

increase its flow capacity to the design drainage discharge of 15.0 m<sup>3</sup>/s in the portion of the pilot scheme area. Secondary drainage canals and farm drainage ditches would be newly constructed to carry excess water in the fields. In addition to the above drainage canals, catch drains would be provided along the boundaries of the pilot scheme area and the surrounding hills to catch drainage water from the external drainage basins, and boundary drainage canals would also be constructed at the downstream of the area to collect drainage water in the area. All drainage canals would be of earth canals with trapezoidal sections. In relation to the above canals, the related structures such as drops and culverts would be provided to protect the canals and to flow water under the roads.

The following table shows the general features of the proposed drainage facilities in the pilot scheme:

Canal		Discharge (m <sup>3</sup> /s)	Length (m)	Bed Width (m)	Water Depth (m)
Main Drainage Canal		18.80 – 15.00	3,010	8.0 – 7.0	2.0
Secondary Drainage Canal	No. 1	0.06	1,600	0.5	0.7
	No. 2	0.06	1,230	0.5	0.7
	No. 3	0.07	780	0.5	0.7
Farm Drainage Ditch		0.01	7,595	0.4	0.4
Catch Drain	Left	0.90	2,345	2.0	1.1
	Right	0.70	2,400	1.8	1.1
Boundary Drainage Canal	Left	0.96	580	2.1	1.1
	Right	0.72	1,145	2.1	1.1
Related Structure	Drop	: 9 nos.			
	Culvert	: 25 nos.			

#### 9.3.4 Farm Road Plan

The proposed road network would consist of trunk roads, main farm roads, lateral farm roads and on-farm roads. The existing road linking the national road No. 2 and the present experimental plot would be improved with asphalt pavement so that this road could become a trunk road in the pilot scheme. The other farm roads would be newly provided along the irrigation and drainage canals for operation and maintenance of the facilities and for effective agricultural activities.

The general features of the proposed farm roads are summarized as follows:

Road	Length (m)	Total Width (m)	Effective Width (m)	Pavement
Trunk Road	2,700	7.0	6.0	Asphalt
Main Farm Road, Left	5,040	5.0	4.0	Gravel
Right	5,385	5.0	4.0	Gravel
Lateral Farm Road, Left	325	4.0	3.0	Gravel
Right	3,650	4.0	3.0	Gravel
On-Farm Road, Left	2,675	2.6	2.0	Earth
Right	1,860	2.6	2.0	Earth
Related Structure	Culvert	: 2 nos.		

#### 9.4 Building and Equipment Plan

To fulfill the functions of the pilot scheme such as experiment, demonstration, training, etc., the following buildings, utility facilities and equipments would be provided.

##### 9.4.1 Buildings

###### (1) Buildings for farm operation

- i) Main office : 650 m<sup>2</sup> x 1 no.
- ii) Warehouse : 200 m<sup>2</sup> x 1 no.
- iii) Workshop : 300 m<sup>2</sup> x 1 no.
- iv) Rice-mill and warehouse : 350 m<sup>2</sup> x 1 no.
- v) Garage : 200 m<sup>2</sup> x 2 nos.

###### (2) Buildings for experiment and demonstration

- i) Laboratory and lecture hall : 650 m<sup>2</sup> x 1 no.
- ii) Nursery bed : 400 m<sup>2</sup> x 1 no.
- iii) Hut : 105 m<sup>2</sup> x 1 no.
- iv) Netted house against birds and rodents : 100 m<sup>2</sup> x 1 no.
- v) Netted house for insect prevention and pathology : 9 m<sup>2</sup> x 10 nos.

- vi) Warehouse : 100 m<sup>2</sup> x 1 no.
- vii) Garage : 200 m<sup>2</sup> x 1 no.
- viii) Meteorological station : 20 m<sup>2</sup> x 1 no.

(3) Residences for staff

- i) Family quarters : 140 m<sup>2</sup> x 6 nos.
- ii) Bachelor quarters : 425 m<sup>2</sup> x 1 no.
- iii) Dormitory for trainees : 560 m<sup>2</sup> x 1 no.

9.4.2 Utility Facilities

- i) Electric power supply system
- ii) Water supply system

9.4.3 Equipment

- i) Agricultural machinery
- ii) Operation and maintenance machinery
- iii) Vehicles
- iv) Rice-mills
- v) Repair shop equipment
- vi) Meteorological and farm observation equipment
- vii) Experimental and training equipment

9.5 Construction Plan and Cost Estimate

9.5.1 Construction Plan

The pilot scheme comprises new construction of the Ndoup intake weir, irrigation and drainage canals and their related structures, farm roads, buildings and their utility facilities. As most of the proposed area are inundated and covered with grass and forests at present, it is necessary at first to carry out clearing and grubbing of grass and forests, and realize drainage works for drying up the area. After that, the irrigation facilities and farm roads would be constructed. The proposed buildings would be located in high areas and the construction

works would be executed without any particular restrictions. The major construction equipments required for the works would consist of swamp bulldozers, swamp rake-dozers, back-hoe shovels, dump trucks, concrete mixers, etc.

The construction period of the pilot scheme was planned to be 17 months by taking into consideration the workable days, construction method and construction equipment plan. The annual workable days were assumed to be 213 days for earth works and 264 days for concrete works based on the daily rainfall records of the Koundja meteorological station. Prior to the actual construction works, it would be necessary to carry out the detailed design including the preparation of tender documents for the selection of contractors. The implementation schedule of the pilot scheme is shown in Fig. 19.

#### 9.5.2 Cost Estimate

The cost of the pilot scheme comprises the construction cost of farm facilities, buildings and utility facilities, equipment cost, physical contingency and engineering cost. The total cost was estimated at CFA F 3,319.36 million as shown below:

Item	Cost (CFA F 103)
<b>1. Construction Cost</b>	
1.1 Farm Development Works *	1,022,708
1.2 Building Works	965,591
1.3 Utility Facility Works	222,947
Sub-total	<u>2,211,246</u>
<b>2. Equipment Cost</b>	
2.1 Agricultural Machineries	187,242
2.2 Operation and Maintenance Machineries	115,799
2.3 Vehicles	41,580
2.4 Rice-Mills	164,759
2.5 Repair Shop Equipments	8,758
2.6 Meteorological and Farm Observation Equipments	25,828
2.7 Experimental and Training Equipments	27,148
Sub-total	<u>571,114</u>
3. Physical Contingency	<u>221,124</u>
4. Engineering Cost	<u>315,877</u>
Total	<u>3,319,361</u>

(Note: US\$1.0 = CFA F 384.5 = ¥ 203.0)

\* These works are overlapping on the part of Main project.

## 9.6 Executive Organization

For the smooth implementation of the pilot scheme, the Baigom Agricultural Development Authority (SODABA: Société de Développement Agricole de Baigom) would be established under an establishment agreement with the Government of the Republic of Cameroon. At present, the Baigom Rice Cultivation Project Office operates and manages small scale experimental farms under the control of the Directorate of Studies and Projects, Ministry of Agriculture, and it would be necessary to expand and reinforce their organizational structures until the establishment of SODABA.

The proposed organization for the pilot scheme would consist of four departments, i.e. administrative and financial department, pilot area management department, construction, supervision and O&M department, and experiments & demonstration department as shown in Fig. 20.

The establishment of a system for technical and financial assistance to farmers and for stable operation and maintenance of the pilot scheme would be of major importance to enable to attain the anticipated agricultural production in the area through intensive cropping practice. Therefore, it would be essential in the first place to use rationally the existing agricultural support agencies and institutions in charge of research and extension, investment and credit services, cooperative and farmers' organization, etc.

To ensure a smooth implementation of the pilot scheme, it is recommended to assign 86 staffs with adequate qualification required at the full development stage of the scheme. The number of staff, especially that of senior officers will be gradually increased according to the volume of works. This means that during the first period, the senior officers should cumulate other functions as far as possible from the standpoint of financial rationality. The personnel expenses at the full development stage of the scheme were estimated at about CFA F 68.9 million on the assumption that salaries and housing allowances of the managing and technical staff are borne by the Government.

## **TABLES**



Table 1 MEMBER LIST OF JICA STUDY TEAM  
AND COUNTERPART PERSONNEL

Name	Title/Speciality
<u>JICA Study Team</u>	
1. Mr. Kensaku TAKEDA	Team Leader
2. Mr. Takeshi KAWAGUCHI	Irrigation & Drainage Engineer
3. Mr. Akio MAEDA	Agronomist
4. Mr. Fumihiko FURUICHI	Agro-Economist/Institutional Expert
5. Mr. Kuninobu NODA	Hydrologist
6. Mr. Shigeyuki SHIOSE	On-Farm Design Engineer
7. Mr. Naotsugu TAGUCHI	Structural Design Engineer
8. Mr. Naoto MORIOKA	Pedologist
9. Mr. Hirohisa ISOGAI	Geologist/Soil Mechanical Engineer
10. Mr. Tomoo FUKAZAWA	Surveying Engineer
<u>Counterpart Personnel</u>	
1. Mr. ATEBA Jean-Marie	Chief Counterpart
2. Mr. MBIADA Emmanuel	Irrigation & Drainage/Hydrology/ Topographic Survey
3. Mr. ONDOUA Jacob	On-Farm Design
4. Mr. KOM	Agronomy
5. Mr. BANGOWENI Paul-Félix	Soil/Geology
6. Mr. TENTCHOU Jean	Agro-Economy/Institution
7. Miss. ELOGO Mafouma	Agro-Economy/Institution



Table 2 ADMINISTRATIVE DIVISION OF  
CAMEROON BY PROVINCE

Province	Administrative Headquarters	Population	Distribution (%)
Centre	Yaoundé	1,764,400	18.4
Littoral	Douala	1,829,900	19.1
West	Bafoussam	1,233,200 <u>/*</u>	12.9
South	Ebolowa	356,400	3.7
South West	Buea	700,900	7.3
North West	Bamenda	1,009,100	10.6
East	Bertoua	420,000	4.4
North	Garoua	508,200	5.3
Far North	Maroua	1,400,000	14.6
Adamaoua	Ngaoundéré	355,800	3.7
Total		9,577,900	100.0

Source : Note Annuelle de Statistique, 1983-1984, Direction de la  
Statistique et de la Comptabilité Nationale.

Remarks : /\* The figure was adjusted to be logical.

Table 3 PRODUCTION AND IMPORTS OF PRINCIPAL CEREALS

(Unit: Thousand tons/CFA F million)

Year	Production (tons)				Imports			
	Rice		Maize	Millet & Sorghum	Rice		Wheat	
	(Paddy)				Quantity	Value	Quantity	Value
1969	22.0	(-)	250	400	10.3	421.4	34.5	628.4
1970	-	(-)	-	-	7.8	389.7	29.8	842.8
1971	13.7	(-)	278	357	31.9	871.8	26.8	608.3
1972	15.2	(10.9)	298	339	28.2	743.2	44.3	907.0
1973	12.2	(-24.6)	319	322	23.9	1,270.9	37.9	824.2
1974	13.3	(9.0)	332	322	17.3	2,121.3	46.9	1,871.9
1975	15.0	(12.8)	341	325	1.7	195.5	36.4	1,897.9
1976	22.2	(48.0)	380	370	7.0	504.3	37.9	1,759.3
1977	25.0	(12.6)	395	380	23.1	1,473.9	62.8	2,911.2
1978	33.0	(32.0)	380	330	18.8	1,365.6	57.1	2,781.1
1979	42.0	(27.3)	350	400	41.3	2,863.1	64.4	2,973.4
1980	46.0	(9.5)	410	410	20.7	1,385.8	78.8	4,164.5
1981	45.6	(-0.9)	414	441	11.0	967.6	50.2	3,270.9
1982	67.6	(48.2)	431	351	16.7	1,174.9	59.8	4,311.3
1983	-	-	-	-	51.2	5,102.2	89.8	6,452.0
1984	-	-	-	-	31.0	2,765.4	65.5	5,320.3
Average					21.4	1,476.0	51.4	2,595.3

Source: Marchés Tropicaux et Méditerranéens - Le Marché Camerounais; Documents de la Direction de la Statistique et de la Comptabilité Nationale; The Fifth Five-Year Economic, Social and Cultural Development Plan, 1981-1986; Annuaire de Statistiques Agricoles, 1981-1982.

Table 4 SUMMARY OF CLIMATIC CONDITIONS

Koundja Station: Lat. 5°37'N, Long. 10°45'W, Altitude 1,208 m, Record Period 1975-1984

Description	Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.	Total or Average
Temperature (°C)													
Mean	21.3	23.1	23.0	22.4	21.4	20.4	19.6	19.6	19.7	20.4	20.7	20.5	21.0
Mean Max.	29.3	30.6	29.7	28.2	26.7	25.7	24.8	24.8	25.1	26.1	27.4	28.5	27.2
Mean Min.	14.5	16.1	17.4	17.8	17.2	16.5	16.3	16.5	16.1	16.3	15.3	13.9	16.2
Relative Humidity (%)													
Mean	57	55	62	74	80	81	83	83	81	78	69	61	72
Mean Max.	87	85	90	96	99	99	100	100	100	99	96	92	95
Mean Min.	26	23	34	50	60	62	65	66	62	56	40	30	48
Pan Evaporation													
Total (mm)	163.2	184.0	188.8	146.2	124.4	104.4	91.1	87.7	99.7	120.0	133.4	143.7	1,586.6
Mean (mm/day)	5.2	6.5	6.1	4.9	4.0	3.5	2.9	2.8	3.3	3.9	4.4	4.6	4.3
Atmospheric Pressure (millibars/day)													
Mean	879.7	879.0	879.0	879.3	880.3	881.5	881.4	881.2	881.0	880.4	880.2	879.8	880.2
Water Vapor Pressure (millibars/day)													
Mean	13.9	14.4	17.2	20.4	21.0	20.5	20.1	20.2	20.0	19.9	17.4	14.9	18.3
Sunshine Duration													
Total (hours)	268.9	239.9	219.3	205.5	208.3	195.4	135.7	125.3	139.0	187.3	244.1	268.8	2,437.5
Mean (hours/day)	8.7	8.5	7.1	6.8	6.7	6.5	4.4	4.0	4.6	6.0	8.1	8.7	6.7
Wind Velocity (m/s)													
Mean	1.2	1.6	1.6	1.4	1.2	1.1	1.0	1.1	1.1	1.4	1.2	1.0	1.2
Max.	7.2	8.3	11.6	11.2	10.6	10.4	8.3	8.5	9.1	10.8	8.7	7.2	9.3

Note: As the Baigom plain is about 100 m below the Koundja meteorological station, the temperatures in the plain are estimated by adding 0.6°C to the above records.

