

Table 8 CASH FLOW STATEMENTS

(Unit: 1,000 US\$)

Year	Capital Cost		Loan Repayment		Cash Inflow		Cost of SCIS		Cash Outflow		Balance	
	FC	LC	Interest	Principal	O & M	Replacement	Total	FC	LC	Revenue		Total
1	6,034	2,926	287	0	0	0	9,247	6,034	2,926	0	8,960	-287
2	53,697	45,826	2,837	0	0	0	102,360	53,697	45,826	0	99,523	-2,837
3	71,440	67,639	6,231	0	5,414	0	150,724	71,440	67,639	5,414	144,493	-6,231
4	56,331	49,693	8,906	0	9,625	0	124,555	56,331	49,693	9,625	115,649	-8,906
5	0	0	8,906	0	9,625	0	18,531	0	0	9,625	9,625	-8,906
6	0	0	8,906	0	9,625	0	18,531	0	0	9,625	9,625	-8,906
7	0	0	8,906	0	9,625	0	18,531	0	0	9,625	9,625	-8,906
8	0	0	8,412	10,417	9,625	0	28,453	0	0	9,625	9,625	-18,828
9	0	0	7,917	10,417	9,625	1,656	29,615	0	0	9,625	9,625	-19,990
10	0	0	7,422	10,417	9,625	0	27,464	0	0	9,625	9,625	-17,839
11	0	0	6,927	10,417	9,625	0	26,969	0	0	9,625	9,625	-17,344
12	0	0	6,432	10,417	9,625	0	26,474	0	0	9,625	9,625	-16,849
13	0	0	5,938	10,417	9,625	0	25,979	0	0	9,625	9,625	-16,354
14	0	0	5,443	10,417	9,625	4,401	29,886	0	0	9,625	9,625	-20,261
15	0	0	4,948	10,417	9,625	0	24,990	0	0	9,625	9,625	-15,365
16	0	0	4,453	10,417	9,625	0	24,495	0	0	9,625	9,625	-14,870
17	0	0	3,958	10,417	9,625	0	24,000	0	0	9,625	9,625	-14,375
18	0	0	3,464	10,417	9,625	0	23,505	0	0	9,625	9,625	-13,880
19	0	0	2,969	10,417	9,625	1,656	24,667	0	0	9,625	9,625	-15,042
20	0	0	2,474	10,417	9,625	0	22,516	0	0	9,625	9,625	-12,891
21	0	0	1,979	10,417	9,625	0	22,021	0	0	9,625	9,625	-12,396
22	0	0	1,484	10,417	9,625	0	21,526	0	0	9,625	9,625	-11,901
23	0	0	990	10,417	9,625	0	21,031	0	0	9,625	9,625	-11,406
24	0	0	495	10,417	9,625	38,226	58,763	0	0	9,625	9,625	-49,138
25	0	0	0	10,417	9,625	0	20,042	0	0	9,625	9,625	-10,417

Remarks: FC: Foreign Currency

LC: Local Currency

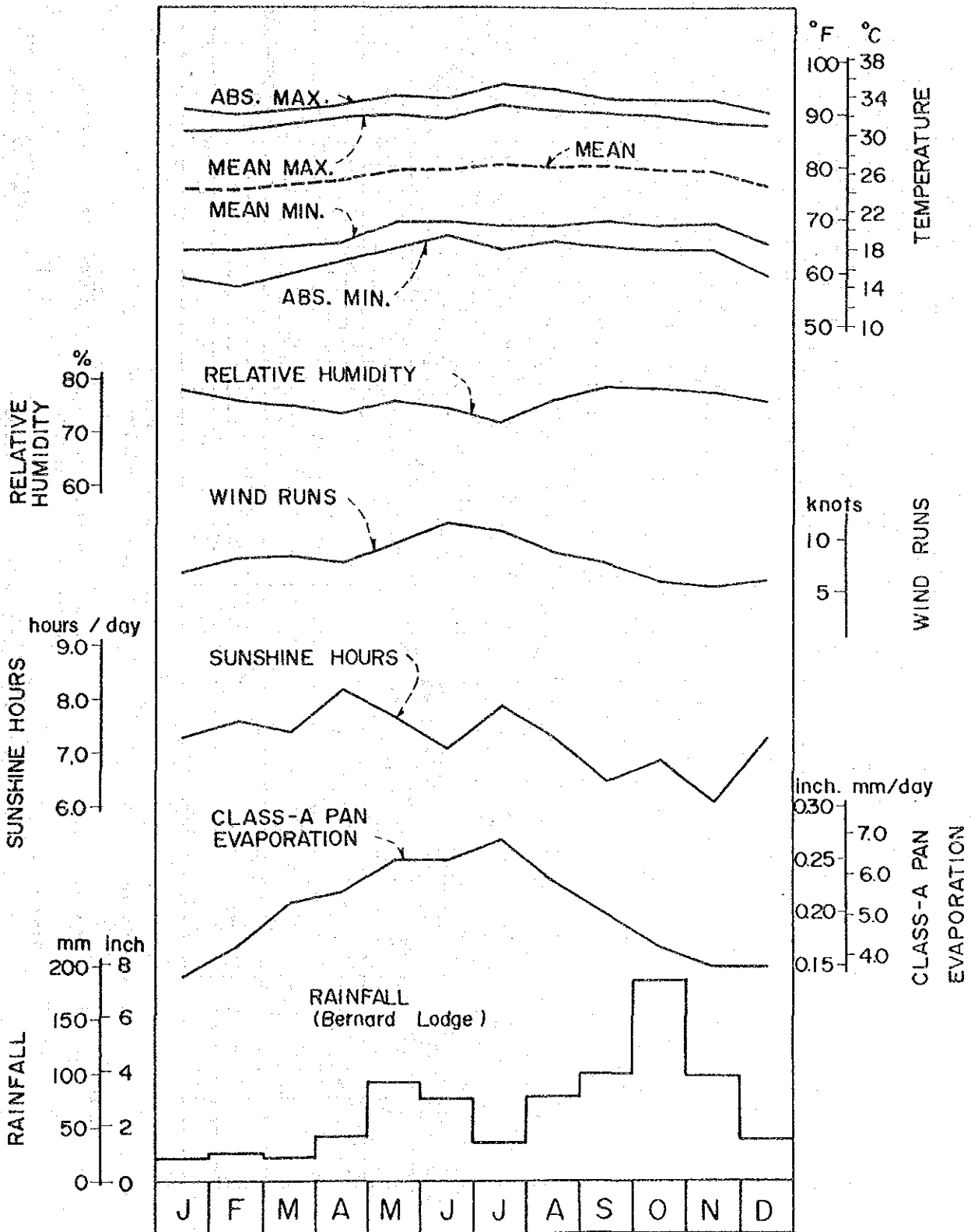
Condition of Loan Repayment;

