REPUBLIC OF THE PHILIPPINES

DEPARTMENT OF AGRICULTURE

FEASIBILITY STUDY ON IMPROVEMENT OF SEED PRODUCTION AND DISTRIBUTION, AND ESTABLISHMENT OF APPROPRIATE SEED STORAGE SYSTEM

Annex

November 1990

JAPAN INTERNATIONAL COOPERATION AGENCY

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ABBREVIATIONS

ACAP	Agricultural Colleges Association of the Philippines
AMC	Area Marketing Cooperative
ATI	Agricultural Training Institute
BAT	Bureau of Animal Industry
BAR	Bureau of Agricultural Research
BCOD	Bureau of Cooperative Development
BPI	Bureau of Plant Industry
BS	Bureau of Soils
E.S	Experiment Station
FACOMA	Farm Cooperative Marketing Association
IPB	Institute of Plant Breeding
IRRI	International Rice Research Institute
JICA	Japan International Cooperative Agency
KRII	Kennedy Round II
LBP	Land Bank of the Philippines
LEAD	Livelihood Enhancement for Agricultural Development
NAPHIRE	National Post Harvest Institute for Research and Extension
NCC	National Crop Center
NCSIP	National Cooperative Seed Improvement Program
NCSO	National Census and Statistics Office
NFA	National Electrification Administration
NEDA	National Economic and Development Authority
NFA	National Food Authority
NIA	National Irrigation Administration
NCR	National Capital Region
OECF	Overseas Economic Cooperation Fund
PAEC	Philippine Atomic Energy Commission
PCA	Philippine Coconut Authority
PNB	Philippine National Bank
PSB	Philippine Seed Board
PSC	Philippine Sugar Commission
PTA	Philippine Tobacco Administration
STL	Seed Testing Laboratory
S.F	Seed Farm
SQCS	Seed Quality Control Services
UNDP	United Nations Development Program
UPLB	University of the Philippines, Los Baños
USAID	United State Agency for International Development

ABBREVIATIONS OF MEASUREMENTS

Length

mm	=	millimeter		
cm	=	centimetre		
	=	0.39 in.		
m	=	meter	=	1.09 yd
	=	3.28 ft.		
km	=	kilometre	=	0.62 ml
in.	=	inch	=	2.54 cm
ft.	=	foot	=	30.48 cm
yd.	=	yard	=	91.44 cm
ml.	=	mile	=	1.61 km

Area

cm^2	=	square centimetre		
m^2	=	square meter		
km^2	=	square kilometre		
	=	100 ha		
ha	=	hectare	=	0.01 km^2
	=	2.5 ac		
ac	=	acre	=	0.41 ha
	=	4,047 m^2		
ft^2	=	square feet		
	=	0.09 m^2		
$mile^2$	=	square mile	=	2.59 km^2

Electrical Measures

kW	=	kilowatt	=	1,000 watt
MW	=	megawatt	=	1,000 KW
GW	=	gigawatt	=	1,000 MW
kV	=	kilovolt	=	1,000 volt

Other Measures

%	=	percent
°	=	degree
'	=	minute
"	=	second
°C	=	degree in Celsius
lakh	=	10^5
crore	=	10^7
Hp, PS	=	horse power
TPH	=	ton per hour

Volume

lit.	=	litter		
cm^3	=	cubic centimetre		
m^3	=	cubic meter		
	=	1,000 lit.		
MCM	=	million m^3		
	=	$1x10^3$ m^3		
ft^3	=	cubic feet	=	0.028 m^3
	=	28.32 lit.		
ac-in.	=	acre inch	=	102.79m^3
ac-ft.	=	acre feet	=	1,234 m^3

Weight

g	=	gram			
kg	=	kilogram			
t	=	metric ton	=	1,000	kg
lb	=	pound	=	454	g
cavan	=	sack (bag)			
		paddy	=	50	kg/sack
		paddy seed	=	45	kg/sack
		corn seed	=	50	kg/sack
		pod peanut seed	=	25	kg/sack

Time

sec	=	second		
min	=	minute	=	60 seconds
hr	=	hour	=	60 minuits
	=	3,600 seconds		
day	=	24 hrs	=	1,440 minutes
	=	86,400 seconds		
yr	=	year		

Derived Measures

m^3/sec	=	cubic meter per second (Cumec)
ft^3/sec	=	cubic foot per second (Cusec)

Monetary

US$	=	US dollar
¥	=	Japanese yen
₱	=	Philippine peso

Annex A

Production of the Study Crops

FEASIBILITY STUDY ON
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ANNEX A PRODUCTION OF THE STUDY CROPS

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1. LAND USE AND CROPPING PATTERN

The total land area of the Philippines is approximately estimated about 30 million ha, which is shown in Table A.1.1. In 1988, the utilization of land indicates that 13.89 million ha or 46% is coveredly by forest. Cropland devoted for Agricultural production is estimated at 10.13 million ha or 34%. Others which include various uses like residential, commercial, industrial and parks share an area of about 2.85 million ha or 9%. Pasture lands, swamp lands, and fish ponds contributes a total share of 3.14 million ha or 10%.

The distribution of the total land by region shows that Region XI has the biggest share at 16% while Regions II and XI have a share of 12% and 11%, respectively. All other Regions have a share less than 10% ranging from 5% from Region VII to 9% at Region X.

On proportion of agricultural crop land by Region the biggest share is at Region IV at 17% while Region XI is next at 11%. Other regions has less than 10% share ranging from 5% in Region VII to 9% at Regions V and VI.

The harvested area of food crops in the country is around 8.2 million ha based on the average of 1985 to 1987 as shown in Table A.1.2. The proportions of harvested area of rice, corn and peanuts in relation to the total harvested area of food crops are estimated at 41%, 42% and 0.6%, respectively.

