

#### *H.4.2 Agricultural credit*

The major portion of farmers in the Study area consist of farmers with holding of small and medium farm represented by settlers of agrarian reform project. These farmers, without access to commercial banks, have no other option but to rely on credit services provided by the BAGRICOLA. Farmers tend to complain of various aspects concerning with BAGRICOLA's credit services in such aspects as: interest rate together with commission is too elevated; the interval between application and disbursement is fairly long; repayment period expires very shortly; etc.

Meanwhile, the financing agency considers that problem of the agricultural credit services lies on lower proportion of repayment from the part of debtors; according the nearest branch of BAGRICOLA, about 40% of the disbursed credit fell into arrears in 1993. In such case, although the financing agency takes sanctions against dishonest debtors imposing additional interest for delayed repayment, no expected effect has been taken. As a consequence, BAGRICOLA goes decapitalized and its resources available for future financing becomes in shortage. For breaking a vicious circle between low proportion in repayment and shortage of resources for agricultural credit, both the financing agency and its users are requested to make effort to on the matter.

The problems related with agricultural credit services are not specific ones coherent to the Study area but are in common all over the country; these problems are closely associated with agricultural policies of the central government, so political decision is required to solve them. Under the circumstances, recommendations will be made for fear that inadequate credit services should not constitute constraint on implementing agricultural development of the area.

1. To strengthen manpower and expand available amount of credit at BAGRICOLA's branch offices near the Study area so as to satisfy increased demand with implementation of the project.
2. BAGRICOLA's credit for settlers is not rendered individually but through associations or cooperatives organized by farmers; to train and educate leaders of these organizations so that their member farmers may become more sensible in management and repayment of their debt.
3. BAGRICOLA's credit services related with the Study area is extremely concentrated on rice cultivation (almost 97% of the total disbursement at the bank's Arenoso branch office); to diversify coverage of the credit to other crops and to other purposes than crop production such as purchase of agricultural machinery, equipment and vehicle, etc.
4. To create special line of credit applied for farmers' organizations; this credit, in turn, shall be provided to members of the organization who fail to get credit from BAGRICOLA.

## **H.5 OPERATION AND MAINTENANCE**

### **H.5.1 Operation and Maintenance Organization**

#### **(I) Proposal for operation and maintenance of irrigation system**

In conformity with INDRHI's policy to turn over irrigation system to water users, water users' association named as "Junta de Regantes" shall be formed after completion of the irrigation and drainage works of the project. In principle, the "Junta de Regantes" shall take charge of operation and maintenance (O/M) of secondary, tertiary and on-farm irrigation system, while INDRHI's control and responsibilities shall remain on water intake system, main canal and drainage system; in case of the present project, in view of the fact that sources of irrigation water are dispersed and intake works proposed for each source are relatively small in scale, it is recommended that Junta de Regantes should take charge of all facilities including intake facilities and main canals. For providing O/M services, offices for INDRHI and "Junta de Regantes" shall be established within the Study area; it is advised that for close communication and coordination between these two organizations, these office should be located in the same site.

One of the constraints which affect on productivity of paddy in the Study area is insufficient O/M services of irrigation/drainage services provided by INDRHI. Therefore it is extremely importance that INDRHI's office should be equipped with machinery and vehicles (excavator, dump truck, motor grader, pick-up, etc.) for rendering proper O/M services as well as qualifies manpower (water charge administrator, heavy-machinery operator, gates operator, etc.) to take charge of the services. The "Junta de Regantes" is also needed to procure and recruit said machinery and personnel.

The "Junta de Regantes" to be formed under the project does not have experiences in O/M of irrigation system, so INDRHI's assistance to the following aspects is essential.

- To train and support in organizing "Junta de Regantes"
- To give advise on administration and management of O/M office
- To transfer technology and know-how in relation with O/M of irrigation system
- To prepare O/M manual for proper functioning of the system
- To render advisory services on establishment, collection and management of water charge
- To coordinate in getting finance for working capital of the "Junta de Regantes"

**(2) Irrigation water management**

As mentioned before, sources of irrigation water are dispersed and available discharge for respective source is limited, so proper management of irrigation water is a critical task. Distribution of irrigation water to the benefittable lands will be determined taking the actual cropping pattern and weather conditions into account. In this context, it is essential that SEA and IAD would participate in the project at the stage of programing irrigation water distribution.

Water to be stored at reservoir will be taken from the Guaraguao river, which means that this irrigation system will be faced with competition with other irrigation systems in drawing water from the said source. In this regard, it is suggested that distribution of water to the reservoir should be made during the period of less water requirement (June in adelant) so that storage water at reservoir should be used in time of unexpected drought.

**(3) Drainage and flood management**

Growth of aquatic plants within drainage canals is observed to be remarkable. Should measures against this growth be taken, the drainage capacity of canals would be deteriorated badly and routine cleaning and clearing taks of canals are of importance accordingly. Romoval work of aquatic plants at the time of significant growth brings about more excavation works, which will result in expansion of canal section and reduction of road width. It is thus advised that canal cleaning task should by carried out concered personnel frequently.

**H.5.2 Operation and Maintenance Organization**

It is advisable the the office for operation and maintenance(O/M) of irrigation and drainage facilities would be located at La Reforma as case with the project office. Both offices for INDRHI and Junta de Regantes will be installed at the same property and this property should have considerable space to keep machenery and materials for O/M services. The inter-relation between INDRHI and Junta de Regantes is illustrated in Fig. H.6.1.

**(1) Responsibilities of INDRHI and Junta de Regantes**

Responsibilities for O/M services of irrigation and drainage facilities shall be demarcated between INDRHI and Junta de Regantes in the following manner.