Interest = 4.75%

Grace Period = seven (7) years

Repayment Period = 25 years including seven (7) years grace period

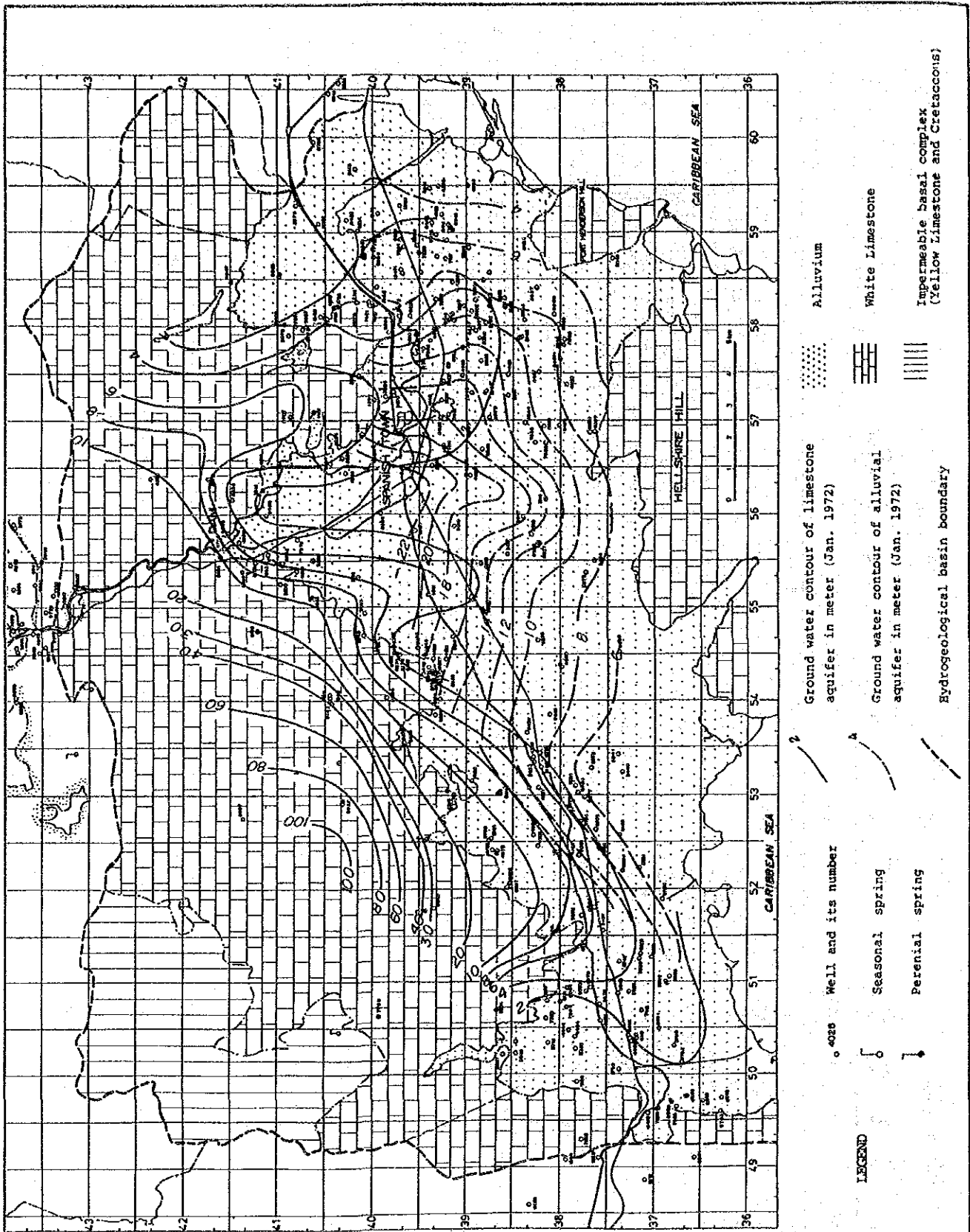
FIGURES



THE MODERNIZATION AND EXPANSION OF THE RIO COBRE IRRIGATION SCHEME

Fig. 1
CLIMATIC FEATURES OF THE STUDY AREA

JAPAN INTERNATIONAL COOPERATION AGENCY



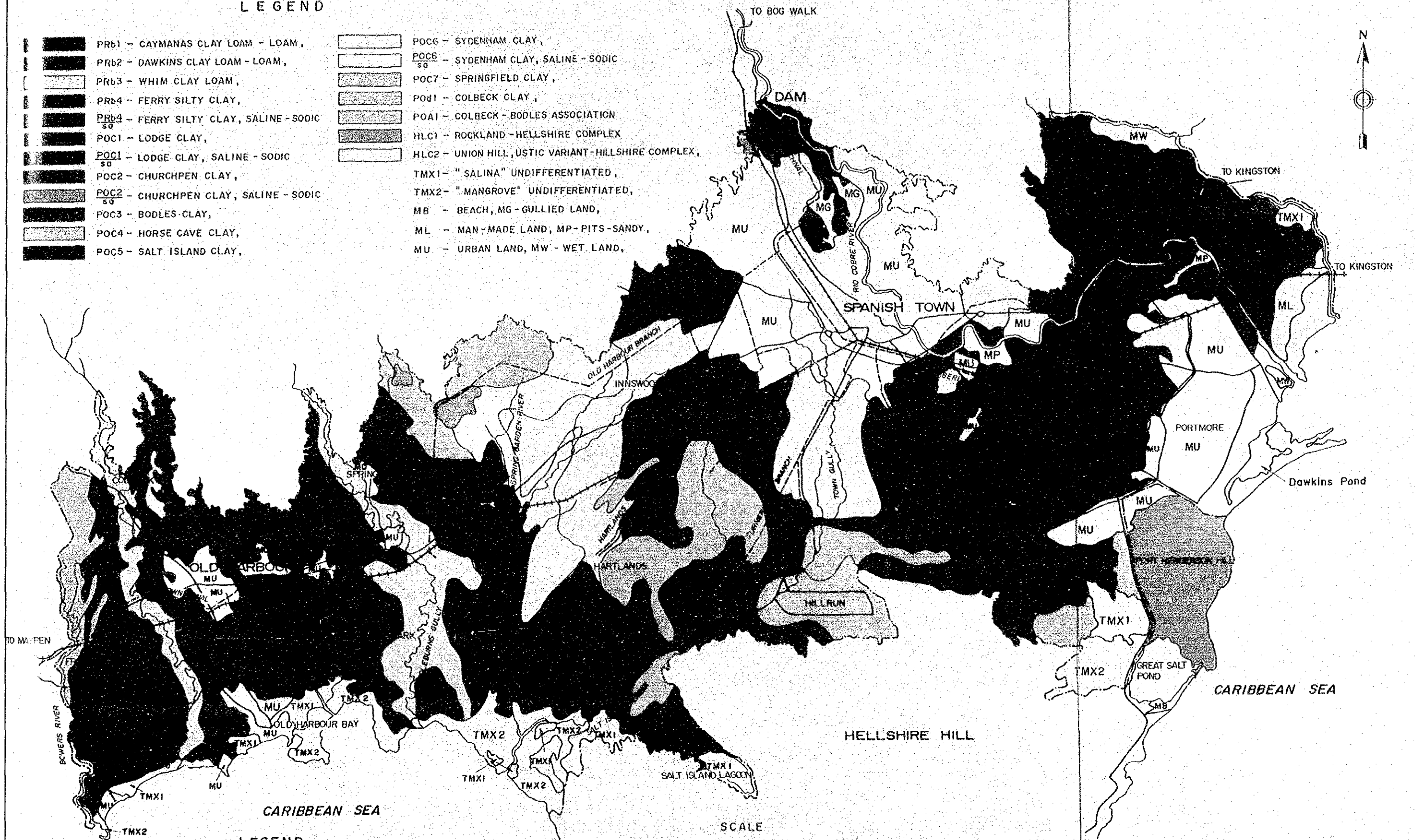
THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 2
HYDROGEOLOGIC MAP