Table 5 POPULATION IN CAMEROON, WEST PROVINCE, NOUN DIVISION AND PROJECT ZONE IN 1976 AND 1984

Region	Area (km <sup>2</sup> )	Population		Average Growth Rate of Population per Annum (%)	Population Density per km <sup>2</sup>	
		1976	1984		1976	1984
<u>Cameroon</u>	465,458	7,661,000	9,578,000	2.83	16.5	20.6
<u>West Province</u>	13,890	968,856	1,233,200	3.06	69.8	88.8
<u>Noun Division</u>	7,687	211,142	257,132	2.49	27.5	33.5
(Sub-Divisions & District)*						
Foumban	1,363		104,762			76.9
Magba	1,169	137,876	12,946	1.5	31.4	11.1
Malentouen	1,360		16,630			12.2
Koutaba (Dist.)	500		21,109			42.2
Foumbot	1,002	73,266	72,517	4.2	22.2	72.4
Massangam	2,291		29,168			12.7
<u>Project Zone</u>	314	26,436	31,547	2.2	84.2	100.5
(Villages in Koutaba District)						
Ngoundoup		1,465	1,531	0.6		
Koundja		2,117	3,054	4.7		
Koundja Military Camp		2,580	3,000	1.9		
Poundimoun Didango		1,378	1,960	4.5		
Kouchakap		1,718	1,802	0.6		
Maparé		1,718	2,085	2.4		
Bafolé		1,078	1,347	2.8		
(Villages in Foumbot Sub-Division)						
Baigom		4,285	4,800	1.4		
Nkoundja		807	1,410	7.2		
Nkouparé		9,290	10,558	1.6		

Sources : Rapport Annuel du Service Provincial des Statistiques Agricoles de l'Ouest, 1983-1984;  
 Note Annuelle de Statistique 1983-1984;  
 Bilan Diagnostique du Secteur Agricole de la Province de l'Ouest;  
 Rapport de l'Etude de Faisabilité de la Plaine de Baigom, SEDA, 1984.

Remarks : /\* Reorganization of the administrative divisions took place in 1979 and 1982. Two (2) Sub-Divisions: Foumban and Foumbot were divided into 5 Sub-Divisions and 1 District.

Table 6 (1/2)

PRODUCTIONS, MARKETING AND PRICES OF THE MAIN  
AGRICULTURAL PRODUCTS IN THE NOUN DIVISION ON  
AUGUST 30 TH, 1984

Products	Production (tons)	Marketed Volume (tons)	Marketing Rate (%)	Price per Kg (CFA F)
<u>Food Crops</u>				
Maize	209,500	65,000	31.0	550
Rice	75	9,200	122.7	190
Yam	60,300	35,000	58.0	60
Macabo	10,750	5,050	47.0	40
Taro	1,110	370	33.3	50
Sweet potato	25,000	12,000	48.0	30
Cassava	71,000	35,000	49.3	35
Groundnuts	43,000	27,500	64.0	170
Haricot beans	53,500	35,600	66.5	222
Plantain	71,230	30,000	42.1	50
Banana	40,250	24,300	60.4	55
Potato	4,650	3,800	81.7	150
<u>Garden Crops</u>				
Tomato	19,450	18,500	95.1	140
Cabbage	1,500	1,480	98.7	125
Onion	25	23	92.0	200
Lettuce	1,800	1,780	98.9	125
Carrot	1,955	1,945	99.5	175
Celery	250	248	99.2	1,000
Pumpkin	360	359	99.7	90
Red pepper	130	110	84.6	2,700
Soybean	40	37	92.5	75
Beet	150	150	100.0	260
Turnip	35	35	100.0	100
Welsh onion	420	400	95.2	85
Eggplant	975	970	99.5	100
Water melon	4	3.5	87.5	500
<u>Garden Crops</u>				
Parsley	10	10	100.0	800
Radish	42	42	100.0	185
Sweet pimento	19	19	100.0	185
French bean	134	134	100.0	175
African vegetable	15,000	5,500	36.7	70

Table 6 (2/2)

PRODUCTIONS, MARKETING AND PRICES OF THE MAIN  
AGRICULTURAL PRODUCTS IN THE NOUN DIVISION ON  
AUGUST 30 TH, 1984

Products	Production (tons)	Marketed Volume (tons)	Marketing Rate (%)	Price per Kg (CFA F)
<u>Fruits</u>				
Oil palm - Oil	700	450	64.3	900/ℓ
- Kernel	150	150	100.0	-
Orange	15	12	80.0	300
Grapefruit	-	-	-	-
Lemon	10	9.5	95.0	210
Avocado	950	750	78.9	100
Mango	15,500	11,000	71.0	75
Papaya	20	5	25.0	25
Guava	0.2	0.2	100.0	230
Cooking plums	150	100	66.7	300
Kola	5	2	40.0	600

Source: Rapport Annual de la Section Départementale de la Statistique Agricole du  
Noun, 1983-1984.

Table 7 EVOLUTION OF THE CREDITS GRANTED BY DIVISION, 1980/81 - 1984/85

Divisions/Year	(Unit: CFA F)					
	1980/81	1981/82	1982/83	1983/84	1984/85	Total
Noun	154,992,945 (75.1)	82,464,000 (69.4)	45,514,746 (48.8)	42,950,560 (37.3)	451,055,155 (19.1)	776,977,406 (26.8)
Mifi	20,929,160 (10.2)	15,750,000 (13.2)	15,225,040 (16.3)	22,848,510 (19.9)	580,961,067 (24.6)	655,713,777 (22.6)
Bamboutos	11,453,000 (5.6)	5,189,000 (4.4)	8,950,000 (9.6)	8,500,000 (7.4)	527,097,950 (22.3)	561,189,950 (19.4)
Ndé	8,342,500 (4.0)	- (0.0)	5,200,000 (5.6)	5,692,350 (4.9)	191,711,105 (8.1)	210,945,955 (7.3)
Ménoua	8,389,200 (4.1)	7,800,000 (6.6)	13,911,000 (14.9)	31,056,270 (27.0)	527,202,731 (22.3)	588,359,201 (20.3)
Haut-Nkam	2,258,000 (1.0)	7,610,000 (6.4)	4,463,015 (4.8)	4,003,000 (2.5)	84,904,456 (3.6)	103,238,471 (3.6)
<b>Total</b>	<b>206,364,805 (100.0)</b>	<b>118,813,000 (100.0)</b>	<b>93,263,801 (100.0)</b>	<b>115,050,690 (100.0)</b>	<b>2,362,932,464 (100.0)</b>	<b>2,896,424,760 (100.0)</b>

Source: FONADER, Agence de Bafoussam

Table 8 FINANCIAL AND ECONOMIC PRICES

Farm Outputs and Inputs		Financial Prices as of December 1985	Economic Prices in 1995 (1985 constant)
Paddy	(CFA F/kg)	78	150
Maize	(CFA F/kg)	70	103
Groundnuts	(CFA F/kg)	200	200
Soybeans	(CFA F/kg)	100	190
Tomato	(CFA F/kg)	80	80
French beans	(CFA F/kg)	110	110
<b>Timber</b>			
- Diameter	> 50 cm (CFA F/m <sup>3</sup> )	25,700	28,800
- Diameter	20~50 cm (CFA F/m <sup>3</sup> )	10,100	7,800
- Firewoods	(CFA F/m <sup>3</sup> )	1,000	770
<b>Fertilizers</b>			
- Urea	(CFA F/kg)	145	210
- TSP	(CFA F/kg)	130	136
- KCl	(CFA F/kg)	107	112
<b>Agro-chemicals</b>			
- Insecticides	(CFA F/kg)	2,950	2,800
- Fungicides	(CFA F/kg)	1,500	1,400
<b>Machinery</b>			
- Hand tractor	(CFA F)	1,318,000	-
- Sprayer	(CFA F)	682,000	-
- Thresher	(CFA F)	596,000	-
Labour	(CFA F/day)	830	600



Table 9 GENERAL FEATURES OF PROPOSED STRAGE DAMS

Description	Ndoup Dam	Nja Dam
<b>1. Reservoir</b>		
(1) Drainage Area	16.7 km <sup>2</sup>	20.8 km <sup>2</sup>
(2) Gross Storage Capacity	8,760,000 m <sup>3</sup>	4,930,000 m <sup>3</sup>
(3) Dead Storage Capacity	130,000 m <sup>3</sup>	160,000 m <sup>3</sup>
(4) Active Storage Capacity	8,630,000 m <sup>3</sup>	4,770,000 m <sup>3</sup>
(5) High Water Level	El. 1,173.0 m	El. 1,142.5 m
(6) Full Water Level	El. 1,171.5 m	El. 1,141.0 m
(7) Low Water Level	El. 1,156.0 m	El. 1,127.0 m
(8) Reservoir Area at Full Water Level	620,000 m <sup>2</sup>	580,000 m <sup>2</sup>
<b>2. Dam</b>		
(1) Dam Type	Fill Type	Fill Type
(2) Dam Crest Elevation	El. 1,175.5 m	El. 1,145.0 m
(3) Freeboard	2.5 m	2.5 m
(4) Dam Height	25.5 m	26.0 m
(5) Dam Crest Length	155.0 m	260.0 m
(6) Embankment Volume	180,900 m <sup>3</sup>	245,600 m <sup>3</sup>
<b>3. Spillway</b>		
(1) Design Discharge	95.0 m <sup>3</sup> /sec	115.0 m <sup>3</sup> /sec
(2) Type	Over Flow Type	Over Flow Type
(3) Crest Length	26.0 m	32.0 m
(4) Overflow Depth	1.5 m	1.5 m
<b>4. Outlet</b>		
(1) Design Discharge	1.261 m <sup>3</sup> /sec	1.157 m <sup>3</sup> /sec
(2) Type	Drop Inlet Type	Drop Inlet Type
(3) Intake Section	φ800 mm Steel Pipe	φ800 mm Steel Pipe
(4) Energy Dissipator	Jet Flow Gate	Jet Flow Gate
<b>5. Diversion Structure</b>		
(1) Design Discharge	12.3 m <sup>3</sup> /sec	9.4 m <sup>3</sup> /sec
(2) Section	Concrete Box 2.0 m x 2.0 m	Concrete Box 2.0 m x 2.0 m
(3) Length	150.0 m	150.0 m

Table 10

## GENERAL FEATURES OF IRRIGATION FACILITIES

1. Ndoup Intake Weir

- 1) Type : Fixed type concrete weir  
 2) Crest Elevation : El. 1,125 m  
 3) Crest Length : 13.0 m  
 4) Height of Weir : 1.0 m  
 5) Scouring Sluice Gate : Width 1.0 m x height 1.5 m x 1 no.  
 6) Intake Discharge : 1.44 m<sup>3</sup>/sec  
 7) Intake Gate : Width 1.0 m x height 1.0 m x 2 nos.

2. Irrigation Canals and Related Structures

Name of Irrigation Canal	Canal Length (m)	Related structures (nos.)				
		Turnout	Drop	Culvert	Checkgate	Spillway
1) DMIC	3,650	4	3	-	3	1
2) DSIC-1	5,900	2	-	2	3	1
3) DSIC-2	1,950	2	-	1	2	1
4) JMIC	4,420	3	-	-	3	-
5) JSIC-1	1,230	1	-	-	2	1
6) JSIC-2	9,050	2	-	-	3	1
<b>Total</b>	<b>26,200</b>	<b>14</b>	<b>3</b>	<b>3</b>	<b>16</b>	<b>5</b>

Note: DMIC - Ndoup Main Irrigation Canal  
 DSIC - Ndoup Secondary Irrigation Canal  
 JMIC - Nja Main Irrigation Canal  
 JSIC - Nja Secondary Irrigation Canal

Table 11 GENERAL FEATURES OF DRAINAGE FACILITIES

1. Drainage Canals and Related Structures

Name of Drainage Canal	Canal Length (m)	Related structures (nos.)				
		Drop	Culvert	Drain Inlet	Drainage Junction	Cross Drain
1) KMDC	3,690	1	1	7	1	-
2) KSDC-1	2,090	-	1	6	-	-
3) KSDC-2	910	-	1	4	-	-
4) JMDC	7,725	3	2	18	-	-
5) DMDC	5,540	11	3	7	-	-
6) CD	36,400	-	-	-	-	23
<b>Total</b>	<b>56,355</b>	<b>15</b>	<b>8</b>	<b>42</b>	<b>1</b>	<b>23</b>

Note: KMDC - Nkoup Main Drainage Canal  
 KSDC - Nkoup Secondary Drainage Canal  
 JMDC - Nja Main Drainage Canal  
 DMDC - Ndoup Main Drainage Canal  
 CD - Catch Drain

2. Diversion Flood Way

- 1) Side Spillway : Crest length 8.0 m, Overflow depth - 0.6 m
- 2) Cross Drain : Length 28.3 m
- 3) Flood Canal : Length 700 m

3. Regulating Gates

- 1) Gate Type : Roller Gate
- 2) Number of Gate : 3 nos.
- 3) Size of Gate : Width 3.0 m x height 2.5 m

Table 12 REQUIRED NUMBER OF PROJECT STAFF

Staff	Stage	Detailed Design					Construction (including O&M)					Operation & Maintenance		
		Category & Grade	1987	1988	1989	1990	1991	1992	1993	1994	1995-			
<u>Managing Staff</u>														
a) Director General of the Project	A2/940	1	1	1	1	1	1	1	1	1	1	1	1	
b) Department Director	A2/605	-	-	-	2 (2)	3 (3)	3 (3)	4	4	4	4	4	5	
c) Senior Officer or Principal Engineer	B2/610	2	2	2	2	2	2	3	3	3	3	3	3	
<u>Technical and Administrative Staff</u>														
d) Civil Engineer	A1/530	1	2	2	2	2	2	2	2	2	2	2	2	
e) Agricultural Engineer	B2/420	1	3	3	4 (1)	4 (1)	4 (1)	5	5	5	5	5	6	
f) Agricultural Technician	B1/480	2	3	3	6 (3)	9 (6)	11 (8)	12	12	12	12	12	17	
g) Accountant & Cashier	B1/480	2	2	2	2	2	2	3	3	3	3	3	4	
h) Agricultural Extension Worker	C/250	-	-	-	3 (3)	5 (5)	5 (5)	6	6	6	6	6	7	
i) Secretary & Typist, Clerk, Store Keeper	V/D	8	16	16	16	16	16	18	18	18	18	18	22	
j) Mechanic, Electrician	V/D	-	-	-	1 (1)	2 (2)	2 (2)	2	2	2	2	2	3	
<u>Workers and Laborers</u>														
k) Gatekeeper, Milling Operator	IV/D	-	-	-	10 (10)	12 (12)	15 (15)	22	22	22	22	22	22	
l) Driver, Operator of Tractor and Foreman	III/D	5	5	5	8 (3)	10 (5)	10 (5)	11	12	12	12	12	15	
m) Guardsman, Office keeper	II/D	3	5	5	10 (5)	11 (6)	11 (6)	12	12	12	12	12	13	
n) Laborers														
- Permanent	II/D	4	6	6	10 (4)	14 (8)	16 (10)	18	20	20	20	20	23	
- Temporary (A)	II/D	-	-	-	5 (5)	5 (5)	5 (5)	8	10	10	10	10	10	
- Temporary (B)	II/D	-	-	-	15 (15)	20 (20)	20 (20)	30	35	35	35	35	40	
<b>Total</b>		<b>29</b>	<b>45</b>	<b>45</b>	<b>97 (52)</b>	<b>118 (73)</b>	<b>125 (80)</b>	<b>157</b>	<b>170</b>	<b>170</b>	<b>170</b>	<b>170</b>	<b>193</b>	

Remarks: Figures in Parentheses ( ) show the number of staff required for operation and maintenance during the construction stage.