**INDRHI:** shall be responsible for O/M of intake facilities (reservoir and pumping station), main drainage canal, river levee, etc; provide Junta de Regantes with technical and managerial advices; coordinate with institutions concerned with disaster prevention.

**Junta de Regantes:** shall be responsible for O/M of intake facilities (other than reservoir and pumping station), irrigation canals (main, secondary and tertiary systems) and drainage canals (secondary and tertiary systems); establishment and collection of water charge; responsibilites for respective level of are as follows:

**a. Nucleos de Regantes:**

The unit shall be responsible for distribution of water from final gate to paddy fields, O/M of irrigation and drainage canals, collection of water charge, coordination for organization among water users as well as for settlement of disputes among members. Representative of each "nucleos" shall participate in "Asociacion de Regantes"

**b. Asociacion de Regantes:**

This is an organization to be formed for each water intake unit and shall take charge in O/M of lateral irrigation and drainage canals and in settlement of disputes among "nucleos". Representative of each "asociacion" shall participate in "Junta de Regantes".

**c. Junta de Regantes:**

This is the highest level of water users' association and shall be responsible for O/M of whole irrigation and drainage system to cover the irrigation project area. Representative of this unit will be selected among members by vote of all affiliated members.

Junta de Regantes shall be headed by general manager and operated by recruited personnel (Organization chart is as per Fig. 6.6.1).

**(2) Composition of Junta de Regantes**

Taking proposed irrigation network Junta de Regantes will be composed of the following units.

Junta de Regantes	Irrigation Block	Asociacion de Regantes	Nucleos de Regantes		
			Plan A	Plan B-1	Plan B-2
Limon del Yuna	Payabo	Payabo main canal	11	26	26
	Ponton	Ponton main canal	16	22	16
		Arrenquin main canal	14	15	15
	Guaraguao	Guaraguao main canal No.1	39	36	36
		Guaraguao main canal No.2	17	27	27
		Reservoir	7	-	-
	La Cueva	La Cueva main canal	8	9	9
		El Cercado main canal	6	6	6
	Lagnita Cristal	Lagnita Cristal main canal	14	14	14
	Borojol	Borojol main canal	20	23	23

**(3) Manpower and budget of INDRHI's office**

INDRHI's office shall consist of the following manpower and will require an annual budget of RD\$ 606,000.

General manger (1), Section manager (2), Secretary (3), Dirver (3), Accountant (1), Administrative staff (1), Communication staff (1), Clerk (1), Watchman (1), O/M engineer (1), Operator (4), Assistant operator (4), Mechanic (1), Assistant mechanic (1), Agronomist (1) and Assistant agronomist (1)

**(4) Manpower and budget of Junta de Regantes' office**

Junta de Regantes' office shall consist of the following manpower and will require an annual budget of RD\$ 2,626,000.

Office manger (1), Section manager (5), Water charge accountant (1), General accountant (1), Topographic engineer (1), Assistant topographic engineer (1), Operator (4), Assistant operator (4), Dump truck operator (6) Dirver (1), Mechanic (1), Assistant mechanic (2), Mason (1), Irrigation engineer (8), Secretary (1), Clerk (1) and Watchman (1)

**II.5.3 Water Charge**

Water charges applied to water users of irrigation system in the Dominican Republic is based on the guidelines and rules for operation defined in the Government Regulation No. 555 on Water Charge dictated in 1982. This regulation establishes that the collection of charge for water use should be destined to cover the costs for administration, operation and maintenance of irrigation districts and areas. In the same regulation, it is contemplated an economical independence of the annual budget for administration, operation and maintenance of irrigation districts and areas. This economical independence was scheduled to be accomplished in six years with the following percentage: 1984-50%, 1985-60%, 1986-70%, 1987-80%, 1988-90% and 1989-100%. Nevertheless, this independence, in fact, was not accomplished effectively, because, the proportion for collection of water charge against operation and maintenance costs had been very low; in any year of the period 1984-1989, this proportion exceeded 20%.

In the face of the above-mentioned situation, the Government Decree No. 435-90 was dictated in 1990 in view of valuation for collection factor for different irrigation canals and districts and owing to this new valuation system INDRHI could recover 70% of the operation and maintenance cost in 1991. The valuation of collection factor is made in the following manner:

$$FC = M / (SFm1 + 2 * Sfm2 + 2 * SA1 + 4 * SA2)$$

where:

FC = Collection Factor (Factor de cobro)

M = Total amount of annual budget for administration, operation and conservation of the irrigation area plus some portion of expenses of the district office.

SFm1 = Total area of lands with farm size up to 10 ha. used for minor crops plus the area which results in summing the first 10 ha of lands which exceed the said area used also for minor crops.

SFm2 = Total area exceeding 10 ha of lands used for minor crops.

SA1 = Total area of lands with farm size up to 10 ha. used for paddy plus the area which results in summing the first 10 ha of lands which exceed the said area used also for paddy.

SFm2 = Total area exceeding 10 ha of lands used for paddy

The water charges applied to irrigation water users are:

$$TFm1 = FC, TFm2 = 2 * FC, TA1 = 2 * FC \text{ and } TA2 = 4 * FC$$

where:

TFm1 = Annual water charge per ha to be collected from water users who cultivate minor crops in lands both smaller 10 ha and first 10 ha of lands which exceeds the said area.

TFm2 = Annual water charge per ha to be collected from water users for each ha or additional fraction to first 10 ha which own, used for minor crops

TA1 = Annual water charge per ha to be collected from water users who cultivate paddy in lands both smaller 10 ha and first 10 ha of lands which exceeds the said area.