Climatic types and cropping patterns for the study crops are shown in Fig. A.1.1. Generally, lowland rice is planted in Region III from mid-June and is harvested in mid-January for the first crop, while the second crop commences from mid-October and is harvested in mid-March. In Region II, lowland rice is grown from mid-June until mid-November for the first crop, while the second crop from mid-November to mid-April. In Regions XI and XII, corn cultivation is generally done from mid-April to mid-September for the first crop, second crop from mid-September to mid-February. Peanuts in Region II are usually planted from mid-April to mid-September for the first crop, from mid-September to mid-January for the second crop .

2. PRODUCTIVITY OF THE STUDY CROPS

For clarification of current production activities of the study crops, records on production, harvested area and yield in each region are calculated from averages for 1986 to 1988.

2.1 Rice

Major rice producing regions, Regions III, VI, II, IV, I and XII, produced 17%, 13%, 12%, 11%, 9% and 9% respectively of the total paddy production of 8.9 million tons. Of the total harvested area of rice fields in the country, estimated at 3.4 million ha on the average of 1986 to 1988, irrigated and rainfed rice area occupied 56% and 40%, respectively. The remaining 4% was upland rice area as shown in Table A.2.1.

The average unit yield of irrigated rice between 1986 and 1988 in the country was estimated at 3.2 t/ha. That of rainfed and upland rice was 2.1 t/ha and 1.2 t/ha, respectively, as shown in Table A.2.1. The ranges of rice unit yields by field conditions are summarized as follows :

Item	Irrigated		Rainfed		Upland	
	Region	Yield(t/ha)	Region	Yield(t/ha)	Region	Yield(t/ha)
Maximum	XI	3.82	XI	2.58	III	1.62
Minimum	VII	2.01	VII	1.14	VI	0.88
Average		3.15		2.08		1.18

The above figures mean that the unit yields of irrigated rice are generally higher than those of rainfed and upland rice. This may be explained by the difference in climatic conditions and the difference in farming practices, etc., while the extension degrees of High Yielding Varieties (HYVs) in the irrigated land influence the present unit yield in the regions as follows :

Extension Range of HYVs	Irrigated Land Yield Range(t/ha)	Region
More than 90%	2.75-3.78	II, VI, VIII, X, XII
80% - 90%	2.85-3.29	I, IX, XI
79%	1.98	VII

Note : Data in 1985, BAS

By crop varieties, it is obvious that unit yields of high yielding varieties (HYVs) of paddy exceed the traditional varieties, i.e. HYVs' unit yield of 2.58 t/ha compared with

traditional varieties' of 1.52 t/ha. in the country based on the average from 1986 to 1988 as shown in Table A.2.2. HYVs' unit yields by region differ from 3.3 t/ha in Region III to 1.51 t/ha in Region VII.

Unit yields of irrigated paddy in the country, based on the calendar year 1980-1988, is fluctuating between 2.8 t/ha in 1980 and 3.18 t/ha in 1986. For the rainfed areas, the range of unit yield was from 1.81 t/ha in 1980 to 2.17 t/ha in 1986, while that of upland paddy fluctuated between 0.96 t/ha in 1980 and 1.19 t/ha in 1986. In general an upward trend in paddy yield is indicated in all regions under irrigation conditions as shown in Table A.2.5.

2.2 Corn

Domestic production of corn is estimated at 4.3 million tons with Region XI contributing the largest volume of about 30% followed by Region XII and Region II which share 24% and 9%, respectively. The majority of the harvested area of corn in the country is occupied by white corn with 75% of the total area of 3.7 million ha. The remaining 25% is yellow corn as shown in Table A.2.3.

Average yields of corn in the country from 1986 to 1988 are estimated at 1.0 t/ha for white corn and 1.5 t/ha for yellow corn as shown in Table A.2.3. Most of the white corn varieties planted in each region are assumed to be local varieties for food use, hence the yields of white corn are lower than those of yellow corn. Majority of the yellow corn is of hybrid and open pollinated varieties. The average yield of corn by region varied from 0.5 t/ha in Region VII to 1.7 t/ha in Region XII.

2.3 Peanuts

In the case of peanuts, production is concentrated mainly in Luzon, particularly in Region II with 47% of the total production of 42 thousand tons, followed by Region I (21%) and Regions IV, III and VII with 6%, 4% and 4% respectively. The harvested area of peanuts in the country is estimated at around 52 thousand ha as shown in Table A.2.4. Most of the areas devoted to peanuts production are under rainfed conditions using local varieties.

For peanuts, the average yield in the country from 1986 to 1988 is estimated at 0.8 t/ha as shown in Table A.2.4. The yields by region differed from 0.41 t/ha in CAR to 1.4 t/ha in Region I. The average yield in Region II was about 0.7 t/ha and lower than the national average.

3. PROFITABILITY OF THE STUDY CROPS

The cost and return per ha of rice, corn and peanuts are estimated on the basis of data from the Bureau of Agricultural Statistics (BAS). The data below indicates the national average from 1985 to 1988 at current prices. Production cost comprises cash cost, non-cash cost and imputed costs for unpaid family labor, depreciation, interest, etc. In order to clarify changes in profitability, the prices are converted to 1988 constant prices using the consumer price index. Profitability of the study crops is as follows :

(Unit : ₱1000 / ha at 1988 constant price)

Item	Rice		Corn		Peanuts	
	1985-86	1987-88	1985-86	1987-88	1985-86	1987-88
Production Cost	5.2	5.9	1.7	1.8	2.8	3.0
Gross Return	6.9	8.2	3.0	3.5	8.6	9.4
Net Return	1.7	2.3	1.3	1.7	5.9	6.4
Net Profit Cost Ratio	0.3	0.4	0.8	0.9	2.1	2.1

Note : Average values in each two year are indicated.

The net profit cost ratio of rice is lower than that of corn and peanuts due to the high requirement of farm inputs including labor compared with other crops. The profitability of peanuts decreased slightly between the two periods, while rice and corn increased.

