FIGURES

Expert	Name	1989 (Fiscal Year) J	J	A	S	O	N	D	J	F	M	1990 (Fiscal Year) A	M	J	J	A	S	O	N	D	J	F
Leader	Takayosi YAMAZAKI																					
Agronomist	Hisashi IKEWADA																					
Civil Engineer	Fusao WATANABE																					
Meteo - Hydrologist	Isamu TOYOKURA																					
Dry Farming Expert	Hiroyasu OHNUMA																					
Pedologist Landuse Planner	Masayuki KOYAMA																					
Project Economist	Tadaharu MURONO																					
Report						IC / R			P / R		IT / R				DF / R				F / R			

Legend : Field Work Home Office Work

IC / R : Inception Report, P / R : Progress Report, IT / R : Interim Report, DF / R : Draft Final Report, F / R : Final Report

Fig. 1.2

Assignment Schedule of Experts

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

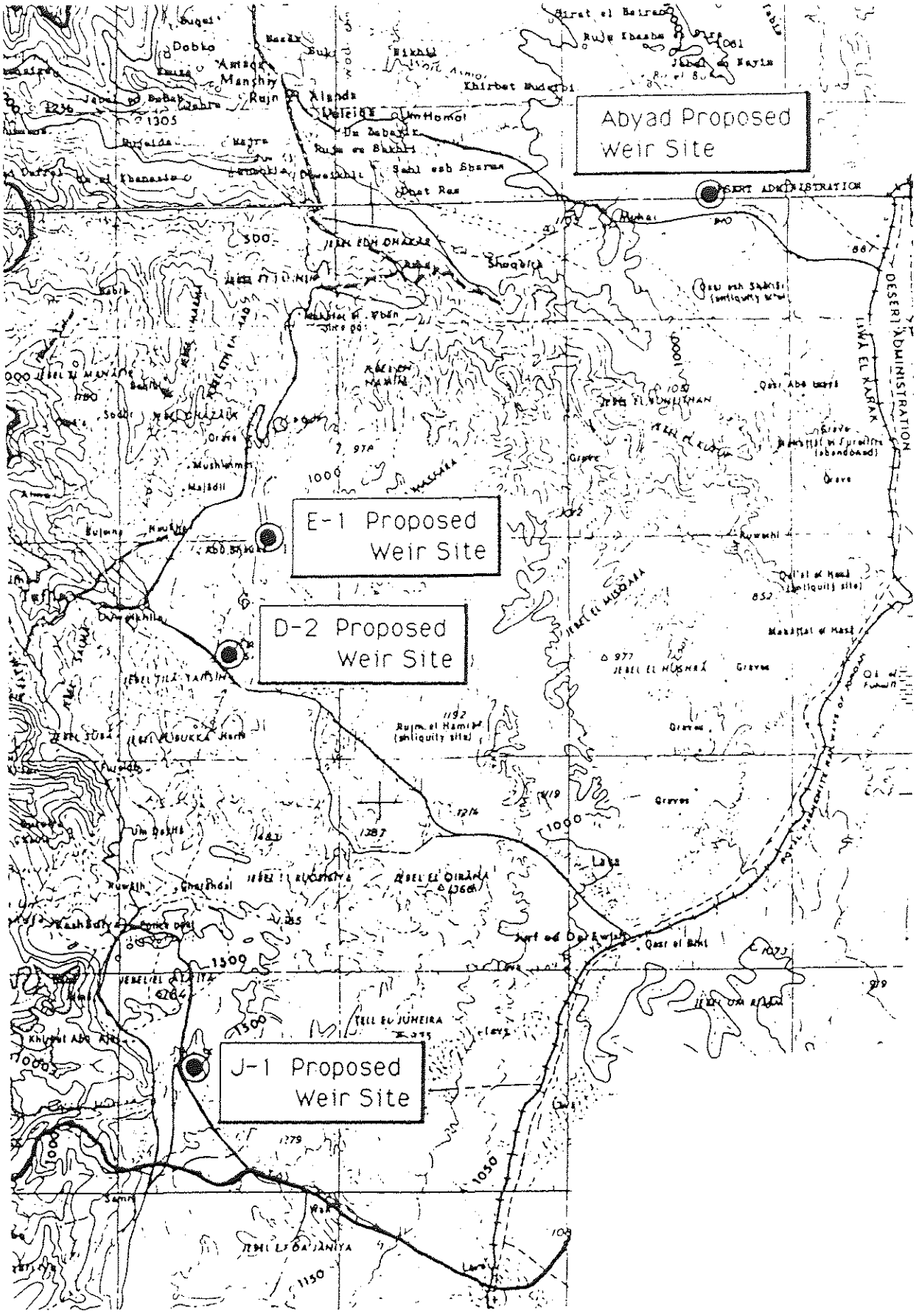

Fig. 1.3

Location Map of Weir Sites

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

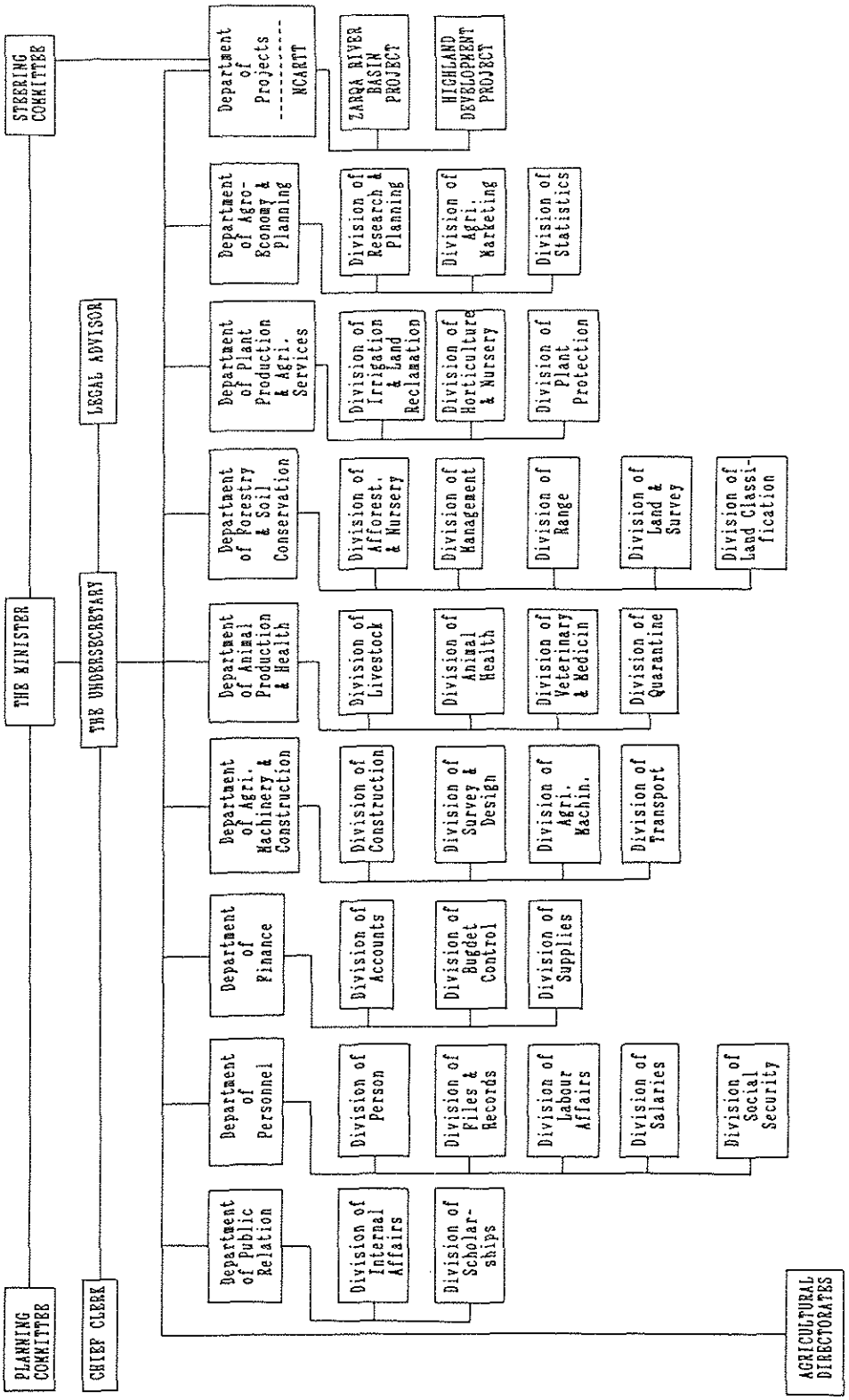

Fig. 2.1

Organizational Chart of Ministry of Agriculture

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

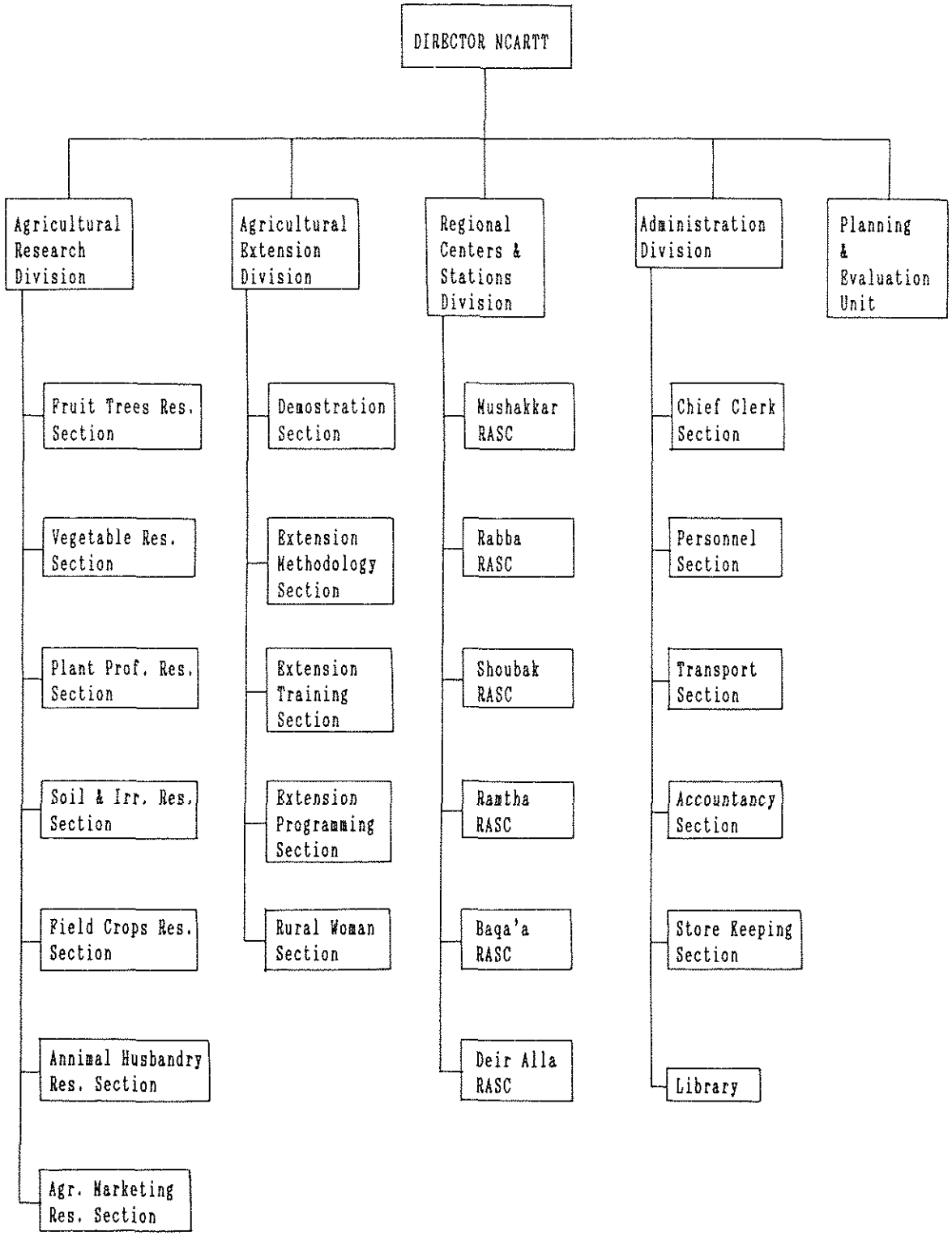

Fig. 2.2

Organizational Chart for NCARTT

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 2.3 Extension System of Jordan

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

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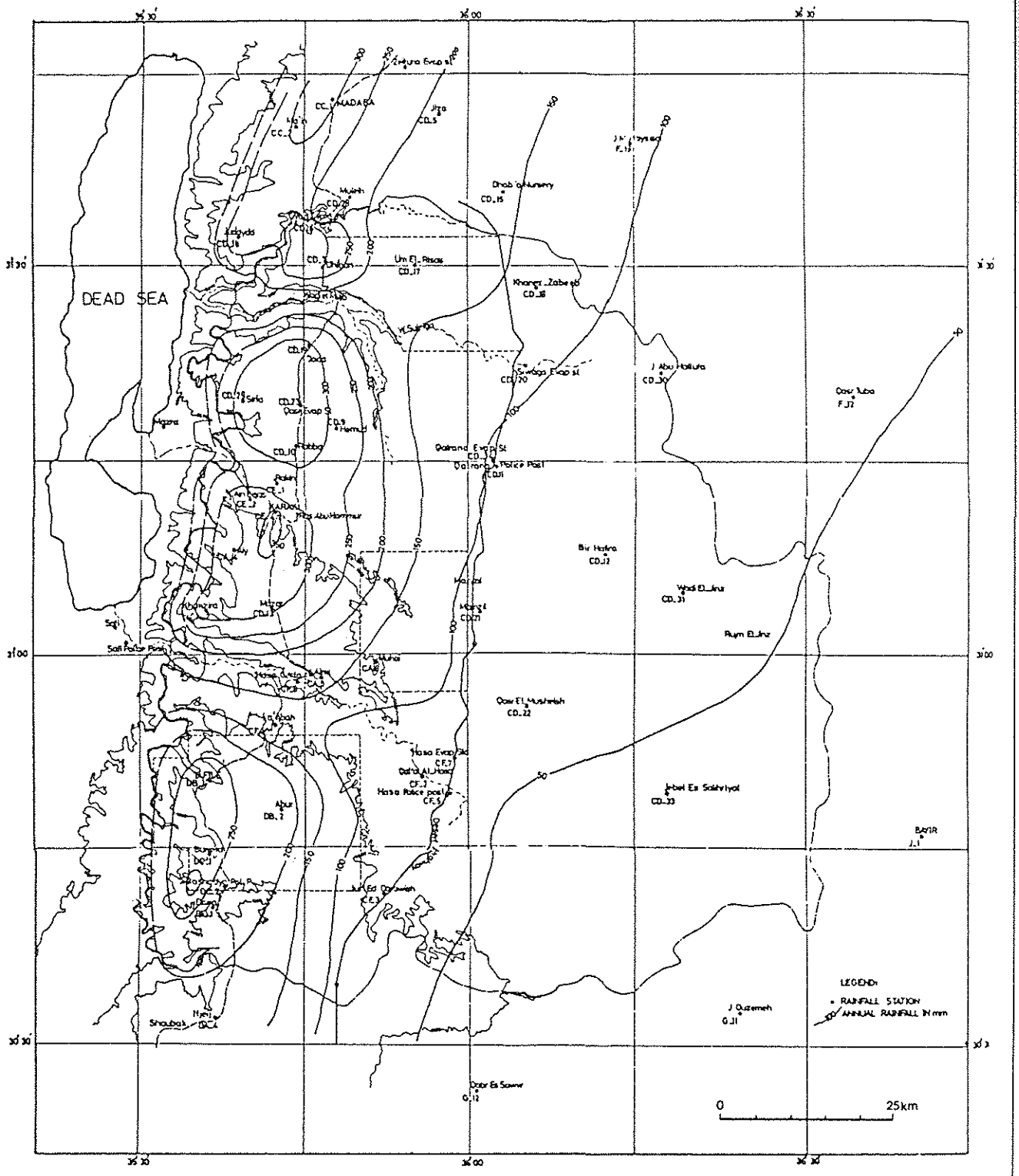

Fig. 3.1 Rainfall Distribution Isohyets : Long Term Average

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

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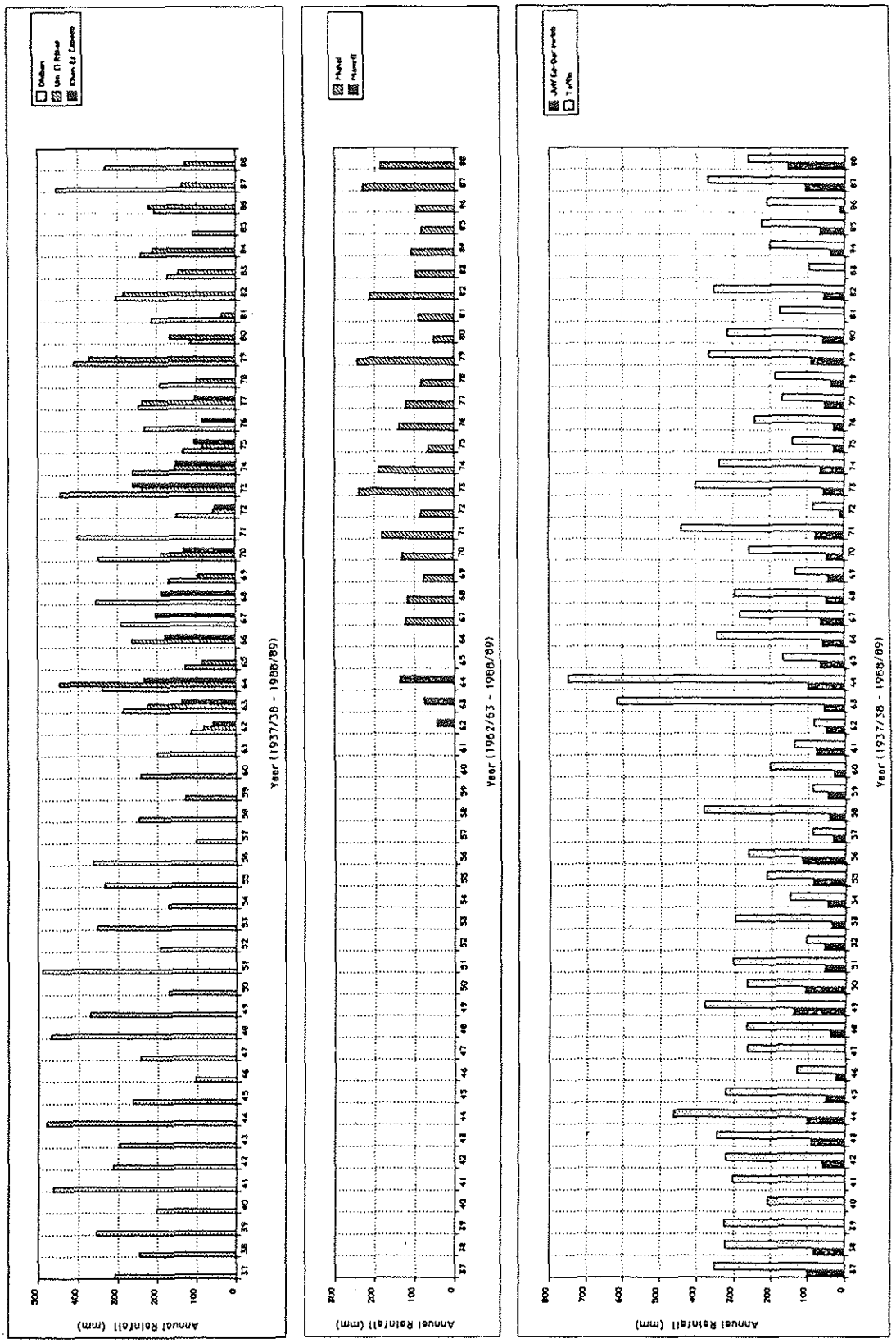