TA2 = Annual water charge per ha to be collected from water users for each ha or additional fraction to first 10 ha which own, used for paddy

In accordance with the said water charge system, water users in the Limon del Yuna project area paid in 1994 water charges on the basis of the collection factor at RD\$ 175.37/ha.

Water charge "With" project shall be calculated in accordance with the following premises.

**(1) Description of O/M services**

O/M Facilities		Length (Structurea)	Responsible Agency	Contents of Services	Necessary Machinery, etc
Intake Works		Pump, Reservoir	INDRHI	General O/M, Oil Supply	
Irrigation Canal	Main	96 km (Concrete)	Junta de Regantes	Removal of Sedimentation, O/M of gates and pumps	Manpower Dump truck
	Secondary	69 km (Earth)			
	Tertiary	217 km (Earth)			
Drainage Canal	Main	9 km (Earth)	INDRHI	Removal of Sedimentation, Weed Control	Excavator Dimp truck
	Secondary	72 km (Earth)	Junta de		
	Tertiary	166 km (earth)	Regantes		
Road	Main	64 km (Gravel)	SEOPC	Gravel Filling Leveling	Motor Grader Dump truck
	Lateral	167 km (Gravel)	Junta		
	Levce	49 km (Gravel)	INDRHI		
	Within Village	9 Km (Gravel)	SEOPC		

**(2) Annual operation and maintenance cost**

An annual cost for O/M services is estimated for respective office of INDRHI and Junta de Regantes as given below.

INDRHI					Junta de Regantes				
		Nos.	Cost (RD\$)				Nos.	Cost (RD\$)	
			Plan A	Plan B			Plan A	Plan B	
Lease of O/M Machinery	Excavator	1	57,953	65,017	Excavator	3	458,243	535,424	
	Dump truck	3	164,640	184,800	Dump truck	3	666,540	722,400	
					Motor grader	1	292,915	342,291	
	Sub-total		222,593	249,817	Sub-total		1,417,648	1,600,115	
Materials			18,804	21,098			134,979	150,234	
Fuels			32,479	36,456			226,165	258,699	
Sub-total			304,474	341,747			2,753,159	3,167,609	
Office Expenses			540,646	540,646			2,692,000	2,692,000	
O/M for pumps				999,166			203,920	203,920	
Total			845,123	1,881,559			5,649,079	6,063,529	

**(3) Establishment of water charge "With" project**

In accordance with the above premises water charges to be imposed on beneficiaries of irrigation/drainage system are established as follows:

Irrigable Area	Alternative Plan A	Alternative Plan B
Up to 10 ha	RD\$ 394/ha	RD\$ 404/ha
Larger than 10 ha	RD\$ 788/ha	RD\$ 808/ha

## ***H.6 Rural Organization Development Plan***

### ***H.6.1 Farmers' organization***

As far as rural organization is concerned, there are 121 associations, 5 cooperatives (formed by 52 associations) and 1 federation named as FALY (formed by 46 associations and 13 private farmers) in the Study area. There is another federation consists of 25 associations which is being organized now. These organizations have been formed under the auspices of IAD for promoting access to agricultural credit to be provided by BAGRICOLA, so no substantial activity is performed by these organizations except for FALY which administrates a rice mill.

Farmers' organizations strengthening plan shall have objectives to realize economical independence of these organizations by means of providing them with substantial economic base and to promote cultivating cooperativism among members of the organizations, and as a measure to attain these objectives, proposal is made to entrust administration and operation of six rice processing facilities contemplated in the "Marketing and Processing Plan of Agro-products" to five cooperatives and one federation existing in the Study area. The medium and long term target of this plan is to expand activities of organizations after attaining the said economical independence in such fields as sale of agricultural inputs, rent of agricultural machinery, credit, sale of subsistence commodities, etc. and to return benefits of the organizations to their affiliated members so that enhancement of farmers' living standard may come true.

### ***H.6.2 Water users' association***

The policy to turn over administration O/M of irrigation and drainage system from INDRHI to private organization formed by beneficiaries of these system called as "Junta de Regantes"(water users' association) is plays an important role within the context of privatization policies of the Dominican Government, and this policy is already put into effect in some nationwide irrigation project areas. To follow this policy, it is proposed to organize Junta de Regantes within the Study area after completion of irrigation/drainage improvement works. Junta de Regantes is already formed at El Pozo area and INDRHI has plan to integrate this it with Juntas to be formed at Aguacate-Guayabo area and at Limon del Yuna area to realize rational performance of operation and maintenance services for irrigation/drainage system. Apart from this INDRHI's plan, this Study aims to facilitate forming and proper management of Junta de Regantes within Limon del Yuna project area.

The final target of turn-over policy of irrigation/drainage works is to entrust Junta de Regantes with the autonomous administration, operation and maintenance of all irrigation and drainage facilities from driving/trunk canals to tertiary system, but it is advised that , for some period after completion of facilities, the O/M services of the trunk canal should be undertaken by INDRHI.