4. DEMAND AND SUPPLY CONDITION

For the period of 1980-1988, rice production in the Philippines registered a positive and negative growth rate with the highest record in 1985 and the lowest in 1983. Negative growth rates are mainly due to the severe drought in 1983 and 1987. Because of shortage in rice supply, the government imported rice in 1984, 1985, 1986 and 1988. In the case of corn, the country is steadily importing substantial quantities of corn primarily to supply to the feed manufacturing industry. Likewise, the supply and demand of peanuts is fluctuating. The country has been a net importer of peanuts since 1980 except 1983. The country imported more than 10 thousand tons of peanuts in 1986 and 1988. The volume of peanuts importation tends to increase recently. Supply and use of the study crops in the country are shown in Tables A.4.1 to Table A.4.3. Export and import quantities may be summarized as follows :

(Unit : '000 tons)

Year	Rice		Corn	Peanuts /1	
	Export	Import	Import	Export	Import
1980	236	-	250	-	2
1981	95	-	253	-	1
1982	-	-	341	-	1
1983	40	-	528	2	-
1984	2	190	182	-	-
1985	-	538	281	-	5
1986	-	2	-	-	15
1987	111	-	56	-	-
1988	-	181	25	10	21

Note : - ; less than one thousand tons /1 ; shelled

For clarification of the present regional demand and supply situation, three year average data from 1986 to 1988 are estimated for rice and corn by region. The demand for rice is based on the present population, per capita consumption, use for seed, feed and waste. Estimation of corn demand is based on the per capita consumption for food, feed for poultry and livestock, and for seed, waste and other uses. The country had a deficit of 103 thousand tons/year of rice and 72 thousand tons/year of corn in recent past three years. The estimation of surpluses and deficits for rice and corn by region are shown in Table A.4.4 and Table A.4.5 respectively, and may be summarized as follows :

(Unit : '000 tons)

Region	Rice	Corn
Philippines	(103.1)	(72.3)
CAR	(9.3)	(40.3)
I	88.4	(136.5)
II	410.0	169.5
III	263.7	(361.7)
IV	(91.7)	(424.5)
V	28.6	(102.3)
VI	128.5	(348.6)
VII	(277.5)	(328.6)
VIII	(70.8)	(10.5)
IX	(25.9)	(22.9)
X	(37.9)	(46.9)
XI	41.4	813.7
XII	209.8	767.2

Note : ( ) ; Deficit

The per capita deficit of rice in the country is estimated at 1.8 kg/year. The regions with deficits greater than 60 kg is Region VII (63 kg) and National Capital Region (NCR) (103 kg) and 8 to 30 kg/year are Region IV (13 kg), VIII (22 kg), IX (9 kg), X (11 kg) and CAR (9 kg) as shown in Fig. A.4.1. Most of the regional deficit of corn arises from the increase in feed demand for livestock and poultry, especially around NCR where most of the feed mills and poultry/livestock firms are located. The large surplus of corn in Region XI and

XII could not offset a shortage in the deficit regions. Corn surplus and deficit by region is shown in Fig. A.4.2. The future demand and supply projection for rice and corn prepared by various institutions are as follows :

(Unit : '000 tons)

Institute	IFPRI/1				FAO/2	NIA/3		DA /4	
Crop	Rice		Corn		Rice	Rice		Rice	Corn
Year	1990	2000	1990	2000	1990	1990	2000	1992	1992
Production	6,494	8,134	4,267	5,620	6,111	5,951	7,183	7,069	4,630
Demand	6,538	8,232	4,824	7,073	6,585	5,990	7,545	7,064	4,626
Surplus(Deficit)	(44)	(98)	(557)	(1,453)	(474)	(39)	(362)	5	4

Note /1 International Food Policy Research Institute, Assessment of Food/Demand and Supply Prospects and Related Strategies for developing Member Countries of ADB, 1984

/2 Food and Agriculture Organization of the United Nations, Committee on Commodity Problem Intergovernmental Group in Rice, 1986

/3 National Irrigation Administration, Communal Irrigation Development Project II, Feasibility Report, 1989

/4 Department of Agriculture, Accelerated Agricultural Production Project, Rice Industry Development Plans, Longer-run Issues and Methodologies, 1988

The present deficit of rice, which is 103.1 thousand tons based on the average of 1986 to 1988, is larger than the projections by IFPRI and NIA and accounts for 22% of the FAO projection. The deficit of corn (72.3 thousand tons on the average) is estimated at 13% from the IFPRI projection.

Table A.1.1 *LAND USE BY REGION, PHILIPPINES, 1988*

(Unit: '000 ha)

Region	Forest Land		Crop Land		Fish Pond		Swamp Land		Pasture Land		Others		Total Land	
	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)
Philippines	13,891	46	10,127	34	399	1	613	2	2,125	7	2,846	9	30,001	100
I	1,065	8	574	6	10	3	23	4	234	11	251	9	2,158	7
II	2,403	17	600	6	35	9	3	0	189	9	410	14	3,640	12
III	693	5	802	8	52	13	10	2	36	2	230	8	1,823	6
IV	2,243	16	1,699	17	72	18	95	15	456	21	191	7	4,756	16
V	460	3	918	9	37	9	24	4	116	5	209	7	1,765	6
VI	333	2	875	9	70	18	158	26	24	1	561	20	2,021	7
VII	436	3	476	5	54	14	46	8	166	8	317	11	1,495	5
VIII	1,060	8	811	8	8	2	25	4	176	8	64	2	2,143	7
IX	732	5	726	7	21	5	88	14	194	9	109	4	1,869	6
X	1,637	12	817	8	17	4	19	3	139	7	204	7	2,833	9
XI	1,602	12	1,091	11	10	2	34	6	222	10	209	7	3,168	11
XII	1,227	9	738	7	13	3	88	14	170	8	92	3	2,328	8

Source: Provincial Irrigation Profile, 1989 (NIA)

Table A.1.2 AGRICULTURAL LAND UTILIZATION BY TYPE OF FOOD CROP AND BY REGION (1985-1987 AVERAGE)

(Unit: '000 ha)