JAPAN INTERNATIONAL COOPERATION AGENCY

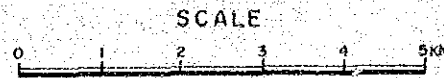
LEGEND

- | | | | |
|--|--|--|---|
| | PRb1 - CAYMANAS CLAY LOAM - LOAM, | | POC6 - SYDENHAM CLAY, |
| | PRb2 - DAWKINS CLAY LOAM - LOAM, | | POC6 SG - SYDENHAM CLAY, SALINE - SODIC |
| | PRb3 - WHIM CLAY LOAM, | | POC7 - SPRINGFIELD CLAY, |
| | PRb4 - FERRY SILTY CLAY, | | POd1 - COLBECK CLAY, |
| | PRb4 SO - FERRY SILTY CLAY, SALINE - SODIC | | POA1 - COLBECK - BODLES ASSOCIATION |
| | POC1 - LODGE CLAY, | | HLC1 - ROCKLAND - HELLSHIRE COMPLEX |
| | POC1 SO - LODGE CLAY, SALINE - SODIC | | HLC2 - UNION HILL, USTIC VARIANT - HILLSHIRE COMPLEX, |
| | POC2 - CHURCHPEN CLAY, | | TMX1 - "SALINA" UNDIFFERENTIATED, |
| | POC2 SO - CHURCHPEN CLAY, SALINE - SODIC | | TMX2 - "MANGROVE" UNDIFFERENTIATED, |
| | POC3 - BODLES-CLAY, | | MB - BEACH, MG - GULLIED LAND, |
| | POC4 - HORSE CAVE CLAY, | | ML - MAN-MADE LAND, MP - PITS-SANDY, |
| | POC5 - SALT ISLAND CLAY, | | MU - URBAN LAND, MW - WET LAND, |



LEGEND

- BOUNDARY OF STUDY AREA
- CANAL
- ROAD
- RAILWAY
- RIVER / GULLY










THE MODERNIZATION AND EXPANSION OF THE RIO COBRE IRRIGATION SCHEME

Fig. 5 SOIL MAP

JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND


ARABLE LAND

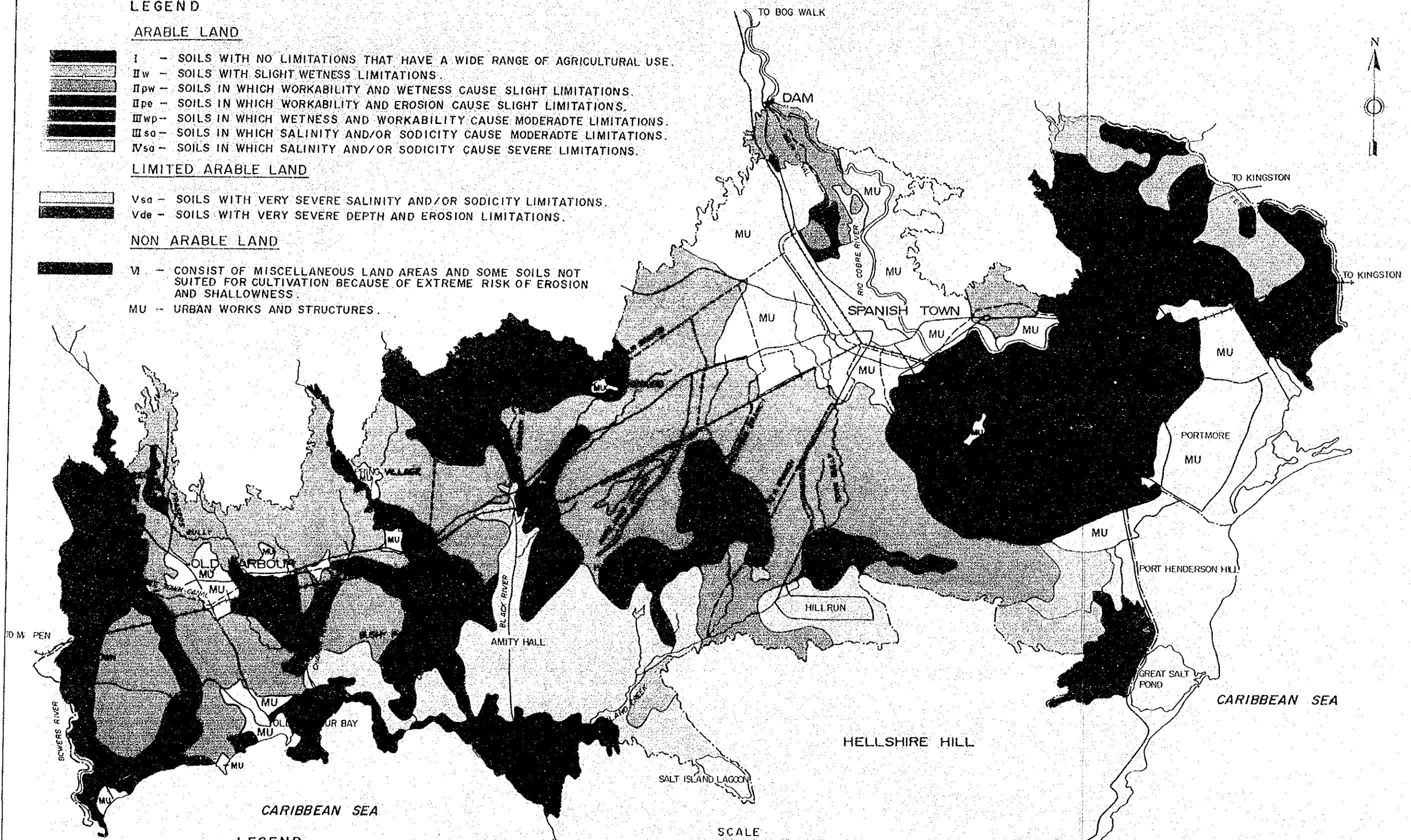
-  I - SOILS WITH NO LIMITATIONS THAT HAVE A WIDE RANGE OF AGRICULTURAL USE.
-  IIw - SOILS WITH SLIGHT WETNESS LIMITATIONS.
-  IIpw - SOILS IN WHICH WORKABILITY AND WETNESS CAUSE SLIGHT LIMITATIONS.
-  IIpe - SOILS IN WHICH WORKABILITY AND EROSION CAUSE SLIGHT LIMITATIONS.
-  IIIwp - SOILS IN WHICH WETNESS AND WORKABILITY CAUSE MODERATE LIMITATIONS.
-  IIIsa - SOILS IN WHICH SALINITY AND/OR SODICITY CAUSE MODERATE LIMITATIONS.
-  IVsa - SOILS IN WHICH SALINITY AND/OR SODICITY CAUSE SEVERE LIMITATIONS.

LIMITED ARABLE LAND




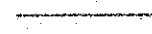
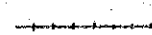
-  Vsa - SOILS WITH VERY SEVERE SALINITY AND/OR SODICITY LIMITATIONS.
-  Vde - SOILS WITH VERY SEVERE DEPTH AND EROSION LIMITATIONS.

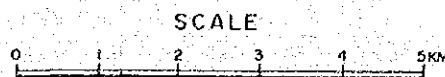
NON ARABLE LAND

-  VI - CONSIST OF MISCELLANEOUS LAND AREAS AND SOME SOILS NOT SUITED FOR CULTIVATION BECAUSE OF EXTREME RISK OF EROSION AND SHALLOWSNESS.
- MU - URBAN WORKS AND STRUCTURES.