## **ANNEX H : TABLES**

Table H.2.1 Agricultural Credit at Arenoso Branch Office of BAGRICOLA for 1993/94

Purpose for Use	1993			1994				
	Quantity	Amount (RDS)	Benefitted Area (ha)	No. of Beneficiaries	Quantity	Amount (RDS)	Benefitted Area (ha)	No. of Beneficiaries
Rice (Cultivation)	225	43,081,497	3,215	1,500	237	71,929,923	4,933.9	1,540
Rice (Marketing)	2	3,991,930	-	2	0	0	-	0
Plantain (Cultivation)	1	24,000	3.8	1	1	6,000	3.8	1
Yautia	0	0	0	0	1	10,000	2.2	1
Equipment for Rice Mill	1	1,439,650	-	503	1	1,668,735	-	504
Motorcultivator	31	1,654,120	-	49	26	1,077,700	-	6
Repair of Equipment	4	770,440	-	4	0	0	-	0
Land Leveling (Mechanical)	2	207,627	-	2	0	0	-	0
Yoked Cow	6	176,900	-	12	26	362,400	-	26
Cattle Farming	5	201,500	-	5	6	450,000	-	6
Swine Farming	2	47,680	-	2	0	0	-	0
Total	279	51,595,344	3,219	2,080	298	75,504,758	4,939.9	2,084

Source: ACTIVIDADES CREDITORIAS CORRESPONDIENTES A LOS ANOS 1993 Y 1994

Banco Agrícola, Sucursal de Arenoso

**Table H.2.2 Water Charge Applicable to Irrigation System**

Irrigation Zone	Investment (RD\$) (A)	Denominated Area for Water Charge (ha) (B)	Calculated Collection Factor (RD\$/ha) (C) = (A)/(B)	Percentage to be Applied for Water Charge (D)	Applied Water Charge (RD\$/ha) (E) = (C) x (D)
Dajabon	2,761,918.80	14,832.28	186.21	58.25	104.74
Las Matas de Santa Cruz	7,502,012.38	27,763.64	270.21	64.85	175.24
Villa Vasquez	7,005,474.31	23,473.64	298.44	71.93	214.67
Santiago	5,665,755.41	15,894.51	356.46	70.23	250.33
				87.87	312.87
Esperanza	7,088,007.80	33,543.27	211.31	83.84	176.14
Mao	4,068,196.26	20,007.85	203.33	59.76	121.52
La Vega	4,482,849.87	34,820.96	128.74	76.05	97.90
				96.11	123.73
Cofui	6,269,613.64	46,617.69	134.49	95.69	128.70
Bonao	1,790,177.08	10,681.25	167.60	71.40	119.66
Constanza	2,252,016.77	2,083.60	1080.83	30.74	332.21
Nagua	6,353,238.30	37,404.41	169.85	89.11	151.59
				243.81	414.77
AGLIPO	13,055,496.86	28,985.80	450.41	33.66	151.60
				92.10	414.83
Limon del Yuna	5,162,807.70	28,418.60	181.67	96.53	175.37
San Cristobal	2,555,297.43	6,444.21	396.53	32.61	129.30
				60.88	214.40
Bani	3,415,463.86	14,634.78	233.38	56.09	130.91
				92.72	216.38
Bayaguana	2,699,722.43	4,390.65	614.88	23.87	146.77
Higüey	1,419,841.24	12,341.08	115.05	57.20	65.81
Sabana del la Mar	1,364,492.98	3,154.93	432.50	15.28	65.83
Azua	9,075,061.00	23,599.17	384.55	36.87	141.78
				45.65	175.56
San Juan	3,533,059.59	28,437.38	124.24	71.42	88.73
				89.27	110.91
Las Matas Farfan	2,938,358.70	9,379.64	313.27	35.41	111.11
Barahona	6,795,646.64	13,614.98	499.13	31.96	159.60
Neyba	8,386,446.23	12,414.98	675.51	16.24	109.70

Source: CUADRO GENERAL DE LA TARIFA DE RIEGO PARA EL PERIOD FISCAL 1/1/93 AL 30/10/94  
Departamento Distrito de Riego, INDRHI

**Table H.2.3 Feature of Existing Water Users' Association (Junta de Regantes)**

Irrigation Districts	Irrigated Area (ha)			No. of Water Users		
	Total	Turned Over	%	Total	Associated	%
Ozama-Nizao	16,447	9,854	59.9	11089	3859	34.8
Valle de Azua	19,064	7,820	41.0	8284	4539	54.8
Valle de San Juan	31,727	13,046	41.1	9926	3404	34.3
Yaque del Sur	36,083	424	1.2	10042	204	2.0
Yuna-Camu	27,546	-	-	5494	-	-
Bajo Yuna	21,429	7,356	34.3	7953	4014	50.5
Alto Yaque del Norte	36,953	6,081	16.5	9376	1995	21.3
Bajo Yaque del Norte	34,245	10,358	30.2	5455	1735	31.8
Eastern Operation Unit	8,179	-	-	2033	-	-
<b>Total</b>	<b>231,673</b>	<b>54,939</b>	<b>23.7</b>	<b>69652</b>	<b>19750</b>	<b>28.4</b>

Source: INDRHI

**Table H.2.4 Water Charges at Different Water Users' Association (Junta de Regantes) - Fiscal Year 1994-95**

Name of Water Users Association	Water Charges by Crop and Area (RD\$/ha)			
	Paddy		Minor Crops	
	> 10 ha	0-10 ha	> 10 ha	0-10 ha
Fernando Valerio	44.32	22.16	22.16	11.08
Juan Calvo	26.32	13.16	13.16	6.58
Nizao-Valdesia	54.52	27.26	27.26	13.63
<b>AGLIPO</b>				
- Canal Japones	104.32	52.16		
- Right Margin, Nagua River	40.04	20.02		
- Canal El Pino	38.12	19.06		
Alto Yaque del Norte	80.00	40.00	40.00	20.00
YSURA, Azua	72.00	36.00	36.00	18.00
Sabaneta	40.00	20.00	20.00	10.00
Canal Nao-Gurabo	486.04	243.02	243.02	121.51

