Medical cover for the Team during their stay in Pakistan when necessary.

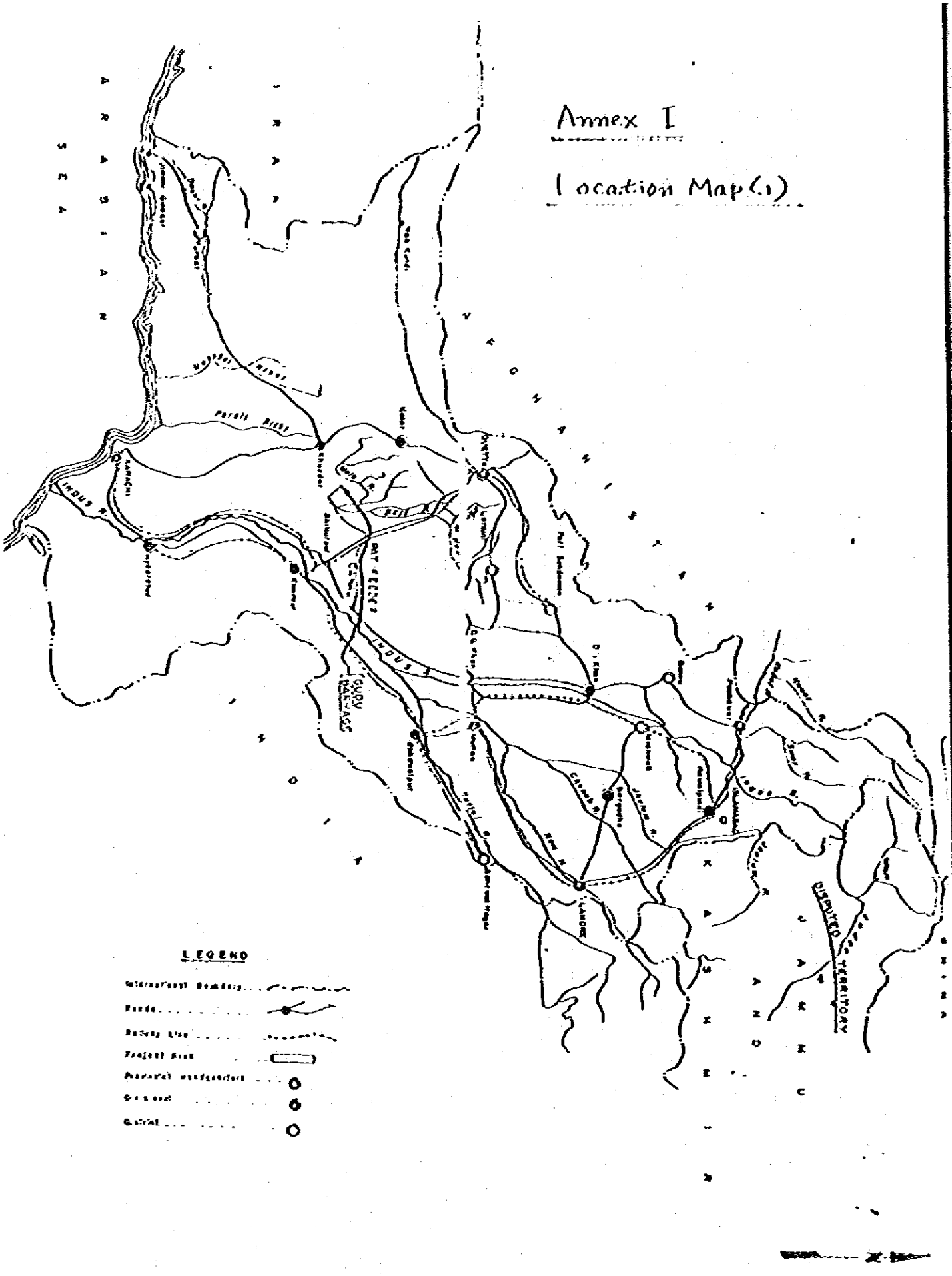
7. To ensure the security of the Team during the field works.

VII. CONTRIBUTION BY THE GOVERNMENT OF JAPAN

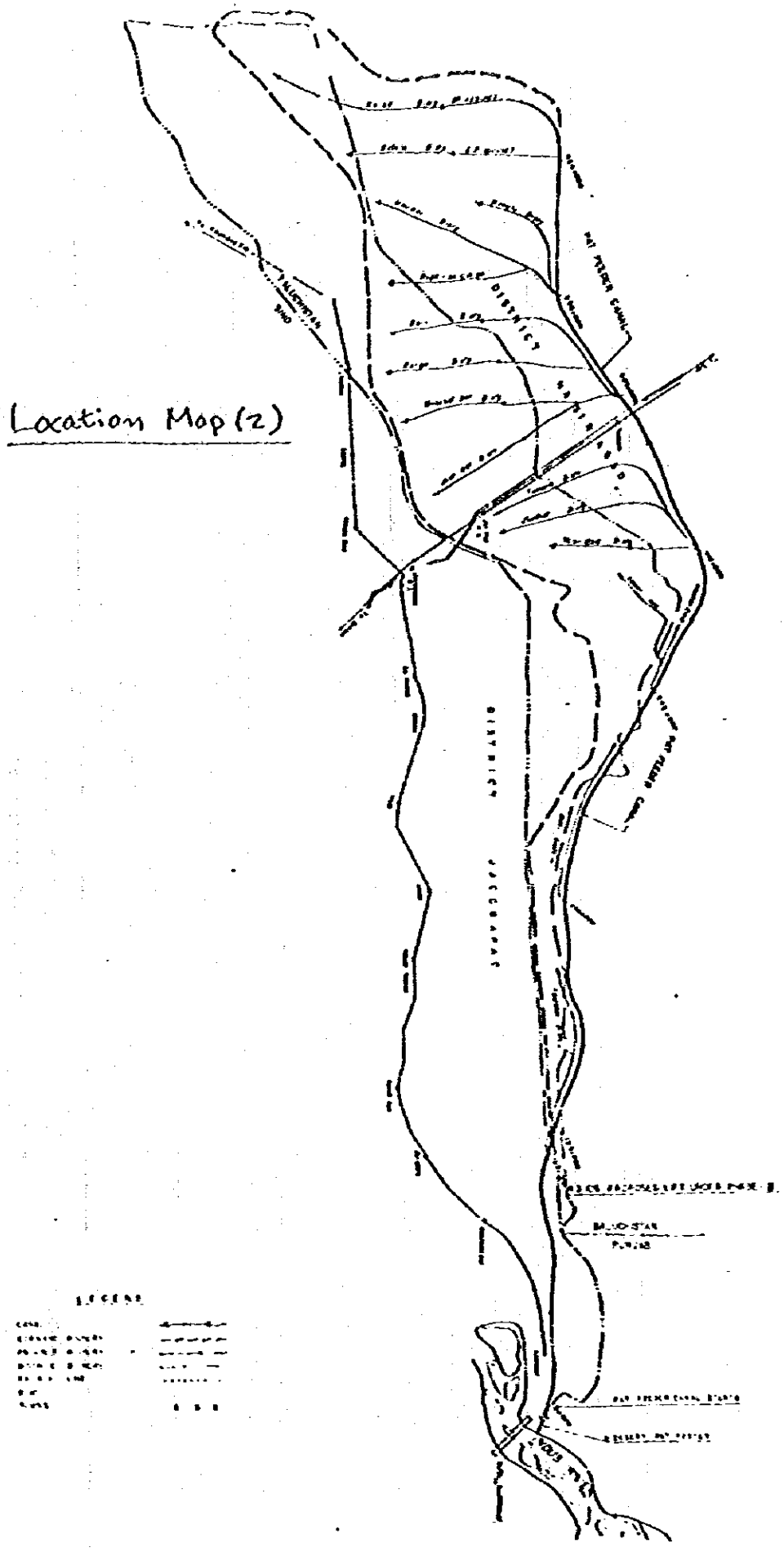
In order to achieve the objectives of the Study, the following assistance will be extended by the Government of Japan :