Item	Rice		Corn		Vegetables 1/		Peanuts		Beans and Peas 2/		Others 3/		Total Food Crop Area ('000 ha)
	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	Area ('000 ha)	Share (%)	
Philippines	3,342.4	40.8	3,474.9	42.4	126.1	1.5	49.6	0.6	50.3	0.6	1,143.1	14.0	8,186.4
I	335.4	10.0	75.8	2.2	25.6	20.3	7.9	15.9	12.5	24.9	54.2	4.7	511.4
II	393.2	11.8	326.6	9.4	7.8	6.2	23.9	48.2	3.9	7.8	34.0	3.0	789.3
III	474.9	14.2	10.2	0.3	15.0	11.9	1.6	3.2	7.5	14.9	33.5	2.9	542.6
IV	372.5	11.1	247.7	7.1	12.5	9.9	3.6	7.3	3.1	6.1	141.6	12.4	781.0
V	324.3	9.7	173.0	5.0	23.2	18.4	1.3	2.6	0.7	1.3	97.6	8.5	620.0
VI	451.1	13.5	88.3	2.5	10.8	8.5	1.6	3.3	6.2	12.4	83.5	7.3	641.6
VII	100.8	3.0	507.7	14.6	6.9	5.4	2.8	5.6	2.0	4.0	101.1	8.8	721.3
VIII	218.3	6.5	213.0	6.1	2.3	1.8	1.5	3.0	0.4	0.8	122.4	10.7	557.8
IX	139.5	4.2	278.3	8.0	3.3	2.6	2.2	4.4	1.1	2.1	100.9	8.8	525.2
X	113.4	3.4	235.6	6.8	9.3	7.4	0.6	1.3	1.7	3.4	152.6	13.4	513.3
XI	185.7	5.6	767.6	22.1	6.6	5.3	1.0	2.0	6.9	13.8	137.3	12.0	1,105.1
XII	233.5	7.0	551.1	15.9	2.8	2.2	1.6	3.3	4.3	8.6	84.4	7.4	877.8

Note: 1/ Includes fruit vegetables and leafy vegetables excluding onion and potatoes
2/ Includes mongo, soybeans and other dry beans
3/ Includes fruits and nuts, citrus and rootcrops

Source: Bureau of Agricultural Statistics

Table A.2.1 PADDY PRODUCTION BY LAND CONDITION (1986-1988 AVERAGE)

Region	Production ('000 t)				Area ('000 ha)			Area ('000 ha)	Yield (t/ha)			
	Irrigated	Rainfed	Upland	Total	Irrigated	Rainfed	Upland	Total	Irrigated	Rainfed	Upland	Total
Philippines	5,965	2,804	151	8,920	1,896	1,348	128	3,372	3.2	2.1	1.2	2.7
CAR	153	23	2	178	56	14	2	71	2.7	1.6	1.0	2.5
I	454	323	3	780	161	137	2	299	2.8	2.4	1.5	2.6
II	907	131	3	1,041	271	74	3	247	3.4	1.8	1.0	3.0
III	1,167	305	1	1,473	355	126	0.4	482	3.3	2.4	2.5	3.1
IV	573	340	31	944	193	157	29	379	3.0	2.2	1.1	2.5
V	440	215	10	665	170	134	12	316	2.6	1.6	0.8	2.1
VI	484	653	10	1,147	155	288	12	455	3.1	2.3	0.8	2.5
VII	82	69	1	152	41	60	1	102	2.1	1.2	1.0	1.5
VIII	216	188	4	408	81	127	4	212	2.7	1.5	1.0	1.9
IX	200	126	20	346	57	62	19	139	3.5	2.0	1.1	2.5
X	271	79	16	366	80	30	11	122	3.4	2.6	1.5	3.0
XI	490	154	10	654	128	60	6	194	3.8	2.6	1.7	3.4
XII	528	198	40	766	148	79	27	254	3.6	2.5	1.5	3.0

Source: Bureau of Agricultural Statistics

Table A.2.2 PADDY PRODUCTION BY VARIETY (1986-1988 AVERAGE)

Region	Production (t)			Area (ha)			Yield (t/ha)		
	HYV	Traditional	Total	HYV	Traditional	Total	HYV	Traditional	Total
Philippines	8,096,736	822,489	8,919,225	2,710,687	564,110	3,274,797	2.99	1.46	2.72
CAR	124,000	54,218	178,218	36,083	43,873	79,956	3.44	1.24	2.23
I	741,118	38,290	779,408	253,087	50,197	303,284	2.93	0.76	2.57
II	978,362	62,756	1,041,118	245,490	56,357	301,847	3.99	1.11	3.45
III	1,434,119	38,596	1,472,715	464,427	21,657	486,084	3.09	1.78	3.03
IV	831,207	112,668	943,875	291,287	83,353	374,640	2.85	1.35	2.52
V	597,547	67,140	664,687	251,303	36,063	287,366	2.38	1.86	2.31
VI	1,119,260	27,435	1,146,695	429,860	36,197	466,057	2.60	0.76	2.46
VII	124,730	26,610	151,340	84,183	26,223	110,406	1.48	1.01	1.37
VIII	348,876	59,839	408,715	141,330	43,583	184,913	2.47	1.37	2.21
IX	277,863	69,004	346,867	82,177	48,117	130,294	3.38	1.43	2.66
X	323,373	42,179	365,552	112,040	12,993	125,033	2.89	3.25	2.92
XI	564,965	88,332	653,297	151,173	34,967	186,140	3.74	2.53	3.51
XII	631,316	135,422	766,738	168,247	70,530	238,777	3.75	1.92	3.21

Source: Bureau of Agricultural Statistics

Table A.2.3 CORN PRODUCTION BY WHITE AND YELLOW VARIETIES (1986-1988 AVERAGE)