Source: INDRHI

## **ANNEX H : FIGURES**

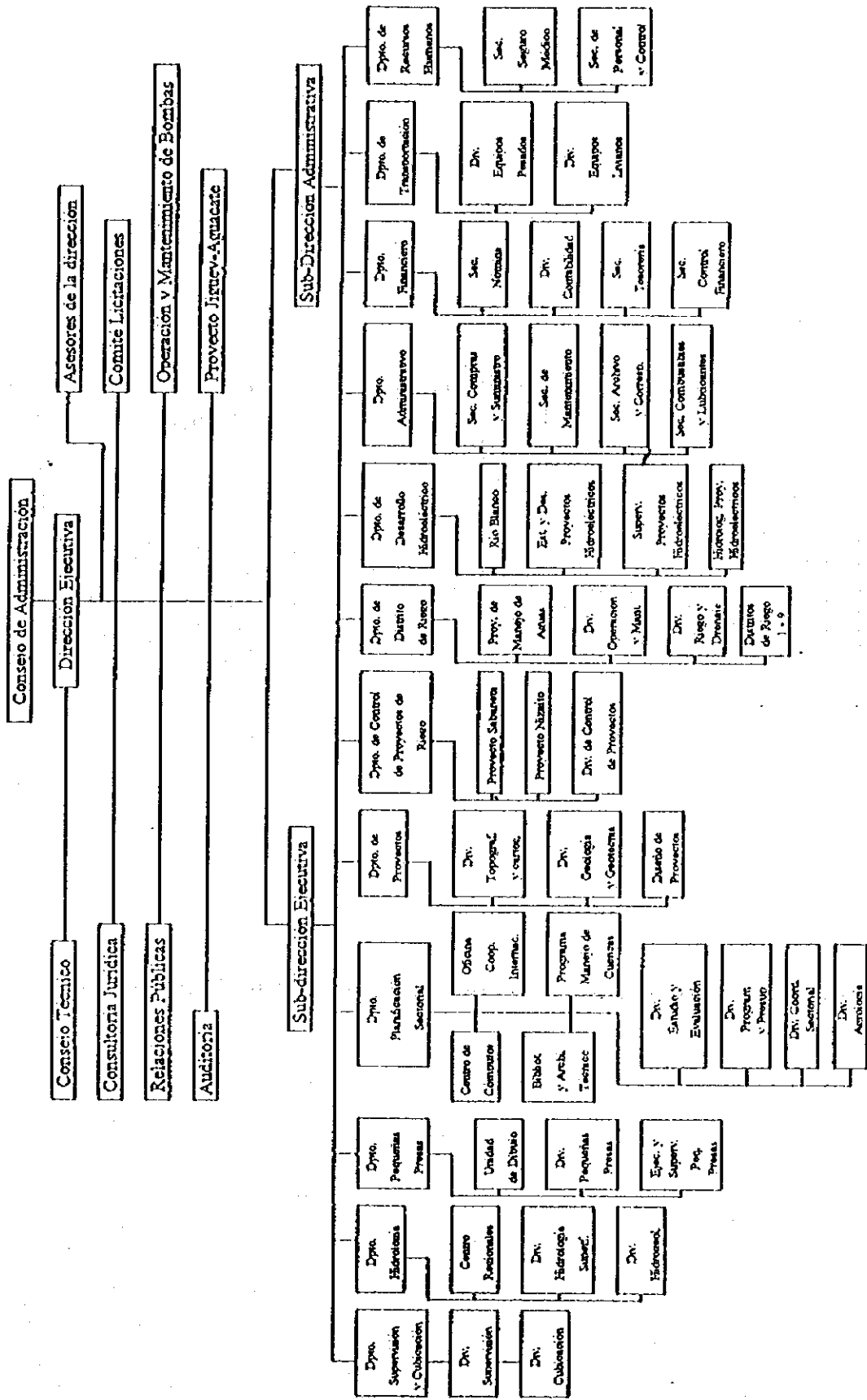
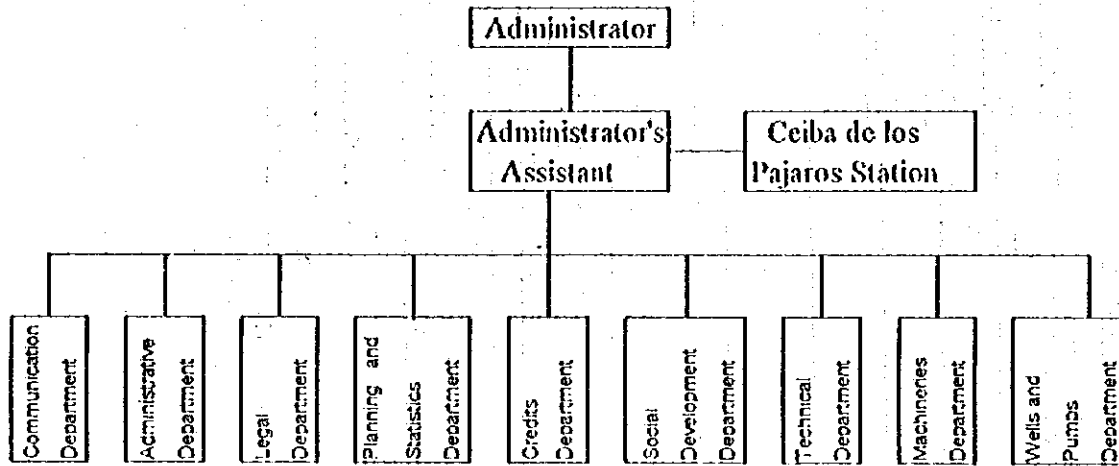