Table 13 QUALIFICATIONS AND REQUIRMENTS OF THE STAFF

No.	Post	Qualifications Required	Least Experience (Years)	Other Abilities or Qualifications Expected
1.	Director General	Bachelor	15	Master or Ph.D.
2.	Department Director	Bachelor	8	Master, Proficiency in English
3.	Senior Officer & Principal Engineer	Bachelor	5	Command of English
4.	Civil Engineer, Agricultural Engineer, Agricultural Technician	Bachelor or Diploma of College	3	Command of English
5.	Accountant & Cashier, Nurse	Diploma of College or Senior High School	2	Certificate of Accountancy, Notion of English
6.	Agricultural Monitor	Graduate of Junior High School	1	Completion of Training Programme, Notion of English
7.	Secretary & Typist, Draftsman, Clerk & Store Keeper	Diploma of Senior or Junior High School	2	Certificate of Speciality, Notion of English
8.	Mechanic, Electrician, Mason, etc.	Diploma of Senior or Junior High School	3	Certificate of Speciality, Notion of English
9.	Gatekeeper, Milling Operator	Diploma of Junior High School	2	Certificate of Speciality, Notion of English
10.	Driver and Operator of Tractor	Graduate of Primary School	5	Certificate of Speciality, Proficiency in French
11.	Laborer	Good Health and Diligence	-	Notion of French

Table 14 ECONOMIC CONSTRUCTION COST

(Unit: CFA F 10<sup>3</sup>)

Year in Order	Year (Tentative)	Direct Construction Cost	Cost for Rice-mill, Office, etc.	Administration Cost	Engineering Cost	Sub-Total	Physical Contingency	Total
1.	1987	-	-	51,802	367,330	419,132	41,913	461,045
2.	1988	907,551 (15%)	262,770	77,938	117,272	1,365,531	136,553	1,502,084
3.	1989	1,512,585 (25%)	455,480	77,937	117,272	2,163,274	216,327	2,379,601
4.	1990	1,512,585 (25%)	-	77,938	117,272	1,707,795	170,780	1,878,575
5.	1991	1,210,068 (20%)	-	77,937	117,272	1,405,277	140,528	1,545,805
6.	1992	907,551 (15%)	-	77,938	117,272	1,102,761	110,276	1,213,037
7.	1993	-	-	-	-	-	-	-
8.	1994	-	-	-	-	-	-	-
Total		6,050,340	718,250	441,490	953,690	8,163,770	816,377	8,980,147

Table 15 PROJECT BENEFIT

(Unit: CFA F 106)

Crops	Total Value							
	1990	1991	1992	1993	1994	1995	1996	1997 -
<u>With Project</u>								
- Rice	46.4	132.5	290.4	595.7	736.2	845.6	909.5	942.6
- Maize	8.2	24.1	53.3	111.8	147.8	175.7	195.2	195.2
- Tomato	20.9	72.2	166.7	347.0	488.6	568.6	608.6	608.6
- Soybean	0.5	4.1	9.1	20.1	30.6	38.1	42.9	42.9
- Groundnuts	0.2	4.0	10.1	25.2	48.2	62.2	72.2	72.2
Sub-total	<u>76.2</u>	<u>236.9</u>	<u>529.6</u>	<u>1,099.8</u>	<u>1,451.4</u>	<u>1,690.2</u>	<u>1,828.4</u>	<u>1,861.5</u>
<u>Without Project</u>	<u>66.9</u>	<u>66.9</u>	<u>66.9</u>	<u>66.9</u>	<u>66.9</u>	<u>66.9</u>	<u>66.9</u>	<u>66.9</u>
<u>Incremental Benefit</u>	<u>9.3</u>	<u>170.0</u>	<u>462.7</u>	<u>1,032.9</u>	<u>1,384.5</u>	<u>1,623.3</u>	<u>1,761.5</u>	<u>1,794.6</u>

Table 16 ECONOMIC COST AND BENEFIT FLOW

(Unit: CFA F 10<sup>6</sup>)

Year in Order	Year (Tentative)	Economic Cost				Economic Benefit		
		Construction Cost	Replacement Cost	O&M Cost	Total	Agricultural Benefit	Other Benefit (Forest Exp.)	Total
1	1987	461.0	-	-	461.0	-	-	0
2	1988	1,502.1	-	-	1,502.1	-	-	0
3	1989	2,379.6	-	-	2,379.6	-	12.0	12.0
4	1990	1,878.6	-	66.1	1,944.7	9.3	18.0	27.3
5	1991	1,545.8	-	93.6	1,639.4	170.0	30.0	200.0
6	1992	1,213.0	-	106.0	1,319.0	462.7	60.1	522.8
7	1993	-	-	222.8	222.8	1,032.9	-	1,032.9
8	1994	-	-	228.4	228.4	1,384.5	-	1,384.5
9	1995	-	-	268.9	268.9	1,623.3	-	1,623.3
10	1996	-	-	269.3	269.3	1,761.5	-	1,761.5
11	1997	-	-	269.6	269.6	1,794.6	-	1,794.6
12	1998	-	0.2	269.6	269.8	1,794.6	-	1,794.6
13	1999	-	192.7	269.6	462.3	1,794.6	-	1,794.6
14	2000	-	-	269.6	269.6	1,794.6	-	1,794.6
15	2001	-	-	269.6	269.6	1,794.6	-	1,794.6
16	2002	-	-	269.6	269.6	1,794.6	-	1,794.6
17	2003	-	-	269.6	269.6	1,794.6	-	1,794.6
18	2004	-	-	269.6	269.6	1,794.6	-	1,794.6
19	2005	-	-	269.6	269.6	1,794.6	-	1,794.6
20	2006	-	-	269.6	269.6	1,794.6	-	1,794.6
21	2007	-	-	269.6	269.6	1,794.6	-	1,794.6
22	2008	-	0.2	269.6	269.8	1,794.6	-	1,794.6
23	2009	-	192.7	269.6	462.3	1,794.6	-	1,794.6
24	2010	-	-	269.6	269.6	1,794.6	-	1,794.6
25	2011	-	-	269.6	269.6	1,794.6	-	1,794.6
26	2012	-	-	269.6	269.6	1,794.6	-	1,794.6
27	2013	-	130.0	269.6	399.6	1,794.6	-	1,794.6
28	2014	-	-	269.6	269.6	1,794.6	-	1,794.6
29	2015	-	-	269.6	269.6	1,794.6	-	1,794.6
30	2016	-	-	269.6	269.6	1,794.6	-	1,794.6
31	2017	-	-	269.6	269.6	1,794.6	-	1,794.6
32	2018	-	0.2	269.6	269.8	1,794.6	-	1,794.6
33	2019	-	192.7	269.6	462.3	1,794.6	-	1,794.6
34	2020	-	-	269.6	269.6	1,794.6	-	1,794.6
35	2021	-	-	269.6	269.6	1,794.6	-	1,794.6
36	2022	-	-	269.6	269.6	1,794.6	-	1,794.6
37	2023	-	-	269.6	269.6	1,794.6	-	1,794.6
38	2024	-	-	269.6	269.6	1,794.6	-	1,794.6
39	2025	-	-	269.6	269.6	1,794.6	-	1,794.6
40	2026	-	-	269.6	269.6	1,794.6	-	1,794.6
41	2027	-	-	269.6	269.6	1,794.6	-	1,794.6
42	2028	-	0.2	269.6	269.8	1,794.6	-	1,794.6
43	2029	-	192.7	269.6	462.3	1,794.6	-	1,794.6
44	2030	-	-	269.6	269.6	1,794.6	-	1,794.6
45	2031	-	-	269.6	269.6	1,794.6	-	1,794.6
46	2032	-	-	269.6	269.6	1,794.6	-	1,794.6
47	2033	-	-	269.6	269.6	1,794.6	-	1,794.6
48	2034	-	-	269.6	269.6	1,794.6	-	1,794.6
49	2035	-	-	269.6	269.6	1,794.6	-	1,794.6
50	2036	-	-	269.6	269.6	1,794.6	-	1,794.6

Discount Rate	10%	12%	15%
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B/C	1.206	1.006	0.788
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B-C (CFA F 10 <sup>6</sup> )	1,829.76	52.03	-1,557.14
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EIRR: 12.1%



Table 17 CASH FLOW STATEMENT

(Unit: CFA F 106)

Year in Order	Year (Tentative)	Cash Outflow			Replace-ment Cost	O&M Cost	Fund for Purchase of Paddy	Total	Construction Fund			Cash Inflow			Government Subsidy	Total Balance
		Capital Cost	Loan Repayment /	Interest					Foreign Currency	Local Currency	Foreign Currency	Local Currency	Revenue from Forest Expl.	Revenue from Milled Rice		
1	1987	443.3	174.7	-	-	-	619.0	443.3	174.7	-	-	-	-	-	619.0	
2	1988	1,052.6	1,253.4	15.6	-	-	2,321.6	1,052.6	1,253.4	-	-	-	15.6	-	2,321.6	
3	1989	1,860.5	2,000.3	52.4	-	-	3,913.2	1,860.5	2,000.3	13.6	-	-	38.8	-	3,913.2	
4	1990	1,476.2	1,829.2	117.5	-	88.0	3,559.6	1,476.2	1,829.2	20.3	60.7	21.1	152.1	-	3,559.6	
5	1991	1,249.2	1,691.7	169.2	-	125.4	3,364.2	1,249.2	1,691.7	33.9	180.5	52.8	176.1	-	3,364.2	
6	1992	1,007.2	1,494.3	212.9	-	142.3	3,124.6	1,007.2	1,494.3	67.8	333.9	105.7	115.7	-	3,124.6	
7	1993	-	-	248.2	-	299.4	1,090.9	-	-	-	677.5	211.3	202.1	-	1,090.9	
8	1994	-	-	248.2	-	308.0	1,160.8	-	-	-	753.8	211.3	195.7	-	1,160.8	
9	1995	-	-	248.2	-	362.1	1,264.3	-	-	-	815.5	211.3	237.5	-	1,264.3	
10	1996	-	-	248.2	-	362.6	1,292.7	-	-	-	850.2	211.3	231.2	-	1,292.7	
11	1997	-	-	248.2	-	362.9	1,661.4	-	-	-	867.5	211.3	582.6	-	1,661.4	
12	1998	-	-	255.7	0.2	362.9	1,649.1	-	-	-	867.5	211.3	570.3	-	1,649.1	
13	1999	-	-	223.3	228.1	362.9	1,864.6	-	-	-	867.5	211.3	785.8	-	1,864.6	
14	2000	-	-	210.9	-	362.9	1,624.1	-	-	-	867.5	211.3	545.3	-	1,624.1	
15	2001	-	-	198.5	-	362.9	1,611.7	-	-	-	867.5	211.3	532.9	-	1,611.7	
16	2002	-	-	186.1	-	362.9	1,599.3	-	-	-	867.5	211.3	520.5	-	1,599.3	
17	2003	-	-	173.7	-	362.9	1,586.9	-	-	-	867.5	211.3	508.1	-	1,586.9	
18	2004	-	-	161.3	-	362.9	1,574.5	-	-	-	867.5	211.3	495.7	-	1,574.5	
19	2005	-	-	148.9	-	362.9	1,562.1	-	-	-	867.5	211.3	483.3	-	1,562.1	
20	2006	-	-	136.5	-	362.9	1,549.7	-	-	-	867.5	211.3	470.9	-	1,549.7	
21	2007	-	-	124.1	-	362.9	1,537.3	-	-	-	867.5	211.3	458.5	-	1,537.3	
22	2008	-	-	111.7	0.2	362.9	1,525.1	-	-	-	867.5	211.3	446.3	-	1,525.1	
23	2009	-	-	99.3	293.1	362.9	1,740.6	-	-	-	867.5	211.3	661.8	-	1,740.6	
24	2010	-	-	86.9	-	362.9	1,500.1	-	-	-	867.5	211.3	421.3	-	1,500.1	
25	2011	-	-	74.4	-	362.9	1,487.6	-	-	-	867.5	211.3	408.8	-	1,487.6	
26	2012	-	-	62.0	-	362.9	1,475.2	-	-	-	867.5	211.3	396.4	-	1,475.2	
27	2013	-	-	49.6	163.0	362.9	1,615.8	-	-	-	867.5	211.3	537.0	-	1,615.8	
28	2014	-	-	37.2	-	362.9	1,450.4	-	-	-	867.5	211.3	371.6	-	1,450.4	
29	2015	-	-	24.8	-	362.9	1,438.0	-	-	-	867.5	211.3	359.2	-	1,438.0	
30	2016	-	-	12.4	-	362.9	1,425.6	-	-	-	867.5	211.3	346.8	-	1,425.6	
31	2017	-	-	0	-	362.9	1,058.7	-	-	-	867.5	211.3	-	-	1,078.8	

Remarks: /1 Interest: 3.5%  
 Grace period: 10 years  
 Repayment period including grace period: 30 years  
 /2 Revenue from operation service fee to be collected from farmers. The total amount of this fee for each farm household occupying 2.1 ha was fixed at CFA F 222,000 per year.  
 This analysis was made on the basis of price level and exchange rate (US\$1.0 = CFA F 384.5) as of November, 1985.

Table-18 ENVIRONMENTAL QUALITY STANDARDS FOR WATER QUALITY IN JAPAN

- (1) Standard relating to human health (Hazardous substances)  
 - Standards are indiscriminate to all aquatic areas

(unit: mg/ℓ)

Item	Standard Value
Cadmium	0.01
Cyanide	not detectable
Organic phosphorous*	not detectable
Lead	0.1
Hexavalent chromium	0.05
Arsenic	0.05
Total mercury	0.0005**
Alkyl mercury	not detectable
PCB (polychlorinated biphenyl)	not detectable

\* Organic phosphorous includes parathion, methyl demeton and E.P.N

\*\* Standard value for total mercury is based on the yearly average value

- (2) Standards relating to living environment  
 - Standards are set up by classifying the public water area into categories of utilization purposes

(unit: mg/ℓ)

Category***		pH	BOD (max.)	COD (max.)	Suspended substance (max.)	Dissolved oxygen (min.)	No. of coliform group bacteria (max.) (MPN/100ml)	Others
River	AA	6.5-8.5	1	—	25	7.5	50	
	A	6.5-8.5	2	—	25	7.5	1,000	
	B	6.5-8.5	5	—	25	5.0	5,000	
	C	6.0-8.5	5	—	50	5.0	—	
	D	6.0-8.5	10	—	100	2.0	—	
	E	6.0-8.5	10	—	—*	2.0	—	* Floating matters and garbages should not be observed

\*\*\* AA, A, B and C can be used as drinking water by using suitable water treatment facilities in purification plant.