LEGEND

-  BOUNDARY OF STUDY AREA
-  CANAL
-  ROAD
-  RAILWAY
-  RIVER / GULLY







THE MODERNIZATION AND EXPANSION OF THE RIO COBRE IRRIGATION SCHEME

Fig. 6 LAND CAPABILITY MAP FOR UPLAND CROPS

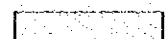


JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND


ARABLE LAND

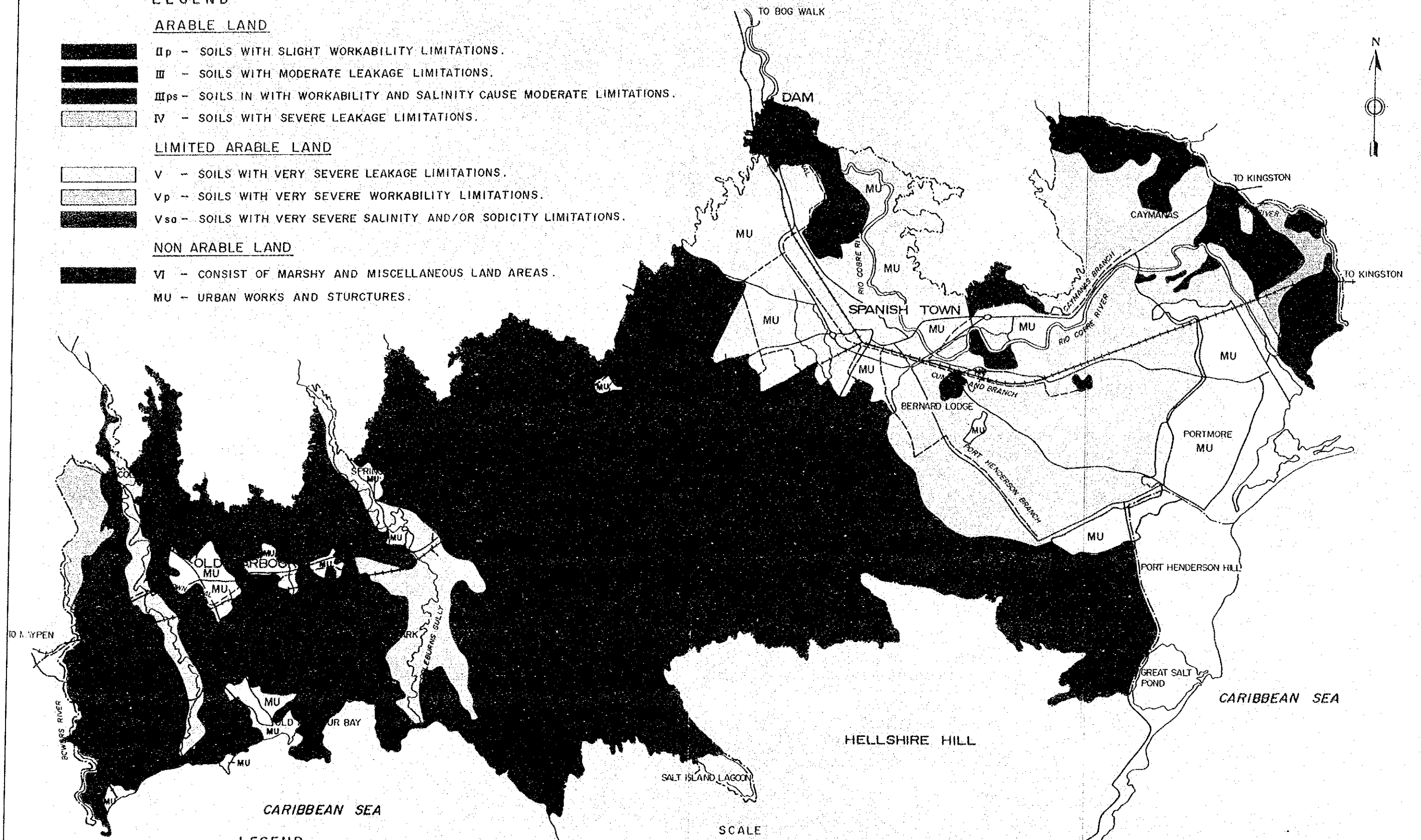
-  IIp - SOILS WITH SLIGHT WORKABILITY LIMITATIONS.
-  III - SOILS WITH MODERATE LEAKAGE LIMITATIONS.
-  IIIps - SOILS IN WITH WORKABILITY AND SALINITY CAUSE MODERATE LIMITATIONS.
-  IV - SOILS WITH SEVERE LEAKAGE LIMITATIONS.

LIMITED ARABLE LAND

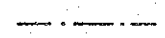
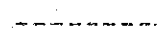
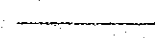
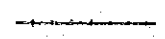
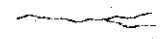
-  V - SOILS WITH VERY SEVERE LEAKAGE LIMITATIONS.
-  Vp - SOILS WITH VERY SEVERE WORKABILITY LIMITATIONS.
-  Vsa - SOILS WITH VERY SEVERE SALINITY AND/OR SODICITY LIMITATIONS.

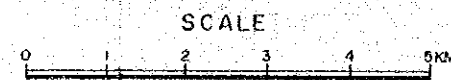
NON ARABLE LAND

-  VI - CONSIST OF MARSHY AND MISCELLANEOUS LAND AREAS.
- MU - URBAN WORKS AND STURCTURES.



LEGEND

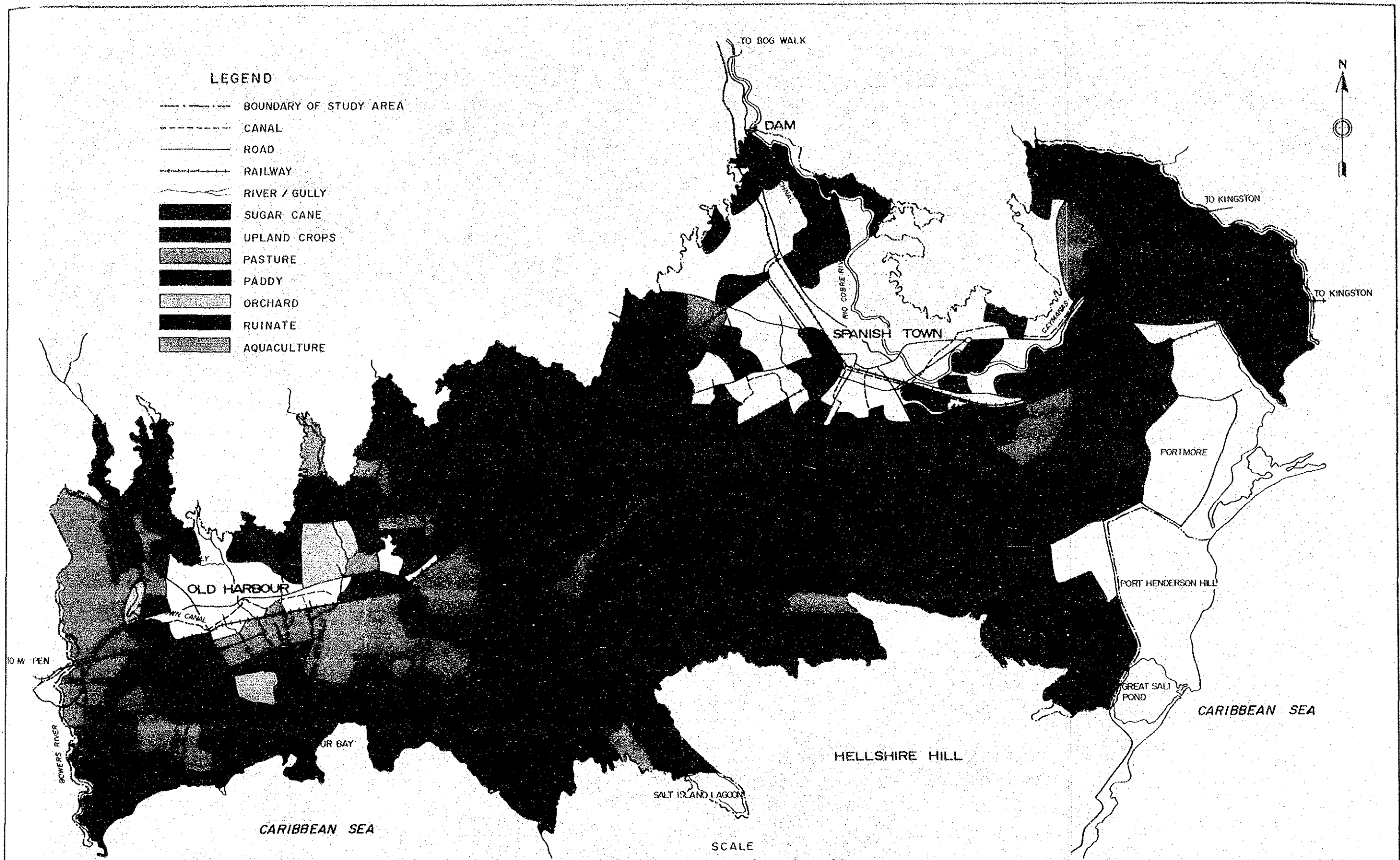
-  BOUNDARY OF STUDY AREA
-  CANAL
-  ROAD
-  RAILWAY
-  RIVER / GULLY



THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 7 LAND CAPABILITY MAP FOR RICE

JAPAN INTERNATIONAL COOPERATION AGENCY



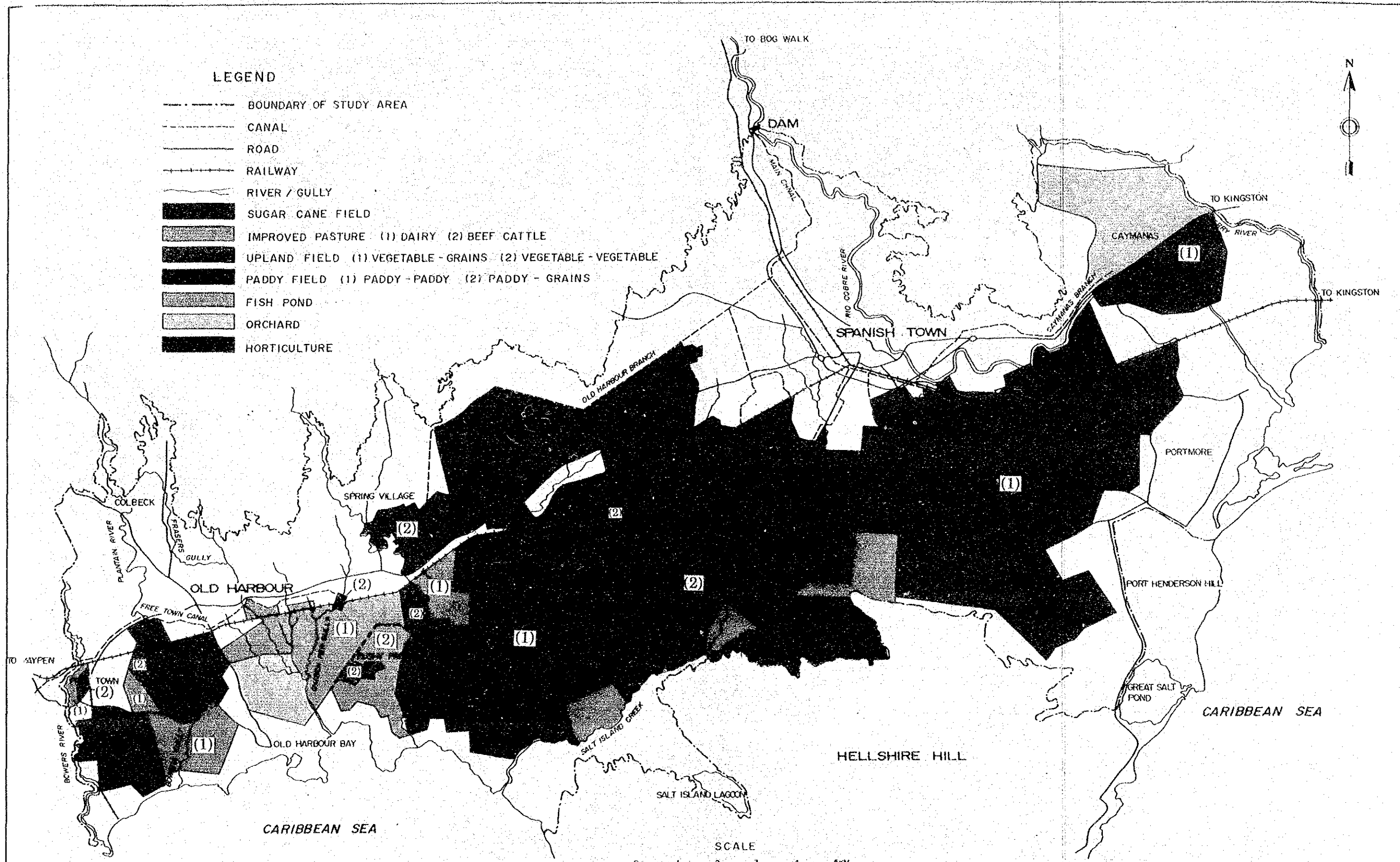
LEGEND

- BOUNDARY OF STUDY AREA
- - - CANAL
- ROAD
- RAILWAY
- ~ RIVER / GULLY
- SUGAR CANE
- UPLAND CROPS
- PASTURE
- PADDY
- ORCHARD
- RUINATE
- AQUACULTURE

THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 8 PRESENT LAND USE MAP

JAPAN INTERNATIONAL COOPERATION AGENCY



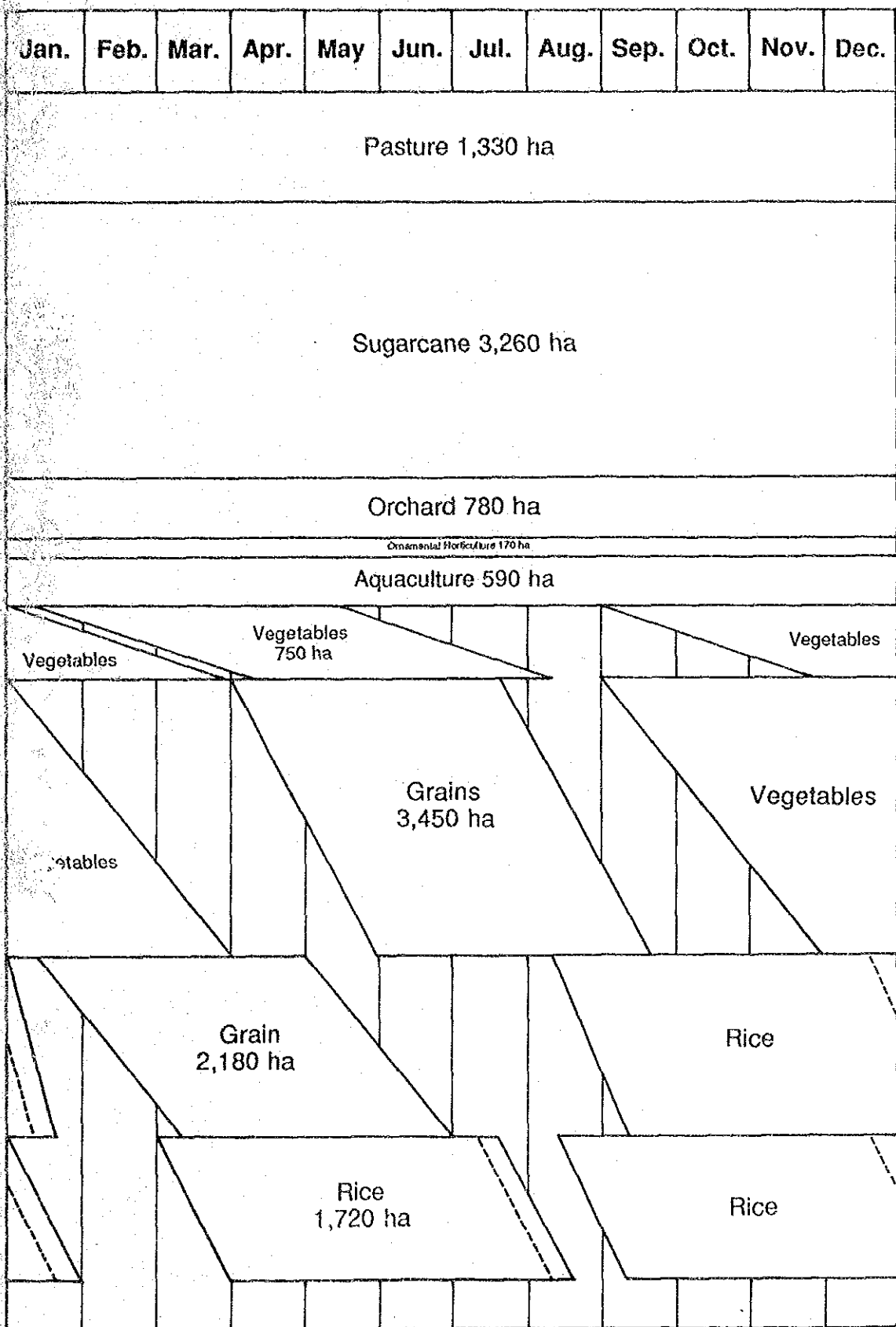
LEGEND

- BOUNDARY OF STUDY AREA
- - - - - CANAL
- _____ ROAD
- _____ RAILWAY
- _____ RIVER / GULLY
- SUGAR CANE FIELD
- ▨ IMPROVED PASTURE (1) DAIRY (2) BEEF CATTLE
- UPLAND FIELD (1) VEGETABLE - GRAINS (2) VEGETABLE - VEGETABLE
- ▨ PADDY FIELD (1) PADDY - PADDY (2) PADDY - GRAINS
- ▨ FISH POND
- ORCHARD
- HORTICULTURE

THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 10 PROPOSED LAND USE MAP

JAPAN INTERNATIONAL COOPERATION AGENCY




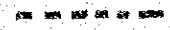

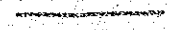
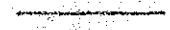





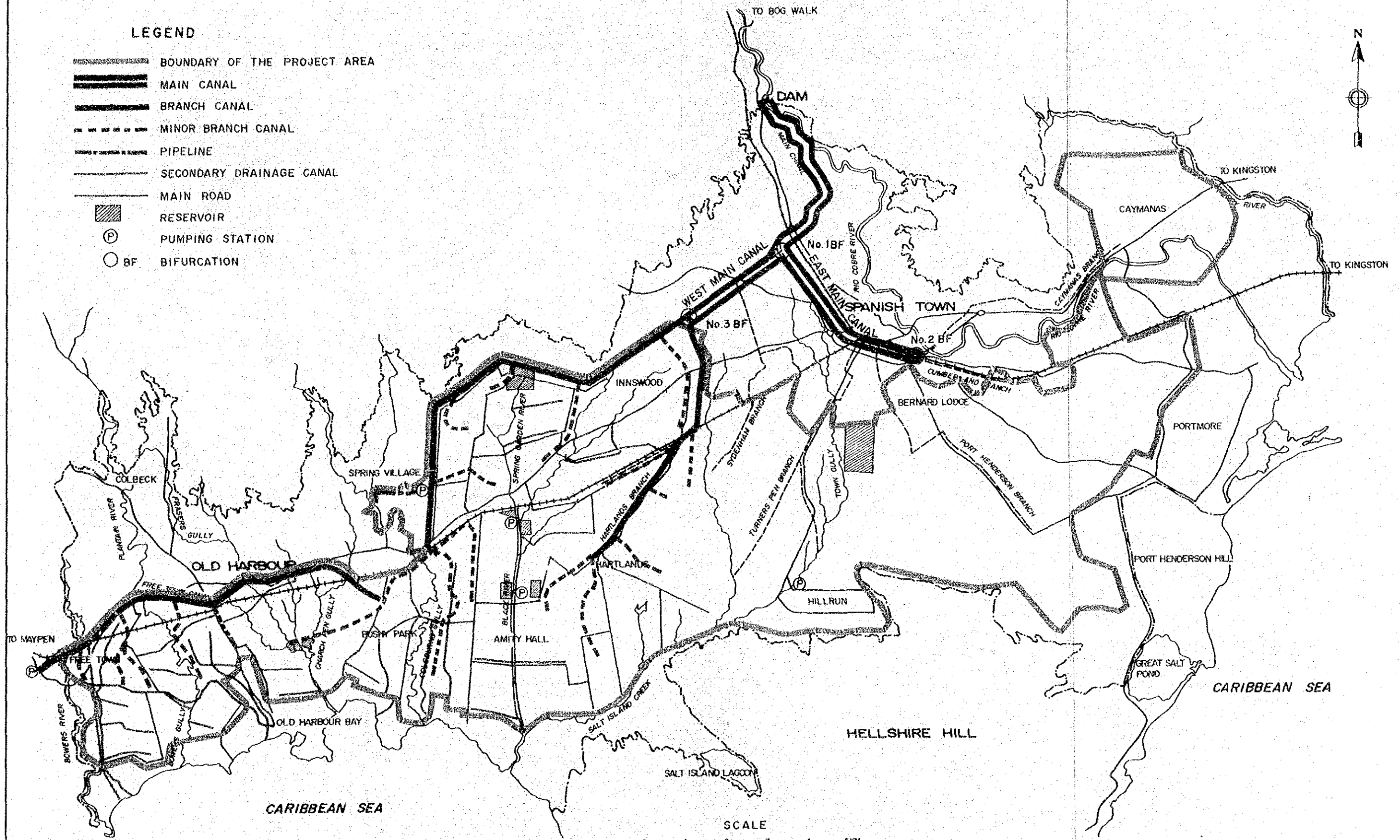
THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 11
PROPOSED CROPPING PATTERN

JAPAN INTERNATIONAL COOPERATION AGENCY

LEGEND

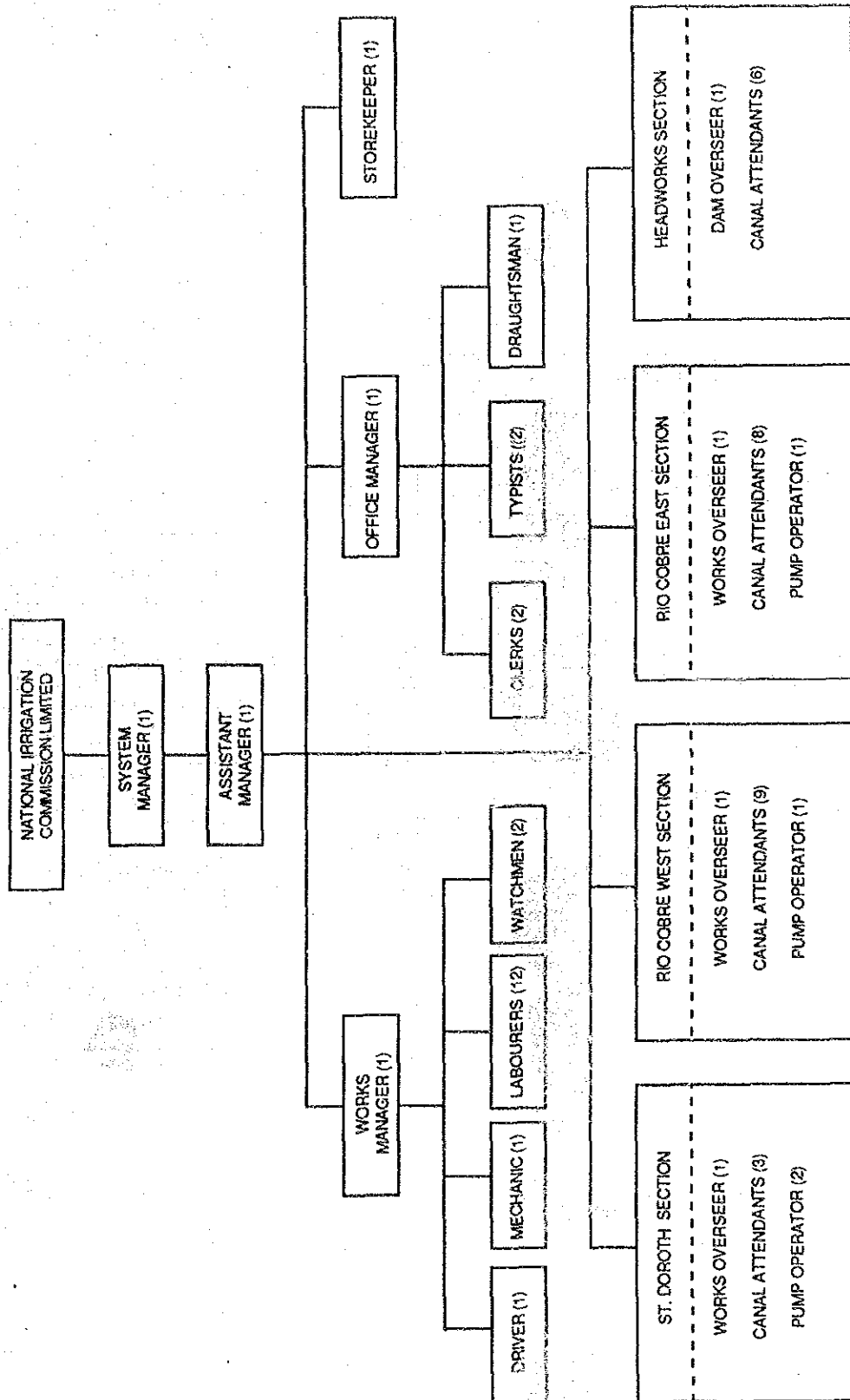
-  BOUNDARY OF THE PROJECT AREA
-  MAIN CANAL
-  BRANCH CANAL
-  MINOR BRANCH CANAL
-  PIPELINE
-  SECONDARY DRAINAGE CANAL
-  MAIN ROAD
-  RESERVOIR
-  PUMPING STATION
-  BIFURCATION



THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 12 GENERAL LAYOUT MAP

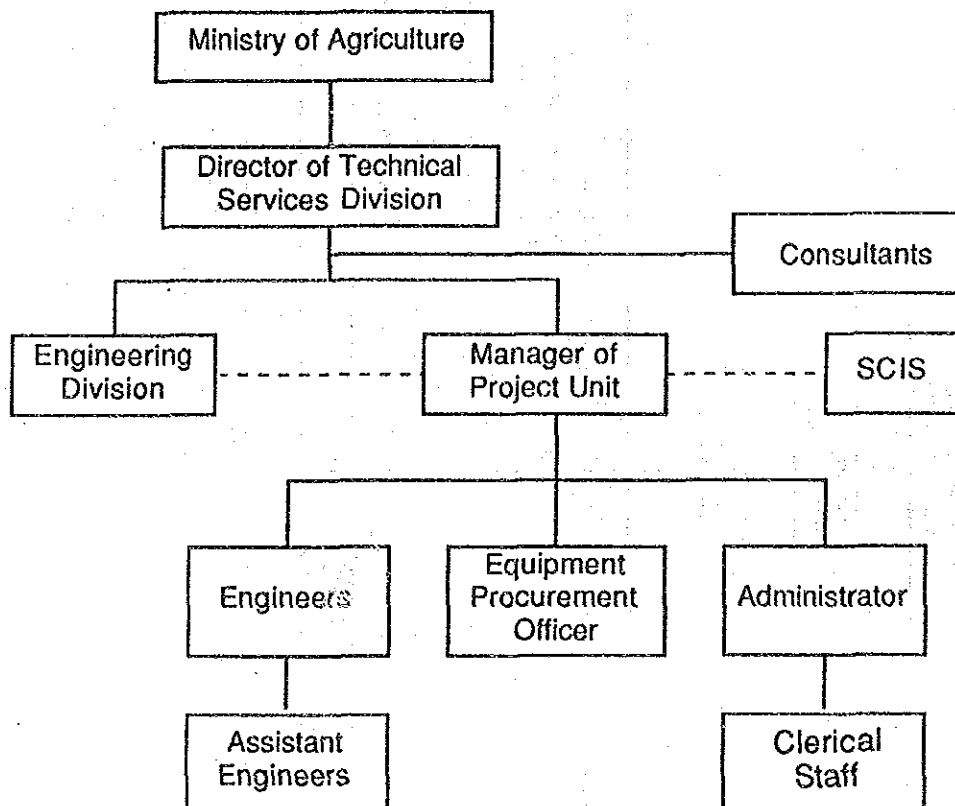
JAPAN INTERNATIONAL COOPERATION AGENCY



THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 13
PROPOSED ORGANIZATION STRUCTURE

JAPAN INTERNATIONAL COOPERATION AGENCY



THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 14
ORGANIZATION STRUCTURE FOR
PROJECT EXECUTION

JAPAN INTERNATIONAL COOPERATION AGENCY

Item	1st Year	2nd Year	3rd Year	4th Year
1. PREPARATORY WORKS				
1.1 Survey and Detailed Design	████████████████████			
1.2 Preparation of Tender Document	████████████████████			
1.3 Selection of Contractor	████████████████████			
1.4 Procurement of O&M Equipment				████████████████████
2. CONSTRUCTION WORKS				
2.1 Mobilization		████████████████████		
2.2 Main Structure				
1) Head works (Dam)		████████████████████		
2) Main canal (4.7 km)		████████████████████		
2.3 Rio Cobre East				
1) East main canal (4.7 km)		████████████████████		
2) Syphon (0.2 km)			████████████████████	
3) Town gully reservoir (9.6 million m3)		████████████████████		
4) Connection Canal (2.5 km)			████████████████████	
5) Minor branch canal (6.7 km)			████████████████████	
6) March Pen pump station			████████████████████	
2.4 Rio Cobre West				
1) West main canal (2.8 km)		████████████████████		
2) Hartland branch canal (7.1 km)			████████████████████	
3) Old Harbour branch canal (10.6 km)		████████████████████		
4) Old Harbour branch canal extension (5.1 km)			████████████████████	
5) Black River reservoir (3.8 million m3)			████████████████████	
6) Minor branch canal (46.4 km)			████████████████████	
7) Nightingale pump station				████████████████████
8) Amity Hall pump station				████████████████████
2.5 St. Dorothy				
1) Free Town pipeline (2.8 km)			████████████████████	
2) Open canal (7.9 km)			████████████████████	
3) Distributary canal (10.3 km)			████████████████████	
2.6 Main Road (75.0 km)			████████████████████	
2.7 Secondary Drainage Canal (21.4 km)			████████████████████	
2.8 On-farm Development				
1) Furrow			████████████████████	
2) Rice Field			████████████████████	
3) Sprinkler			████████████████████	
4) Drip			████████████████████	
5) Drainage system			████████████████████	
6) Road network			████████████████████	

THE MODERNIZATION AND EXPANSION OF
THE RIO COBRE IRRIGATION SCHEME

Fig. 15
PROJECT IMPLEMENTATION SCHEDULE

JAPAN INTERNATIONAL COOPERATION AGENCY

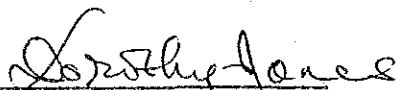
ATTACHMENT

MINUTES OF UNDERSTANDING FOR
THE FEASIBILITY STUDY ON THE MODERNIZATION
AND EXPANSION OF THE RIO COBRE IRRIGATION SCHEME

This is to confirm that the PLANNING INSTITUTE OF JAMAICA (PIOJ), on behalf of the Government of Jamaica, and the JAPAN INTERNATIONAL COOPERATION AGENCY (JICA), have discussed the Plan of Operation for the Feasibility Study on the Modernization and Expansion of the Rio Cobre Irrigation Scheme and have mutually agreed on the following aspects:

- (a) The Plan of Operation presented by the Study Team was basically accepted.
- (b) The undertaking of the Government of Jamaica mentioned in the Scope of Works agreed upon between the Planning Institute of Jamaica and JICA was reconfirmed.