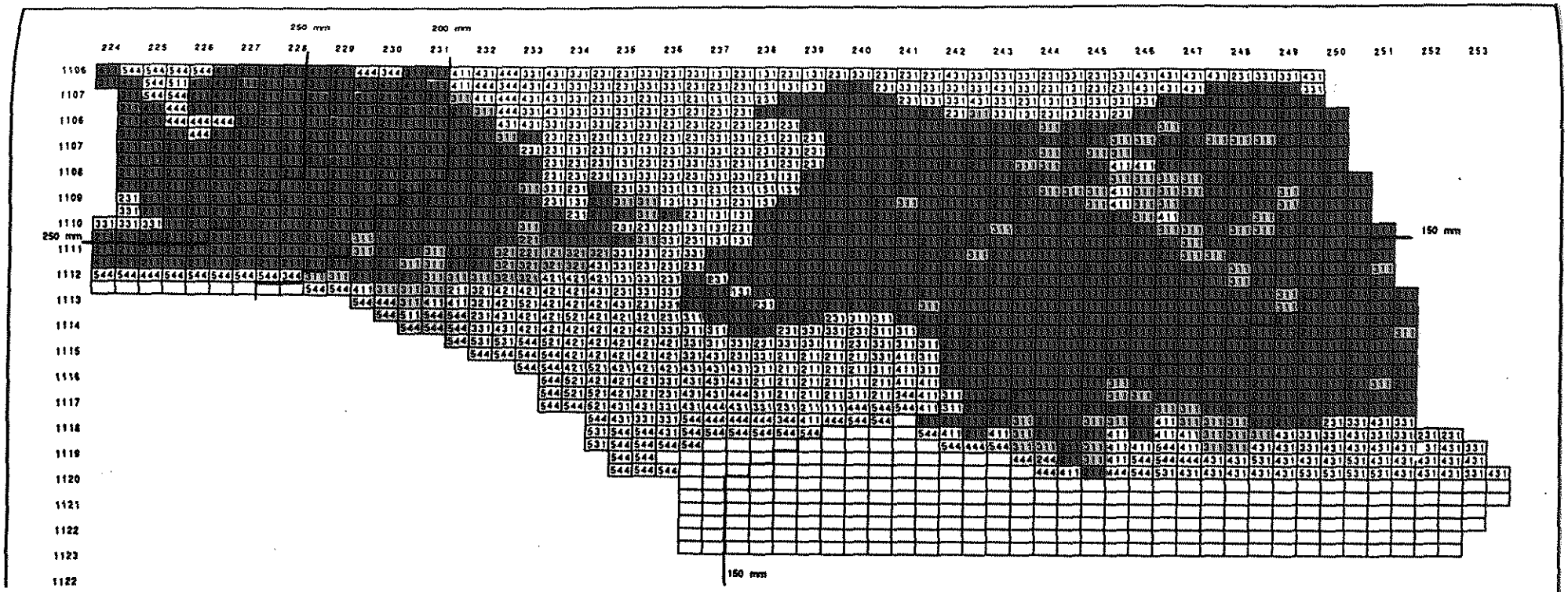
Fig. 3.2

Annual Rainfall Change in the Priority Areas

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY



Land Suitability

- Field Crops
- Fruit Trees
- Barley & Forage Legume
- Fodder Shrubs

RATING CRITERIA

TOPOGRAPHY	SOIL DEPTH	ROCKINESS
100: Flat to Almost Flat (0-4%)	10: Deep (100 cm <)	1: Non Rocky (0-10%)
200: Undulating (4-8%)	20: Deep to Moderately Deep (100-50 cm)	2: Rocky (10-25%)
300: Rolling (8-12%)	30: Moderately Deep (50-20 cm)	3: Very Rocky (25-50%)
400: Hilly (12-30%)	40: Shallow (20 cm >)	4: Extremely Rocky (50% <)
500: Mountains (30% <)		

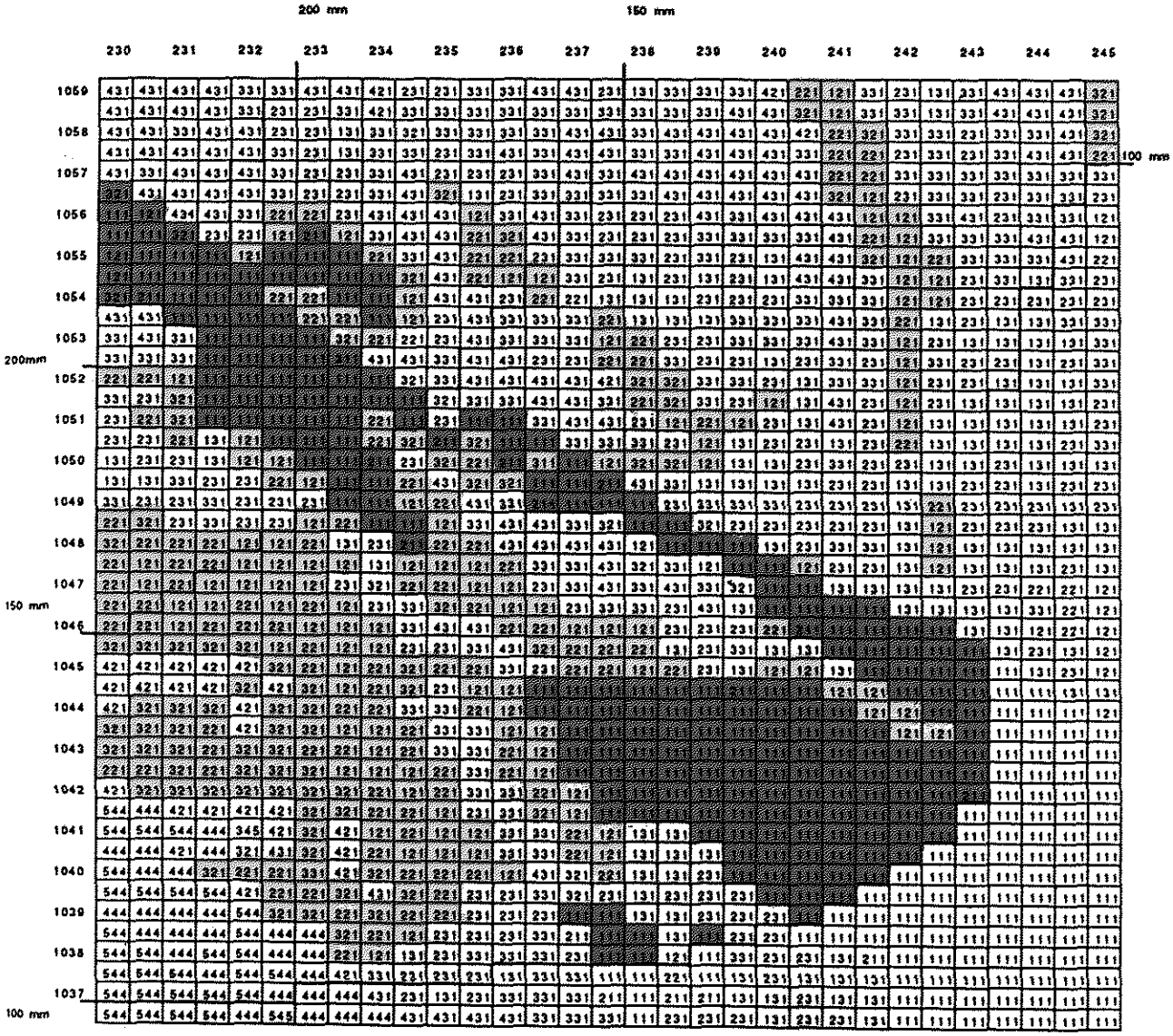
For example, 123 indicates the land class of (I) Flat to Almost Flat, (II) Deep to Moderately Deep Soils and (III) Very Rocky.

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.3 Land Classification Map of Dhiban



RATING CRITERIA

TOPOGRAPHY	SOIL DEPTH	ROCKINESS
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500: Mountainos (30% <)		

For example, 123 indicates the land class of (I) Flat to Almost Flat, (II) Deep to Moderately Deep Soils and (III) Very Rocky.

Land Suitability

- Field Crops
- Fruit Trees
- Barley & Forage Legume
- Fodder Shrubs

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.4 Land Classification Map of Abyad

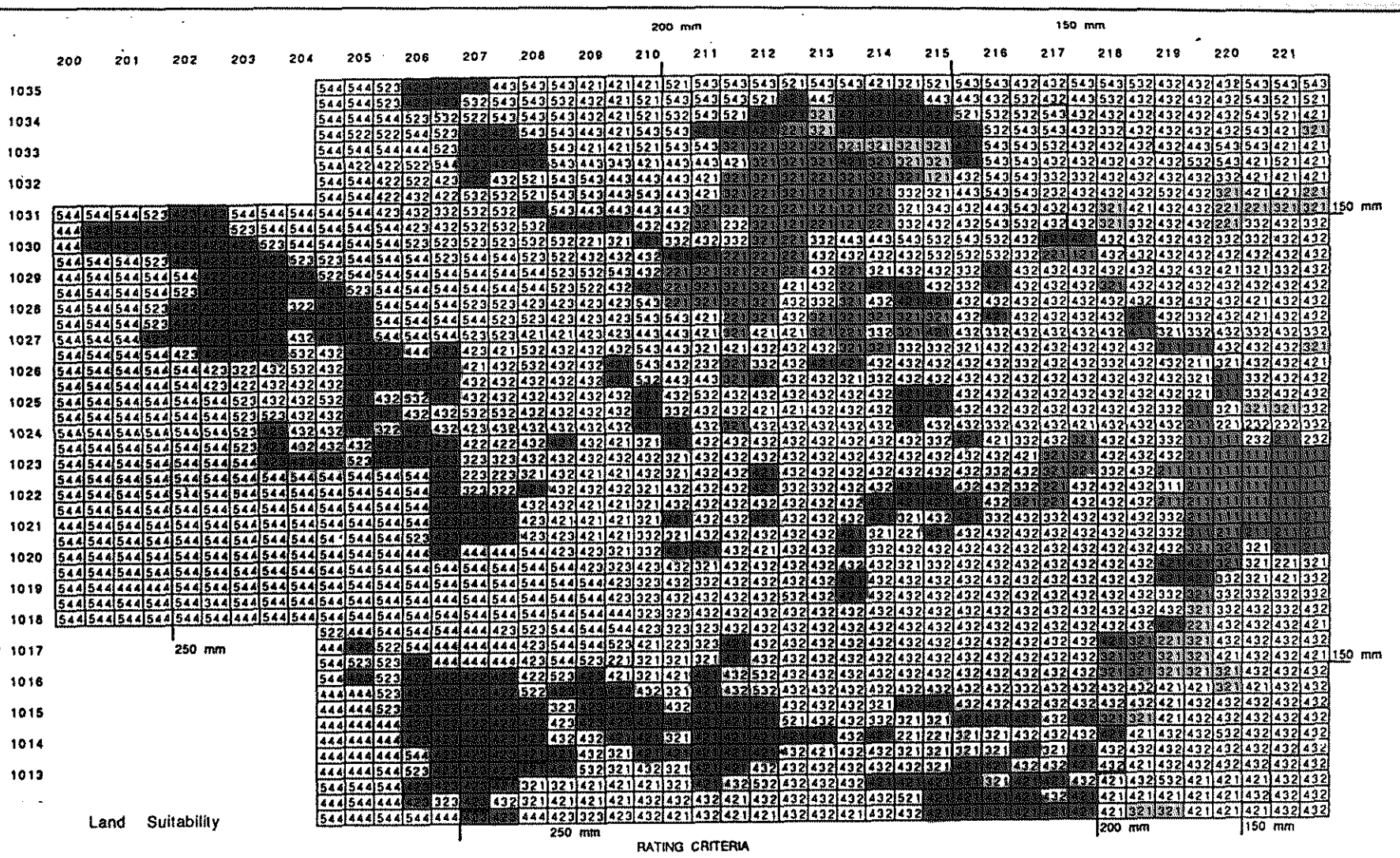


Fig. 3.5 Land Classification Map of Tafila

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY

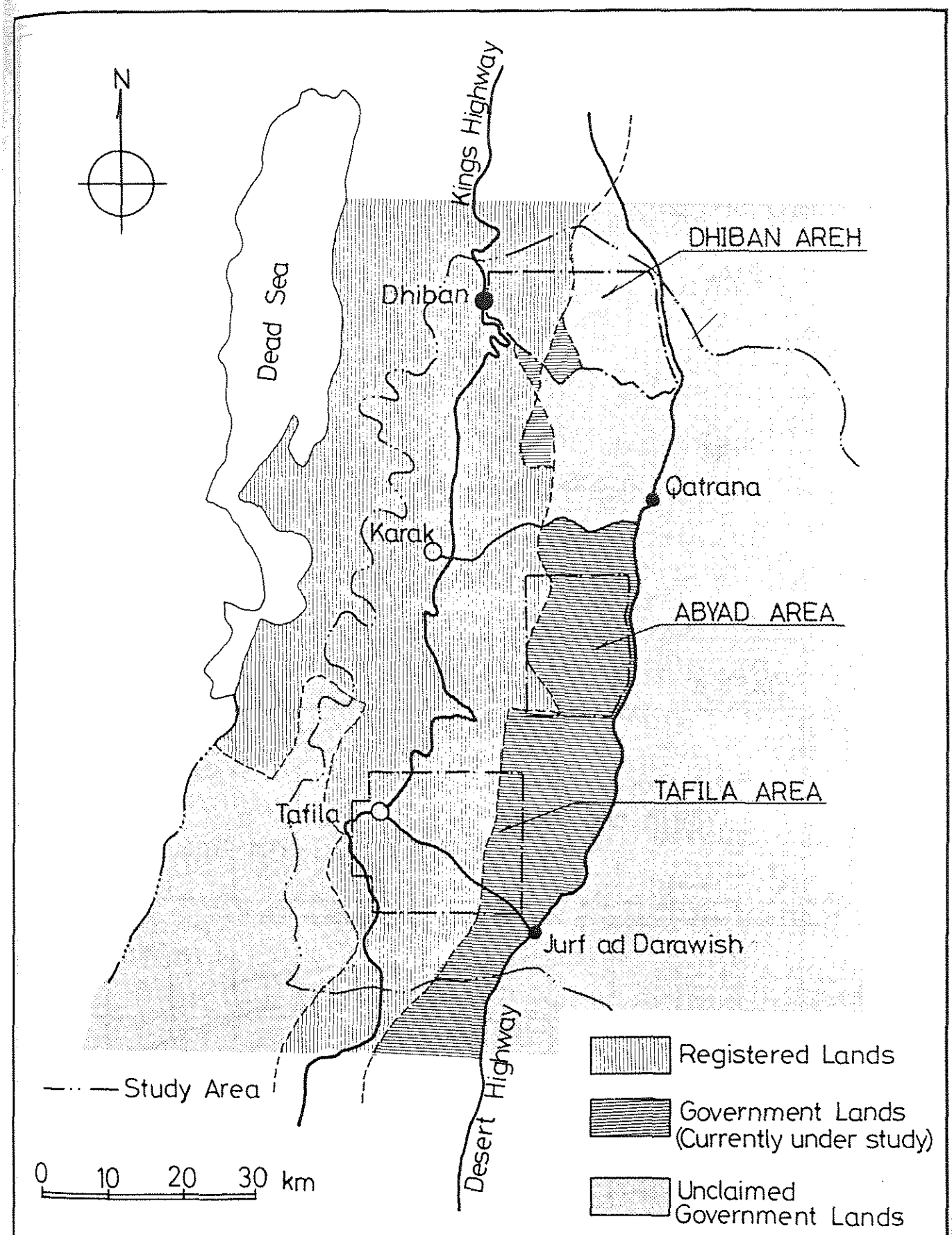
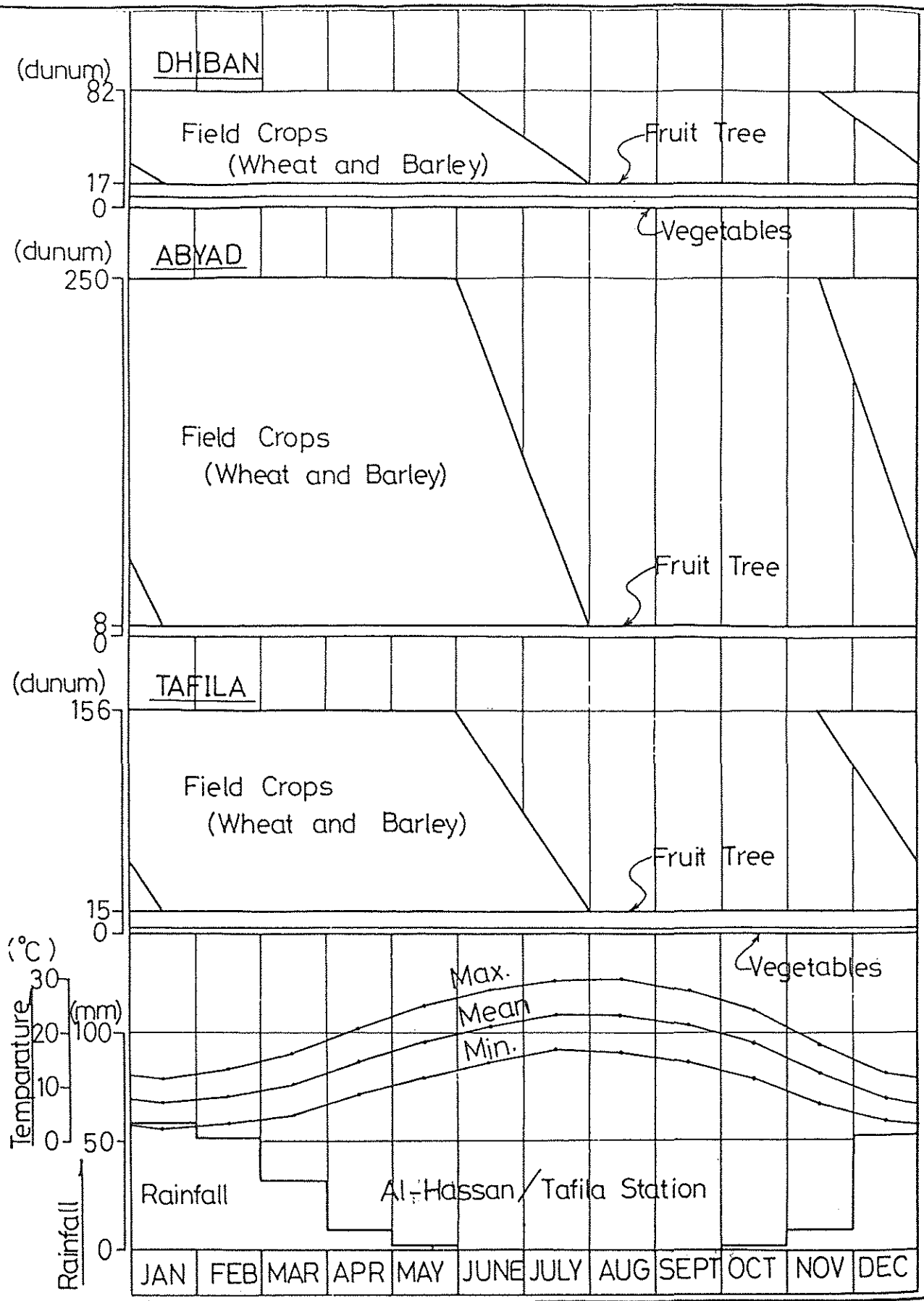