Table - 19 PROHIBITED AND RESTRICTED FARM CHEMICALS

Name	Application
γ-BHC	Prohibited to sell
DDT	Prohibited to sell
Endrin	Can be used for control of insects on citrus, before seed-setting
Dyldrin	Can be used for control of insects on trees, except for fruit trees
Aldrin	Can be used for control of <i>Scepticus griseus</i> (Roelofs) on nursery stock

Table - 20 RECOMMENDABLE FARM CHEMICALS AND FERTILIZERS IN THE PROJECT

## (1) Farm Chemicals

Item	Production Name	LD <sub>50</sub> (RAT)
Insecticides	Sumithion EC.	800 mg/kg
	Sumithion L. (60)	800 mg/kg
	Diazinon EC. (40)	500 mg/kg
	EPN EC. (1.5)	20 - 40 mg/kg
Pesticides	Rabcide EC.	2,500 mg/kg
	Rabcide EC., F.	2,500 mg/kg
	Rabcide - Validacin EC.	2,500 mg/kg
	Rabcide - Neosaso EC.	2,500 mg/kg

## (2) Chemical Fertilizers

Name	Formula
Ammonium Sulfate	(NH <sub>4</sub> ) <sub>2</sub> SO <sub>4</sub>
Triple Super Phosphate	Ca (H <sub>2</sub> PO <sub>4</sub> ) <sub>2</sub> · H <sub>2</sub> O
Mixed Fertilizer	N:P:K = 10:14:12

## **FIGURES**



Fig. 1 ORGANIZATIONAL CHART FOR THE REGIONAL RURAL DEVELOPMENT

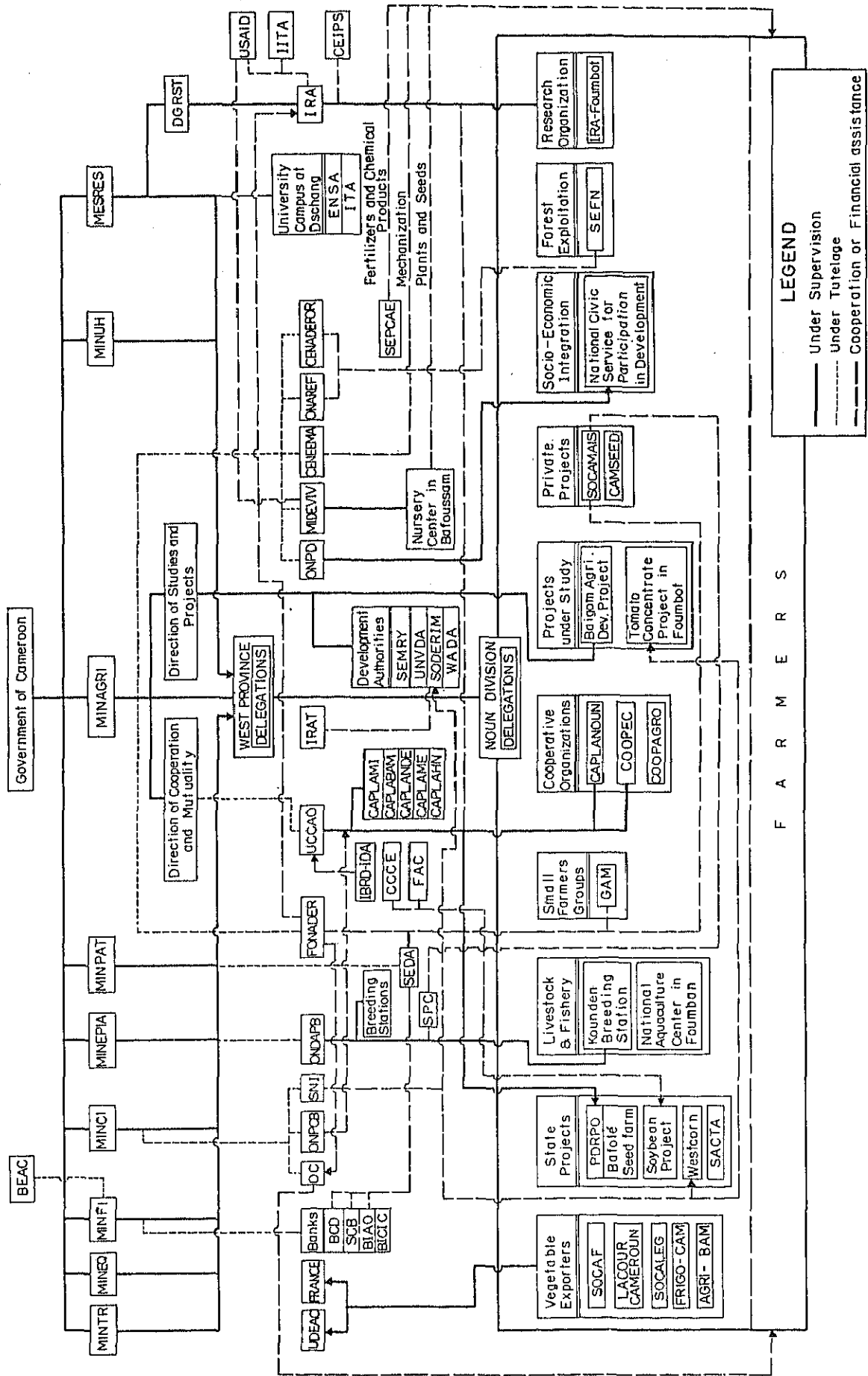


Fig. 2 REGIONAL ORGANIZATION OF AGRICULTURAL SERVICES  
(WITH THE DETAILS OF THE STUDY REGION)

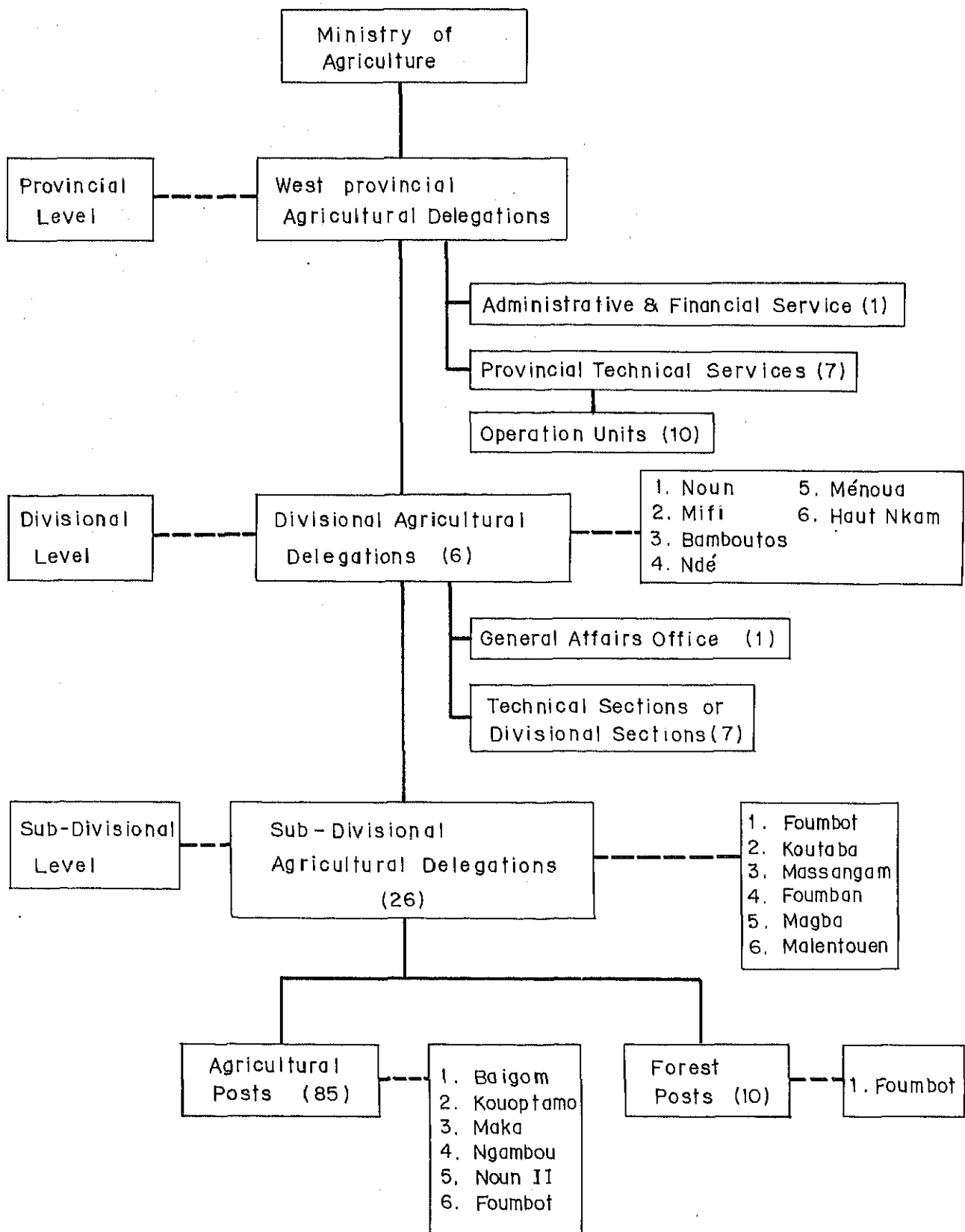
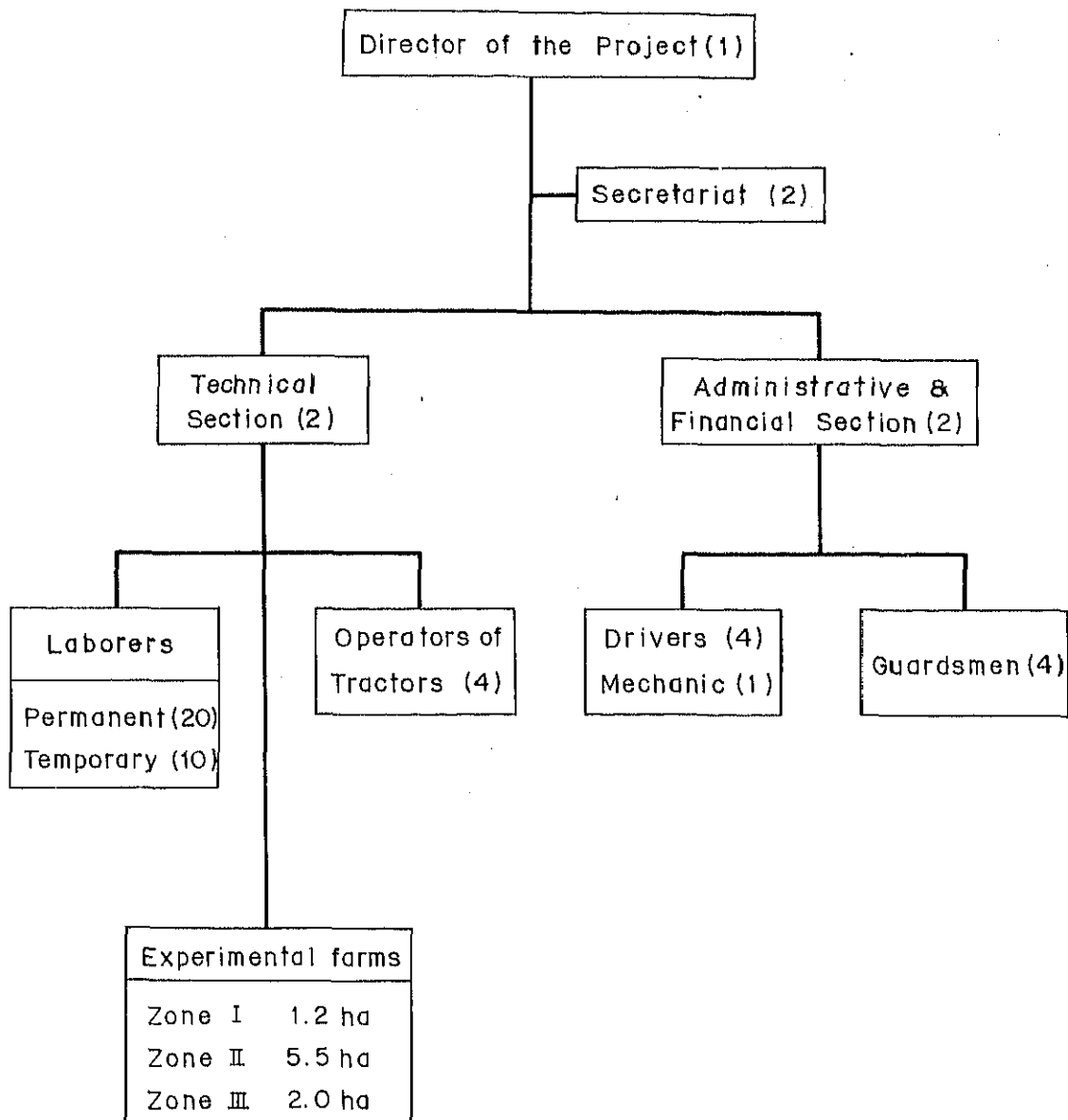


Fig. 3 ORGANIZATION CHART OF THE BAIGOM RICE CULTIVATION PROJECT OFFICE



Remarks : Figures in parentheses ( ) are number of staff as of November 1985.