Fig. H.1.1 Organization Chart of INDRHI



**Fig. H.1.2 Organization Chart of IAD's AC-46 Office at Limón del Yuna**

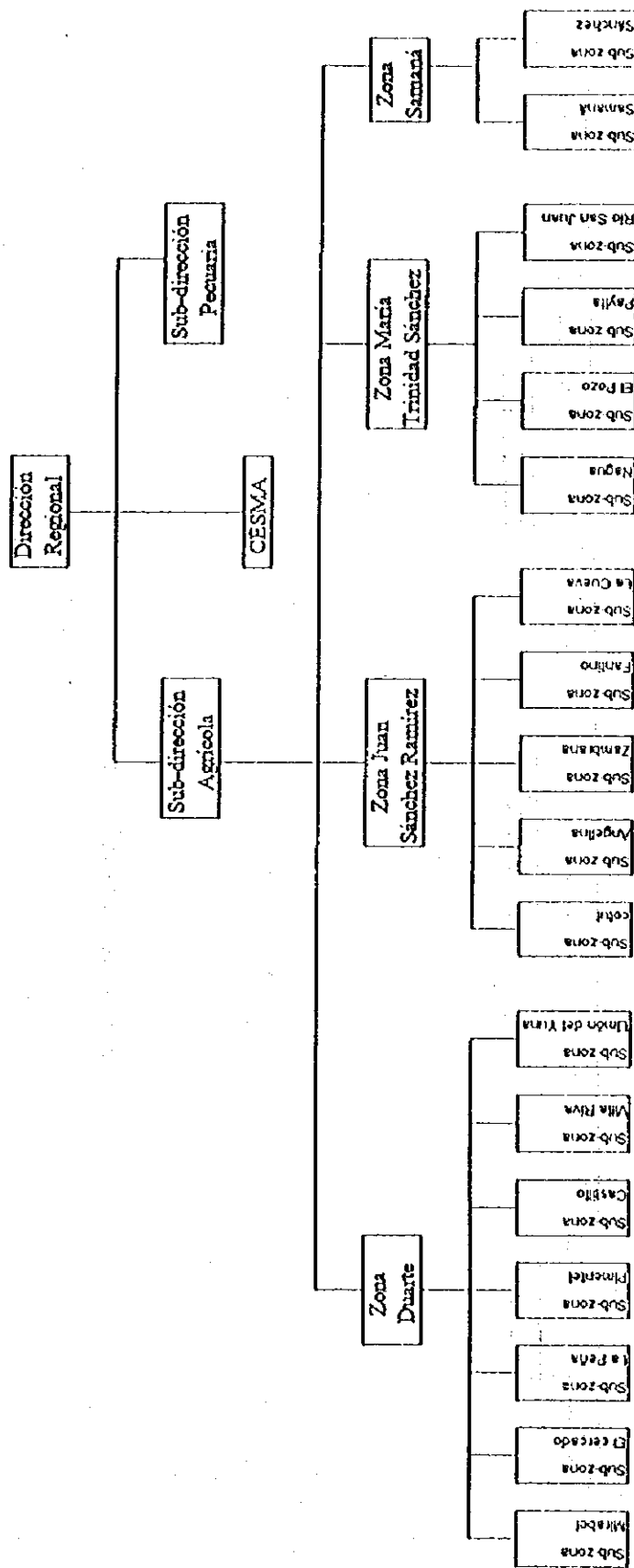