Fig. 3.6 Land Tenure Status

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY

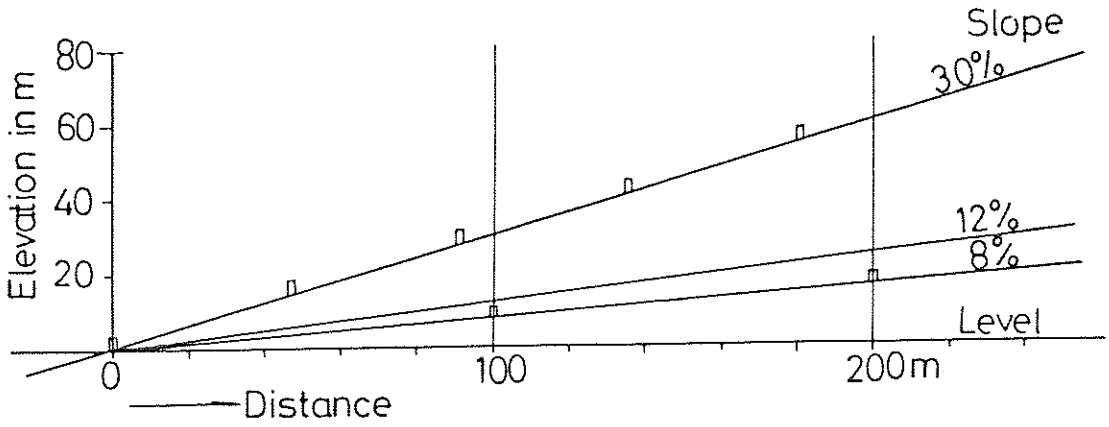


THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

Fig. 3.7 Present Cropping Pattern in the Priority Areas



Spacing of Contour Stone Walls

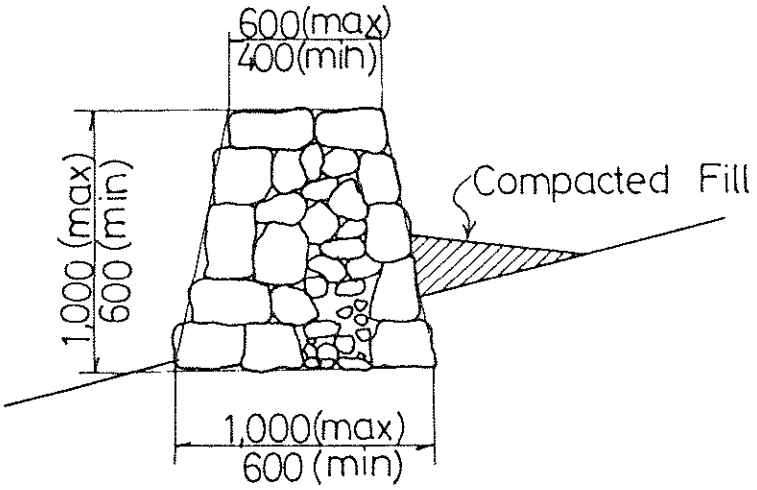
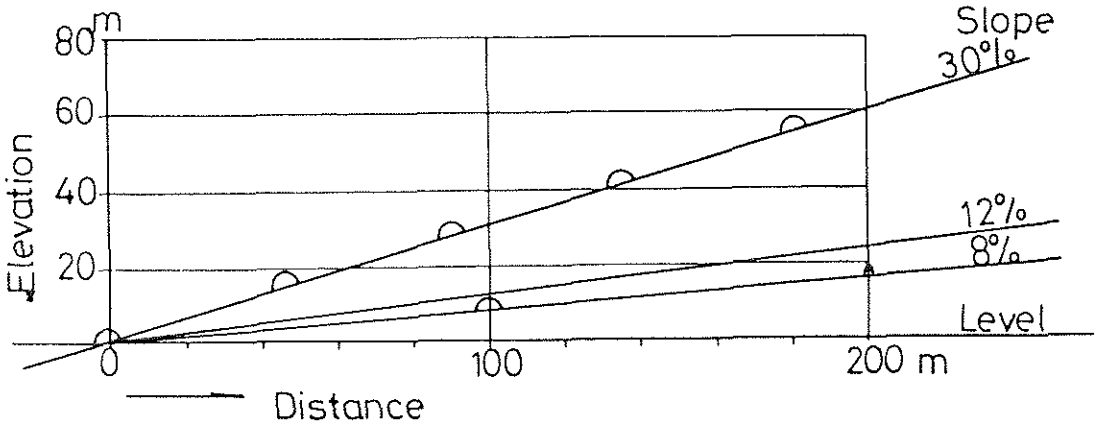


Fig. 4.1 Typical Section of Contour Stone Wall

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



Spacing Of Absoption Earth Banks

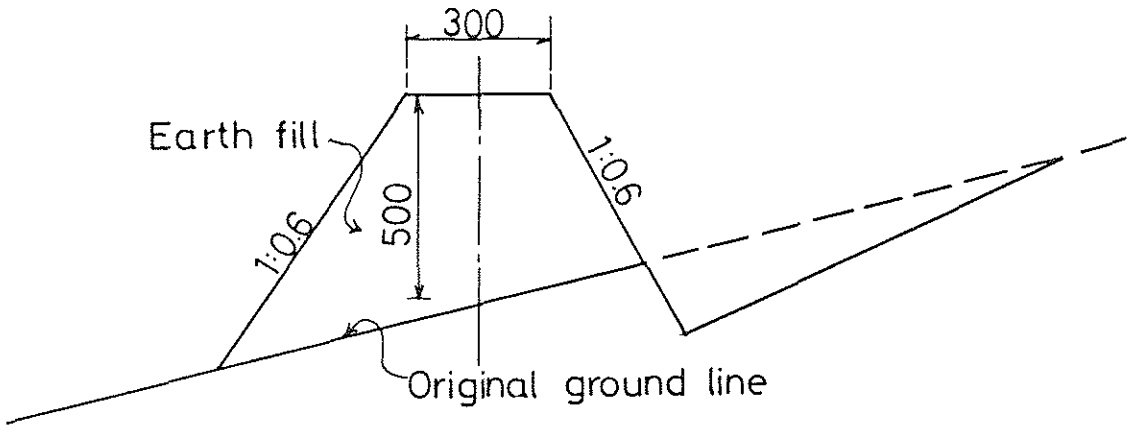
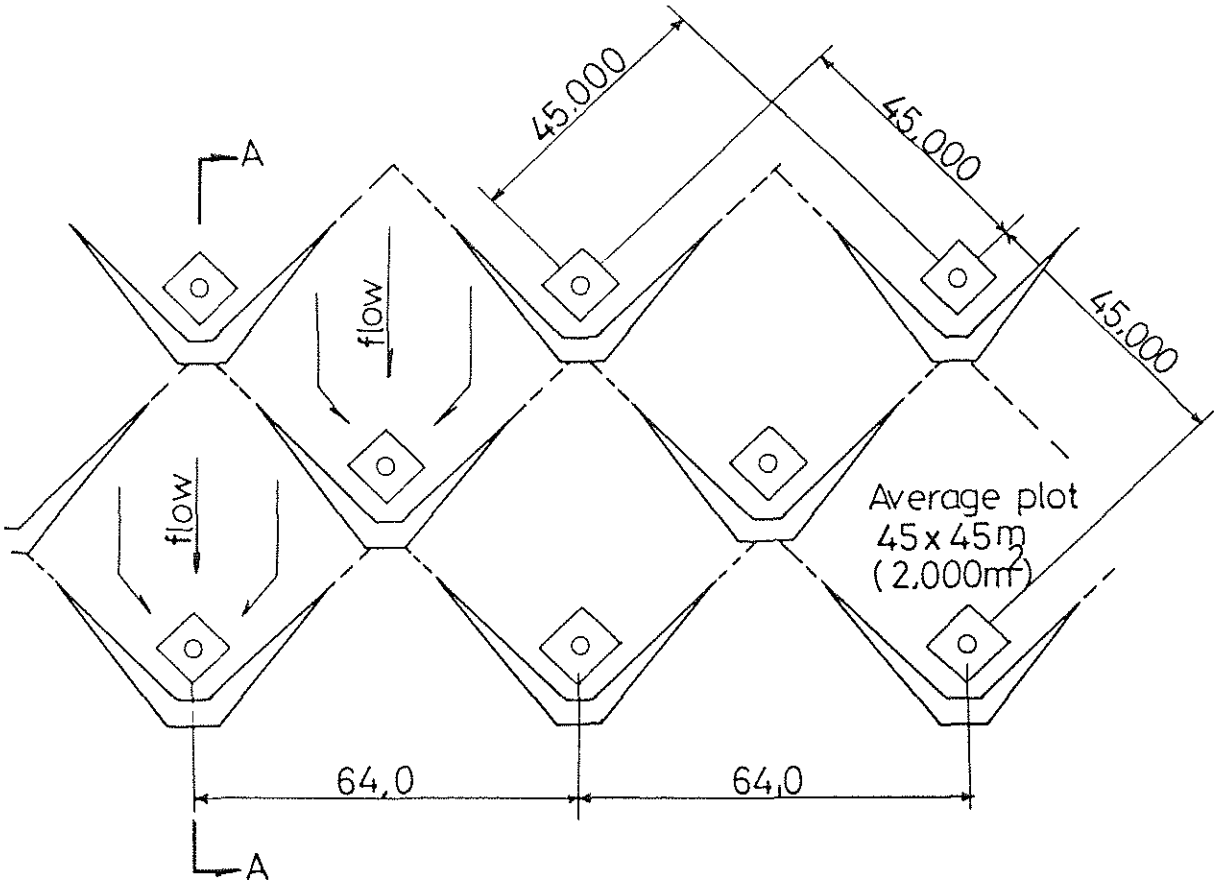
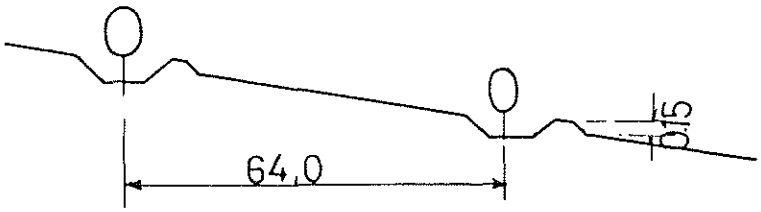


Fig. 4.2 Typical Section of Absorption Earth Bank

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY

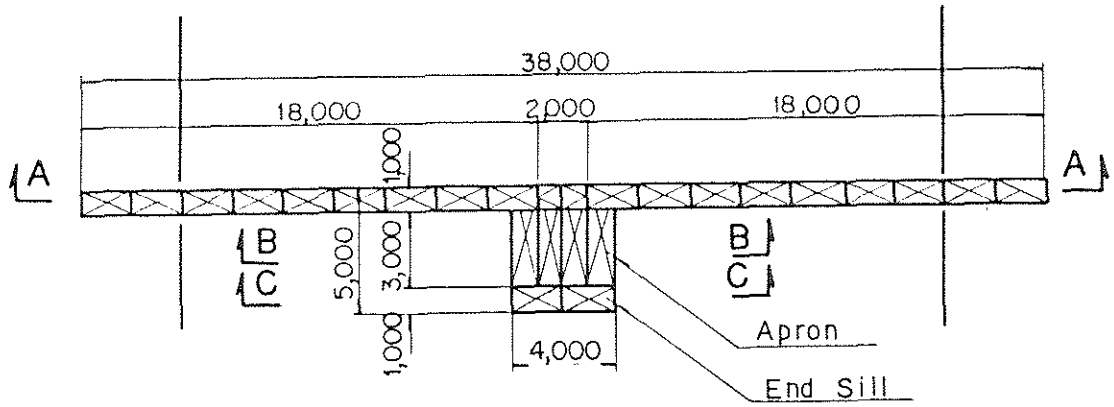




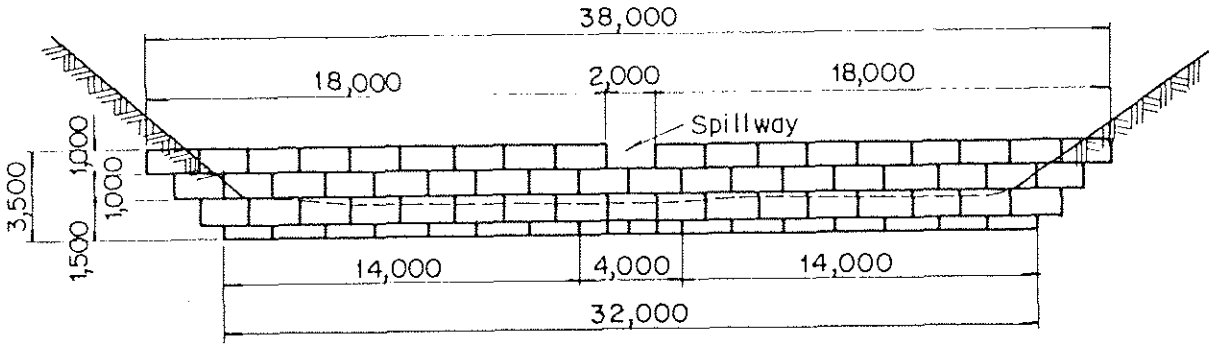
SECTION A-A

Fig. 4.3 Microcatchments

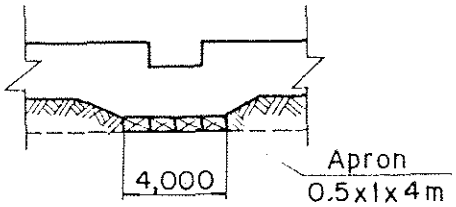
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



PLAN



SEC. A-A



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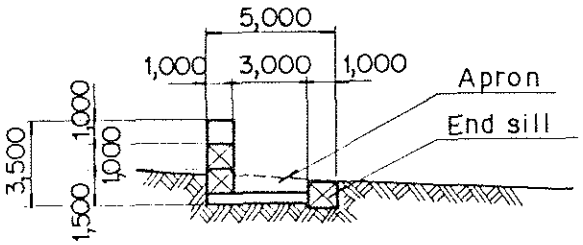
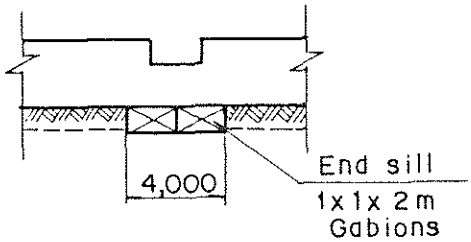


PROFILE



SEC. C-C

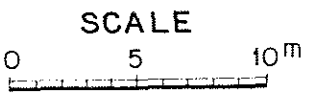
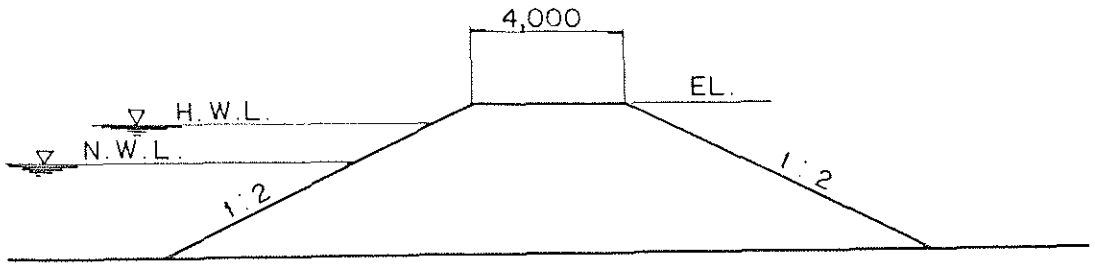
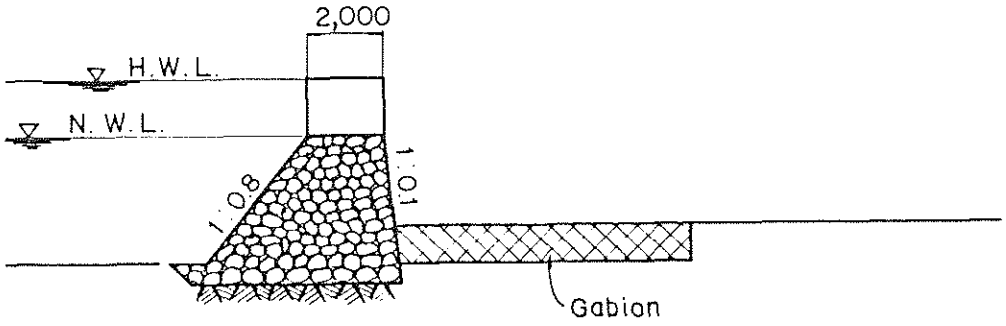