Fig. 4 PROPOSED CROPPING PATTERN

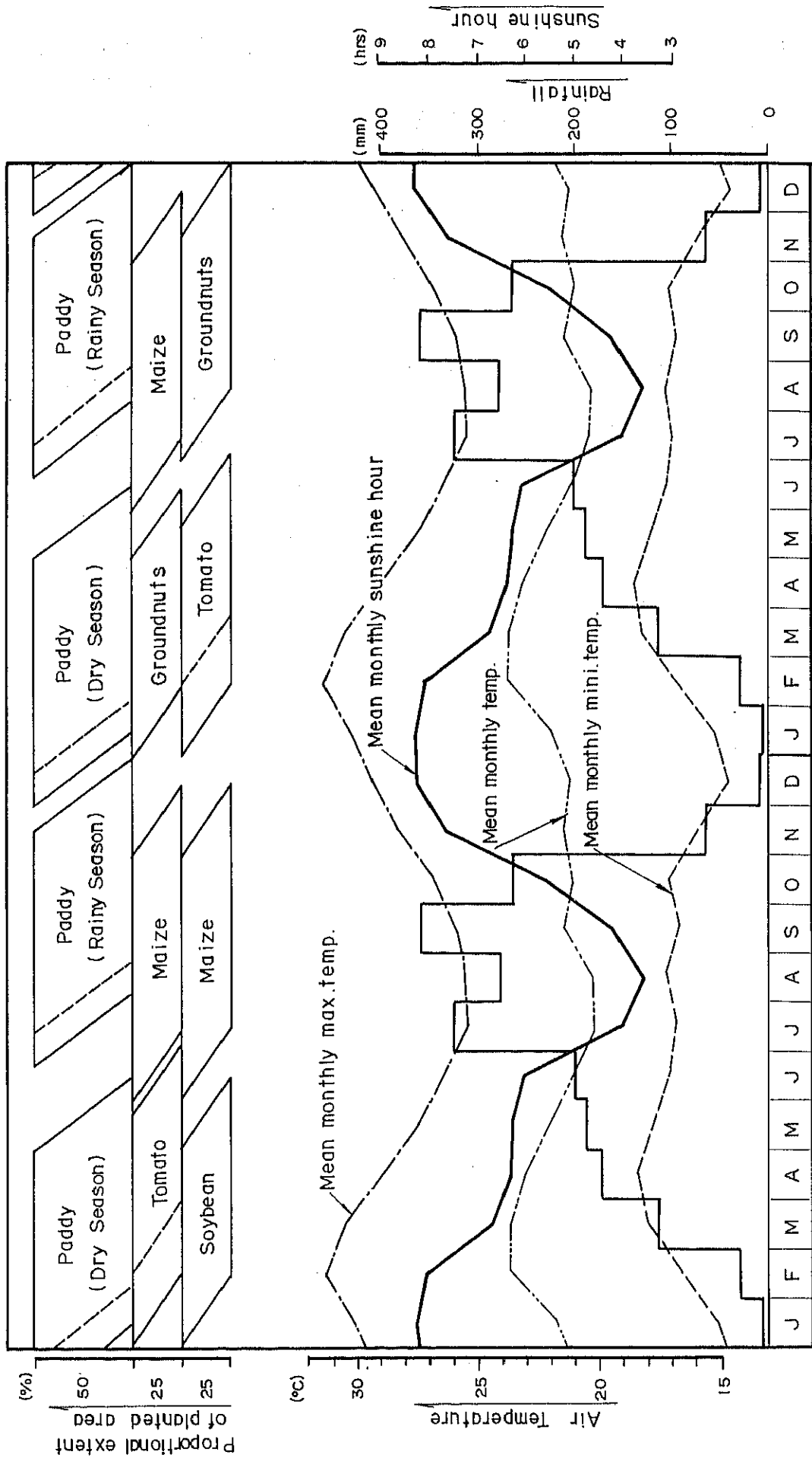


Fig. 5 IRRIGATION DIAGRAM

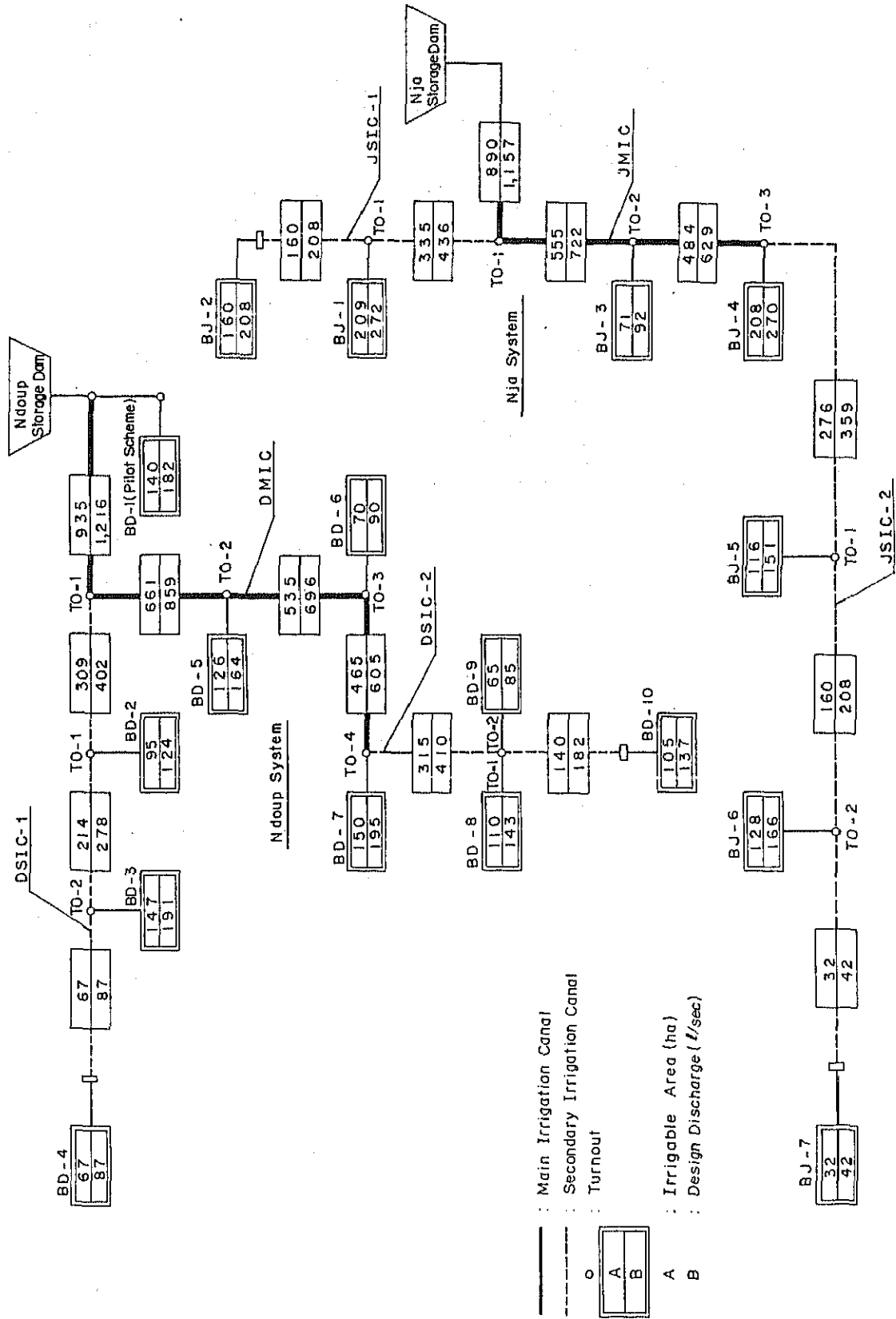


Fig. 6 PROPOSED IRRIGATION AND DRAINAGE SYSTEMS

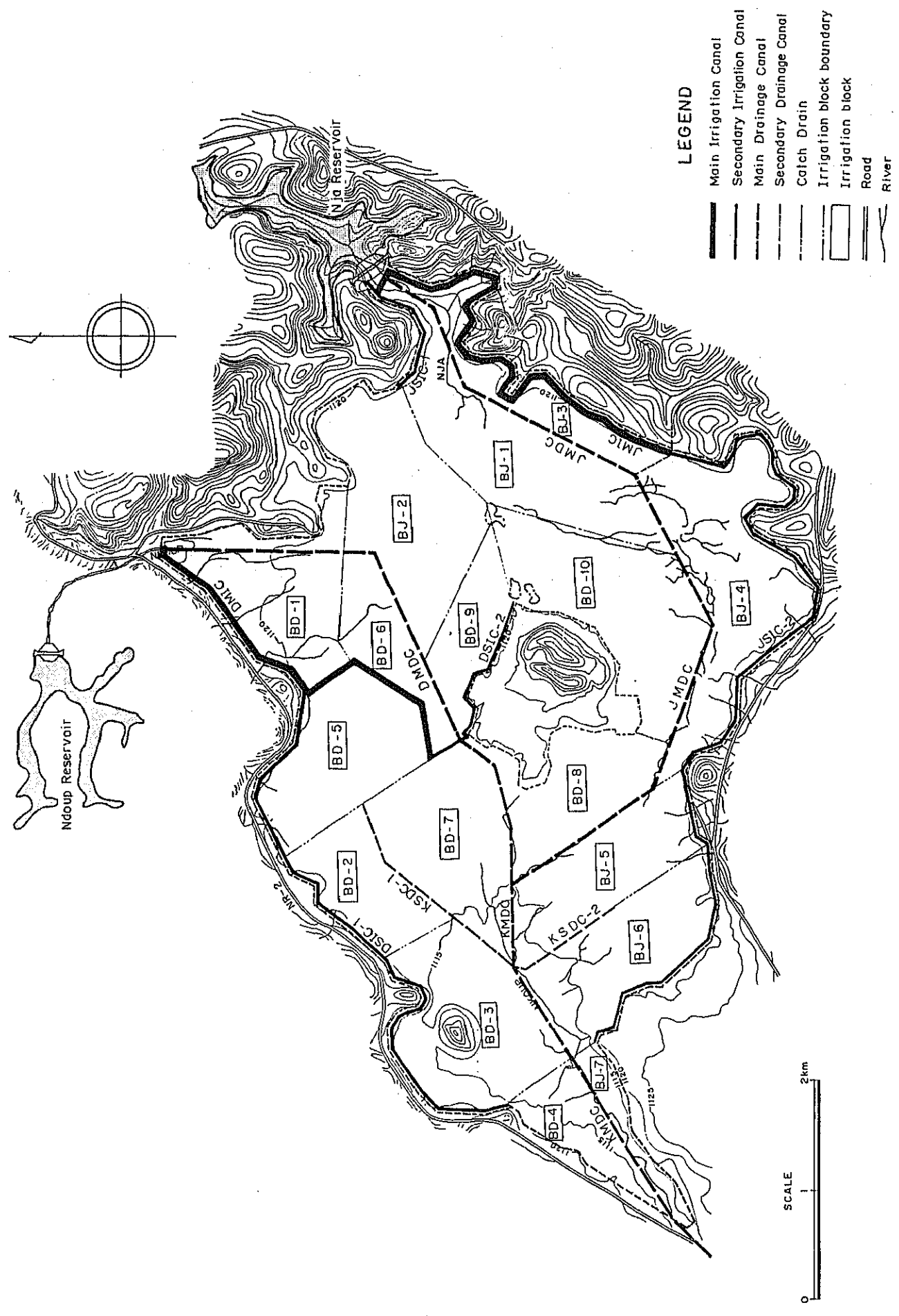


Fig. 7 ELEVATION-AREA, CAPACITY RELATIONSHIP OF NDOUP RESERVOIR

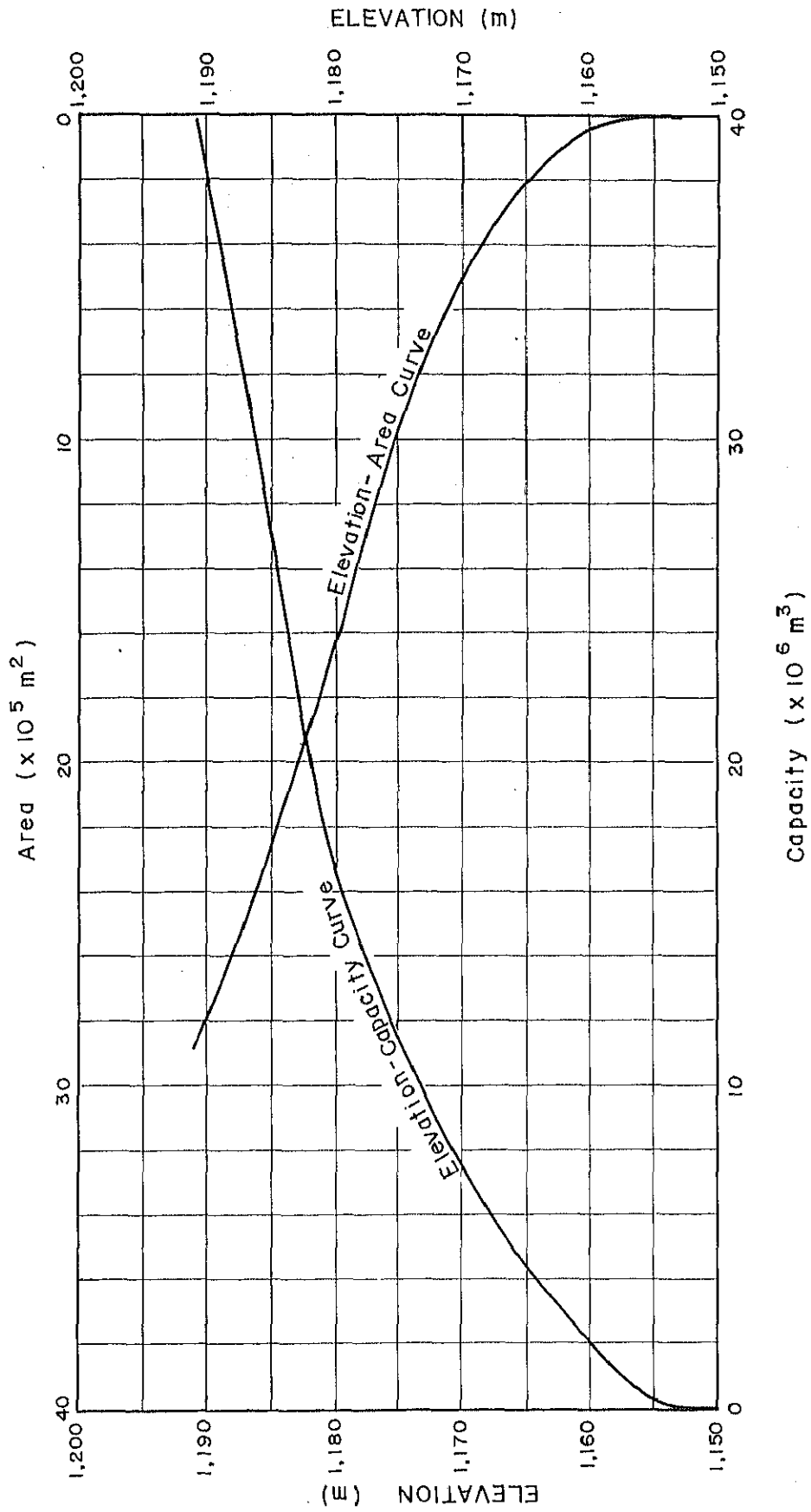


Fig. 8 TYPICAL SECTION OF NDOUP DAM

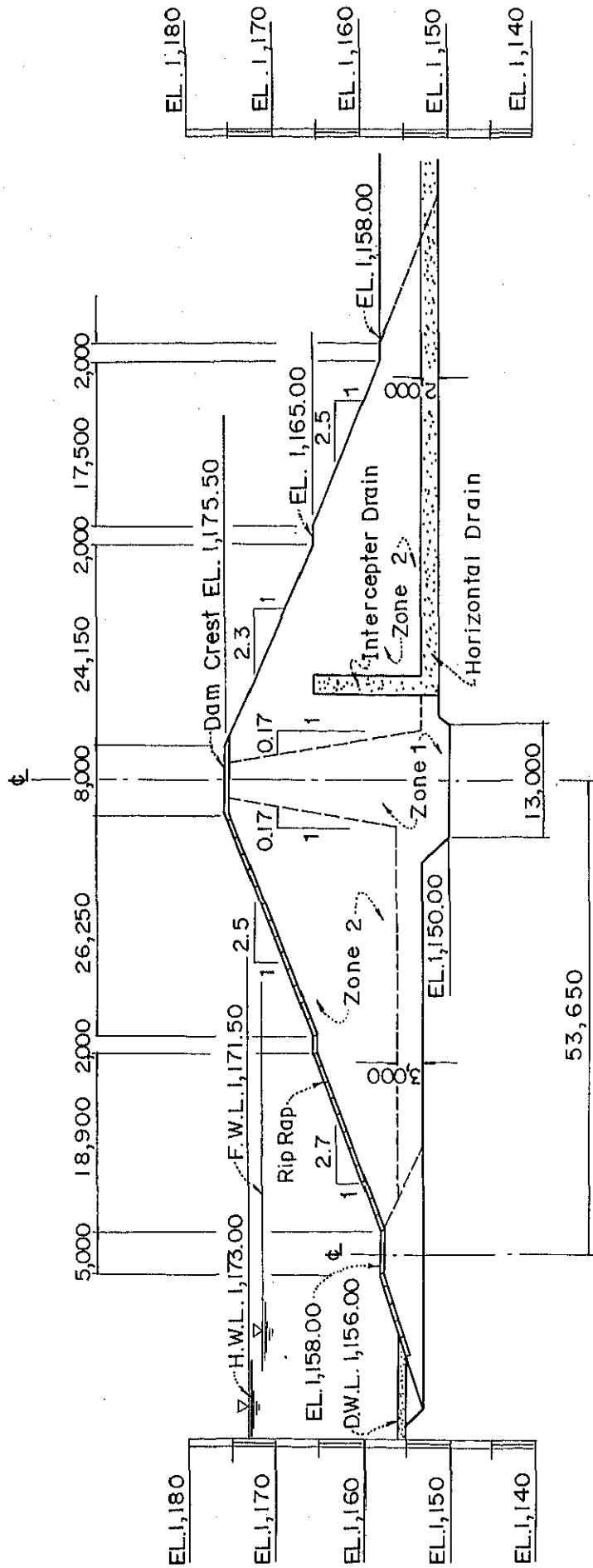