Region	Production ('000 t)			Area ('000 ha)			Yield (t/ha)		
	White	Yellow	Total	White	Yellow	Total	White	Yellow	Total
Philippines	2,849	1,417	4,266	2,738	935	3,673	1.0	1.5	1.2
CAR	14	10	24	14	7	21	1.0	1.4	1.1
I	17	45	62	26	45	71	0.7	1.0	0.9
II	107	292	399	151	184	335	0.7	1.6	1.2
III	7	3	10	8	3	11	0.9	1.0	0.9
IV	103	141	244	118	134	252	0.9	1.1	1.0
V	35	97	132	81	106	187	0.4	1.0	0.7
VI	17	40	57	50	62	112	0.3	0.7	0.5
VII	254	20	274	497	38	535	0.5	0.5	0.5
VIII	214	2	216	223	-	223	1.0	-	1.0
IX	215	13	228	281	15	296	0.8	0.9	0.8
X	212	100	312	223	46	269	1.0	2.2	1.2
XI	939	354	1,293	625	146	771	1.5	2.4	1.7
XII	715	300	1,015	441	149	590	1.6	2.0	1.7

Source: Bureau of Agricultural Statistics

Table A.2.4 PEANUT PRODUCTION (1986-1988 AVERAGE)

Region	Production (t)	Area (ha)	Yield (t/ha)
Philippines	41,714	52,394	0.8
CAR	132	324	0.4
I	8,782	6,227	1.4
II	19,557	26,730	0.7
III	1,739	1,555	1.1
IV	2,438	3,091	0.8
V	959	1,256	0.8
VI	1,384	2,635	0.5
VII	1,732	2,906	0.6
VIII	925	1,924	0.5
IX	1,243	2,076	0.6
X	971	1,107	0.9
XI	692	1,190	0.6
XII	1,160	1,372	0.8

Source: Bureau of Agricultural Statistics

Table A.2.5 PADDY UNIT YIELD BY LAND CONDITION (1986-1988 AVERAGE)

(Unit: t/ha)

Region/Land	1980	1981	1982	1983	1984	1985	1986	1987	1988	Average
Philippines										
Irrigated	2.80	2.89	3.07	2.93	2.93	3.17	3.18	3.14	3.12	3.15
Rainfed	1.81	1.89	1.96	1.83	2.02	2.13	2.17	2.02	2.05	2.08
Upland	0.96	1.01	1.01	1.06	1.04	1.10	1.19	1.15	1.19	1.18
CAR										
Irrigated	1.92	2.21	2.31	2.33	2.38	2.56	2.80	2.65	2.75	2.73
Rainfed	1.39	1.43	1.69	1.51	1.61	1.85	1.83	1.36	1.76	1.67
Upland	0.86	0.97	1.33	0.90	1.22	1.10	1.14	1.25	1.85	1.32
I										
Irrigated	2.19	2.61	2.93	2.71	2.66	2.85	2.92	2.73	2.84	2.83
Rainfed	1.65	1.91	2.24	1.85	2.11	2.38	2.46	1.99	2.53	2.36
Upland	1.25	0.95	1.09	0.99	0.98	1.85	1.35	1.29	1.57	1.38
II										
Irrigated	2.85	2.66	2.94	2.88	2.92	3.41	3.23	3.35	3.46	3.35
Rainfed	1.63	1.64	1.64	1.44	1.77	1.84	1.84	1.59	1.88	1.78
Upland	0.78	1.08	1.18	1.06	1.28	1.07	1.28	1.28	0.92	1.23
III										
Irrigated	2.97	3.45	3.76	3.40	3.23	3.22	3.45	3.44	2.95	3.29
Rainfed	2.21	2.72	2.89	2.27	2.65	2.70	2.72	2.35	2.12	2.42
Upland	1.57	1.85	1.96	1.74	1.78	1.73	1.73	0.92	0.00	2.43
IV										
Irrigated	2.49	2.40	2.69	2.63	2.88	3.17	3.06	2.84	3.00	2.97
Rainfed	1.70	1.78	1.68	1.92	2.03	2.28	2.17	2.09	2.23	2.17
Upland	1.10	0.78	0.86	0.92	1.13	1.12	1.20	0.95	0.93	1.05
V										
Irrigated	2.66	2.54	2.53	2.54	2.64	2.68	2.57	2.59	2.60	2.58
Rainfed	1.62	1.46	1.58	1.46	1.75	1.68	1.69	1.51	1.60	1.60
Upland	0.67	0.82	0.73	0.84	0.74	0.73	0.81	0.78	1.15	0.86
VI										
Irrigated	3.09	3.07	3.16	2.96	2.97	3.19	3.15	3.08	3.16	3.13
Rainfed	1.96	2.10	2.08	1.95	2.15	2.15	2.27	2.35	2.17	2.27
Upland	0.83	0.86	0.56	0.68	0.61	0.65	0.60	1.04	1.01	0.79
VII										
Irrigated	2.01	1.80	2.03	2.01	1.93	1.98	1.82	2.00	2.19	2.01
Rainfed	1.36	1.06	1.07	1.26	1.14	1.17	1.27	1.09	1.06	1.14
Upland	0.64	0.64	0.51	0.95	0.82	0.69	0.80	0.98	1.01	0.87
VIII										
Irrigated	2.50	2.31	2.55	2.16	2.31	2.75	2.70	2.60	2.73	2.68
Rainfed	1.50	1.50	1.50	1.05	1.64	1.69	1.51	1.43	1.52	1.49
Upland	1.08	1.21	0.86	0.87	0.92	0.85	0.73	1.21	1.12	0.97
IX										
Irrigated	3.23	3.24	3.20	3.29	2.91	3.29	3.37	3.60	3.54	3.50
Rainfed	1.98	1.65	1.95	2.11	2.25	1.98	2.15	2.13	1.82	2.03
Upland	0.87	1.09	1.10	1.28	1.07	1.00	1.03	1.03	1.09	1.05
X										
Irrigated	3.14	2.77	2.99	3.00	2.54	3.12	3.24	3.41	3.51	3.39
Rainfed	1.71	2.07	2.03	1.86	2.10	2.40	2.85	2.41	2.46	2.59
Upland	1.01	0.94	0.84	1.12	1.02	1.00	1.45	1.41	1.41	1.43
XI										
Irrigated	3.25	3.36	3.23	3.41	3.50	3.78	3.92	3.78	3.75	3.82
Rainfed	1.81	1.75	2.07	2.05	2.05	2.62	2.61	2.51	2.62	2.58
Upland	0.82	0.95	1.00	0.95	1.22	1.36	1.67	1.32	2.10	1.72
XII										
Irrigated	3.51	3.28	3.32	3.22	3.66	3.78	3.70	3.38	3.61	3.57
Rainfed	2.37	2.55	2.39	2.59	2.53	2.86	2.77	2.54	2.28	2.50
Upland	1.22	1.27	1.24	1.39	1.23	1.37	1.60	1.44	1.36	1.51