Fig. 4.4 Check Dam

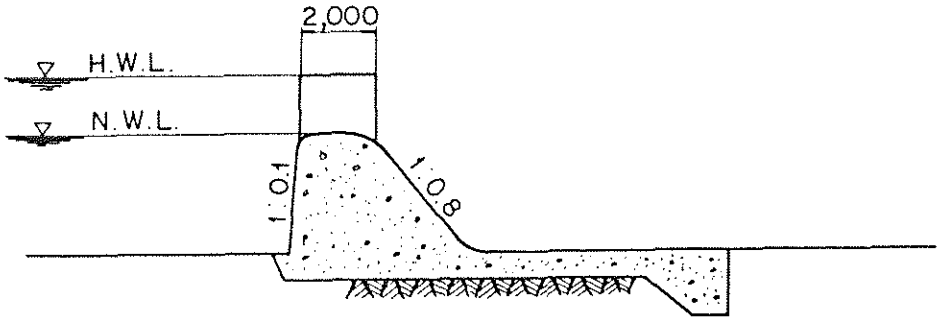
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



HOMOGENEOUS EARTH FILL



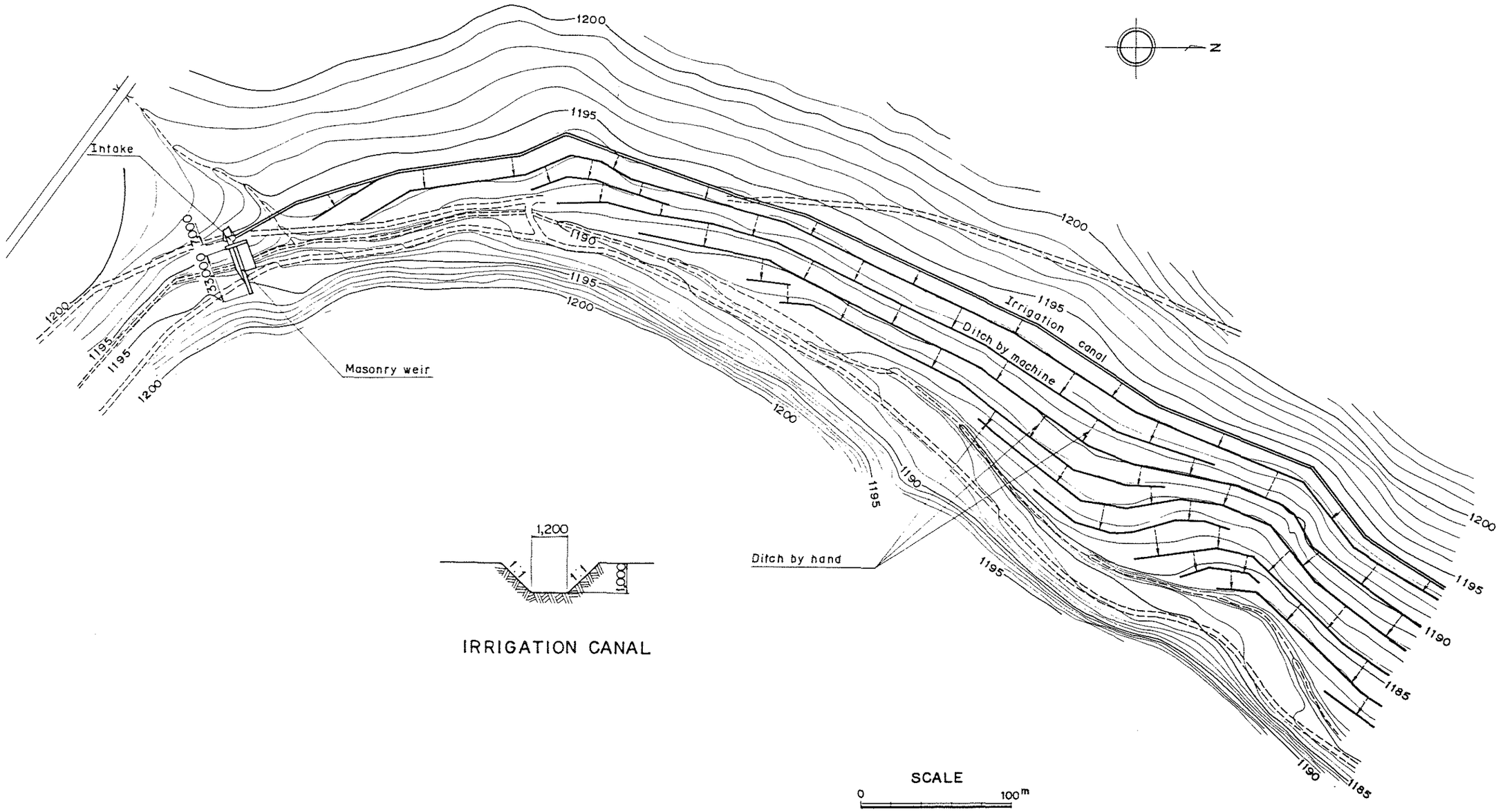
WET MASONRY



CONCRETE GRAVITY

Fig. 4.5 Typical Type of Weirs

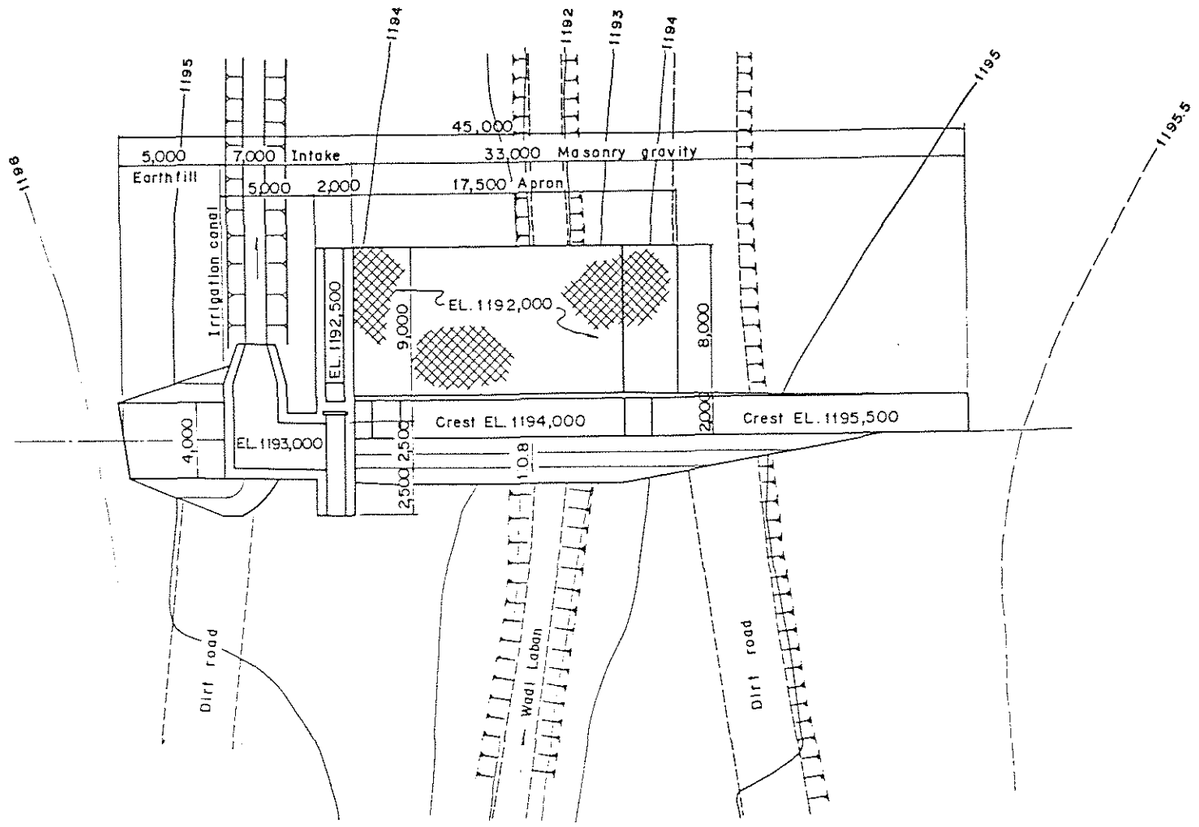
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



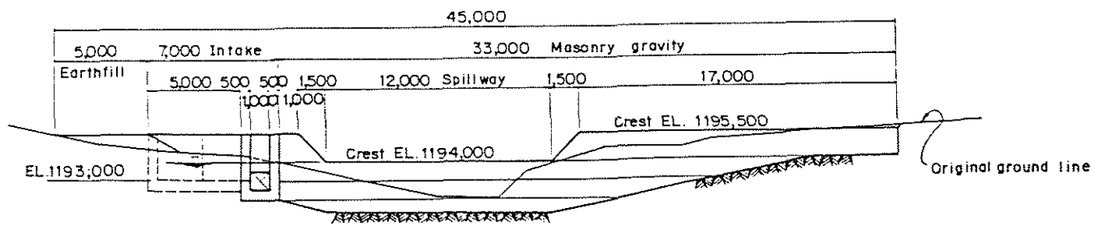
IRRIGATION CANAL

Fig. 4.6 Plan of D-2 Site

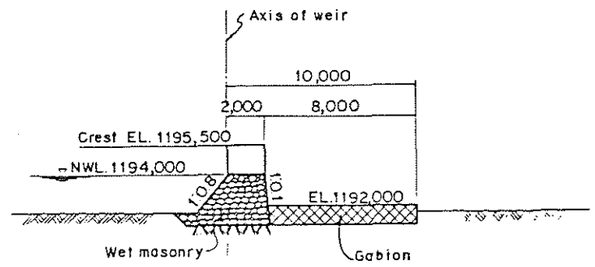
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



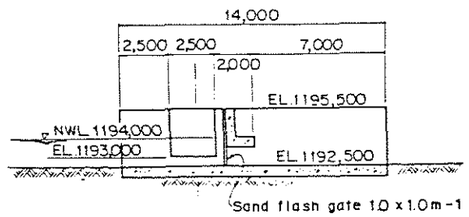
PLAN



PROFILE



SECTION OF MASONRY GRAVITY WEIR

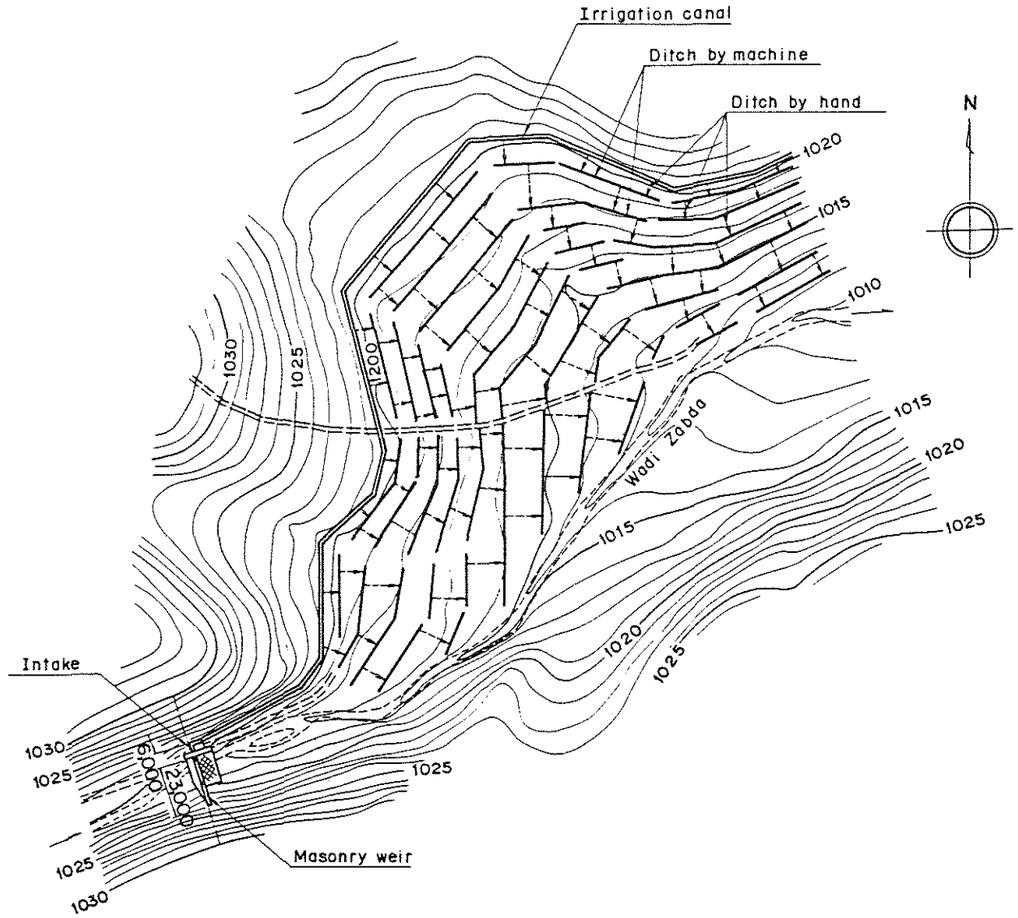


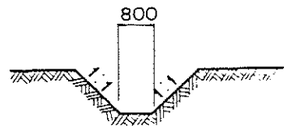
PROFILE OF INTAKE

SCALE
0 10m

Fig. 4.7 Wet Masonry Weir of D-2

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY





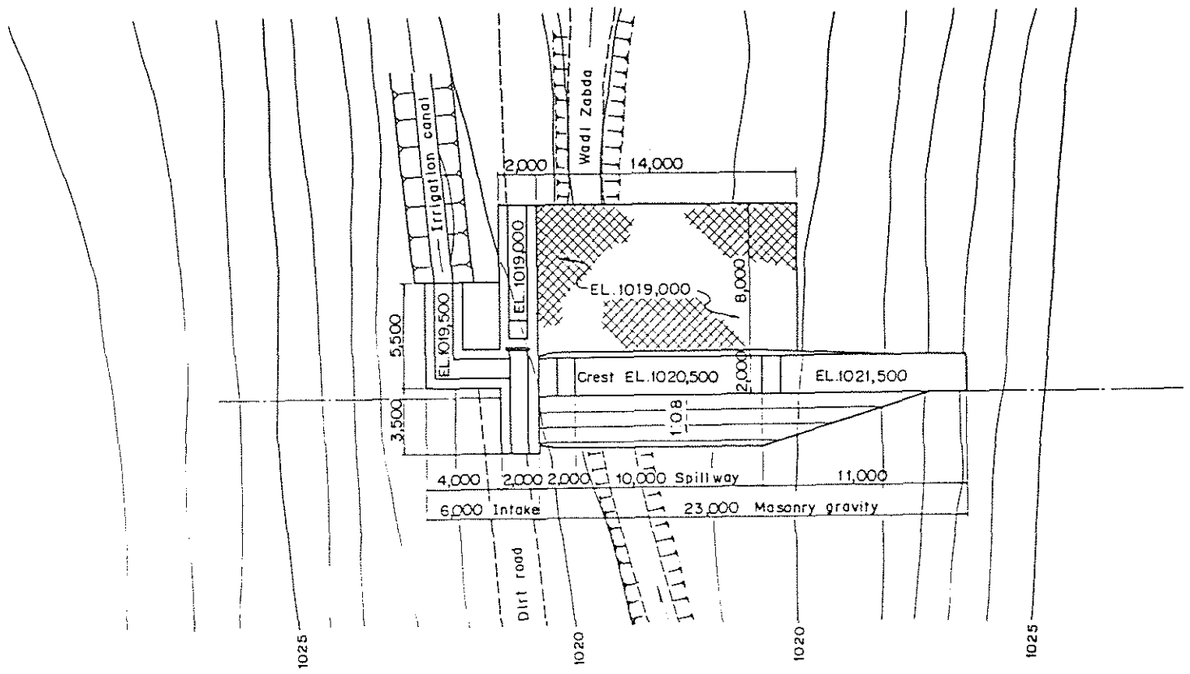
IRRIGATION CANAL

SCALE

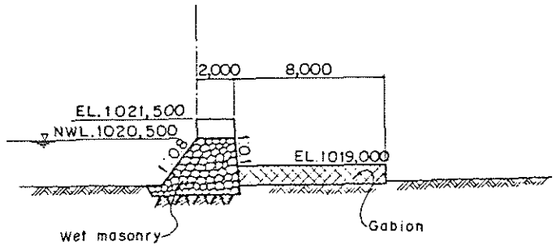
0 100 m

Fig. 4.8 Plan of E-1 site

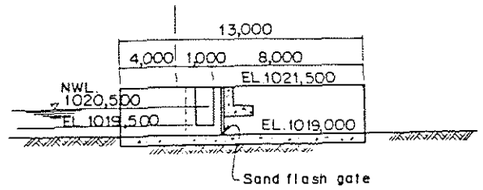
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