Fig. H.1.3 Organization Chart of SEA's Northeastern Regional Bureau



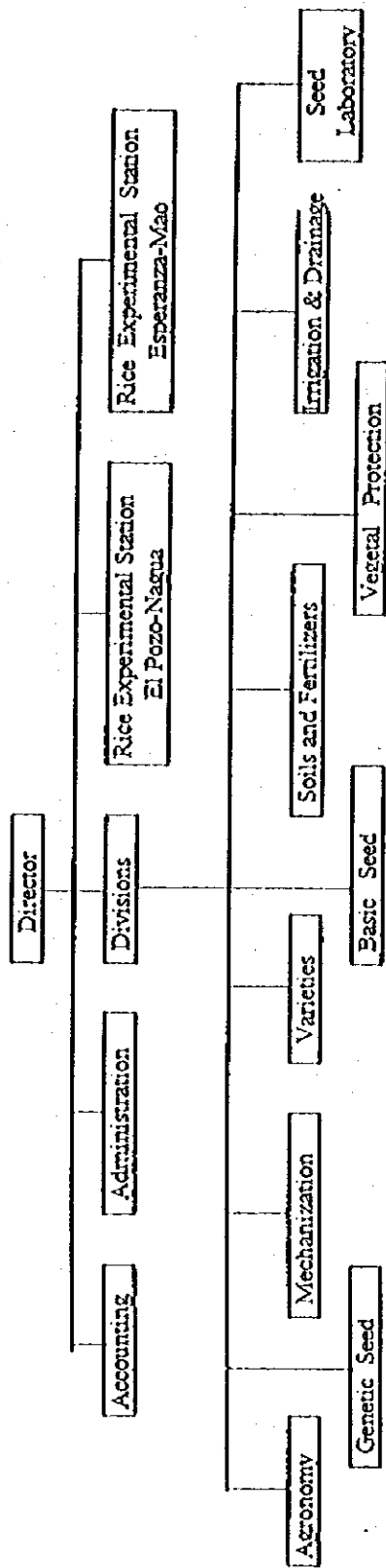


Fig. H.1.4 Organization Chart of CEDIA