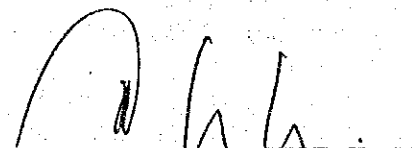
Kingston, 14th February, 1986



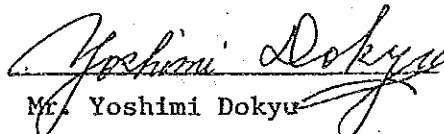
Mrs. Dorothy Jones
for Director General
Planning Institute of Jamaica



Mr. Shinichi Yano
Team Leader
Feasibility Study Team
Japan International
Cooperation Agency



Mr. Trevor F. Clarke
Director of Technical Services
Special Projects and Programmes
Ministry of Agriculture



Mr. Yoshimi Dokyu
Leader of the Advisory Team,
Japan International
Cooperation Agency

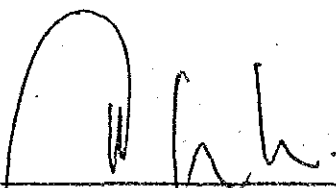
MINUTES OF UNDERSTANDING FOR THE
FEASIBILITY STUDY ON THE MODERNIZATION AND
EXPANSION OF THE RIO COBRE IRRIGATION SCHEME

On the completion of the First Stage field investigation of the feasibility study on the Modernization and Expansion of the Rio Cobre Irrigation Scheme, the Ministry of Agriculture and the Japan International Cooperation Agency Study Mission met at the Ministry of Agriculture on March 17, 1986 to discuss the Field Report of the Mission.


It was agreed at this meeting that the Mission had completed its terms of reference satisfactorily.

The Jamaican side pointed out that although the irrigated area by the Rio Cobre and St. Dorothy Irrigation Systems was approximately 12,000 hectares, the actual study area was approximately 21,000 hectares. It was further pointed out that the total arable area had to be studied in order to come up with a comprehensive plan.


Kingston, 17th March, 1986



Mr. Trevor F. Clarke
Director of Technical Services
Special Projects and Programmes
Ministry of Agriculture



Mr. Shinichi Yano
Team Leader
Feasibility Study Team
Japan International Cooperation
Agency

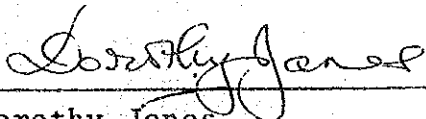

Mr. Thorant Hardware
Managing Director
Underground Water Authority
Ministry of Agriculture

MINUTES OF UNDERSTANDING FOR THE
FEASIBILITY STUDY ON THE MODERNIZATION AND
EXPANSION OF THE RIO COBRE IRRIGATION
SCHEME

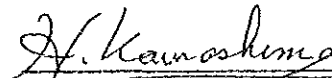
At the commencement of the Second Stage field investigation of the feasibility on the Modernization and Expansion of the Rio Cobre Irrigation Scheme, the Jamaican Authorities concerned and the JICA Advisory Team met at the Ministry of Agriculture on July 23, 1986 to discuss the Study Area which was pointed out by the Jamaican side in the previous meeting between the Ministry of Agriculture and the JICA Study Team on March 17, 1986.

In the meeting, the Jamaican side and the JICA Advisory Team confirmed that although the irrigated area by the Rio Cobre and St. Dorothy Irrigation Systems was approximately 12,000 hectares, the actual study area was approximately 21,000 hectares, and also confirmed that the total arable area would be studied in order to come up with a comprehensive plan.

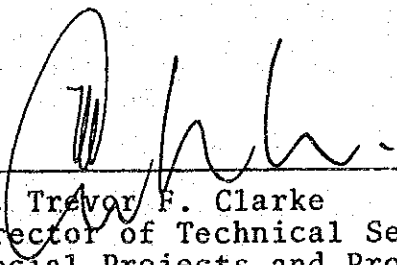
Kingston, July 23, 1986.



Mrs. Dorothy Jones
for Director General
Planning Institute of Jamaica



Mr. Hisayoshi Kawashima
Leader of Advisory Team
Japan International
Cooperation Agency



Mr. Trevor F. Clarke
Director of Technical Services
Special Projects and Programmes
Ministry of Agriculture

MINUTES OF UNDERSTANDING FOR THE
FEASIBILITY STUDY ON THE MODERNIZATION AND
EXPANSION OF THE RIO COBRE IRRIGATION SCHEME

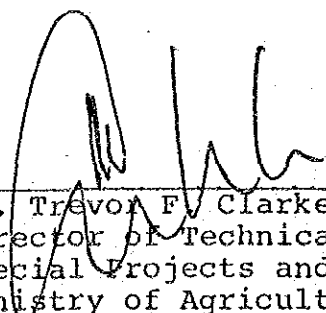
On the completion of the Second Stage field investigation of the Feasibility study on the Modernization and Expansion of the Rio Cobre Irrigation Scheme, the Ministry of Agriculture (MOA) and the Japan International Cooperation Agency Study Team met at the Ministry of Agriculture on November 20, 1986 to discuss the Interim Report of the Team.

It was agreed at this meeting that the Team has completed its terms of reference satisfactorily, and MOA would send their comments on the Interim Report submitted through the Embassy of Japan in Kingston by the end of December 1986 if needed, which would be incorporated into the Draft Final Report.


The Ministry of Agriculture (MOA) requested that the donation of the following equipment which had been already provided by JICA for the study.

- (1) Four (4) wheel drive vehicles
Toyota Land Cruiser, Model BJ75RV-KR.....2 units
- (2) Water Level Recorder
Tamaya, Richard Type.....2 sets
- (3) Water Level Recorder
Ogasawara, Model FL-200.....1 set
- (4) Digital Current Meter
Toho Dentan, Model TK-101D.....2 sets
- (5) Personal Computer
Macintosh Plus, Printer and Others.....1 unit

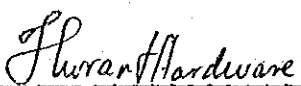
Kingston, November 20, 1986



Mr. Trevor F. Clarke
Director of Technical Services
Special Projects and Programmes
Ministry of Agriculture



Mr. Shinichi Yano
Team Leader
Feasibility Study Team
Japan International
Cooperation Agency



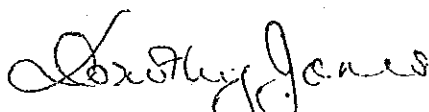
Mr. Thorant Hardware
Managing Director
Underground Water Authority
Ministry of Agriculture


MINUTES OF UNDERSTANDING FOR THE
FEASIBILITY STUDY ON THE MODERNIZATION
AND EXPANSION OF THE RIO COBRE IRRIGATION
SCHEME

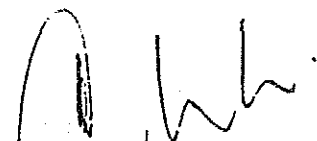
The Japanese Study Team for the Feasibility Study on the Modernization and Expansion of the Rio Cobre Irrigation Scheme dispatched by Japan International Cooperation Agency (hereinafter referred to as "JICA") and Jamaican Authorities concerned (hereinafter referred to as "Jamaican Side") held a series of meetings and exchanged views on the Draft Feasibility Report.

Both sides agreed in principle with the Draft Final Feasibility Report, however, the Jamaican Side had observations on the necessity of reservoirs.

These observations will be reviewed and incorporated into the Final Feasibility Report.


Mrs. Dorothy Jones
for Director General
Planning Institute of Jamaica
Kingston


Mr. Yano Shin-ichi
Team Leader
Feasibility Study Team
JICA


Mr. Trevor B. Clarke
Director of Technical Services
Special Project & Programmes
Ministry of Agriculture

Kingston, March 20, 1987

JICA