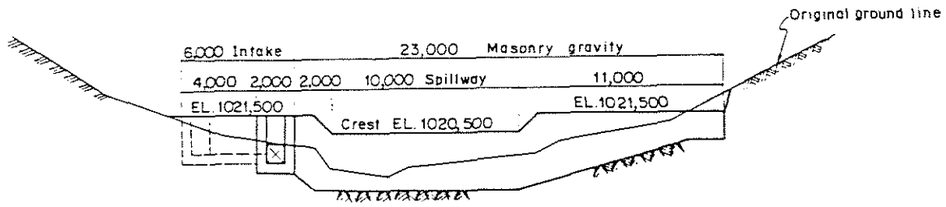
PLAN



SECTION OF MASONRY GRAVITY WEIR



PROFILE OF INTAKE

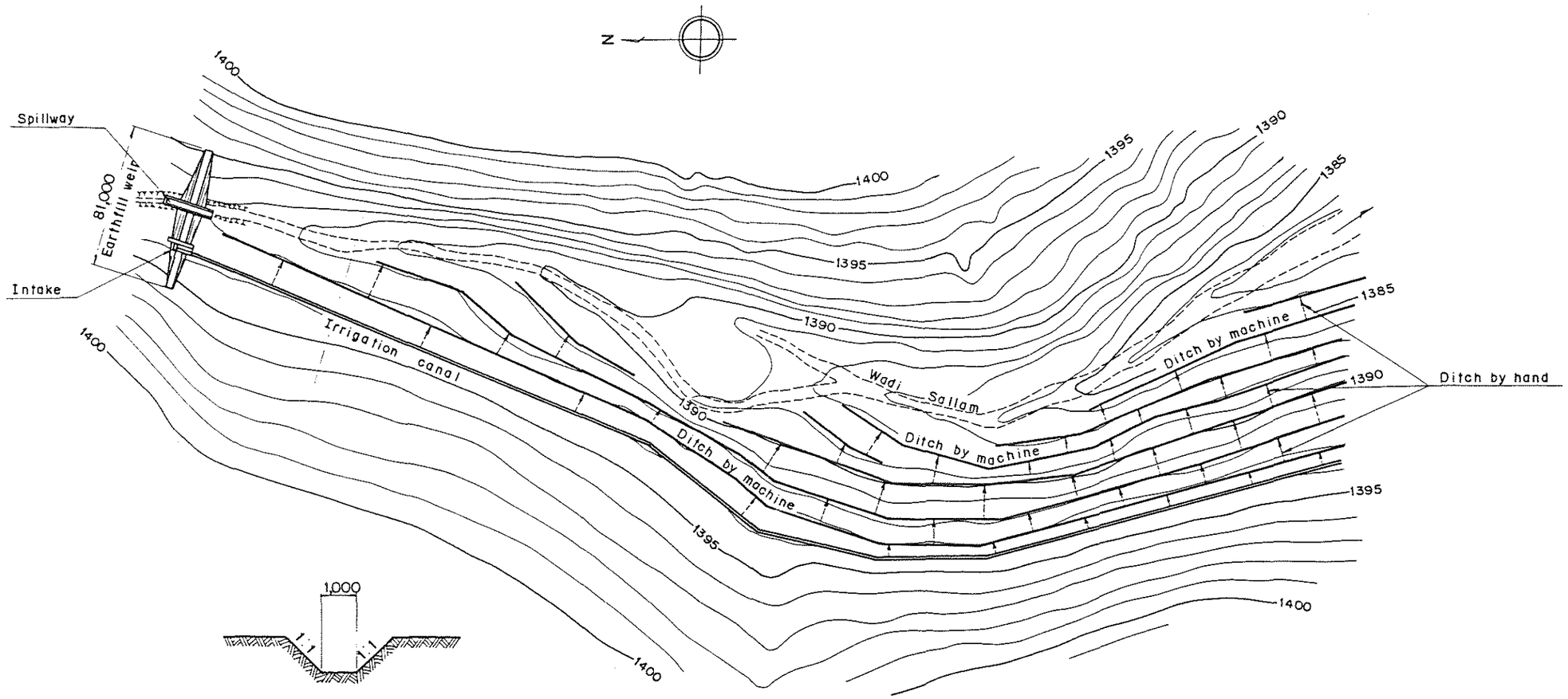


PROFILE

SCALE
0 10m

Fig. 4.9 Wet Masonry Weir of E-1

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY

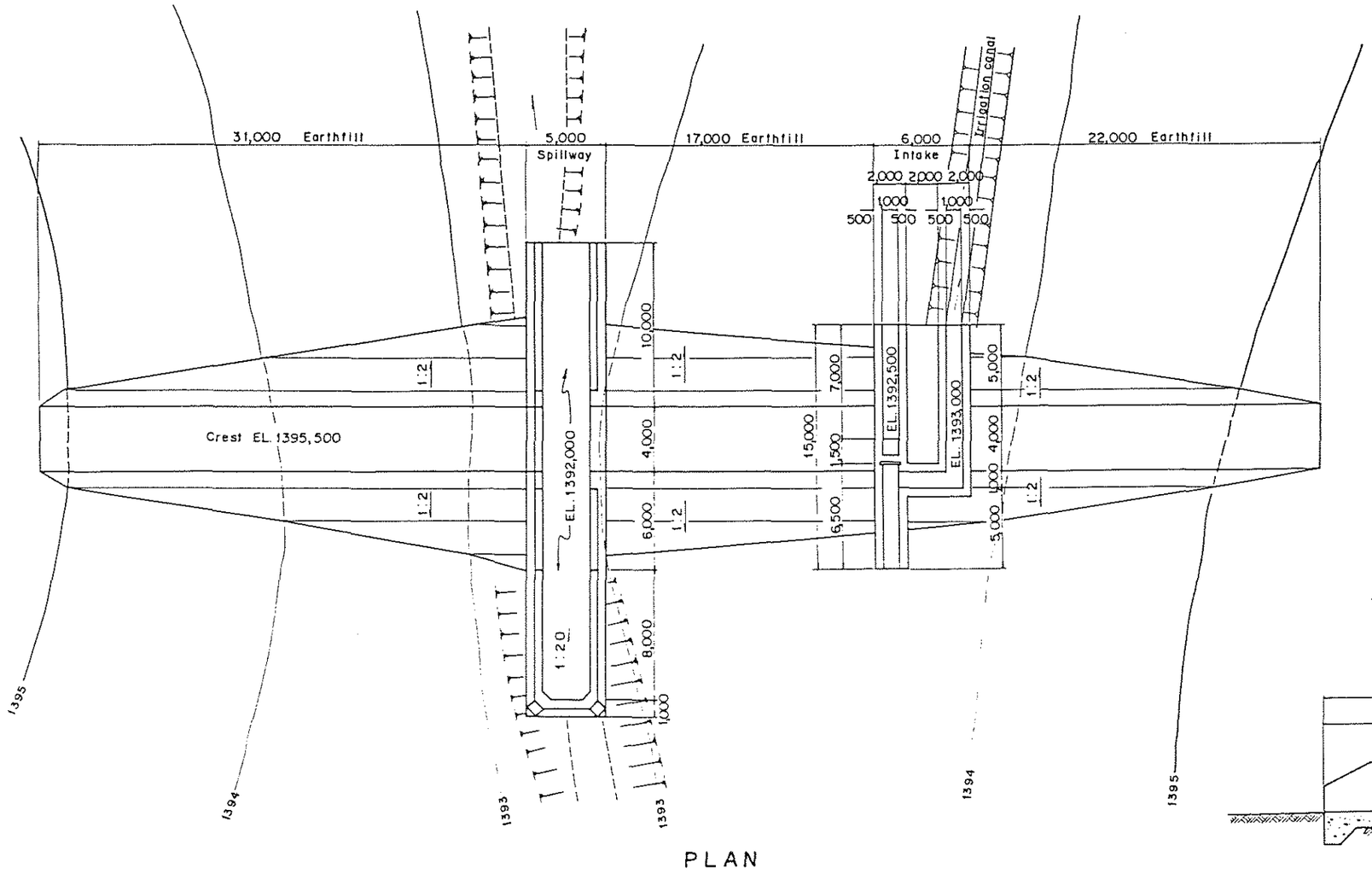


IRRIGATION CANAL

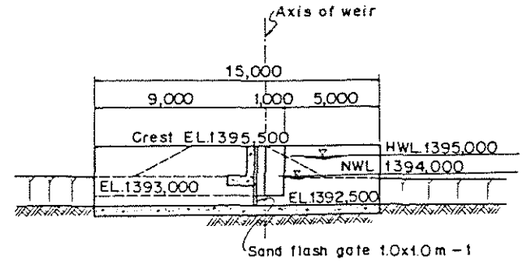
SCALE
0 100 m

Fig. 4.10 Plan of J-1 site

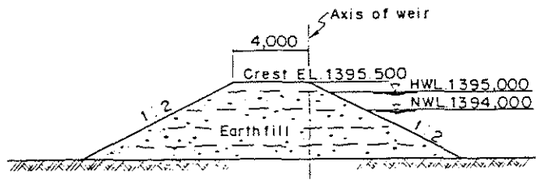
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



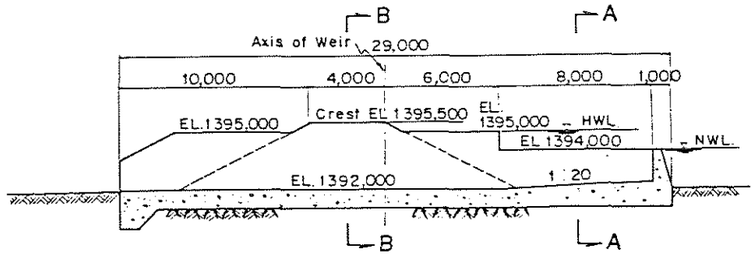
PLAN



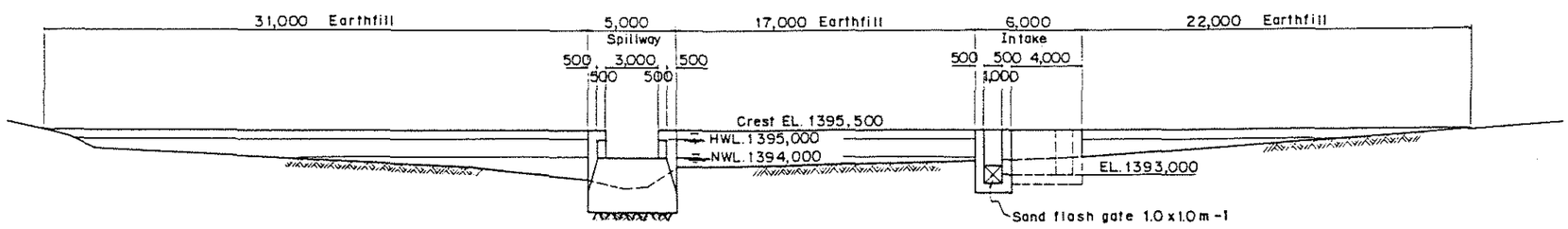
PROFILE OF INTAKE



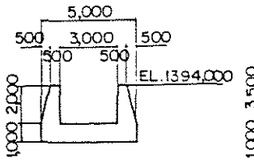
SECTION OF EARTHFILL



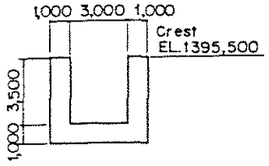
PROFILE OF SPILLWAY



PROFILE



SEC. A-A



SEC. B-B

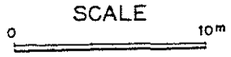


Fig. 4.11 Earthfill Weir of J-1

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY

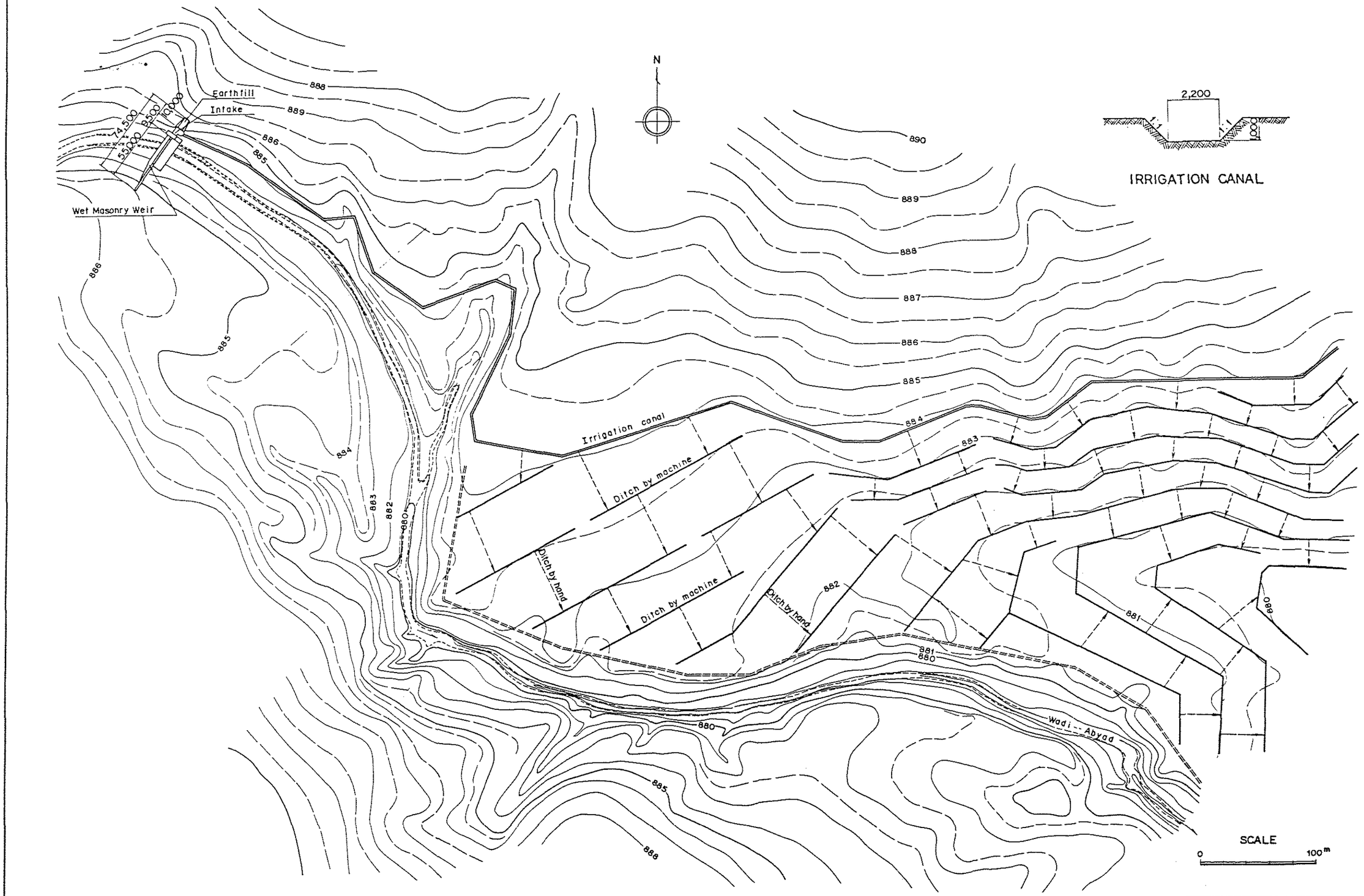
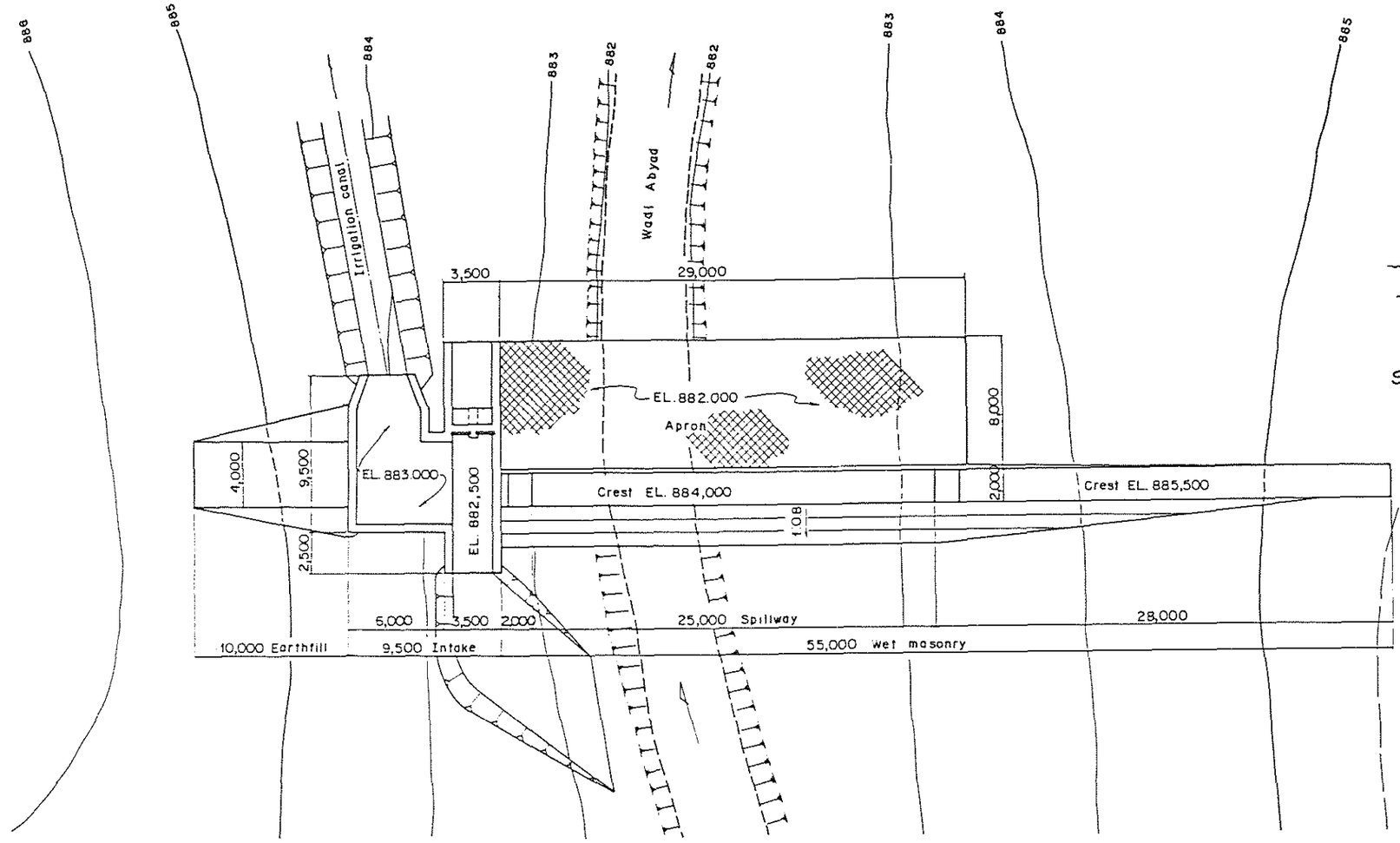
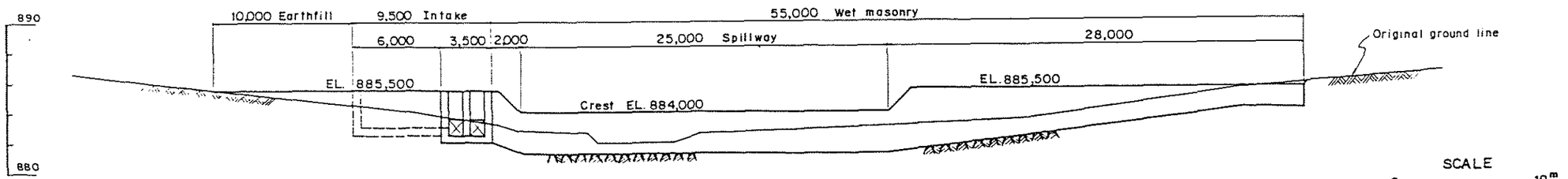


Fig. 4.12 Plan of Abyad Site

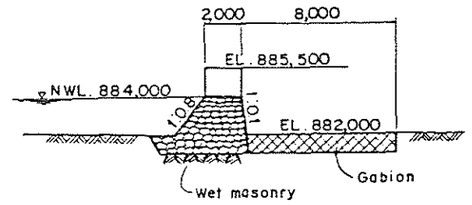
THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY



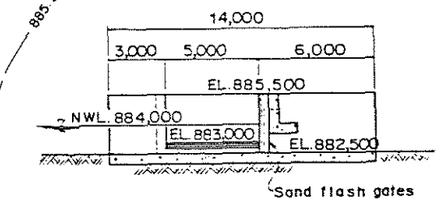
PLAN



PROFILE



SECTION OF WET MASONRY WEIR



PROFILE OF INTAKE

SCALE
0 10 m

Fig. 4.13 Wet Masonry Weir of Abyad

THE HASHEMITE KINGDOM OF JORDAN
FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION
JAPAN INTERNATIONAL COOPERATION AGENCY