1. to dispatch a team to Pakistan to conduct the Study,
2. to bear international and inland travel expenses as well as boarding and lodging expenses of the Team within Pakistan,
3. to bear expenses necessary for tele-communication between Japan and Pakistan in connection with the Study,

4. to bear expenses necessary for hiring of such equipment and facilities which are not available with the Government of Pakistan and are arranged through the Liaison Officer,
5. to transfer the knowledge and technology to the counterparts during the period of the Study,
6. to arrange training in Japan for a few counterparts during the Study period, and
7. to provide the equipment necessary for the execution of the Study.

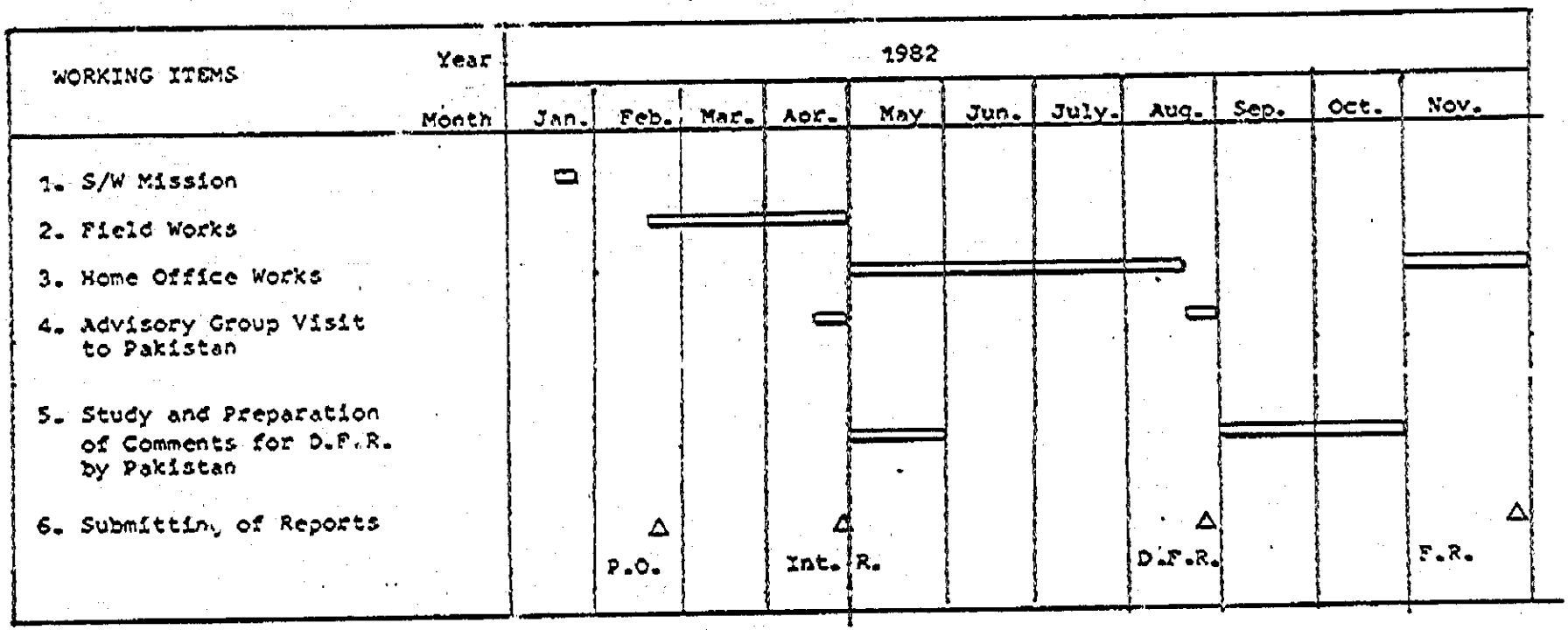

Annex I
Location Map (i)
ARABIAN SEA
INDIA
PAKISTAN
Makran Coast
Range
Pab Range
Kirthar Range
Sulaiman Range
Khyber Pass
Peshawar
Parachinar
Kohat
Bannu
Dera Ismail Khan
Zhob R.
Gomal Pass
Gomal R.
Kurram R.
Tochi R.
Indus R.
Kabul R.
Swat R.
Jhelum R.
Chenab R.
Ravi R.
Sutlej R.
Beas R.
Multan
Bahawalpur
Sukkur
Hyderabad
Karachi
Quetta
Kalat
Sibi
Jacobabad
Mithankot
Rohri
Kotri
Thal Desert
Rann of Kutch
Lahore
Amritsar
Ferozepur
Ludhiana
Ambala
Simla
Delhi
Jaipur
Jodhpur
Bikaner
Jaisalmer
Ahmedabad
Baroda
Surat
Bombay
Nagpur
Jabalpur
Kanpur
Agra
Aligarh
Meerut
Bareilly
Moradabad
Rampur
Saharanpur
Dehra Dun
Roorkee
Hardwar
Kashmir
Srinagar
Jammu
Pathankot
Gurdaspur
Amritsar
Ferozepur
Ludhiana
Ambala
Simla
Delhi
Jaipur
Jodhpur
Bikaner
Jaisalmer
Ahmedabad
Baroda
Surat
Bombay
Nagpur
Jabalpur
Kanpur
Agra
Aligarh
Meerut
Bareilly
Moradabad
Rampur
Saharanpur
Dehra Dun
Roorkee
Hardwar
Kashmir
Srinagar
Jammu
Pathankot
Gurdaspur
DISPUTED TERRITORY
LEGEND
International Boundary
Roads
Railway Line
Project Area
Provincial Headquarters
Divisional
District

Location Map (2)



ANNEX II

TENTATIVE WORKING SCHEDULE



(Remarks)

F/S	:	Feasibility Study
P.O.	:	Plan of operation
Int. R.	:	Interim Report
D.F.R.	:	Draft Final Report
F.R.	:	Final Report

This Scope of work is signed by the following two authorities concerned:

Economic Affairs Division,
Ministry of Finance, Planning
& Economic Affairs,
Islamic Republic of Pakistan,
Islamabad

Japan International Cooperation Agency,
the Official Agency responsible for the
implementation of technical cooperation
programmes of the Government of Japan.