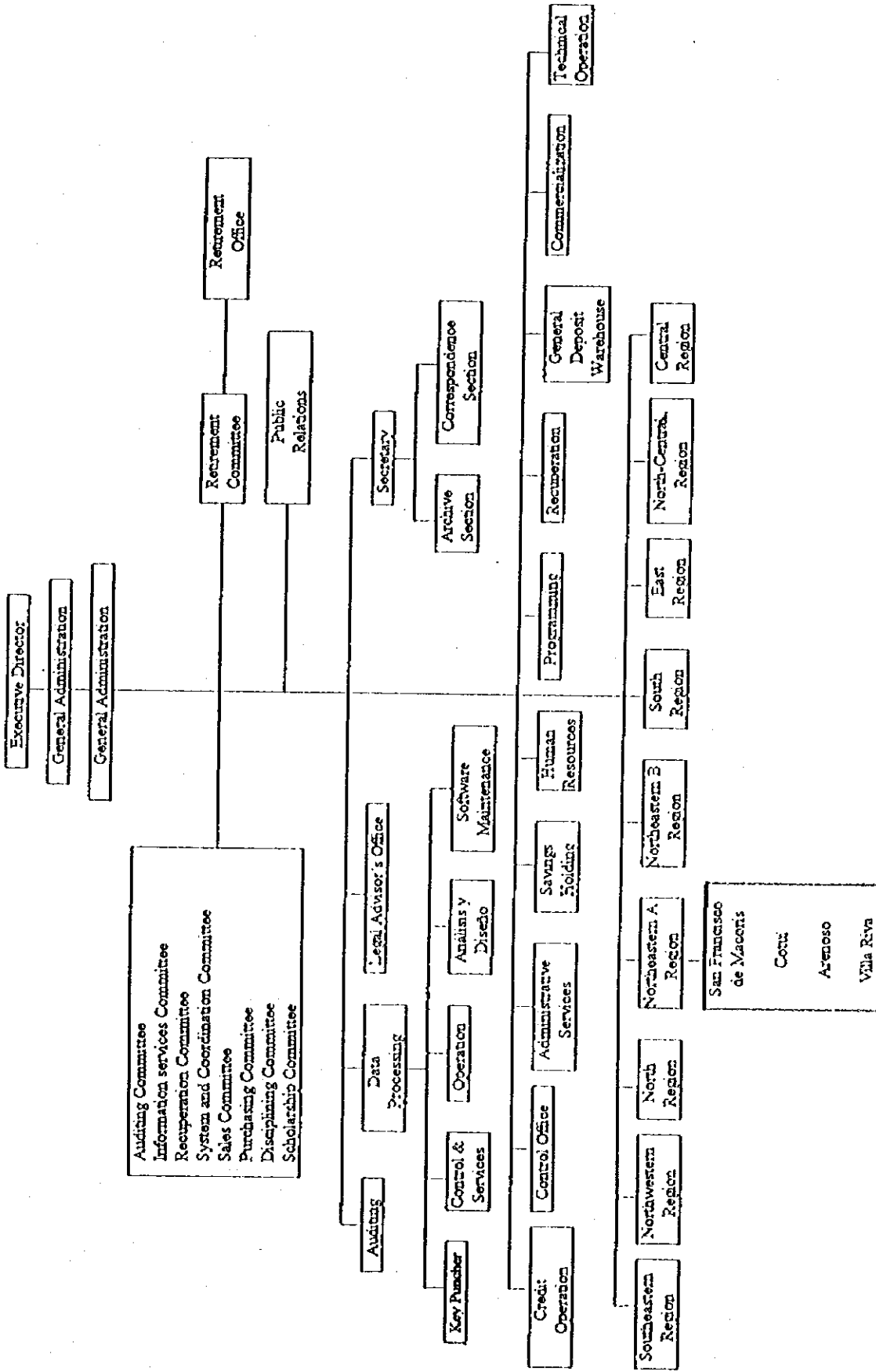
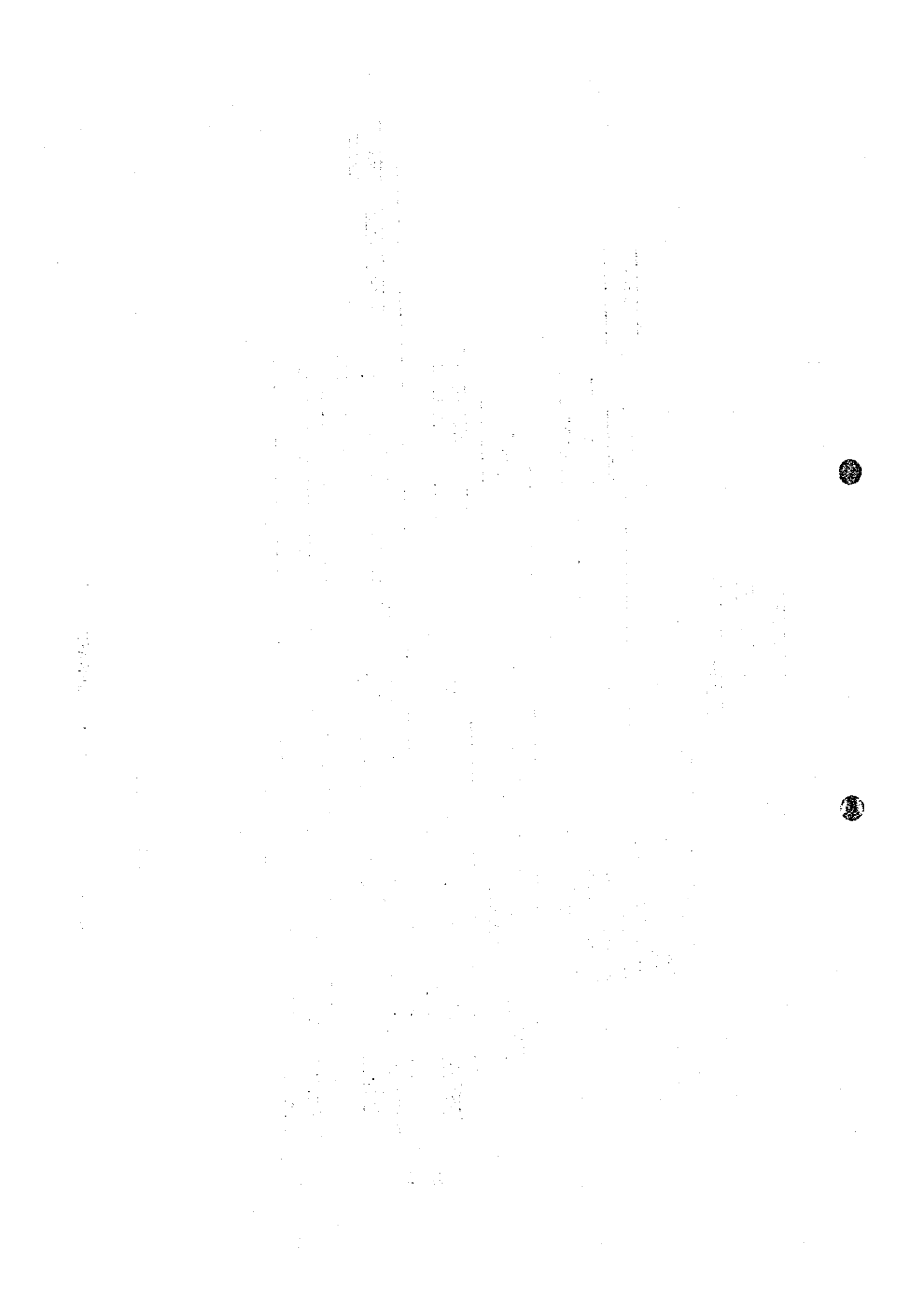
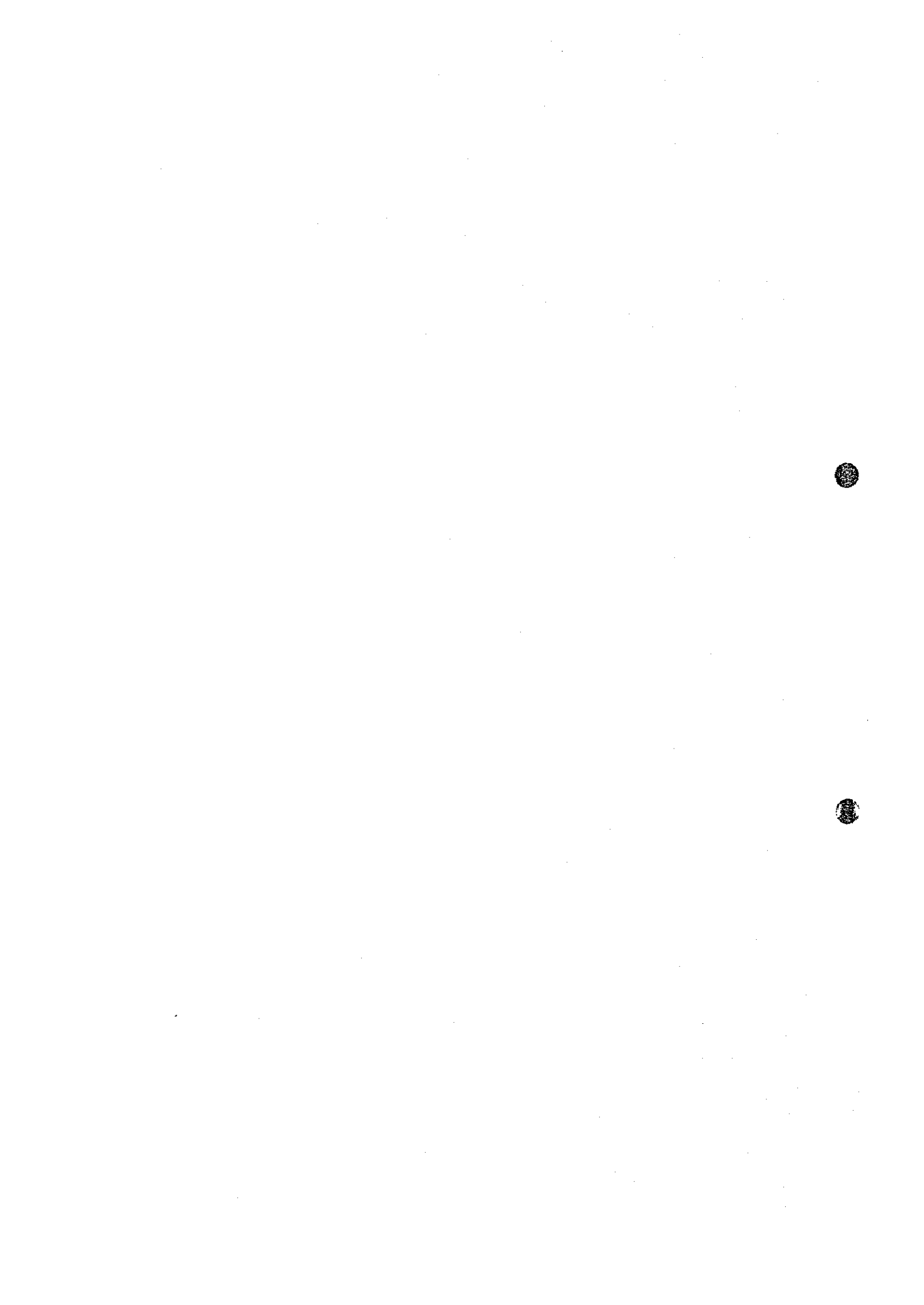


Fig. H.1.5 Organization Chart of BAGRICOLA









JICA