Fig. 9 ELEVATION - AREA, CAPACITY RELATIONSHIP OF NJA RESERVOIR

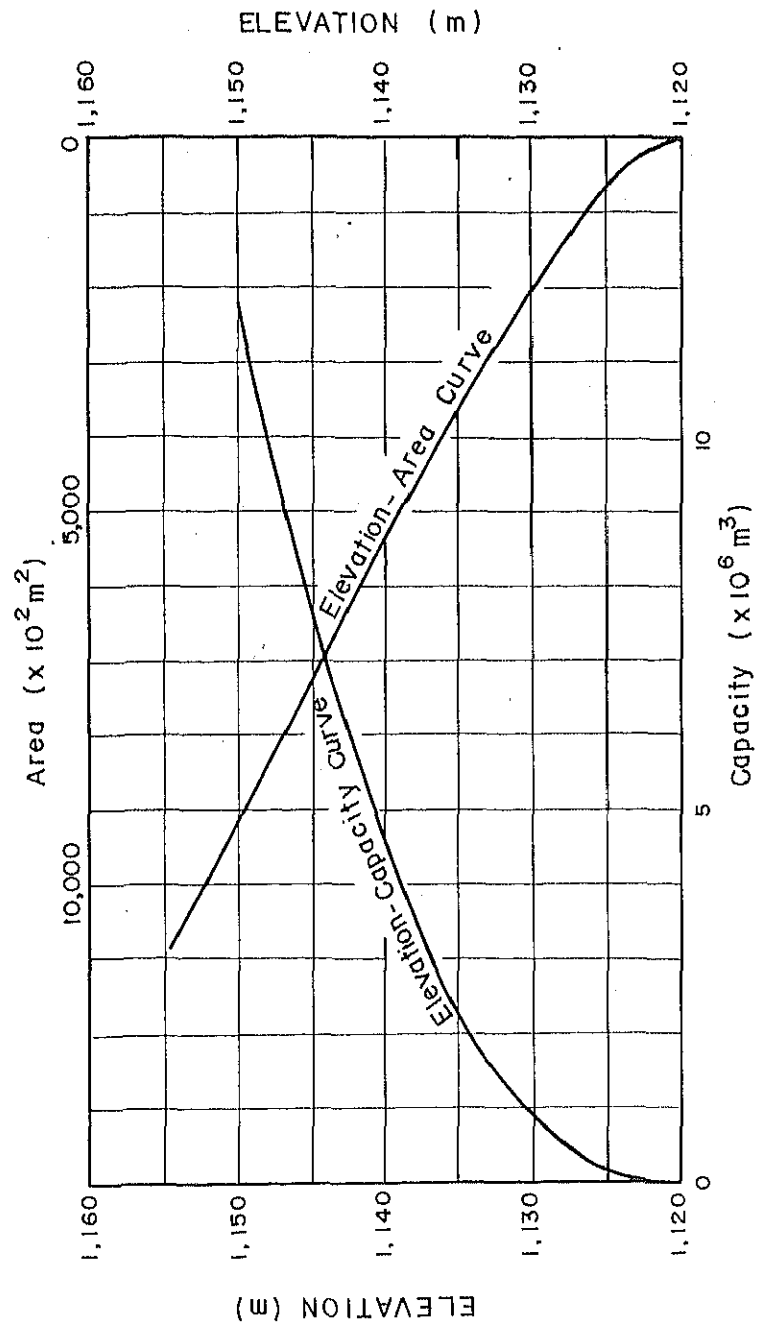


Fig.10 TYPICAL CROSS SECTION OF NJA DAM

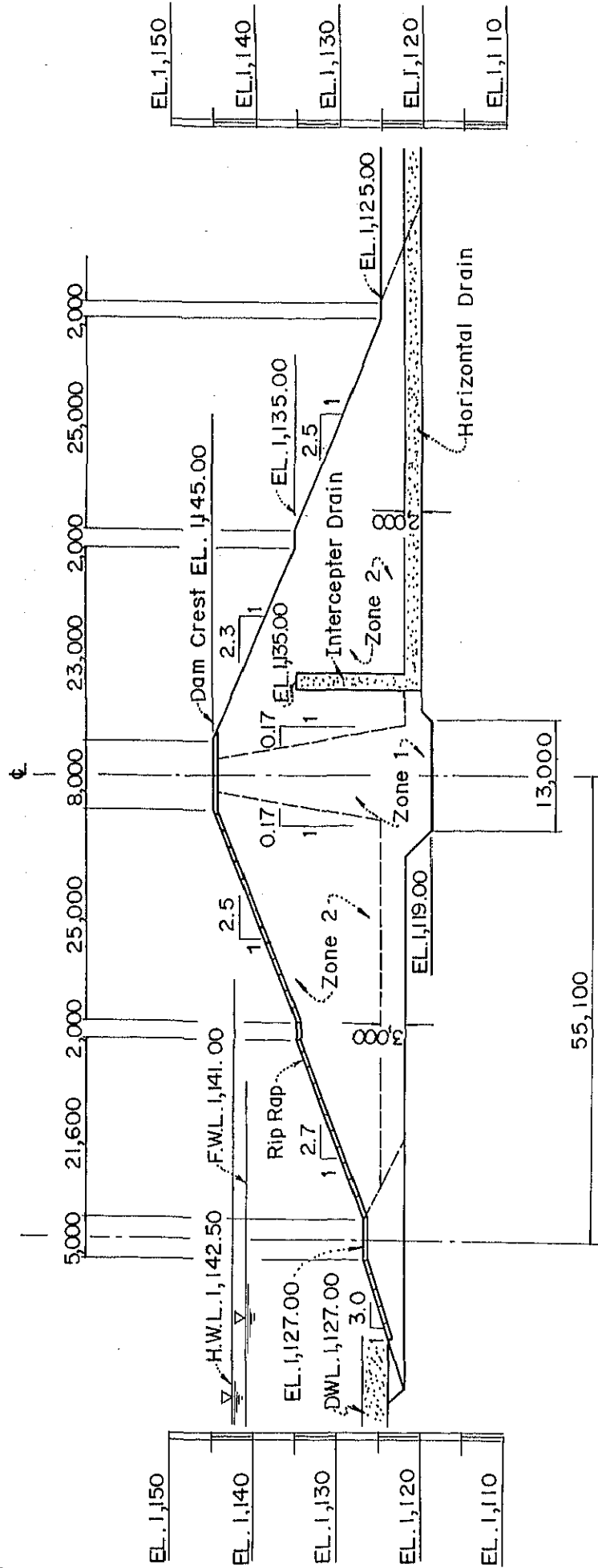
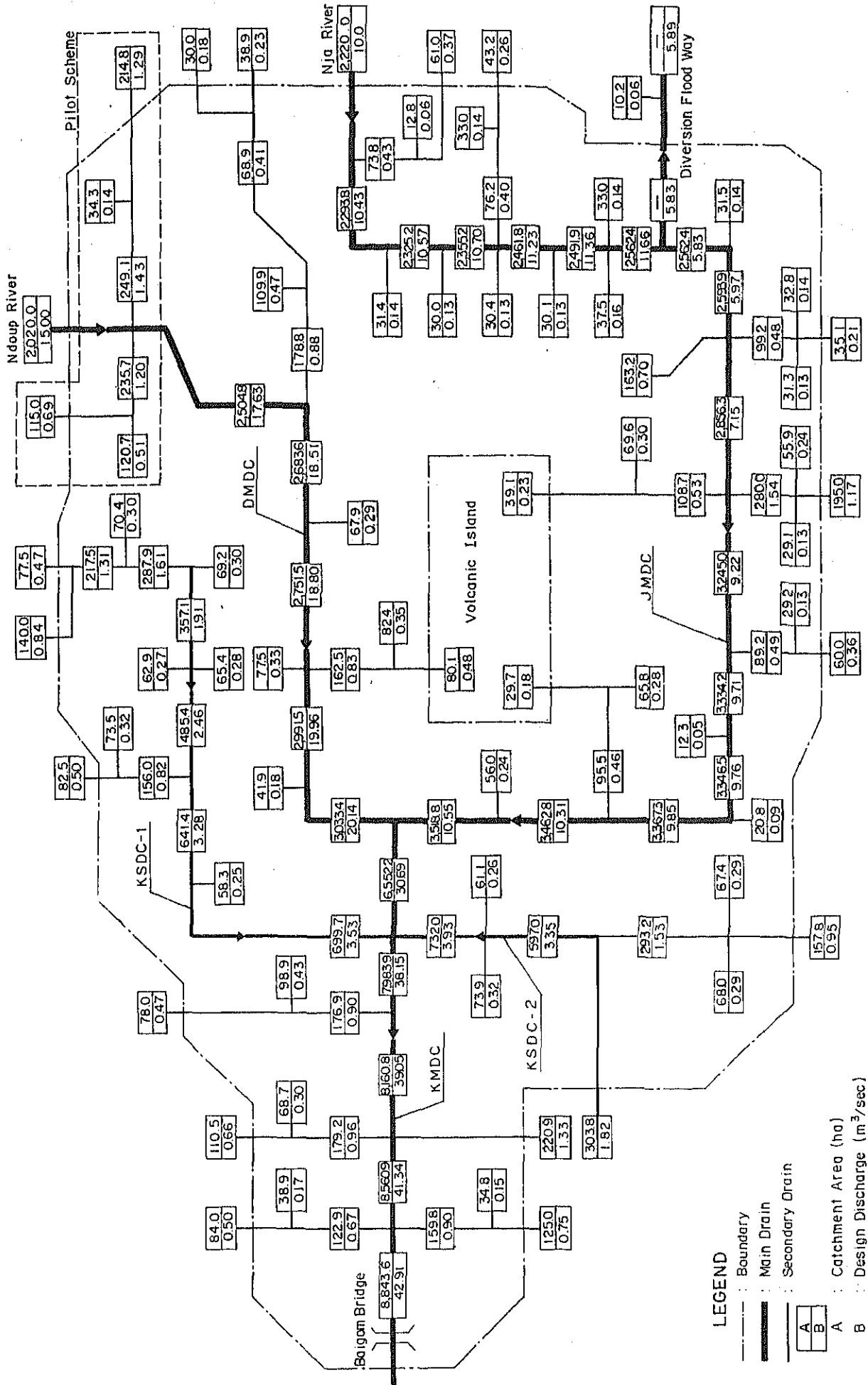


Fig. 11 DRAINAGE DIAGRAM



LEGEND

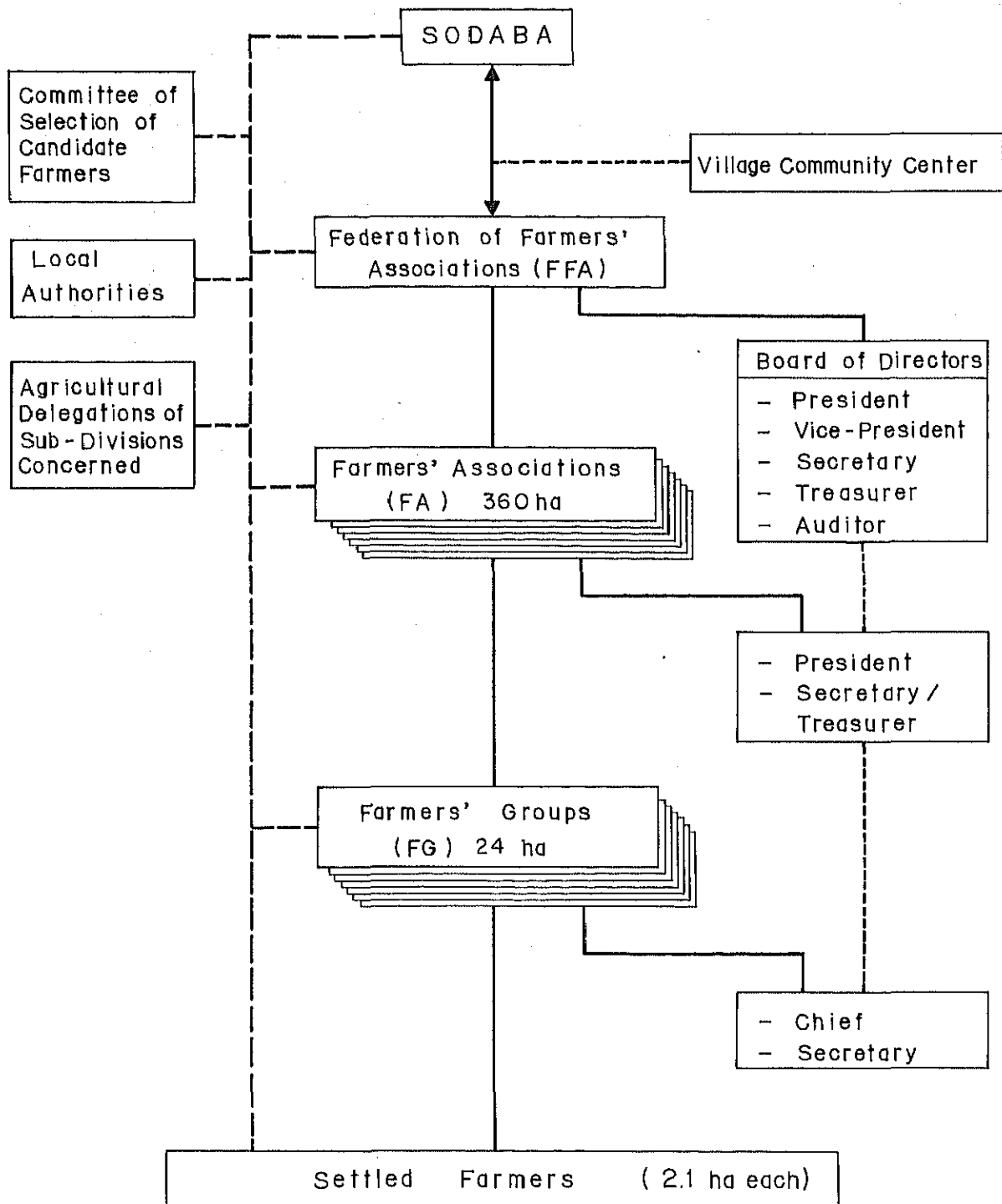
- : Boundary
- : Main Drain
- - - : Secondary Drain
- |   |
|---|
| A |
| B |