To confirm the aforementioned, the Scope of work is herewith attached and signed by the responsible personnels of the said authorities concerned.

Date: 23rd January, 1982.

Issued at Islamabad.

For Economic Affairs Division
Ministry of Finance, Planning
& Economic Affairs,
Government of Islamic Republic
of Pakistan.

S. G. Ahmad.

(S. GHULAM AHMAD)
Joint Secretary
Economic Affairs Division
Government of Pakistan

For Japan International
Cooperation Agency,
the Government of
Japan.

Kazushige Matsuo

Kazushige Matsuo
Leader of the Scope of
Work Mission for the
Feasibility Study on
Agricultural Development
Project with Widening of
Pat Feeder Canal

ATTACHEMENT

- LIST OF PARTICIPANTS -

A series of discussions on the contents of the said Feasibility Study's Scope of Work was held in frank and friendly atmosphere, on 19th, 20th and 21st January 1982, consecutively, between Pakistani Government officials concerned, Officials concerned of Japanese Embassy in Islamabad and members of currently visiting JICA's S/W Mission, on the basis of PC-I Proforma and the survey result by the previous JICA team which visited Pakistan from 28th, Oct. to 15th Nov. 1981.

The name list of participants in the above-mentioned discussions is as follows.

I. PAKISTANI SIDE

1. Federal Government.

a) Economic Affairs Division (EAD)

Mr. N. Lutfullah	Joint Secretary
Mr. Afzaluddin Ahmed	Deputy Chief
Mr. Mohammad Athar	Section Officer

b) Water & Power Division (WPD)

Maj. Gen. Agha Manzoor Rauf	Additional Secretary
Mr. Bashir Ahmed	Deputy Secretary

c) Planning & Development Division (PDD)

Mr. S.A. Ghafoor	Chief
Mr. M.F. Zaidi	Deputy Chief
Mr. Shahnawaz Hussain	Research Officer

2. Baluchistan Government.

a) Irrigation and Power Department (IPD)

Mr. Mohammad Amin — Superintending Engineer

3. Water & Power Development Authority (WAPDA)

a) Planning and Investigation Division (PID)

Mr. Mohammad Hussain — Deputy Director.

II. JAPANESE SIDE

1. Embassy of Japan in Islamabad.

Mr. Yoshinari Ohshima	Third Secretary
Mr. Abdullah Farooqui	Economic Adviser
Mr. Jaffar Hyder	Economic Adviser

2. Scope of Work (S/ W) Mission

Mr. Kazushige Matsuo	Leader
Mr. Makoto Shimada	Member
Mr. Kouji Inoue	Member

MINUTES OF MEETING

The Japanese preliminary survey team (the team) organized by the Japan International Cooperation Agency headed by Mr. T. YOSHIMITSU, visited the Republic of the Philippines from October 25th to 31st 1981 for the purpose of working out Implementing Arrangement of the feasibility study on Matuno River Development Project (the project).

The team had a series of discussions and exchanged views with the representatives from National Irrigation Administration and National Power Corporation.

The following is the summary of discussions:

1. Both sides agreed that the project shall be composed of three major components such as irrigation, hydro-electric power and flood control and there would be two ways of approaches to the feasibility study on the project; one is irrigation oriented plan and the other is the hydro-electric power oriented plan, with consideration of flood control in both approaches.

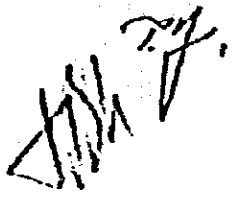
2. Both sides confirmed that priority was not put on either approach at present. Philippine side shall determine the development plan for the project after the completion of the feasibility report which will show the technical, economic and financial feasibility of both approaches.

3. Philippine side requested that total investment levels for the project should be fully considered in the course of the feasibility study in order to raise the possibility of realization of the project. In case the project was to be commenced, lead agency would be decided by National Water Resources Council.

4. The Matuno River No. 1 Multipurpose Project pre-feasibility study report (July 1981) on Cagayan river basin prepared by Ministry of Public Works shall serve as reference in the process of the feasibility study.

5. Both sides agreed that the drilling works would be carried out by the National Irrigation Administration. Borings to be undertaken by NIA shall be about 14 holes with an approximate total depth of 1,000 meters. However Philippine side strongly requested that additional works which may be required shall be provided by Japan side.

6. The uncompleted access road to the dam site was to be finished by the end of January 1982, Philippine side explained.



7. NIA shall undertake additional ground survey and soil survey of irrigation service area of about 3,000 ha (20,000 ha in total) and discharge observation at Batu Ferry bridge which should be started as soon as possible.

8. NIA shall secure the necessary permits for the JICA study team with regard to the use of explosives and other activities related to the field investigation.

9. Philippine side will take all necessary measures to ensure the security for the members of the team during the survey period.

October 30, 1981
Manila, Philippines

T. Yoshimitsu

TADASHI YOSHIMITSU
Team Leader
Preliminary Survey Team
Japan International
Cooperation Agency

JOSE B. DEL ROSARIO, JR.
Project Development Director
National Irrigation Administration

IMPLEMENTING ARRANGEMENT OF THE TECHNICAL COOPERATION

BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY
AND
NATIONAL IRRIGATION ADMINISTRATION

FOR

THE FEASIBILITY STUDY ON THE MATUNO RIVER DEVELOPMENT PROJECT

AGREED BETWEEN

JAPAN INTERNATIONAL COOPERATION AGENCY
AND
NATIONAL IRRIGATION ADMINISTRATION

OCTOBER 30, 1981

T. Yoshimitsu

TADASHI YOSHIMITSU
Team Leader,
Preliminary Survey Team
Japan International Co-
operation Agency

FIORELLO R. ESTUAR
Administrator,
National Irrigation
Administration

T.Y.

1. INTRODUCTION

In response to the request of the Government of the Republic of the Philippines, the Government of Japan has decided to provide technical assistance in accordance with laws and regulations in force in Japan for undertaking of the Feasibility Study on the MATUNO RIVER DEVELOPMENT PROJECT (hereinafter referred to as the Project), and the Japan International Cooperation Agency (hereinafter referred to as JICA), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan, will carry out the Study in close cooperation with the Government of the Philippines and the lead agency for the Feasibility Study, National Irrigation Administration (hereinafter referred to as NIA).