Source: Bureau of Agricultural Statistics

Table A.4.1 RICE SUPPLY AND UTILIZATION IN THE PHILIPPINES, 1981-1988

(Unit: '000 t)

Item	1981	1982	1983	1984	1985	1986	1987	1988
Beginning Stock	1,646.5	1,611.2	1,866.3	1,491.3	1,147.3	1,754.6	2,017.1	1,575.0
Production	5,142.0	5,416.9	4,756.2	5,120.1	5,758.9	6,047.4	5,585.1	5,867.1
Imports 1/	0	0	0	189.7	538.1	2.1	0.0	181.4
Total Supply	6,788.5	7,028.1	6,622.5	6,801.1	7,444.3	7,804.1	7,602.2	7,623.5
Exports 1/	94.8	0.5	40.4	1.9	0.1	0.0	111.0	0.0
Seed 2/	166.7	163.4	149.4	155.1	162.2	169.9	159.7	166.4
Feeds & Wastes /3	334.2	352.1	309.2	332.8	374.3	393.1	363.0	352.1
Net Food Disposable	4,581.5	4,645.8	4,632.2	5,164.0	5,153.1	5,224.0	5,393.5	5,587.4
Per Capita (kg)	92.5	91.5	89.0	96.8	94.3	93.3	94.0	95.1
Total Demand	5,177.2	5,161.8	5,131.2	5,653.8	5,689.7	5,787.0	6,027.2	6,105.9
Ending Stock	1,611.3	1,866.3	1,491.3	1,147.3	1,754.6	2,017.1	1,575.0	1,517.6

Note: 1/ NSO data
2/ 1.5 sacks of 50 kgs. palay per hectare
3/ 6.5 percent of production
Source: Bureau of Agricultural Statistics

Table A.4.2 CORN SUPPLY AND UTILIZATION IN THE PHILIPPINES, 1981-1988

(Unit: '000 t)

Item	1981	1982	1983	1984	1985	1986	1987	1988
Beginning Stock	218.6	235.5	263.9	319.1	181.5	431.1	241.1	229.9
Production	3,295.7	3,404.0	3,134.0	3,250.3	3,862.8	4,090.7	4,278.1	4,427.9
Imports 1/	253.1	340.9	528.4	182.4	281.2	0.2	55.8	25.0
Total Supply	3,767.4	3,980.4	3,926.3	3,751.8	4,325.5	4,522.0	4,575.0	4,682.8
Seed 2/	65.9	67.6	62.6	64.5	70.2	71.9	73.7	74.9
Feeds & Wastes 2/	2,477.5	2,655.3	2,593.0	2,555.7	2,824.2	3,241.3	3,253.3	3,287.9
Net Food Disposable	988.5	993.6	951.6	950.1	1,000.0	967.7	1,018.1	1,026.9
Per Capita (kg)	20.0	19.6	18.3	17.8	18.3	17.3	17.8	17.5
Total Demand	3,531.9	3,716.5	3,607.2	3,570.3	3,894.4	4,280.9	4,345.1	4,389.7
Ending Stock	235.5	263.9	319.1	181.5	431.1	241.1	229.9	293.1

Note: 1/ NSO data
2/ 1981-1987 estimates were revised figures based on estimates of consumption
Source: Bureau of Agricultural Statistics

Table A.4.3 PEANUT SUPPLY AND UTILIZATION IN THE PHILIPPINES, 1981-1988

(Unit: '000 t)

Item	1981	1982	1983	1984	1985	1986	1987	1988
Beginning Stock	-	-	-	-	-	-	-	-
Production	43.0	44.0	34.0	40.0	41.0	42.0	43.0	40.0
Imports 1/	1.0	1.0	-	-	5.0	15.0	-	21.0
Total Supply	44.0	45.0	34.0	40.0	46.0	57.0	43.0	61.0
Exports 1/	-	-	2.0	-	-	-	-	10.0
Seed	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Feeds & Wastes	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Net Food Disposable	32.0	32.0	22.0	28.0	32.0	41.0	30.0	36.0
Per Capita (kg)	0.6	0.6	0.4	0.5	0.6	0.7	0.5	0.6
Total Demand	35.0	35.0	27.0	31.0	35.0	44.0	33.0	49.0
Ending Stock	9.0	10.0	7.0	9.0	11.0	13.0	10.0	12.0

Note: Bureau of Agricultural Statistics
Source: 1/ NSO data

Table A.4.4 RICE PRODUCTION AND USE BY REGION (1986-1988 AVERAGE)

(Unit: '000 t)

Region	Supply Utilization					Production	Surplus/ (Deficit)	Population 1/ Human ('000 persons)
	Food Use		_2/ Seeds	_3/ Feeds/ Wastes and Others	Total Use			
	Total	Per Cap. (kg)						
Philippines	5,392.0	93	165.3	379.2	5,936.5	5,833.4	(103.1)	57,360.5
CAR	114.8	106	3.5	7.6	125.9	116.6	(9.3)	1,077.6
I	373.5	112	14.7	33.1	421.3	509.7	88.4	3,328.1
II	209.8	91	17.0	44.3	271.1	681.2	410.0	2,298.4
III	613.2	101	23.6	62.6	699.4	963.2	263.7	6,052.3
IV	1,410.7	97	18.6	40.1	1,469.4	617.3	(852.1)	14,517.4
V	362.3	88	15.5	28.3	406.0	434.7	28.7	4,105.0
VI	550.3	103	22.3	48.7	621.4	749.9	128.6	5,323.0
VII	365.1	83	5.0	6.4	376.5	99.0	(277.6)	4,362.2
VIII	310.4	97	10.4	17.4	338.2	267.3	(70.9)	3,185.6
IX	231.2	77	6.8	14.7	252.7	226.9	(25.9)	2,994.5
X	255.5	76	6.0	15.5	277.0	239.1	(37.9)	3,350.4
XI	348.6	86	9.5	27.8	385.9	427.3	41.4	4,032.8
XII	246.6	90	12.5	32.6	291.7	501.4	209.8	2,733.3