 : Catchment Area (ha)
- |   |
|---|
| A |
| B |

 : Design Discharge (m<sup>3</sup>/sec)



Fig.12 PROPOSED ORGANIZATIONAL STRUCTURE OF FARMERS' ASSOCIATIONS



Remarks :

- : Direct linkage
- - - - - : Supervisory relation
- · - · - : Coordinating relation



Fig. 14 PROPOSED ORGANIZATION FOR PROJECT IMPLEMENTATION

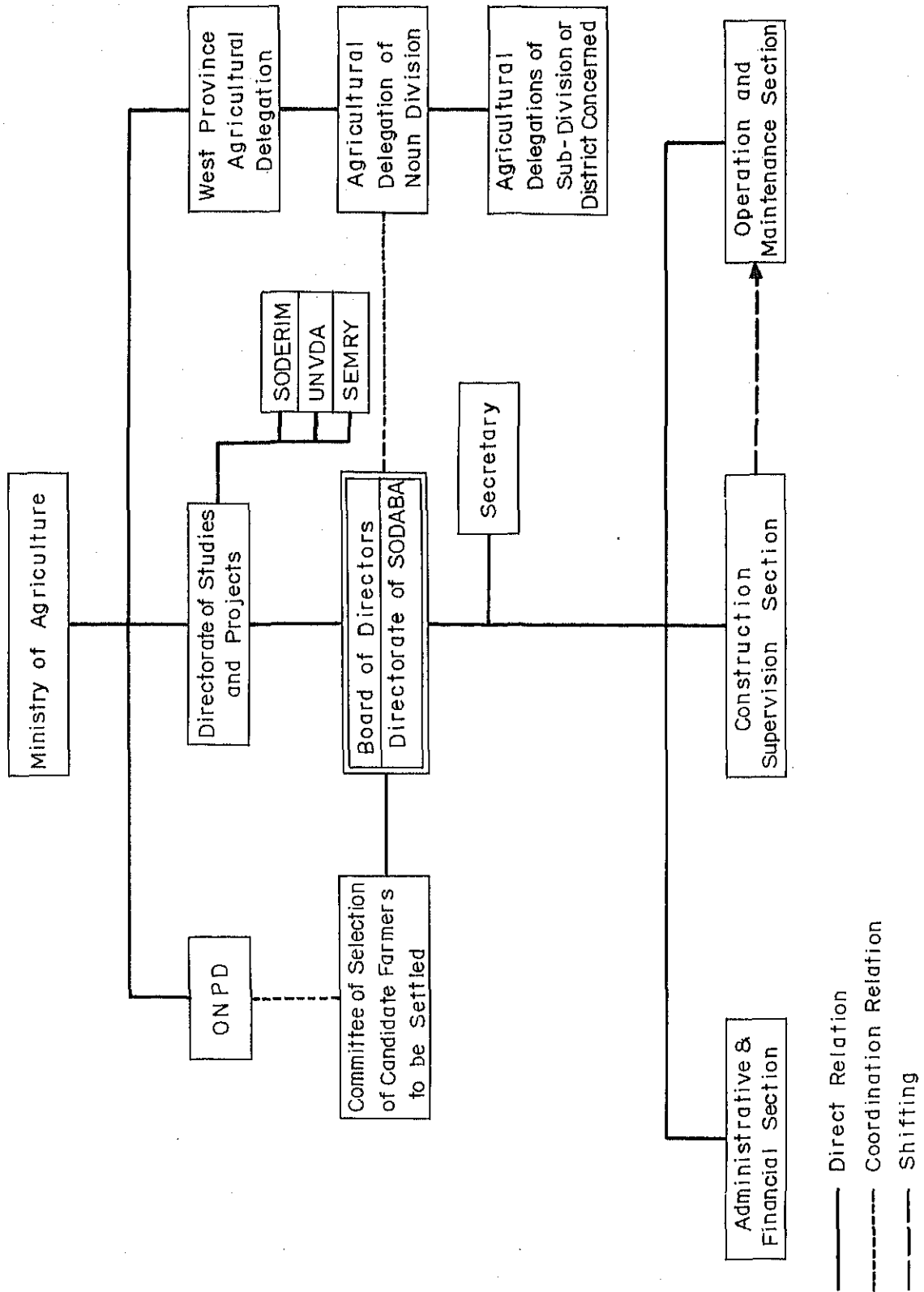
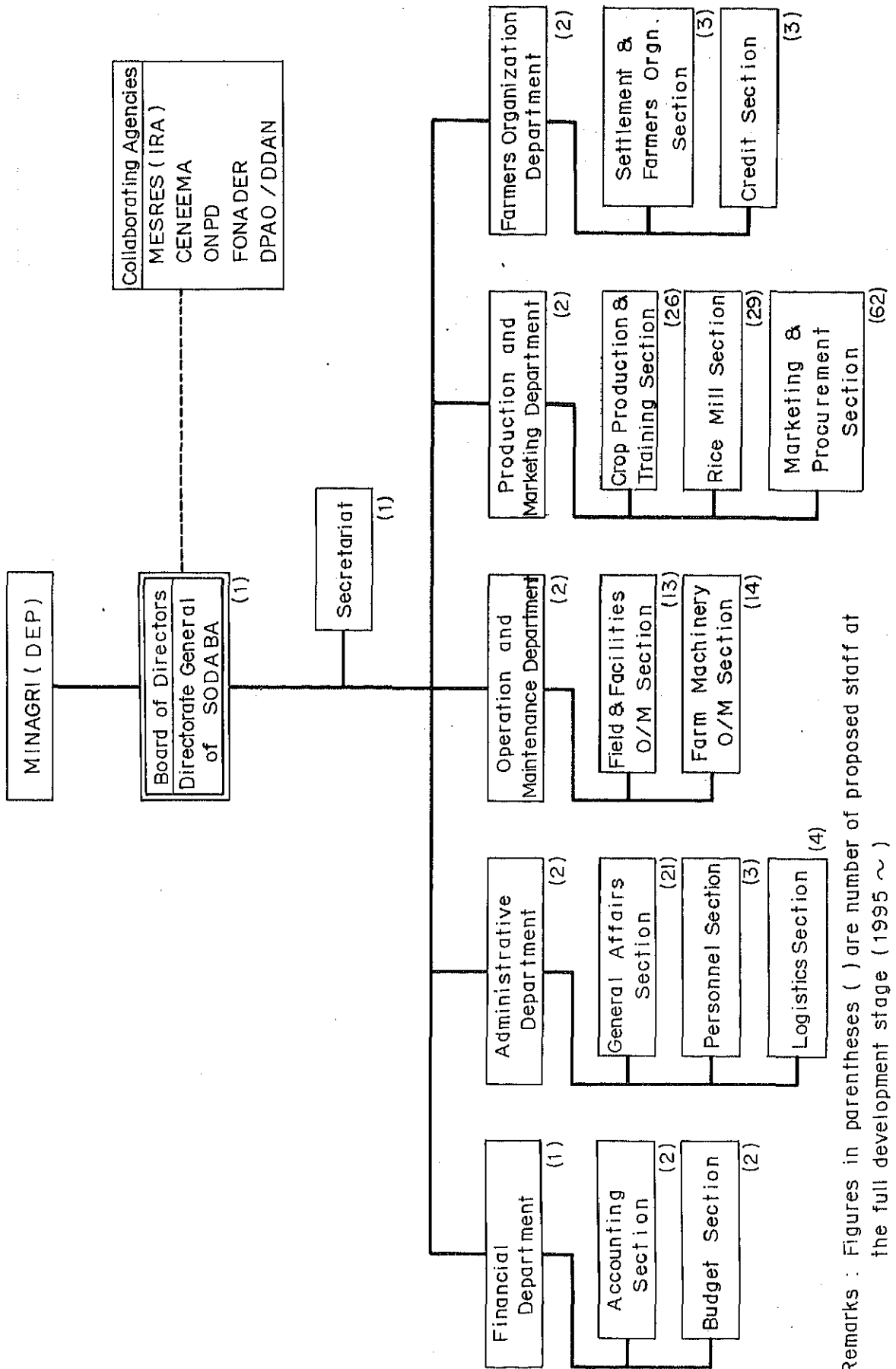
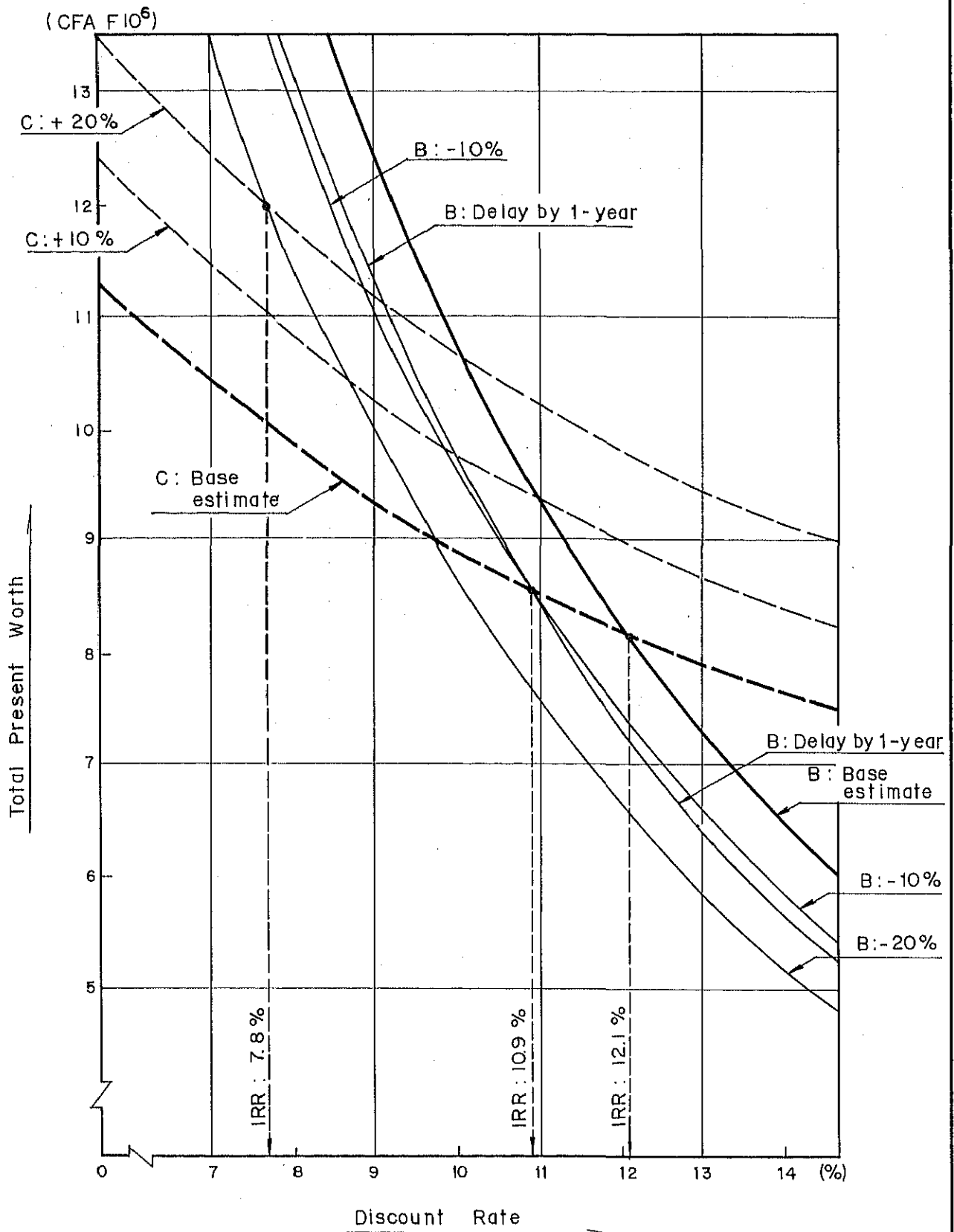


Fig. 15 PROPOSED ORGANIZATION FOR OPERATION AND MAINTENANCE



Remarks : Figures in parentheses ( ) are number of proposed staff at the full development stage ( 1995 ~ )