The Project site is located in the Province of Nueva Vizcaya of the Cagayan river basin in Northern Luzon which is the largest among the nine (9) major basins in the Philippines.

The Project is envisaged to provide irrigation, hydroelectric power development as well as flood control.

The Project also introduces the necessary infrastructures, considering the optimum utilization of water resources of the Matuno River in conjunction with Magat River Multi-Purpose Project which is currently under construction.

2. SCOPE OF WORK

2.1 Objectives

The objectives of the study will be:

(1) To undertake the Feasibility Study for the Project considering the various potential components for the development such as irrigation, hydro-electric power generation and flood control.

(2) To undertake the training of the Philippine counterparts in the course of the survey and study, both in country and in Japan.

2.2 Survey and Study

The survey and study to be undertaken will comprise the following:

(1) Data collection

a) Meteorological, hydrological and geological data including construction materials.

b) Topographic maps and aerial photographs.

c) The existing condition of power supply.

d) Record of flood damage.

e) Socio and agro economy.

f) Power generation.

g) Houses, roads, land and rights to be submerged in the reservoir and recommendation on compensation thereof.

T.Y.

(2) Field investigation and survey

a) Hydro-meteorological investigation on flood/dry discharge and sediments.

b) Topographic survey on the proposed sites for main structures including alternative sites and reservoir area and check survey of the elevations along the main canal alignments.

c) Geological investigation by seismic prospecting, drilling work, trench excavation, field laboratory test and test pitting on the proposed sites for main structures.

d) Power market survey and investigation of the substations and transmission line to the closest bulk transmission line associated.

e) Investigation and study on irrigation and drainage.

f) Survey on diversion sites including the storage dam and regulation reservoir.

g) Soil and land use survey including soil sampling and chemical analysis.

h) Agricultural survey including measurement of consumptive use by crop.

i) Others, if necessary.

(3) Feasibility design and analysis of all components of the project (including cost estimate, construction schedule for implementation of the Project, economic and financial analysis) will be carried out using the results of the field investigation.

2.3 The itemized undertakings by NIA and JICA of the Feasibility Study is as per Appendix.

3. REPORTS

The JICA will prepare and submit the following reports to the Government:

(1) Interim report (20 copies)
Upon completion of the field works.

(2) Draft final report (20 copies)
Upon completion of the home works.
NIA is requested to provide the JICA with its comments within twenty (20) days after the receipt of the above-mentioned draft report.

(3) Final report (50 copies)
Within three (3) months after receipt of the comments to the above-mentioned draft final report.

T.Y.

4. IMPLEMENTATION SCHEDULE OF THE STUDY

Tentative implementation schedule of the study is attached hereto as Annex 1.

5. CONTRIBUTION BY NIA AND JICA

5.1 Contribution of NIA

(1) To provide the JICA study team with available data, information and materials necessary for the Study and such survey connected with it.

(2) To arrange/coordinate meetings with authorities/ agencies concerned.

(3) To obtain official permission for the members of the study team to enter into, stay and work in, and depart from the Philippines.

(4) To exempt from any taxes, duties, surcharges and the likes to be imposed on the equipment imported to the Philippnes for the Study and on the JICA experts for their personal belongings carried to or sent to the Philippines, and, income tax, sales tax and any taxes to be imposed to JICA experts icluding the remittance from abroad.

T.Y.

(5) To arrange customs clearance handling and storage at the port/airport and inland transportation (to and from the Project site) and custody of equipment, machines, instruments, tools and other articles to be brought into the Philippines, for the performance of the Study.

(6) To assign counterpart personnels to the Study team during the study period.

(7) To obtain necessary permission for the team to use radiophones and explosives in carrying out the investigation.

(8) To arrange free access to all areas and use of land required by the JICA experts in carrying out the Study.

(9) To provide the additional hydrological observation.

(10) To provide the following facilities/services:

a) First aid services

b) Office accommodation in Manila with adequate floor space and necessary office equipment including copying machines together with secretarial and clerical services.

c) Office accommodation at the Project site with adequate floor space and necessary office equipment.

T.Y.

d) Provision for the team necessary lodging accommodation with pieces of furniture for daily life, lighting and water supply at the project site with an adequate floor space.

e) Provision of four (4) units or more of 4-wheel-drive jeep and a motor-boat with drivers and fuel spare parts, maintenance etc., and a raft.

f) Provision of a helicopter with a pilot, fuel and etc., for aerial reconnaissance of the project area, if necessary.

g) Construction of access tracks for execution of field investigation work, geological investigation and drilling work as well as of all associated reconnaissance on the project area.

(11) To make security clearance arrangement at the project area.

5.2 Contribution of JICA

(1) To dispatch the Japanese expert Study Team to conduct the study, as outlined in the Scope of Work.

(2) To transfer the knowledge and technology to the counterparts during the period of the Study.

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APPENDIX

ITEMIZED UNDERTAKINGS BY NIA AND JICA

Contribution by NIA

Working Item	
1. Site reconnaissance	1. Provision of counterpart engineers and labourers for guidance, clearing of paths.
2. Topographic survey	
2.1 Aerial survey and mapping	1. Provision of aerophotos on the scale of 1:40,000, partly 1:25,000. 2. Provision of maps: the shole project area...1:50,000 the dam sites, irrigation service and reservoir.... 1:4,000 the route of the transmission lines....1:25,000. 3. Additional irrigation service area mapping. 4. Cross-section mapping of the dam sites and reservoir area.
2.2 Ground survey	1. Dam sites (including afterbay dam). 2. Canals. 3. Other major construction sites.
3. Geological investigation	
3.1 Drilling work and permeability tests	

Working Item	
	1. Dam sites (including afterbay dam). 2. Power plant sites.
3.2 Seismic prospecting	1. Dam sites (including afterbay dam). 2. Other major construction sites.
3.3 Trench and pit excavations	1. Dam sites (including afterbay dam). 2. Quarry areas.
3.4 Filed/laboratory tests.	1. Provision of labourers for sampling and local transport of sampled materials. 2. To prepare testing devices. 3. Carrying out tests.
3.5 Preparation of geological maps	1. Preparation of geological maps. 2. Provision of the existing available data on past earthquake record in the vicinity of the project area or in the Philippines.

Working Item	
4. Soil survey	1. Carrying out of pit excavations. 2. Physical and chemical analysis for cultivation.
5. Hydrological investigation	1. Installation of measuring intruments. 2. To prepare measuring instruments. 3. Observation and recording. 4. Provision of labourers for sediment sampling.
6. Planning	1. Collaboration with the JICA Study Team in formulating the development plan for the project.