Note:
_1/ NEDA estimates
_2/ 1.5 Sacks of 50 kgs. palay per hectare
_3/ 6.5 percent of production
Source: Bureau of Agricultural Statistics

Table A.4.5 CORN PRODUCTION AND USE BY REGION (1986-1988 AVERAGE)

(Unit: '000 t)

Region	Supply Utilization									Production	Surplus (Deficit)	Population			Area
	Food Use		Feeds			Seeds	Wastes	Others	Total Use			6/ Human ('000 persons)	7/ Hog ('000 heads)	8/ Chicken ('000 heads)	('000 ha)
	Total	Per Cap. (kg)	Hog 1/	Chicken 2/	Total										
Philippines	1,004.0	17.5	1,839.0	1,080.0	2,919.0	73.7	128.0	213.3	4,337.9	4,265.6	(72.3)	57,360.5	7,297.8	55,518.8	3,628.3
CAR	1.7	1.6	37.0	22.9	59.9	0.4	0.7	1.2	63.9	23.6	(40.3)	1,077.6	170.4	1,177.5	20.0
I	2.5	0.8	111.8	78.1	189.9	1.4	1.9	3.1	198.8	62.3	(136.6)	3,328.1	498.3	4,004.6	69.6
II	47.9	20.9	87.9	54.2	142.1	6.7	11.9	19.9	228.7	398.3	169.6	2,298.4	462.1	2,777.6	331.6
III	5.9	1.0	212.8	151.8	364.6	0.2	0.3	0.5	371.5	9.9	(361.7)	6,052.3	948.7	7,817.4	11.2
IV	17.5	1.2	395.2	231.6	626.8	5.1	7.3	12.2	668.9	244.4	(424.5)	14,517.4	959.6	11,973.0	249.8
V	23.5	5.7	133.4	63.6	197.1	3.7	4.0	6.6	235.0	132.7	(102.3)	4,105.0	546.9	3,265.1	184.2
VI	107.8	20.3	163.1	128.4	291.5	2.1	1.7	2.9	406.0	57.4	(348.6)	5,323.0	587.7	6,601.4	104.2
VII	337.7	77.4	147.3	84.4	231.7	10.7	8.2	13.7	602.0	273.4	(328.6)	4,362.2	650.4	4,314.2	527.2
VIII	51.6	16.2	112.8	40.3	153.1	4.7	6.5	10.8	226.7	216.2	(10.5)	3,185.6	535.6	2,070.3	231.6
IX	89.6	29.9	89.8	46.4	136.1	5.9	6.8	11.3	249.8	227.0	(22.9)	2,994.5	312.4	2,372.8	290.7
X	155.8	46.5	117.9	54.9	172.8	5.2	9.4	15.6	358.8	311.8	(46.9)	3,350.4	572.3	2,815.8	257.6
XI	128.8	31.9	149.7	82.0	231.7	15.7	38.8	64.7	479.6	1,293.3	813.7	4,032.8	795.4	4,210.6	771.4
XII	33.5	12.2	80.3	41.4	121.7	11.8	30.5	50.8	248.1	1,015.3	767.2	2,733.3	258.0	2,118.7	579.4

Note: 1/ 0.25 kilograms per head/day based from the national level estimates
2/ 0.02 kilograms per head/day based from the national level estimates
3/ 20 kilograms per hectare
4/ 3 percent of the total production
5/ 5 percent of the total production
6/ Based on NEDA estimates.
7/ January 1 inventory.
8/ Average inventory of four quarters (July, October, January and April).
*/ Preliminary estimates
*/ Figures were rounded off and may not add up to total