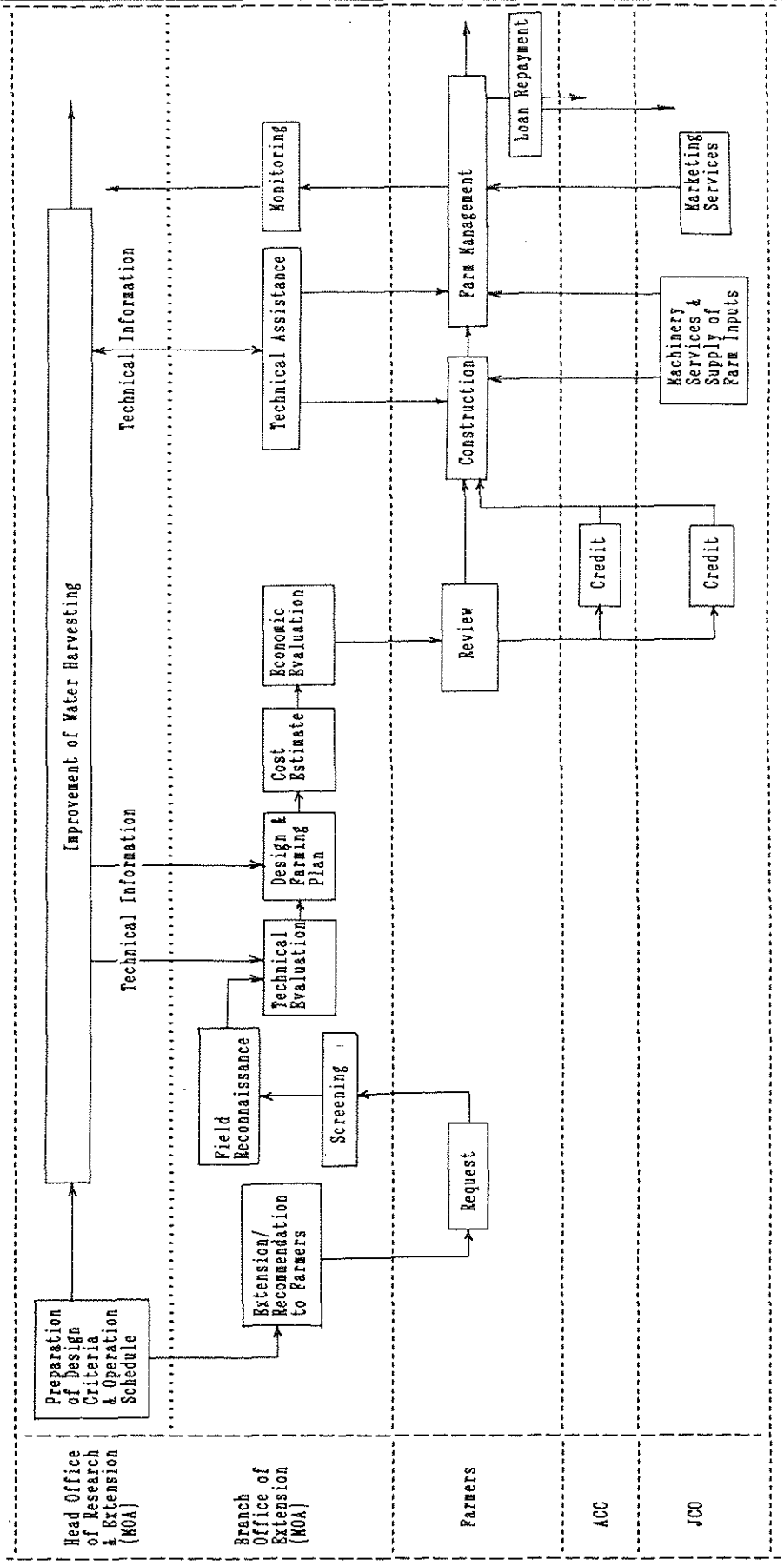


Fig. 4.14 Implementing Procedure - Crop Production Scheme

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

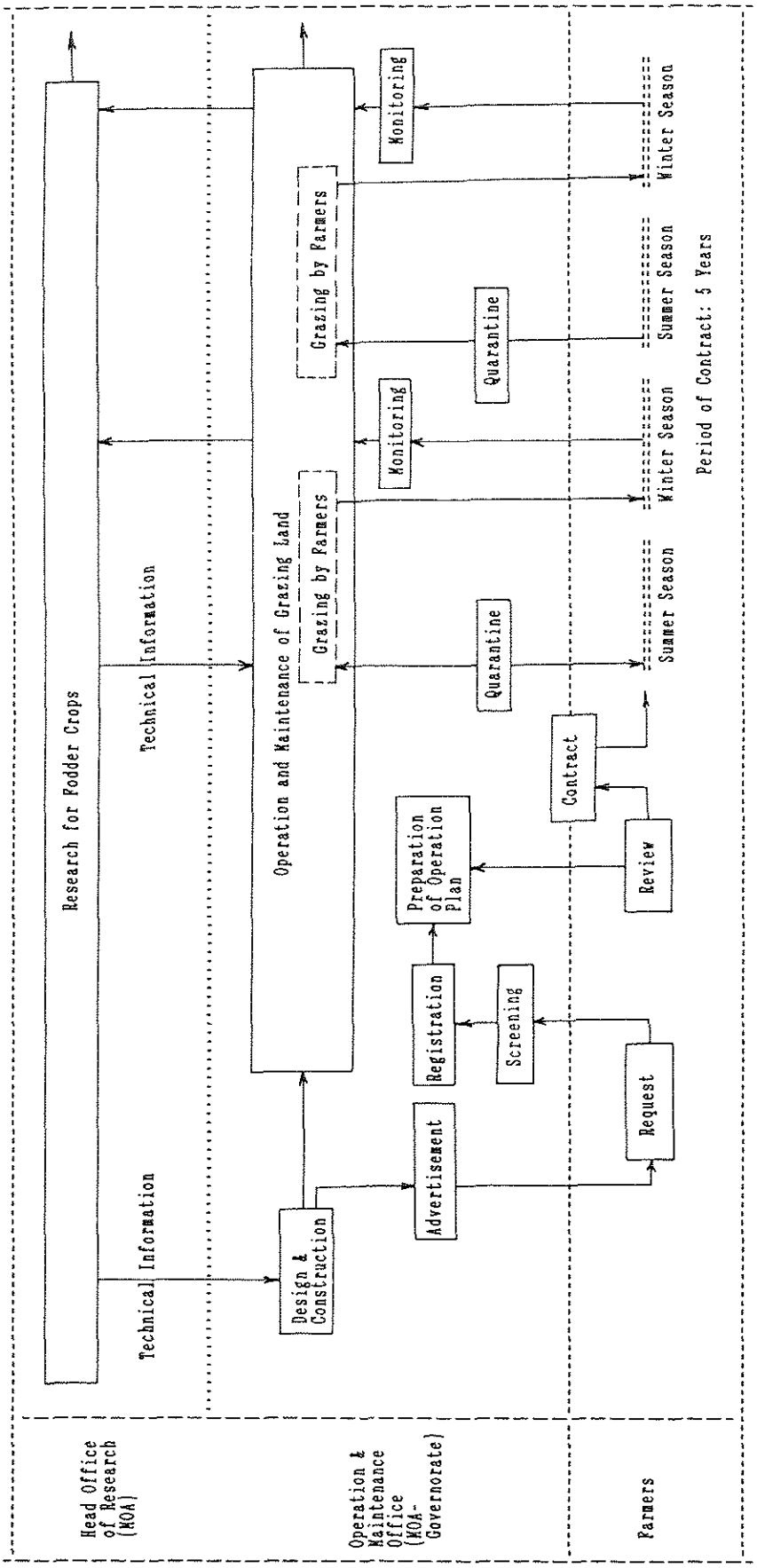


Fig. 4.15 Implementing Procedure - Fodder Shrub Production Scheme

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

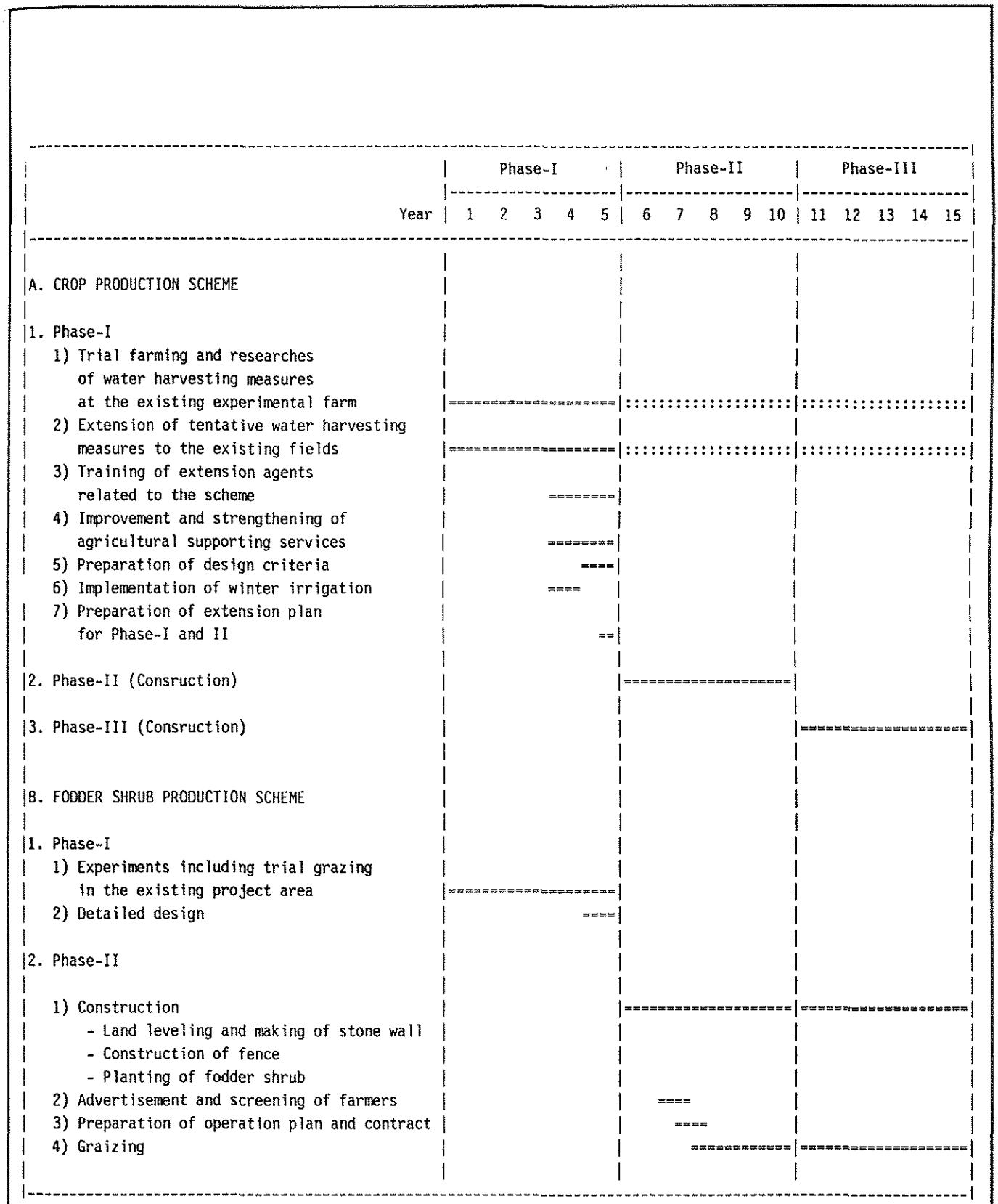


Fig. 4.16 Implementation Schedule

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

ATTACHMENTS

MINUTES OF MEETING

FOR

THE PRELIMINARY STUDY

ON

AGRICUTURAL DEVELOPMENT PROJECT

FOR

THE KARAT-TAFILA DEVELOPMENT REGION

IN

THE HASHEMITE KINGDOM OF JORDAN

Amman, 11 April 1989

Dr Abdul-Ilah abu Ayyash
Director, Regionalplanning
Department
Ministry of planning

岩井孝道

Mr. Takamichi Iwai
Team Leader
Preliminary Survey
Japan International
Cooperation Agency

In response to the request of the government of the Hashemite Kingdom of Jordan, Japan International Cooperation Agency (JICA) sent the prelinimary Study Team for the Agricultural Development Project for the Karak-Tafila Development Region (hereinafter referred to as "the Team") from 3rd to 12th April, 1989.

The Team, headed by Mr. Takamichi Iwai, had a series of discussions with representatives from the Ministry of Planning and other authorities concerned, a list of those who attended is shown in Appendix B, and carried out field reconnaissance survey in the study area.

As a result of discussions and field reconnaissance survey, both sides have agreed on the scope of work and the salient results are as follows:

1. a. The field reconnaissance survey was conducted in Karak-Tafila Development Region on 4th to 6th April, 1989.

   The findings and results were summarized as attached in Appendix A.

   b. Regarding Ain Sara Intake Weir (A.4) in Section 2.1), it is confirmed that the scheme (A.4) will not be included in the F/S because utilization of the spring water affects another project.

c. The dam smaller than 100 thousand cubic meters can be planned except in the watershed of Wala Dam.

2. Ministry of Planning should act as counterpart agency to the Japanese Study Team and also coordinating body in relation with other agency such as, mainly, Ministry of Agriculture and Water Authority in Jordan.

3. MOP requested that the Study Team will provide itself with necessary facilites needed to conduct their work.
The Team promised to convey the request to JICA HDQ.

4. MOP requested to shorten the study period.
The team understood the situation and stated to convey the request to JICA HDQ.

THE RESULTS OF RECONNAISSANCE

The preliminary survey team conducted field reconnaissance during 4th to 6th April in Karak - Tafila Development Region, especially in the areas proposed in the M|P study report. The results of reconnaissance are as follows:-

1. GENERAL

1) Most water harvesting scheme areas along the Desert Highway have annual rainfall not more than 200mm. It will give little possibility of success to apply either microcatchment or contour furrows for fruit and crops in such areas above.

2) Microcatchment may not be quite proper because the trees are planted scatterly against the strong winds here.

3) There have been observed many such cases of rough agricultural management as no treatment is made after planting barley or wheat until harvest in the area having rainfall as much as 300mm.

4) The team could not survey all the sites where the winter irrigation scheme was proposed in the M|P study. Some facilities have little feasibility in the point of techical or cost-benefit asspect.

2. EACH CASE

1) Ain Sara Intake Weir (A-4)

The site is located in the narrow valley, north westward of the city of Karak. There is a quantity of stable spring water. But most of the spring water is delivered to the Karak city as municipal water. Surplus water equivalent to 60M^3|hr flows in the Wadi Karak. There lies farmland of 124ha. on the narrow space on the both banks of the Wadi, where fruits like oranges and lemons, barley, wheat etc... are cultivated. According to the M|P study, the Kammina Dam (A-2) is also proposed upstream to irrigate the farmland of 124Ha. Height of the Kammina dam is 50M, crest length is 104M and the type is the concrete gravity. Construction cost is estimated US$ 15 millions, which benefit from only124ha. can hardly cover. In case the Kammina Dam is not built, surplus spring water only will be diverted at the Ain Sara Intake Weir. It is still expected to have quite a big effect. Therefore, it is proper to carry out further surveys and investigations about the Ain Sara Intake Weir.

cont|....

cont|2....

2) Midden Dam (C-2)

The site is located near from the Guweir town, about 15Km south east of the city of Karak. Many limestones, whose scale is from fist to man's head is scattered in the river-bed at the site, which shows that quite a big flood occurs every now and then. Farmland lies on the steep slope of the both banks. Apples and grapes are cultivated there. People make masonry to prevent soil from erosion, which our counterpart calls 'the stone wall'. According to the plan, height of the Midden Dam is 22M, crest length 142M and construction cost US$ 2.8 millions. Though construction itself is technically possible, there is some difficulty in water storage because of porous geological features of limestone and in cost-benefit matter because of small irrigable area of 75ha. By the way, we saw a farmer drawing up water in the cave manually and irrigating fruit trees. The fact that a cave and groundwater exist denies the possibility of water storage by the dam. Therefore, it is more practical to enlarge irrigable areas and save labour by using a portable pump for the groundwater in the cave rather than constructing a dam.

3) The area about 10Km east of Dhiban

The area is expected to have annual rainfall as much as 300mm, where barley and wheat are cultivated on a large scale. However, farmers commonly manage rough agriculture like no treatment after planting in November or December until harvesting in June in spite of rather good conditions. As a result, yield per hectar is less than 1t. In the Karak Experimental Farm managed by Ms. Sabah Al Majali, they get an average yield of 3.5t|ha. utilizing big machinery, fertilizers and agrochemicals. It may be difficult for ordinary farmers to catch up on the record above in a short time. But it is preferable to promote agricultural extensions and prepare soft loans for purchasing fertilizers and agrochemicals in order to reach the target at least 2t|ha. While it is also considered good to divert fruit from barley and wheat at the relatively steep slope in the area. In this case, it is proper to apply contour furrows proposed in the M|P study, considering a strong wind.

4) East of Tafila city

The water harvesting scheme is proposed as a suitable area for fruit cultivation in the M|P study. Generally speaking the eastern part of the area has less rainfall. So, we would rather limit the area up to about 10km east of Tafila city expecting larger possibility. It is useful to promote the water harvesting scheme within the range above for regional development. By the way, when we asked about matters from a farmer who planted fruit trees three years ago, he was asking about what governmental assistance will be given for insecticides and for electricity supply.

cont|...

5) Tafila Intake Weir

The location is about 10Km east of Tafila City. According to the M/P study, it is proposed to construct an intake weir on the Wadi La'ban. Height of the weir is 2M and crest length is 60m. Construction is technically possible but it may be difficult to store water for a long period because of quick infiltration. The irrigable area will fluctuate year by year in accordance with rainfall and the pattern of rain. Generally speaking, it is difficult to identify an intake weir with an irrigable area in the arid zone. It may rather be proper to understand the intake weir like this facility as useful for recharging groundwater.

6) At the existing Qatrana Dam

We observed the damage by washing away on the coffer dam of the right bank. It is necessary to repair by compacting stones at the toe of the slope. As the pond is deepest at the centre, the Fodder Project has some difficulty in utilizing water when the water level is low. In order to solve the problem, it is proper to dig the canal towards the Fodder Project and to construct the suction tank for pumping with concrete at a suitable place.

3. CONCLUSION

As a result, we propose the following areas:

1. The west of Abiad
2. The east of Dhiban
3. a) the east of Tafila

   b) the Tafila Intake Weir
4. Other areas with similar conditions if found.

Appendix B

Attendance List:

The Jordanian Side

1. Dr. Abdul-Ilah Abu-Ayyash
   Director, Regional Planning Department
   Ministry of Planning.
2. Bolous Kefaieh
   Director, Infrastructure Dept.
3. Mustafa Zahran
   Director, Productive Dept.
4. Taher Asad Jaradat
   Economic Researcher, M.O.P.
5. Osama A. Younes
   Researcher, M.O.P.
6. Lina Jardaneh
   Engineer M.O.P.