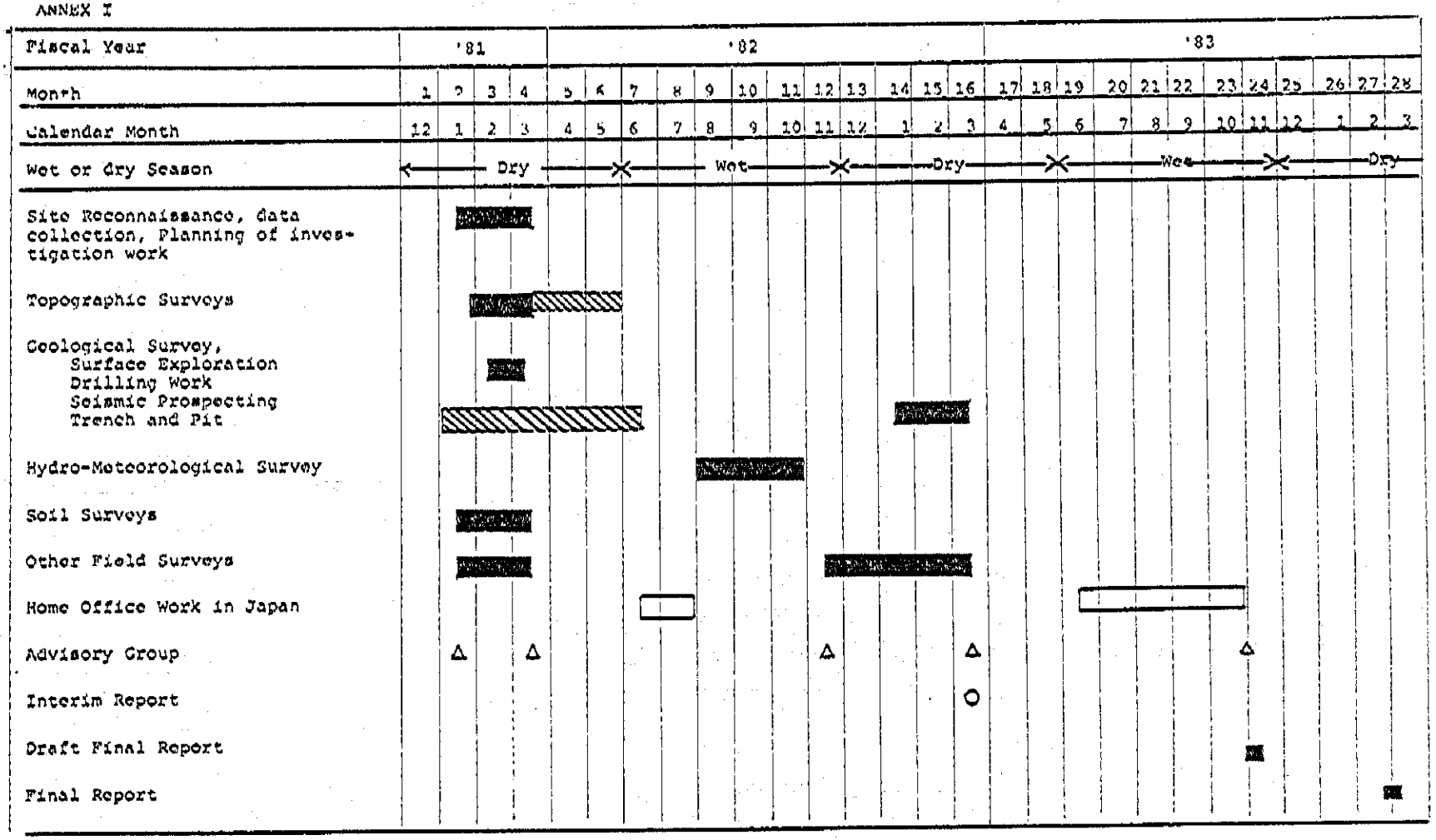
Working Item	Contribution by JICA
1. Site reconnaissance	1. Site reconnaissance.
2. Topographic survey 2.1 Aerial survey and mapping	1. Preparation of the technical specifications. 2. Supervision of aerial topographic survey together with NICA counterparts.
2.2 Ground survey	1. Programming and analysis. 2. Preparation of technical specifications. 3. Determination of location. 4. Supervision of ground survey together with NIA counterparts.
3. Geological investigation 3.1 Drilling work and permeability tests	1. Preparation of technical specifications. 2. Selection of drilling locations. 3. Geological assessment of boring cores. 4. Supervision of geological investigations together with NIA counterparts.

Working Item	
3.2 Seismic prospecting	1. Programming. 2. Identification of location and area. 3. Supervision of seismic prospecting. 4. Dispatch of an expert in seismic prospecting. 5. Analysis of data.
3.3 Trench and pit excavations	1. Programming. 2. Preparation of technical specifications. 3. Determination of location. 4. Supervision of trench and pit excavations. 5. Geological assessment of results of trench and pit excavations.
3.4 Field/laboratory tests	1. Programming. 2. Preparation of technical specifications. 3. Identification of locations for sampling. 4. Dispatch of an expert. 5. Analysis of data.
3.5 Preparation of geological maps	1. Field reconnaissance.

Working Item	
	2. Geological assessment based on results of field geological explorations. 3. Dispatch of an expert.
4. Soil survey	1. Programming. 2. Preparation of technical specifications. 3. Determination of location. 4. Supervision of pit excavation.
5. Hydrological investigation	1. Planning of hydrological measurement. 2. Analysis of data.

TENTATIVE SCHEDULE OF MATUNO RIVER DEVELOPMENT PROJECT FEASIBILITY STUDY

ANNEX I



Field works by the Japanese Team

Field works by Philippines

Home Office work in Japan

T. Y.

MEMORANDUM OF UNDERSTANDINGS

BETWEEN

THE NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY (NEDA)

AND

THE JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

ON THE

FEASIBILITY STUDY OF ILOCOS NORTE IRRIGATION PROJECT

IN THE REPUBLIC OF THE PHILIPPINES

1978 August 4

MEMORANDUM OF UNDERSTANDINGS

The National Economic and Development Authority (NEDA), Government of the Philippines, represented in this Memorandum of Understandings by its Assistant Director General, EDUARDO G. CORPUZ hereafter referred to as NEDA;

and

The Japan International Cooperation Agency (JICA), represented in this Memorandum of Understandings by TADASHI YOSHIHITSU, Leader, Scope of Works' Mission for the Ilocos Norte Irrigation Project, hereafter referred to as JICA.

WITNESSETH

WHEREAS, the Government of the Republic of the Philippines has requested technical assistance from the Government of Japan in the feasibility study of the Ilocos Norte Irrigation Project;

WHEREAS, in response to the request of the Government of the Republic of the Philippines, the Government of Japan has dispatched through JICA a Scope of Works' Mission for the feasibility study of Ilocos Norte Irrigation Project;

NOW THEREFORE, for and in consideration of the foregoing premises herein set forth, the parties hereto agree to the scope of works and to cooperate and undertake the respective tasks and responsibilities as listed in the "Scope of Works for Feasibility Study of Ilocos Norte Irrigation Project in the Republic of the Philippines" attached hereto and made an integral part of this Memorandum of Understandings.