Fig. 16 SENSITIVITY TESTS OF EIRR



Remarks : B Benefit  
C Cost



Fig. 18 GENERAL LAYOUT OF PILOT SCHEME

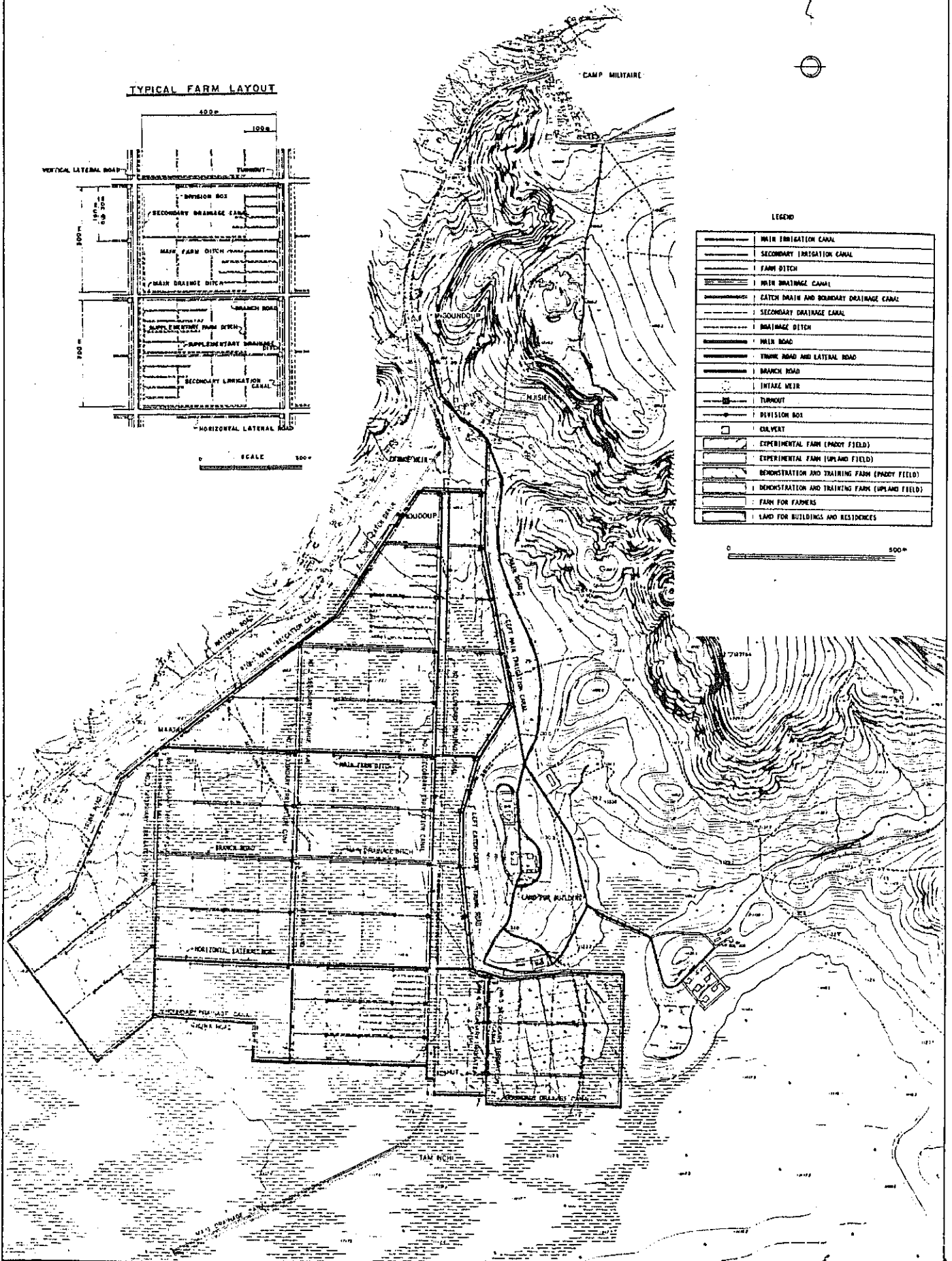
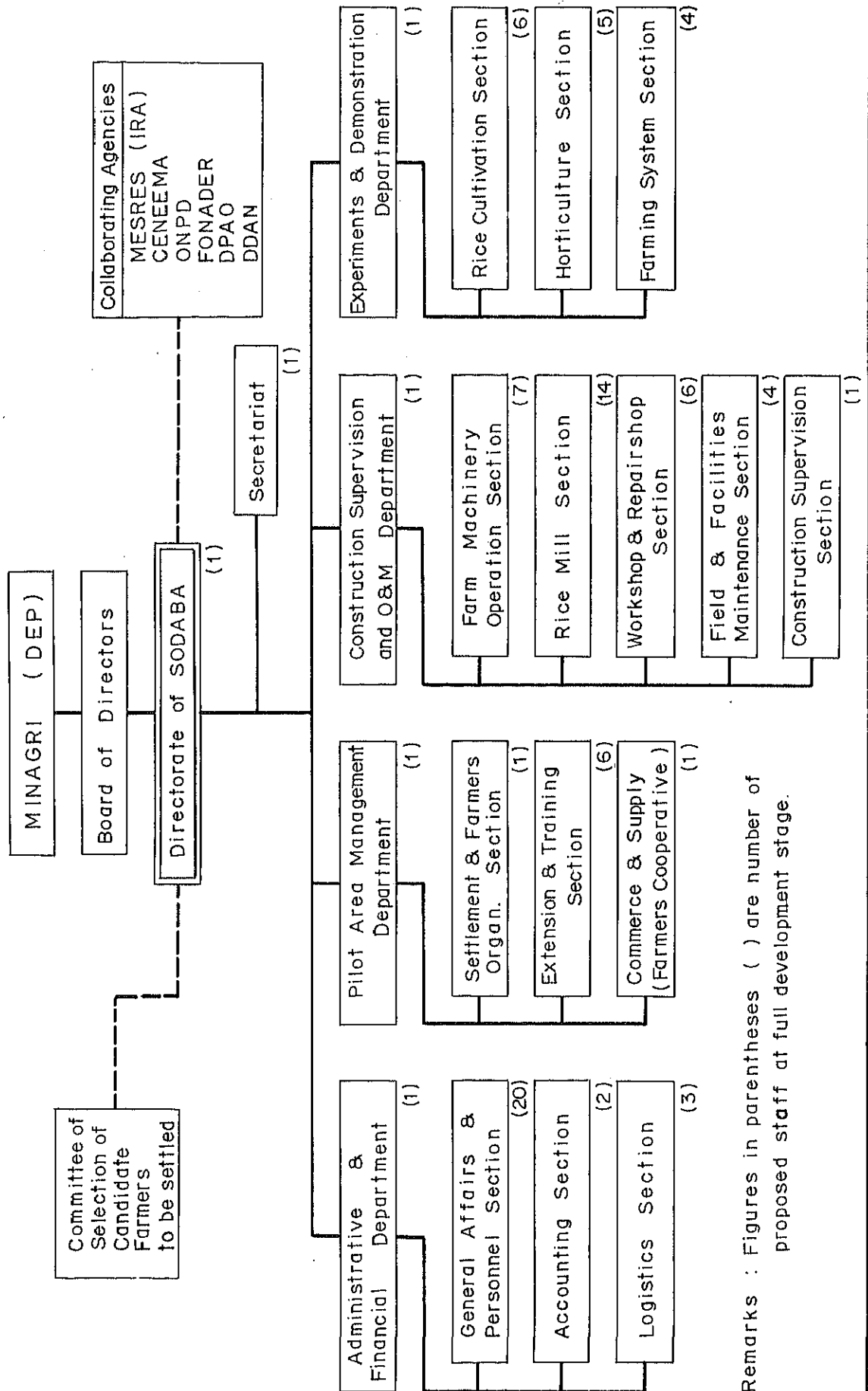






Fig. 20 PROPOSED ORGANIZATION FOR PILOT SCHEME

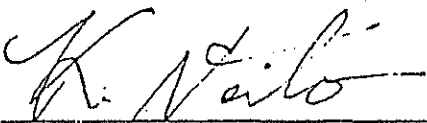


Remarks : Figures in parentheses ( ) are number of proposed staff at full development stage.

**ATTACHMENT**

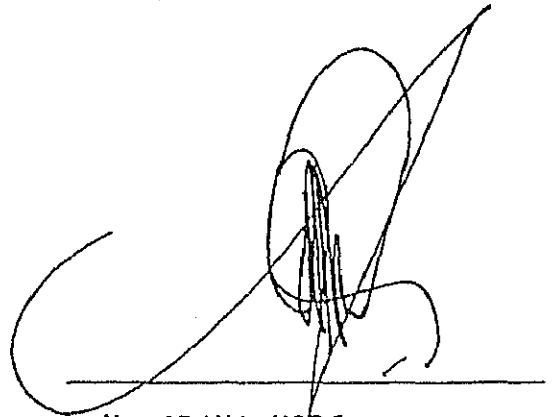


SCOPE OF WORK  
FOR  
FEASIBILITY STUDY  
ON  
BAIGOM AGRICULTURAL DEVELOPMENT PROJECT  
IN  
THE REPUBLIC OF CAMEROON



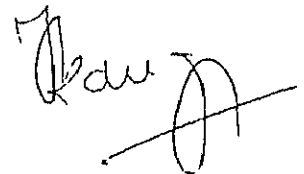
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MR KATSUMI MAITO  
LEADER  
PRELIMINARY SURVEY AND  
SCOPE OF WORK TEAM  
JAPAN INTERNATIONAL  
COOPERATION AGENCY  
(JICA)



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MR ADAMA MODI  
DIRECTEUR DE LA COOPÉRA-  
TION ÉCONOMIQUE ET TECH-  
NIQUE-MINISTÈRE DU PLAN  
ET DE L'AMÉNAGEMENT DU  
TERRITOIRE



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MR KAMGA JOSEPH,  
DIRECTEUR DES ÉTUDES ET  
PROJETS-MINISTÈRE DE  
L'AGRICULTURE

SCOPE OF WORK  
FOR  
FEASIBILITY STUDY  
BAIGOM AGRICULTURAL DEVELOPMENT PROJECT  
IN  
THE REPUBLIC OF CAMEROON

I. INTRODUCTION

In response to the request of the Government of the Republic of Cameroon, the Government of Japan has decided to conduct the Feasibility Study on the Baigom Agricultural Development Project in Cameroon (hereinafter referred to as "the Study"), in accordance with the relevant laws and regulations in force in Japan.

The 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 carry out the study in close cooperation with the Government and the authorities concerned of the Republic of Cameroon.

The Ministry of Agriculture, the Republic of Cameroon (hereinafter referred to as "MOA") shall act as counterpart body to the Japanese Study Team and also as coordinating body to other relevant organizations for the smooth implementation of the Study.

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

II. OBJECTIVE OF THE STUDY

The objective of the Study is to formulate the feasibility study on the Baigom Agricultural Development Project having about 3,000 ha in gross of potential area.

### III. STUDY AREA

The study area is located at about 10 km northeast of Foubot in the West Province, covering the Baigom plain with about 3.000 ha of gross area suitable for agricultural development. The plain is situated between 1.000 to 1.100 m above sea level stretching toward the southeast from the national road between Bafoussam and Foumban.

### IV. SCOPE OF THE STUDY

The scope of the study is broadly divided into three major categories as shown below.

- Work-I : Preparation of the topographic map with a scale of 1/5,000 covering the whole study area
- Work-II : Data collection, necessary field survey, and formulation of the basic concept for the project
- Work-III : Formulation of the plan for the project including the pilot farm and preparation of the feasibility study report including the preliminary design of the pilot farm

Each of Work-I to III consists of the following work items :

#### 1. Work-I

- (1) To conduct topographic control point survey, signalization and levelling survey necessary for the aerial photography and topographic mapping.
- (2) To conduct aerial photography with a scale of 1/20,000
- (3) To conduct topographic mapping of the project area with a scale of 1/5,000 and 1 m contour interval.

## 2. Work-II

- (1) To carry out data collection and necessary field survey relevant to the study on the following items.
  - (a) Topography
  - (b) Meteorology and hydrology
  - (c) Geology and soil mechanics including ground water
  - (d) Soil, land use and land suitability
  - (e) Vegetation
  - (f) Agriculture including farming practices and production
  - (g) Agro-economy
  - (h) Agricultural institutions
  - (i) Irrigation and drainage
  - (j) Agricultural and social infrastructure
  - (k) Flood damage
  - (l) Regional and national economy including marketing
  - (m) Regional and national development plans relevant to agriculture
  - (n) Experiment and research activities relevant to agriculture
  - (o) Construction materials and cost
  - (p) Settlement programme
  - (q) Others
  
- (2) To formulate the basic concept for the project relevant to the following items.
  - (a) Delineation of the project area
  - (b) Outline of proposed agricultural development plan
  - (c) Basic layout of irrigation and drainage facilities
  - (d) Layout of pilot farm
  - (e) Strategy for implementation
  - (f) Others.

3. Work-III

- (1) To formulate the plan for the project including the pilot farm consisting of the following items.
  - (a) Project area including pilot farm area
  - (b) Land use
  - (c) Cropping pattern
  - (d) Irrigable water resources and flood discharges
  - (e) Irrigation requirement and drainage discharge
  - (f) Farming practices including farm mechanization
  - (g) Agricultural output
  - (h) Farm settlement
  - (i) Irrigation and drainage networks
  - (j) Layout of the project works including preliminary design of major structures
  - (k) Social and agricultural infrastructure including rural road, post harvest and so on
  - (l) Organization for operation and maintenance of the project
  - (m) Preliminary design of the pilot farm
  - (n) Transfer and pervasion of agricultural technology
  - (o) Implementation plan and schedule
  - (p) Benefit and cost estimate
  - (q) Economic and financial analyses
  - (r) others
  
- (2) To prepare the feasibility report including the preliminary design of the pilot farm

V. STUDY SCHEDULE

The Study will be conducted in accordance with the tentative work schedule attached EXHIBIT-I.



## VI REPORTS

The JICA study team will prepare the following reports in English with French summary and submit them to the MOA.

1. Inception Report : Twenty (20) copies at the beginning of the 2nd month after commencement of the field survey and investigation
2. Interim Report : Twenty (20) copies at the end of the field survey and investigation
3. Draft Final Report : Thirty (30) copies at the end of the analyses of results of the field survey and investigation
4. Final Report : Fifty (50) copies within two (2) months after receiving the comments of the Government on the Draft Final Report.

## VII UNDERTAKING OF THE GOVERNMENT OF THE REPUBLIC OF CAMEROON

1. To facilitate the smooth implementation of the Study, the Government of the Republic of Cameroon 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 Cameroon for duration of their assignment therein, and exempt them from alien registration requirements,
  - (3) to exempt the members of the Japanese study team from taxes, duties and any other charges on equipment, machinery, and other materials brought into Cameroon for the implementation of the Study,
  - (4) to provide medical services as needed, those of which will be chargeable on the members of the Japanese study team,

- (5) to exempt the members of the Japanese study team from income tax and other charges imposed on or in connection with any emolument or allowance paid to the members of the Japanese study team for their service in connection with the implementation of the study,
  - (6) to provide necessary facilities to the Japanese study team for remittance as well as utilization of funds introduced into Cameroon from Japan in connection with the implementation of the Study, and
  - (7) to secure permission for the Japanese study team to take all data and documents related to the Study including aerial photographs out of Cameroon to Japan by the study team.
  - (8) to secure permission for entry into private properties or restricted areas for that conduct of the Study.
2. The Government of Cameroon shall bear claims, if any arises against the members of the Japanese study team arising from, occurring in the course of, or otherwise connected with the discharge of their duties in the implementation of the Study, except when such claims arise from gross negligence or wilful misconduct on the part of the members of the Japanese study team.
3. MOA shall, at its own expense, provide the Japanese study team with the following, in cooperation with other relevant organizations :
- (1) available data and information related to the Study,
  - (2) credentials or identification cards to the members of the study team,
  - (3) suitable office space with necessary equipment,
  - (4) counterpart personnel to assist the study team and participate in the various activities for Study, and
  - (5) appropriate number of vehicles with drivers.

VIII UNDERTAKING OF JICA

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

- (1) to dispatch, at its own expense, the Study Team to Cameroon,
- (2) to perform technology transfer to the Cameroon counterpart personnel in the course of the Study,
- (3) to provide the necessary equipment for the implementation of the Study, which will remain the property of JICA unless otherwise agreed upon.

IX OTHERS

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













JICA