The Japaneese Side

1.	T. Iwai	Preliminary Study Team
2.	Y. Shoda	Preliminary Study Team
3.	Y. Okazaki	Preliminary Study Team
4.	Y. Nakagawa	Preliminary Study Team
5.	M. Sekiguchi	Preliminary Study Team
6.	K. Doi	Preliminary Study Team

The Embassy of Japan

Yukiharu Aoki	Embassy of Japan

SCOPE OF WORK

FOR

THE FEASIBILITY STUDY

ON

AGRICULTURAL DEVELOPMENT PROJECT

FOR

THE KARAK - TAFILA DEVELOPMENT REGION

IN

THE HASHEMITE KINGDOM OF JORDAN

AGREED UPON BETWEEN

THE MINISTRY OF PLANNING

AND

JAPAN INTERNATIONAL COOPERATION AGENCY

Amman, April 11, 1989

Dr. Ziad Fariz
Secretary General
Ministry of Planning

岩井孝道

Mr. Takamichi Iwai
Team Leader
Preliminary Survey Team
Japan International Cooperation Agency

I. INTRODUCTION

In response to the request of the Government of the Hashemite Kingdom of Jordan (hereinafter referred to as 'the Government of Jordan'), the Government of Japan decided to conduct the Feasibility Study on Agricultrural Development Project for the Karak - Tafila Development Region in the Hashemite Kingdom of Jordan (hereinafter referred to as 'the Study'), in accordance with the Agreement on Technical Cooperation between the Government of Japan and the Government of Jordan signed on July 16, 1985. (hereinafter referred to as 'the Agreement').

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

The present document sets forth the Scope of Work for the Study.

II. OBJECTIVES OF THE STUDY

The objectives of the Study are to formulate an agricultural development project (Water Harvesting Development Project) for the Karak - Tafila Development Region and to verify technical and economic feasibility of the project.

III. STUDY AREA

The study area covers the west side of the Desert Highway in the Karak - Tafila Development Region. It comprises the west of Abiad, the east of Dhiban and the east of Tafila as well as areas with similar conditions if they are found during the Phase-1 Study.

IV. OUTLINE OF THE STUDY

The Study consists of two Phases.

1. Phase 1

   (1) Review of the Study on Intergrated Regional Development Master Plan for the Karak - Tafila Development Region.

   (2) Collection, review and analysis of relevant basic data, information and basic field survey on the following:-

1) Natural Conditions

   a) Topography

   b) Meteorology and Hydrology

   c) Geology and Hydrogeology

   d) Soil

2) Social Conditions

   a) Population

   b) Social structure of farmers society

   c) Social structure of pastoral tribes society

   d) Regional and national development programmes

   e) Economy

3) Agriculture

   a) Irrigation and Drainage

   b) Land use

   c) Farming

   d) Land ownership

   e) Livestock

   f) Farmers organizations

   g) Farm household economy

   h) Marketing

   i) Supply and demands of agricultural products

   j) Agricultural supporting systems

(3) Identification and evaluation of the development potentials and constrains based on the results of the above survey.

(4) Identification of appropriate sites within the Study areas based on the development potentials.

2. Phase II

(1) Supplementary data collection and detail field survey in the feasibility study area (s).

1) Natural conditions

a) Topography

b) Meteorology and Hydrology

c) Geology and Hydrogeology

d) Soil

2) Social Conditions

a) Population

b) Social Organizations

c) Economy

3) Agriculture

a) Irrigation and drainage

b) Land use

c) Farming

d) Land ownership

e) Livestock

f) Farmers organizations

g) Farm household economy

h) Marketing

i) Agricultural supporting systems

(2) Formulation of the agricultural development project which will consist of the following.

1) Agricultural development plan

2) Plan of Irrigation and other major facilities including Preliminary design.

3) Project implementation plan

a) Schedule of Project implementaion

b) Organization for Project implementation

c) Project operation and management

4) Cost benefit analysis

5) Project evaluation

6) Recommendations

V. STUDY SCHEDULE

The tentative work schedule is shown in the Appendix.

VI. REPORTS

JICA shall prepare and submit the following reports in English to the Government of Jordan.

1. Inception Report

   Thirty (30) copies at the commencement of the Phase 1 Study.

2. Progress Report (I)

   Thirty (30) copies at the end of the field study in the Phase I Study.

3. Interim Report

   Thirty (30) copies at the commencement of the Phase II Study.

4. Progress Report (II)

   Thirty (30) copies at the end of the field study of the Phase II Study.

5. Draft Final Report

   Thirty copies (30) at the end of Phase II study.

   The Government of Jordan shall provide JICA with its comments on the draft final report within one (1) month after the receipt of it.

6. Fianl Report

   Fifty (50) copies within (2) months after the receipt of the comments of the Government of Jordan on the Draft Final Report.

VII. UNDERTAKING OF THE GOVERNMENT OF JORDAN

1. In order to facilitate smooth conduct of the Study, the Government of Jordan will accord privilages, exemptions and other benefits to the Japanese study team in accordance with Agreement and shall take necessary measures:

   1) To secure the safety of the Japanese Study Team

   2) To permit the members of the Japanese study team to enter, leave and sojourn in Jordan for the duration of their assignment therein, and exempt them from alien registration requirements and consular fees.

3) To exempt the members of the Japanese Study Team from taxes, duties, fees and any other charges on equipment, machinery and other materials brought into Jordan for the conduct of the Study.

4) to exempt the members of the Japanese Study Team from income tax and other charges of any kind imposed on or in connection with any emolument or allowance paid to the members of the Japanese Study Team for their services in connection with the implementation of the Study.

5) to provide necessary facilities to the Japanese Study Team for the remittance as well as utilization of the funds introduced into Jordan from Japan in connection with the implementation of the Study.

6) To secure permission to take all data and documents (including photographs) related to the Study out of the Jordan to Japan by the Japanese Study Team.

7) To secure permission for entry into all areas as required for the proper conduct of the Study.

8) To provide medical services as needed. Its expenses will be chargable on the member of the Japanese Study Team.

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

3) The Ministry of Planning (hereinafter referred to as 'MOP') shall act as counterpart agency to the Japanese Study Team and also as coordinating body in relation with other governmental and non-governmental organizations concerned for the smooth implementation of the Study.

4) MOP shall, at its own expenses, provide the Japanese study team with the following, in cooperation with other agencies concerned, if necessary:

(1) Available data and information related to the Study,

(2) Counterpart personnel,

(3) Suitable office in the field,

(4) Credentials or identification cards.

VIII. UNDERTAKING OF JICA

For the implementation of the Study, JICA will take necessary measures.

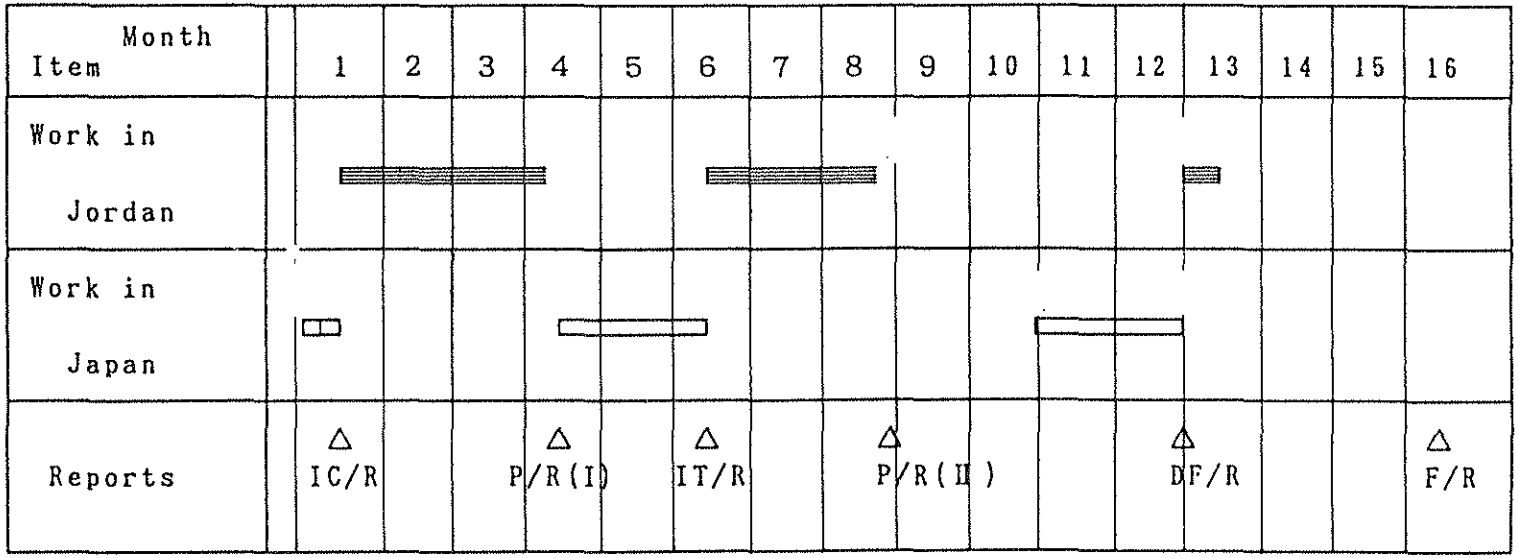
(1) To dispatch, at its own expense, study teams to Jordan

(2) To persue technology transfer to the Jordan counterpart personnel in the course of the Study.

IX. CONSULTATION

JICA and MOP shall consult with each other in respect of any matters that may arise from or in connection with the Study.

Tentative Work Schedule



Remarks

IC/R : Inception Report
IT/R : Interim Report
F/R : Final Report
P/R : Progress Report
DF/R : Draft Final Report

MINUTES OF MEETING

THE INCEPTION REPORT OF THE AGRICULTURAL DEVELOPMENT PROJECT, THE KARAK-TAFILA DEVELOPMENT REGION

Japan International Cooperation Agency (JICA) sent a study team for the captioned study on October 1, 1989. The team and Jordanian authorities concerned discussed the inception report in a meeting room of the Ministry of Planning on October 17, 1989. Lists of the participants in the meeting and contacted persons are attached to Annex 1 & 2.

The salient results of the meeting are as follows:-

1. Jordanian side principally accepted the inception report submitted by the team.

2. The Jordanian side stresses priority for small and medium-scale projects with strong orientation toward the private sector.

3. The Jordanian side expects analytical and problem-oriented reports.

Dr. Abdul-Ilah Abu-Ayyash
Director of Regional Planning
Ministry of Planning

Takayoshi Yamazaki
Leader
JICA Study Team

Witnessed by

Teruhisa Nanba
JICA Supervisor

Annex I

List of Participants

Jordanian Participants:-

Name	Position
Dr. A. Abu-Ayyash	Director of Reginal Plannig Dept (RPD), Ministry of Planning (MOP).
Boulos Kefaya	Director, Infrastructure Department-Mop.
Sami Tuffaha	Director, Irrigation, Water Authority
S. Wahsheh	Director, Irrigation, Jordan Valley Authority (JVA).
Ragheb Shammout	Director,National center of Agriculture research and Technology Transfer (NCARTT), Ministry of Agriculture (MOA).
Lina Jardaneh	Engineer, Infrastructure Dept (MOP).

Iyad Hussein	Engineer, Infrastructure Dept.
Halimeh Sa'adeh	Researcher, RPD-MOP.
Khaled Tarauneh	Engineer, RPD-MOP.
Osama Younes	Researcher, RPD-MOP.
Taher Jaradat	Researcher, RPD-MOP.
Basel Abdel Hamid	Lands and Survey Dept.
Jamal Khitan	Ministry of Agricultur/ Karak.

Japaneas Participants:

T. Namba	JICA Supervisor
T. Yamazaki	Team Leader
	Team.
F. Watanabe	Civil Engineer, JICA Study Team.
H. Ikewada	Agronomist, JICA Study

Annex II

NAMES OF PERSONS CONTACTED

1. Ministry of Planning

   Secretary General: Dr. Safwan Toukan

   Director of Regional Planning Department: Dr. Abdul-Ilah Abu-Ayyash

   Director of Productive Sector: Mr. Mustafa Zahran

   Director of Infrastucture: Mr. Bouless Kefayah

   Staff of Regional Planning:

   Eng. Khaled Tarawneh

   Taher Jaradat

   Osama Younes

   Halimeh Sa'adeh

2. Ministry of Agriculture

   Secretary General: Dr. Samy Sona'a

   Agr. Engineer. Eng. Ragheb Shammout:

3. Water Authority of Jordan

   Secretary General: Mu'ataz Belbesi

   Director of Irrigation: Sami A. Tuffaha

   Director of Infrastructure.

MINUTES OF MEETING
ON
THE INTERIM REPORT OF THE AGRICULTURAL
DEVELOPMENT PROJECT IN THE KARAK-TAFILA
DEVELOPMENT REGION

Japan International Cooperation Agency (JICA) sent a study team for the captioned study on October 1, 1989. The team made surveys on the present agricultural conditions, identified potential and constraints for the agricultural development, and formulated a preliminary plan of the development for the region. The results of the studies were compiled in the interim report and submitted to the government of Jordan in March.

The team and Jordanian authorities concerned discussed the interim report in a meeting room of the Ministry of Planning on March 6, 1990, under the chairmanship of Dr. A. I. Abu-Ayyash, director of Regional Planning, Ministry of Planning.

A list of the participants in the meeting was attached to Annex I.

The salient result of the meeting are as follows:

1. Jordanian side principally accepted the interim report submitted by the team. The comments made by the Jordanian side were summarized in Annex II and will be taken into consideration in the Draft Final Report.

2. The Draft Final Report will be submitted to Jordanian Side in August 1990.

March 7, 1990, Amman

Takayoshi, YAMAZAKI
Team Leader
JICA Study Team

Dr. A. I. Abu-Ayyash
Director of
Regional Planning
Ministry of Planning

Witnessed by

Y. Nishikawa
JICA Supervisor

Annex I. List of Participants

Name	Position
A. Jordanian Side:	
1) Ministry of Planning	
Dr. A. I. Abu-Ayyash	Director of Regional Planning Dept. (RPD)
Mr. Boulos Kefaya	Director of Infrastructure Department(ID)
Mr. M. Zahran	Director of Production Department(PD)
Eng. Samar Juma'an	PD
Eng. Yanal Khassawneh	PD
Miss Halimeh Sa'adeh	RPD
Mr. Mahmoud Qatarneh	RPD
Mr. Osama Younes	RPD
Eng. Iyad Hussein	ID
Mr. Taher Jaradat	RPD
Eng. Benitta Sa'ad	ID
2) Ministry of Agriculture:	
Eng. Ragheb Shammout	National Center of Agriculture Research and Technology Transfer
3) Ministry of Water and Irrigation:	
a. Water Authority:	
Eng. Sami Tuffaha	Director, Irrigation
Eng. Rakad Ayed	
b. Jordan Valley Authority:	
Mr. Suhail Wahsheh	Director, Irrigation
4) Jordan Cooperative Organization:	
Dr. Mohammed Masalha	Assistant General Director, Projects Director.
5) Land and Survey Department:	
Eng. Mahmoud Amer	
B. Japanese Side:	
Mr. Takayoshi Yamazaki	Team Leader
Mr. Tadaharu Murono	Project Economist
Mr. Hisashi Ikewada	Agronomist
Mr. Fusao Watanabe	Civil Engineer
Mr. Y. Nishikawa	JICA Supervisor

Annex II. Comments by Jordanian Side

TECHNICAL

1. From the standpoint of environmental aspects, some counter measures for soil erosion must be considered to the sloping land with over 30%.

2. Some kind of soils can support wheat and fruit crops even with a soil depth of less than 50cm. This should be taken into consideration in the land evaluation.

3. Figs should be taken as the recommendable crop for the project.

SOCIAL

1. Social factors such as generation of job opportunities, mitigation of imbalance in income between regions, should be taken into account in project evaluation, because economic efficiency such as IRR is not the absolute criteria for the project evaluation.

2. Institutional and organizational woman role should be further explored to promote more local participation and to compensate for the labour shortage in the area.

ORGANIZATIONAL

1. A coordinating body consisting of Ministry of Agriculture, Water Authority and Jordan Cooperative Organization should be formulated to implement the proposed activities and measures in the project.

2. It can be suggested that the following point is included in the study of project implementation. "The water harvesting farmers should be the member of JCO." Furthermore, necessity of the marketing services, improvement of accesses for transportation of products, strengthening of farm machinery services are also included in the study.

3. The study of the time schedule for project implementation will be included in the draft final report.

MINUTES OF MEETING
ON
FEASIBILITY REPORT ON
THE AGRICULTURAL DEVELOPMENT PROJECT FOR
THE KARAK-TAFILA DEVELOPMENT REGION

Japan International Cooperation Agency (JICA) sent the Study Team in order to present the Draft Final Report on the Agricultural Development Project on the Karak-Tafila Development Region (The Report) to the Jordanian authorities concerned. The Study Team and the Jordanian counterparts held the discussion on the Report in the meeting room of the Ministry of Planning on July 30,1990, under the chairmanship of Dr. A.I. Abu-Ayyash, Director of Regional Planning, Ministry of Planning. A list of the participants in the meeting is attached to Appendix-1.

Following the official opening by the Chairman, the Leader for the JICA Study Team, Mr. T.Yamazaki, was requested to make a presentation of the Report. All the participants were invited to scrutinize and comment on the Report. The salient results of the meeting are as follows:-

1. For the official comments arising from the Interim Report submitted in March 1990 (Appendix-2), the JICA Study Team made the further review and in-depth study through the home office work in Japan. All the comments from the Jordanian side were studied and incorporated into the Report.
2. Based on the joint meeting between the Jordanian side and the Japanese side, the Jordanian side accepted the Draft Final Report. The further comments on the Report, if any, will be fully taken into account in the Final Report. The final comments will be officially sent to JICA within one (1) month period. The Final Report will be submitted to Ministry of Planning by the end of October, 1990.

July 30, 1990 Amman

Dr.Abdul-Ilah Abu-Ayyash
Director of Regional Planning
Ministry of Planning

Takayoshi Yamazaki
Team Leader for
The JICA Study Team

Witnessed by

Yoshiaki Nishikawa
JICA Supervisor

Appendix - 1

Name of Participants

I.	Jordanian Side:	
1)	Dr. Abdel Ilah Abu-Ayyash	Director of Regional Planning Department/ MOP
2)	Dr. Moussa Khamis	MOP/RPD
3)	Taher Jaradat	MOP/RPD
4)	Dr. Hussein Al-Khatib	Manpower Department MOP
5)	Eng. Ragheb Shamoot	MOA
6)	Eng. Jamal Khitan	MOA/Karak
7)	Mr. Brian Keane	UNDP/ILO
8)	Eng. Benitta Saad	MOP/RPD
9)	Eng. Mahmoud Al-Qatarneh	MOP/RPD
10)	Miss. Halimeh Saadeh	MOP/RPD
11)	Eng. Mahmoud Amer	Land and Survey Department
12)	Eng. Eyad Hussein	MOP/ID
13)	Eng. Muna Juwhary	MOP/ID
14)	Eng. Samar Jumei'an	MOP/PD
15)	Eng. Yanal Al-Khasawneh	MOP/PD
16)	Eng. Ghasy Kanaan	Jordan Cooperative Organization
17)	Miss. Hyam Kalimat	MOP/RPD

18)	Mr. Hayel Al-Khasawneh	MOP

II. Japanese Side:

A. Study Team:

1)	Mr. Takayoshi Yamazaki	Team Leader
2)	Mr. Masayuki Koyama	Landuse Planner

B. JICA Headquarters:

1)	Mr. Yoshiaki Nishikawa	JICA Supervisor

Comments on the Interm Report of the Study Entiteld "Agricultural Development Project on Karak-Tafelah Region" Submitted on March 1990 By JICA Team

1. Comments of Ministry of Planning:

A) Productive Department:

1) The southern region is characterized by livestock farming. To develope this sector concentration should be on, providing enough feeds and veterinary services...etc.