NATIONAL ECONOMIC AND DEVELOPMENT AUTHORITY

By:

EDUARDO G. CORPUZ
Assistant Director General

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

By: Tadashi Yoshihitsu

TADASHI YOSHIHITSU
Leader, Scope of Works' Mission for Ilocos Norte Irrigation Project in the Republic of the Philippines

WITNESSES

SCOPE OF WORKS

FOR

FEASIBILITY STUDY

ON

ILOCOS NORTE IRRIGATION PROJECT

IN

THE REPUBLIC OF THE PHILIPPINES

JULY 1978

SCOPE OF WORK

ON

ILOCOS NORTE IRRIGATION PROJECT

I. INTRODUCTION

In response to the request of the Government of the Republic of the Philippines (hereinafter referred to as "the Government"), the Government of Japan has decided to conduct a study of Ilocos Norte Irrigation Project in accordance with laws and regulations in force in Japan, and the Japan International Cooperation Agency (JICA), the official agency responsible for the implementation of technical cooperation programs of the Government of Japan, will carry out the study.

The present document sets forth the scope of works in regard to the above-mentioned study which is to be carried out in close cooperation with the Government and authorities concerned.

II. OBJECTIVES OF THE STUDY

2.1 Necessity of Phased Development

In the Project Area which is relatively low-invested area for agriculture development in the Philippines, the irrigation water has been distributed improperly due to absence of the water sources facilities and poorly provided irrigation systems in the state of deterioration. Under the circumstances, an irrigation project should be formulated urgently for the development of the area.

The Project, covering a vast area and being planned to be provided with large-scaled structures, requires adequate data on meteorology, hydrology and geology; at present, however, inadequacy in collection of these data has prevented a feasibility study for an overall Project Area in one package, whereas the inhabitants have an earnest desire for the Project.

Under the situation, a phased development strategy should be adopted according to sub-areawise availability of water sources and data arrangement.

The Study Team shall carry out the feasibility study in two phases due to the above-mentioned reason, that is;

The Phase I study for development program was planned for about 10,000 Ha. on the right bank of the Bonga river, which has been given the first priority from such view points that 1) the hydrological and geological data of the area are available to some extent at present, 2) prospective water resources for irrigation can serve the area, and 3) the area is anticipated to quickly produce good effect in various aspect of agriculture development.

The Phase II study for development of the overall Project Area inclusive of Batac and Badoc areas of about 11,500 Ha. for which the construction of a storage dam across the Paleiguan river has been planned. The feasibility study for power generation to make use of a water head at the Paleiguan storage dam shall be also carried out as a part of the Phase II study.

2.2 Objectives of the Study will be:

1) to carry out the study of the overall project.
2) to carry out the feasibility study for development of about 10,000 Ha. on the right bank of the Bonga River (Phase I).
3) to carry out the feasibility study for Phase II development plan.
4) to promote transfer of knowledge to the Government counterpart staff during the period of the survey.

III. OUTLINE OF THE STUDY

The Study is categorized into the field works in the Philippines and the home works in Japan.

3.1 Formulation for the overall plan together with the rough estimate of the project cost and benefit.

3.2 Feasibility Study for Phase I and Phase II Development Plan.

Field Works

1) Collection of data and information as follows:
   a) Meteorological and hydrological data,
   b) Topographic maps and aerial photographs,
   c) Geological data,
   d) Data regarding the existing condition of power supply,
   e) Agro-economy,
   f) Socio-economy, and
   g) Power generation
2) Studies and Surveys to be carried out in the Project Area.
   a) Collection of the relevant existing data and information,
   b) Delineation of the irrigation areas on the basis of reconnaissance survey,
3) The following surveys and studies shall be conducted for the Project Area.
   a) Meteorology and hydrology,
   b) Topographical survey at proposed sites for the major structures,
   c) Geological investigation inclusive of test pit and analysis for foundation of major structures,
   d) Investigation and study on irrigation and drainage,

e) Survey and study on diversion sites inclusive of those for the storage dam and regulation reservoir,

f) Data collection on power generation in the vicinity of the Project Area,

g) Agro-economic survey,

h) Study on socio-economy and farmers' organizations,

i) Agricultural survey, and

j) Data collection and analysis to secure construction materials and to estimate the Project cost.

4) A fundamental strategy to agricultural development shall be estimated and the Project cost and benefit shall be roughly estimated.

Home Work

The following home works shall be conducted in accordance with the findings in the field survey and based on a fundamental strategy to be established.

1) Preliminary design for the Project plan,

2) Preparation of the implementation schedule for overall development plan, and construction schedule for the Phase I and Phase II development plans,

3) Estimation of the respective project cost and benefit for the overall plan and the Phase I and Phase II Development Plans, and

4) Economic evaluation for the overall Plan and the Phase I and Phase II development plans.

IV. REPORTS

The JICA will prepare and submit the following reports of Overall Plan and both the Phase I and Phase II development plans to the Government:

1) Interim report (20 copies)

Upon completion of the field works.

2) Overall Plan Draft report (20 copies)

Upon completion of the home works.

3) Overall Plan Final report (50 copies)

Upon completion of the home works.

4) Draft final report (20 copies)

Upon completion of the home works.

The Government of the Republic of the Philippines is requested to provide the JICA with its comments within twenty (20) days after the receipt of the above-mentioned draft report.

5) Final report (50 copies)

Within one (1) month after receipt of the comments to the above-mentioned draft final report.

V. IMPLEMENTATION SCHEDULE OF THE STUDY

Implementation schedule of the study is attached hereto as Annex 1.

VI. UNDERTAKING OF THE GOVERNMENT

To facilitate the field works, the Government shall provide free of charge all necessary services and facilities, and be responsible:

1) to except members of the team from duties and taxes and other levies on the equipment, supplies and materials which they may bring in the Philippines in connection with the project, and which will be retained by the Philippine government; and on the household and personal effects which they may bring with them, including those

belonging of the members of the family, which, however, shall be re-exported upon the termination of the term of duty in the Philippines, otherwise, taxes and duties shall be collected unless the items were already consumed.

2) to offer convenience in contacting the Governmental organizations for collection of data and information or for cooperation and assistance required for the study,

3) to provide necessary equipment and manpower for geological and soil surveys,

4) to provide vehicles, and whenever necessary, helicopter service, and manpower required for the field investigation.

5) to assign the counterpart personnel competent to assist the Study Team in the following fields;

i) Irrigation Engineering
ii) Hydrology
iii) Geology
iv) On-farm development
v) Soil science
vi) Dam engineering
vii) Diversion dam engineering
viii) Agronomy
ix) Agro-economy
x) Hydro-power generation
xi) Agricultural extension
xii) Computer processing

6) to provide office spaces with necessary furnitures to ensure and enable efficient performance of the Study Team during the survey and study both in Manila and the Project site,

7) to assure security of the Study Team members throughout the field works,

8) to arrange living accommodation in or around the Project Area and such accommodation shall be provided with necessary number of private rooms for the experts (about 14 persons) and facilities for water supply, electricity and other necessary utilities,

9) to provide the necessary data for the Project studies and permission for the Study Team members to bring them back to Japan for their home works, and

10) to provide other facilities and materials required for the survey and study other than those mentioned above.

VII. UNDERTAKING OF THE GOVERNMENT OF JAPAN

For the purpose of the study, the Government of Japan will assist to the extent possible:

1) to send the Japanese study team to conduct the survey and study,

2) to provide the equipment (Annex A) necessary for the purpose of the survey and study, and

3) to bear the charge of accommodation for the team.

The Possibility Study Equipment
Donation from Japan International Cooperation Agency

Tokyo ..... July 17th, 1978

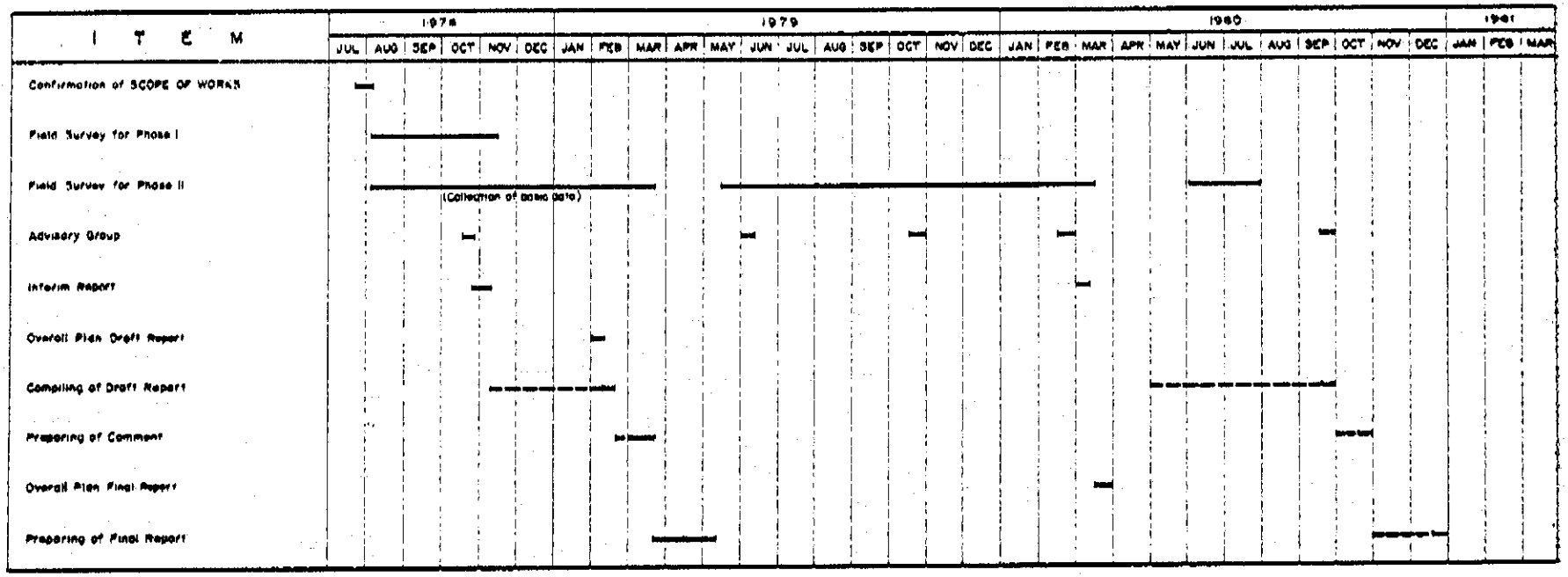
L I S T

Quantity	Description
2 sets	Topcon Theodolite Model TL-20P with plastic case and Metal extension leg tripod
2 sets	Topcon Auto Level Model AT-S3 with plastic case and Metal extension leg tripod
3 pcs.	Aluminium staff 5M.
3 pcs.	Wooden Pole 2M.
2 pcs.	Nylon tape 50 M with case
1 pcs.	Steel tape 50 M with case
1 pcs.	Planimeter Model P-2
2 sets	Drafting set Model H W7
1 set	Current Meter
1 set	Seismic Propeating Meter PS-10C12ch.
TOTAL	8 SETS AND 10 PCS.

NOTE: These equipment will be retained by the Philippine Government after the completion of the survey and investigation of the project.

ANNEX I

TENTATIVE SCHEDULE



MINUTES OF MEETINGS

ON

THE FEASIBILITY STUDY

ON

THE ALCOGAS PROJECT

IN

DASMARIÑAS, CAVITE

IN

THE REPUBLIC OF THE PHILIPPINES

DECEMBER 16, 1980 Manila

SHOJIRO IMANISHI
Leader of the Preliminary Survey
Team for the Alcogas Project

ELPIDIO L. ROSARIO
Leader of the Philippine
Team for the Alcogas Project

MINUTES OF THE MEETINGS
(December 9-16, 1980)

The preliminary survey team sent by the Japan International Cooperation Agency (JICA) and the Philippine counterparts have discussed the study of the Alcogas Project in the Republic of the Philippines. Members lists of both sides are attached in Annex I. Both sides agreed on the Implementing Arrangement attached in Annex II and in that connection both sides had the following discussions:

1. Both sides agreed to have a study conducted on the Dasmariñas, Cavite area. Both sides also agreed to consider taking up another site for study at a later stage, while taking the results of the study on the above-mentioned site into consideration.

2. Both sides agreed that an objective analysis of the various feedstock alternatives (sugarcane, sweet potato and cassava) will be undertaken and the best feedstock will be considered on the basis of 1) suitability to the area; 2) cost of production; 3) stability of supply; and 4) processing considerations.

The Philippine side expressed the desire to give emphasis also to sweet potato/cassava in accordance with the policy of raw material diversification. The Japanese side, however, cited several problems which may make the planned study on the use of sweet potato/cassava as a raw material still premature. These are:

a) Technology of large scale cultivation in the Philippines
b) Weevil protection for sweet potato
c) Breeding of a variety most suitable for the natural conditions in the Philippines
d) Energy balance
e) Additional investment on saccharification facilities
f) Technology of fermentation of cassava

Nevertheless, a general study on sweet potato and cassava will still have to be undertaken before a final recommendation on the raw material is made and adopted as the subject of the more comprehensive study.

3. Both sides agreed that the study shall include all

aspects directly related to the functioning of the project from farm development, raw material production and processing up to the production of anhydrous alcohol.