2) Land fragmentation is a major problem for agricultural development, therefore, more attention should be given to it.

3) Studying the possibility of increasing the number and efficiency of the cooperative organizations for providing the farmers with essential inputs in the fields of agricultural production and Agroprocessing.

4) It was proposed to plant both of wheat and barely, while, judging by the amout of rainfall and the salinity, we strongly reccomend the plantation of barely only, for its feasibility.

5) As mentioned, the region is located withen the semiarid zone, besides the dominant productive sector is livestock farming so one expect that great attention should be paid to fodder shrubs more than any other kind of

plants in order to overcome the shortage of animal feed.

6) Project impact should be measured based on its socio-economic impact, rather than on pure cost effectivness. Asound justification should be clarified and varified.

7) The plantation density per hectare mentioned in the report is as follows:

Rainfall/Year	Planting Density (Tree/ha)		
	Olive	Grapes	Apricots
100-150 mm	5	44	3
150-200 mm	6	61	5
200-250 mm	8	79	6

We can conclude here that the plantation density is very low and is not feasible to the farmer.

B. Infrastructure Department:

1) The exclusion of lands with less than 50 cm of top soil will reduce the available areas considerably. Certain agricultural produce such as wheat requires less than 50 cm of top soil. Furthermore, calcareous soils under thin soil covers, could also be utilized for planting trees and should be considered in this project.

2) The areas between 200 and 300mm rainfall proposed to be planted with wheat are not suitable for such activity because wheat requires between 500 and 600mm of rainfall.

3) The study did not cover the accessibility to land and markets.

4) The study did not cover capital cost and maintenance versus benefits to the farmers. This is very important because if no benefits are expected by the farmers they will not participate in this development.

5) On page 5 of the Summary of presentation is the production of olives of 20.8kg per plant as an average since olive produces good quality for one year and almost nothing the next.

6) In the selection of agricultural produce for this project future requirements of fruits, fodders, etc. should be considered in light of the increasing population.

II. Coments of:

Ministry of Agriculture:

1) Wheat shouldn't be planted in areas of less than 300m average annual rainfall. Barley could be more suitable under such conditions. Because rain is seasonal in the area, and the wheat (if grown) is so small that one can hardly harvest. It is also possible to grow fodders like vetch and vetch common in the agricultural circle with barley and summer crops.

2) It is better to grow figs & grapes instead of apples besides olives when using collective basins for water harvesting or small soil dams because of the wet soil scalation around apples stem could cause it's damage.

3) Better concentrate on growing pistachois and select good kinds in the areas of 180-250m, annual rainfall by using water harvesting techniques to provide the right amount of water. We should say here that the Badia area (the area between the rainy mountains and the dry area) is the best area to grow pistachios as it needs 450 cold hours in winter and very hot environment in Summer in order to ripe. The tree needs low humidity in April.

This area shows to be the best place to grow pistachios and the studies of the Arabic Centre for the studies of arid areas proved that growing it is feasible and is sold at high prices.

4) It is recommended not to construct retaining walls in areas where the soil is flat (and the depth does not exceed 50 cm) and the slope does not exceed 15% (in order to avoid exposing soils to erosions by water and its substitution by the soils layers down below.

5) It is recommended to take soil sample from different depths in order to conduct further laboratorial analysis, which include laboratorial experiments and measuring the impact of fertilizers, (class quantity for each crop) before recommending there utilization for different kind of crops.

6) It is recommended to concentrate on growing ediple cactus, since this tree could help in preserving soils and formulation of chains which could substitute fences, in addition to its tuicy fruits, which is in great demand. One should not forget that cactus leaf after drying it up could be used to fed animals, besides this tree could grow in several weather conditions

III. Comments of Ministry of Water and Irrigation:

1) Studying the impact of the proposed projects to the regional environment.

2) Cleaning the desert dams (Qatrana and Sultani) from the sediments to increase their efficiencies.

3) An extensive plan should be prepared for water harvesting particularly in the Gevernmental lands.

4) Conduct study on soil conservation in different techniques.

5) The use of agricultural machinery should be coincided with the type of soil to conserve water and soil from erosion.

6) In case of executing such projects, an official committee consisting of Ministry of Agriculture and Ministry of Water and Irrigation should be involved to supervise and execute these projects.

7) Relying on the extremes of the run off coefficient for the studied wadis instead of using one number, which is proposed in the report as, 7.9%.

8) The parameters used for the computations of the flood runoff were not well-defined in the report, should be reviewed.

9) The recommended projects should be coherent with the executed or the adopted projects relying on the same resources.

IV. Comments of Jordan Co-Operative Organization

1) Concentrate on the rule of Co-operative Societies in an agricultural development in the study region of (Karak/Tafila)

2) Concentrate helping farmers and the subsided scheme in agricultural projects in that area, so that to avoid any financial risk for implementation by farmers.

3) To strengthen machine services capacity of Co-operative movements in this region, in particular Tafila, whereas the J.C.O. is planning to have a machinery sub-station there.

4) The woman must be given a role in any agricultural Development plan for this area, choosing appropriate projects that women can be recruited, ie., bee-keeping, aqua-culture (fishing) and pickling.

5) To follow up the stratergy of multi-site development projects on a complimentary basis, ie. to have rangeland project with fattening project with fodder growing, which will work together as a tool or instrument for development of this area.

6) I do fully agree with the conclusion of the team report that there should be a credit

scheme by re-lending institutions to attract farmers attention by soft loans, with less interest charged and longer payments and grace periods, because the benefits in these regions are very low.

7) The fodder rangeland in Tafila area must be handled in such a way in co-ordination with Ministry of Agriculture and J.C.O. in government land on the basis of community usage of this land for grazing of the sheep raisers in these areas.

8) Finally, but most important, the water harvesting projects on a small or large scale can be implemented by the concerned agricultural parties, from the government side and the private sectors side, including J.C.O. and CO-operative Societies to help in growing fodder shrubs for sheep raisers use (drinking) and even to recharge ground water reserves.

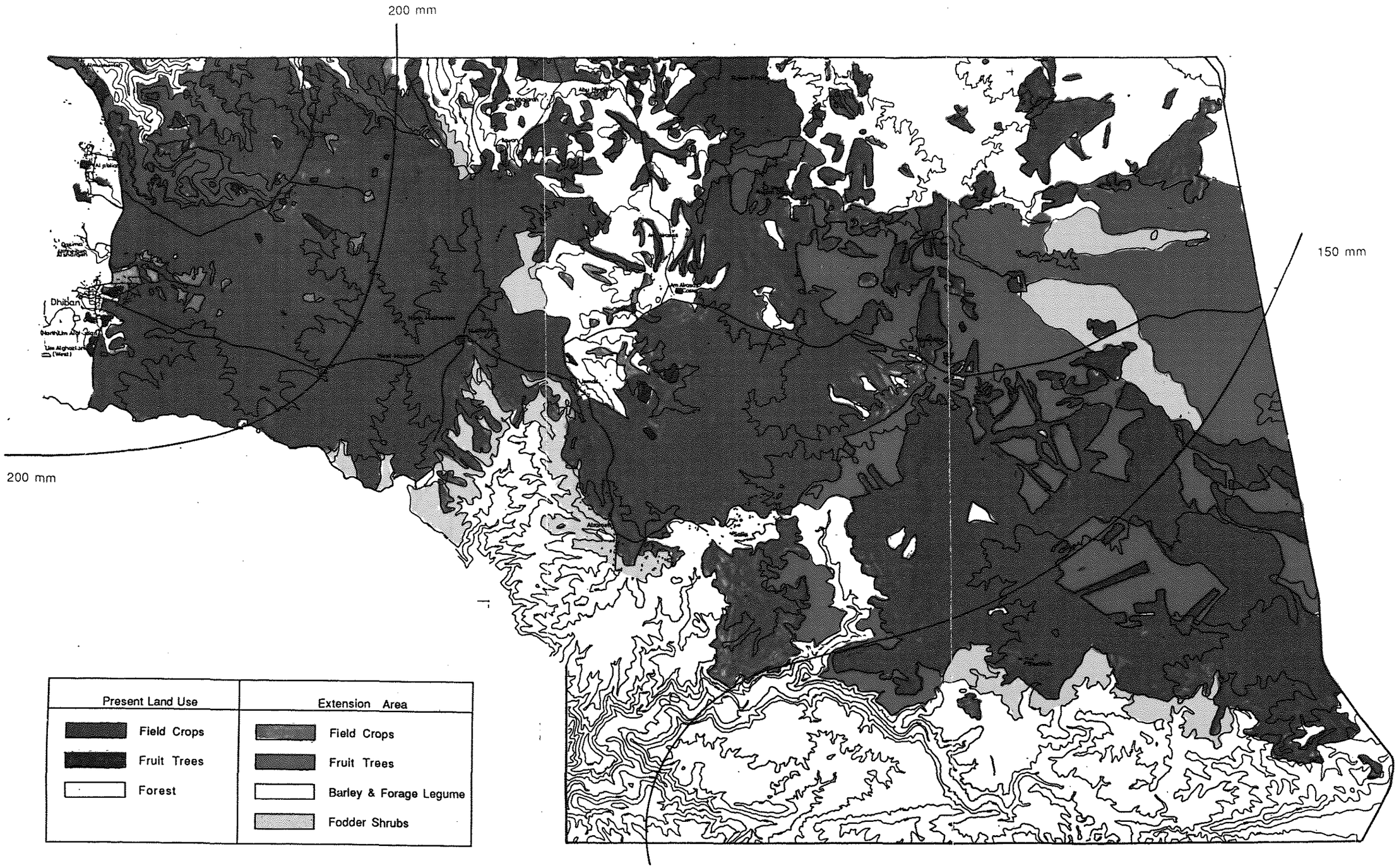


PLATE 1 LAND USE PLAN OF DHIBAN

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK-TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY

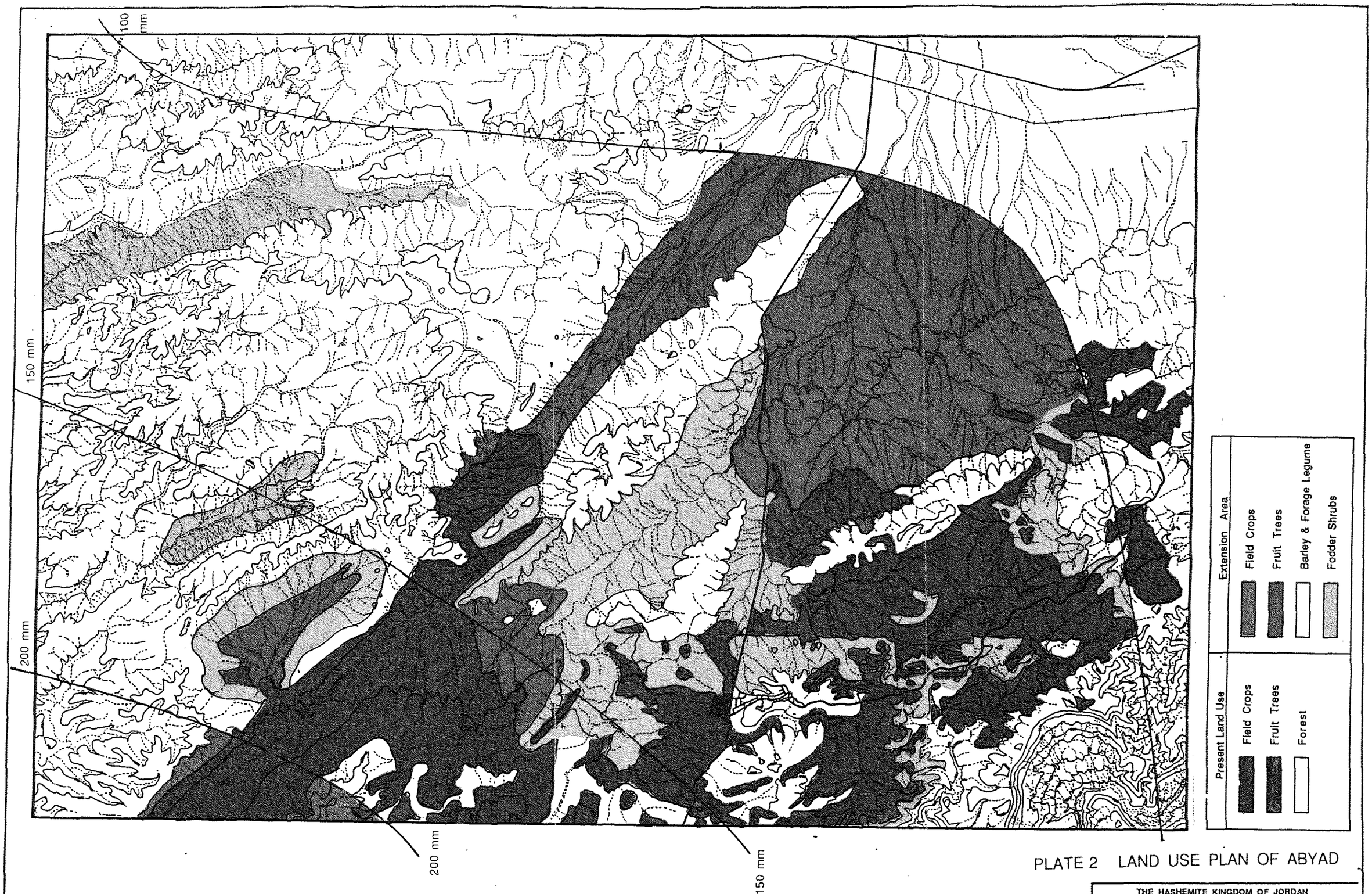
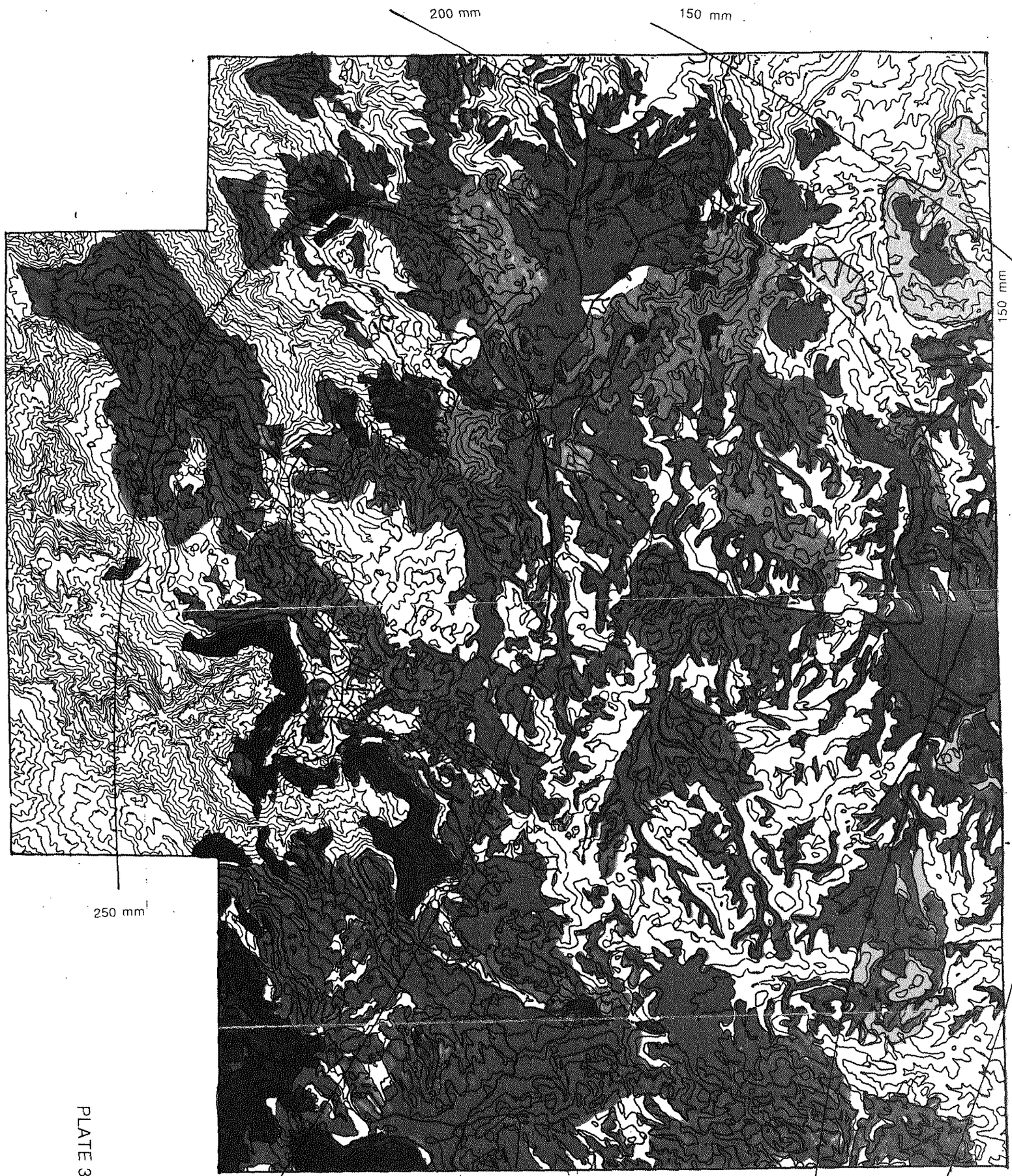


PLATE 2 LAND USE PLAN OF ABYAD

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY



Present Land Use	Extension Area
Field Crops	Field Crops
Fruit Trees	Fruit Trees
Forest	Barley & Forage Legume
	Fodder Shrubs

PLATE 3 LAND USE PLAN OF TAFILA

THE HASHEMITE KINGDOM OF JORDAN

FEASIBILITY STUDY ON AGRICULTURAL DEVELOPMENT FOR THE KARAK - TAFILA DEVELOPMENT REGION

JAPAN INTERNATIONAL COOPERATION AGENCY