4. The Japanese side offered to have distribution, storage and consumption of Alcogas covered under the study on the grounds that the study had best deal with the entire system from cultivation of raw materials to the consumption of produced alcohol.

Both sides understood, however, not to include distribution, storage and consumption of Alcogas in the study in view of the assurance given by the Philippine side to the effect that the Philippine side alone could deal with the matter.

ANNEX I

LISTS OF

JAPAN INTERNATIONAL COOPERATION AGENCY

TEAM MEMBERS

AND

REPUBLIC OF THE PHILIPPINES

TEAM REPRESENTATIVES

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA) REPRESENTATIVES

1)	IMANISHI, SHOJIRO	Director, Development Cooperation Div., Economic Cooperation Bureau, Ministry of Foreign Affairs
2)	NAKAZAWA, AKIRA	Development Cooperation Div., Economic Cooperation Bureau, Ministry of Foreign Affairs

(Agricultural Field)

1)	HIURA, MICHIO	Director, Planning Department, Agricultural Land Development Corporation
2)	KUDO, MASAAKI	Director, Second Crop Division, KYUSHU Agriculture Experiment Station, Ministry of Agriculture, Forestry and Fisheries
3)	KAWAKITA, TOSHIHIKO	Deputy Director, Upland Crop Development Div., Agricultural Production Bureau, Ministry of Agriculture, Forestry and Fisheries
4)	MIYAZAKI, TAKESHI	Director, Irrigation & Drainage Project Office of the Lower CHIKUGO River Basin, KYUSHU Regional Agricultural Administration Office, Ministry of Agriculture, Forestry and Fisheries
5)	TAHARA, TAKAFUMI	International Cooperation Div., Economic Affairs Bureau, Ministry of Agriculture, Forestry and Fisheries

6)	NISHIHATA, NORIO	Technical Affairs Division, Agricultural, Forestry and Fisheries, Planning and Survey Department, Japan International Cooperation Agency

(Industrial Field)

1)	NIIMURA, AKIRA	Director, Business Division, Alcohol Business Department, Basic Industries Bureau, MITI
2)	YAMAJI, KAIZO	Deputy Director, Technical Cooperation Division, International Trade Policy Bureau, MITI
3)	URAO, HIDEO	Biomass Policy Office, Basic Industries Bureau, MITI
4)	TAKIZAWA, HIROO	Alcohol Association of Japan
5)	WADA, EIJIRO	Japan Automobile Manufacturers Association (Inc.)
6)	CHIBA, HIROO	Petroleum Association of Japan
7)	ISHIDA, MASUMI	International Development Center of Japan
8)	YASUKI, HIDEO	Deputy Director, Industrial Survey Division, Japan International Cooperation Agency

RP REPRESENTATIVES

1)	ROSARIO, ELPIDIO L.	PNAC, Deputy Director Chief, Agricultural Services
2)	BALCE, NORBERTO V.	PNAC Chief, Industrial Service
3)	LORILLA, FRANCIS M.	PNAC Chief, Planning and Administration
4)	JAYME, FORTUNATO	Ministry of Agriculture Energy Crops Consultant
5)	CAMURUNGAN, RUBEN G.	Philippine Sugar Commission Director, Special Operati Office
6)	SILVA, CONCHITA C.	Ministry of Energy Planning Service
7)	REGUNAY, JOSE	Ministry of Natural Resources Planning Service
8)	SANTOS, ARSENIO	Ministry of Finance Bureau of Internal Revenue
9)	LEGASPI, CRISANTA S.	Ministry of Finance
10)	LAGOS, JULIETA S.	PNAC Planning & Administration

13)	FORTUNO, ANDREW S.	PNAC Industrial Services
14)	ANTONIO, EDWIN M.	PNAC Industrial Services

ANNEX II

IMPLEMENTING ARRANGEMENT

OF

THE TECHNICAL COOPERATION

BETWEEN

THE JAPAN INTERNATIONAL COOPERATION AGENCY

AND

THE PHILIPPINE NATIONAL ALCOHOL COMMISSION

ON

THE FEASIBILITY STUDY

ON

THE ALCOGAS PROJECT

IN

DASMARIÑAS, CAVITE

IN

THE REPUBLIC OF THE PHILIPPINES

I. Background

In response to the request of the Republic of the Philippines, the Government of Japan dispatched a preliminary survey team headed by Mr. Shojiro Imanishi from 8th to 17th December 1980, through the Japan International Cooperation Agency (hereinafter referred to as "JICA"), the official agency responsible for the implementation of the technical ccoperation of the Government of Japan, to carry out the preliminary survey for the feasibility study on the Alcogas Project in Dasmariñas, Cavite (hereinafter referred to as "the Study") and to discuss the implementing arrangement of the Study with the Philippine National Alcohol Commission (hereinafter referred to as "PNAC").

II. Objective of the Study

The basic objective of the Study is to examine the technical and economic feasibility of developing a farm for raw materials and establishing a municipal alcohol distillery with a capacity ranging from 50 to 60 kilo liters per day in Dasmariñas, Cavite.

III. Scope of Work

In order to achieve the above objective, the Study will cover the following items:

1. Data collection on the project site

   (1) Natural Condition

      1) Location
      2) Topography
      3) Meteorology
      4) Hydrology
      5) Soil and geology
      6) Vegetation
      7) Others

(2) Social and cultural environment

1) Number of houses and population densities
2) Accommodations, schools, hospitals, religious buildings, amusement places, and stores
3) Security measures
4) Sanitation

(3) Infrastructures

1) Transportation
2) Electricity
3) Communication
4) Possibility of utilizing river water for industries and irrigation
5) Others

(4) Present situation of the various industries

1) Mining
2) Industry
   - Sugar mills
   - General contractors
   - Other major industries
3) General service companies, such as bank insurance agencies, etc.

(5) Agriculture

① Present land use and major agricultural products
② Land ownership
③ Present cropping pattern and crop production
4) Farm economy
5) Agricultural inputs
6) Farm labor balance and mechanization
7) Agricultural infrastructures
   - Irrigation facilities
   - Drainage facilities

- Farm Roads

8) Agricultural cooperatives and other farmer's association

9) Others

6) Availability of industrial labors

1) Skilled laborers

2) Factory laborers

2. Selection of Raw Materials

(1) Adaptability

1) Current production

2) Future production

3) Possibility of the year round production

(2) Required inputs and facilities

(3) Constraints

1) Pest and disease

2) Weeds

3) Labour balance and mechanization

(4) Supporting services

1) Research and breeding activities

2) Agricultural extension

(5) Energy balance

(6) Production cost of raw materials and alcohol

(7) Others

3. Raw Material Production

(1) Concept design of farms

1) Water resources development

2) Irrigation and drainage facilities

3) Land consolidation

4) Soil improvement

5) Others