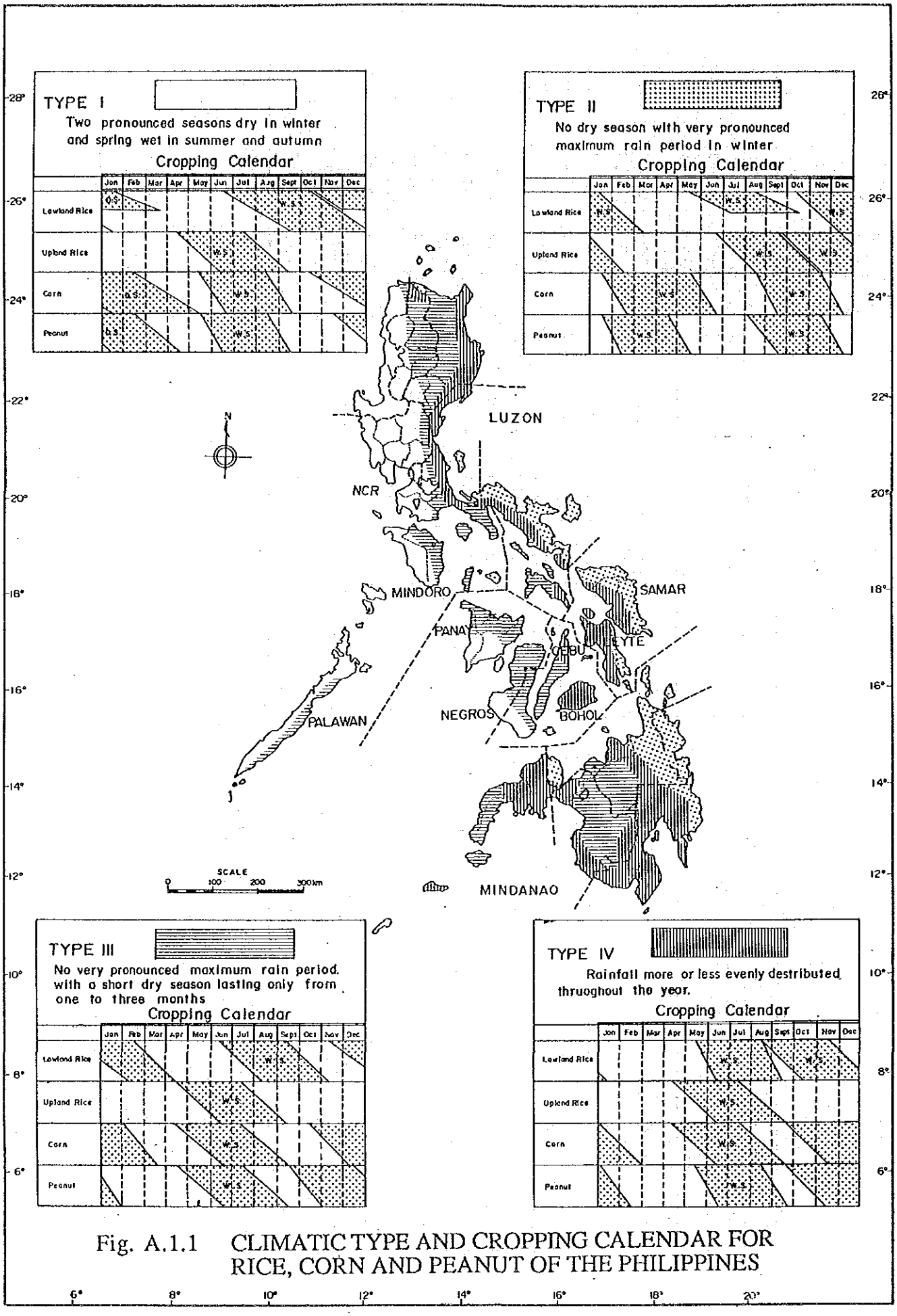

Fig. A.1.1 CLIMATIC TYPE AND CROPPING CALENDAR FOR RICE, CORN AND PEANUT OF THE PHILIPPINES

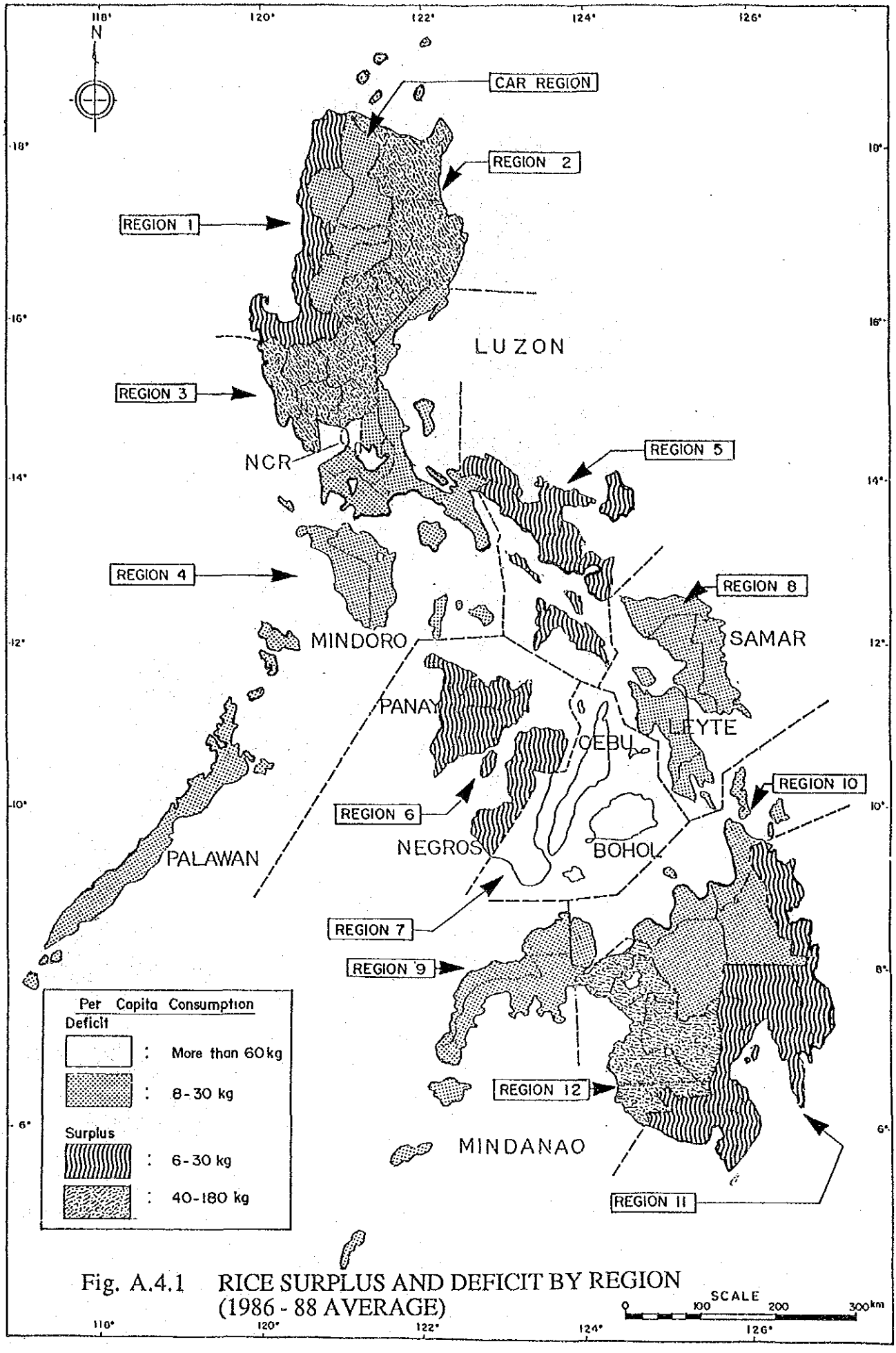

Fig. A.4.1 RICE SURPLUS AND DEFICIT BY REGION (1986 - 88 AVERAGE)

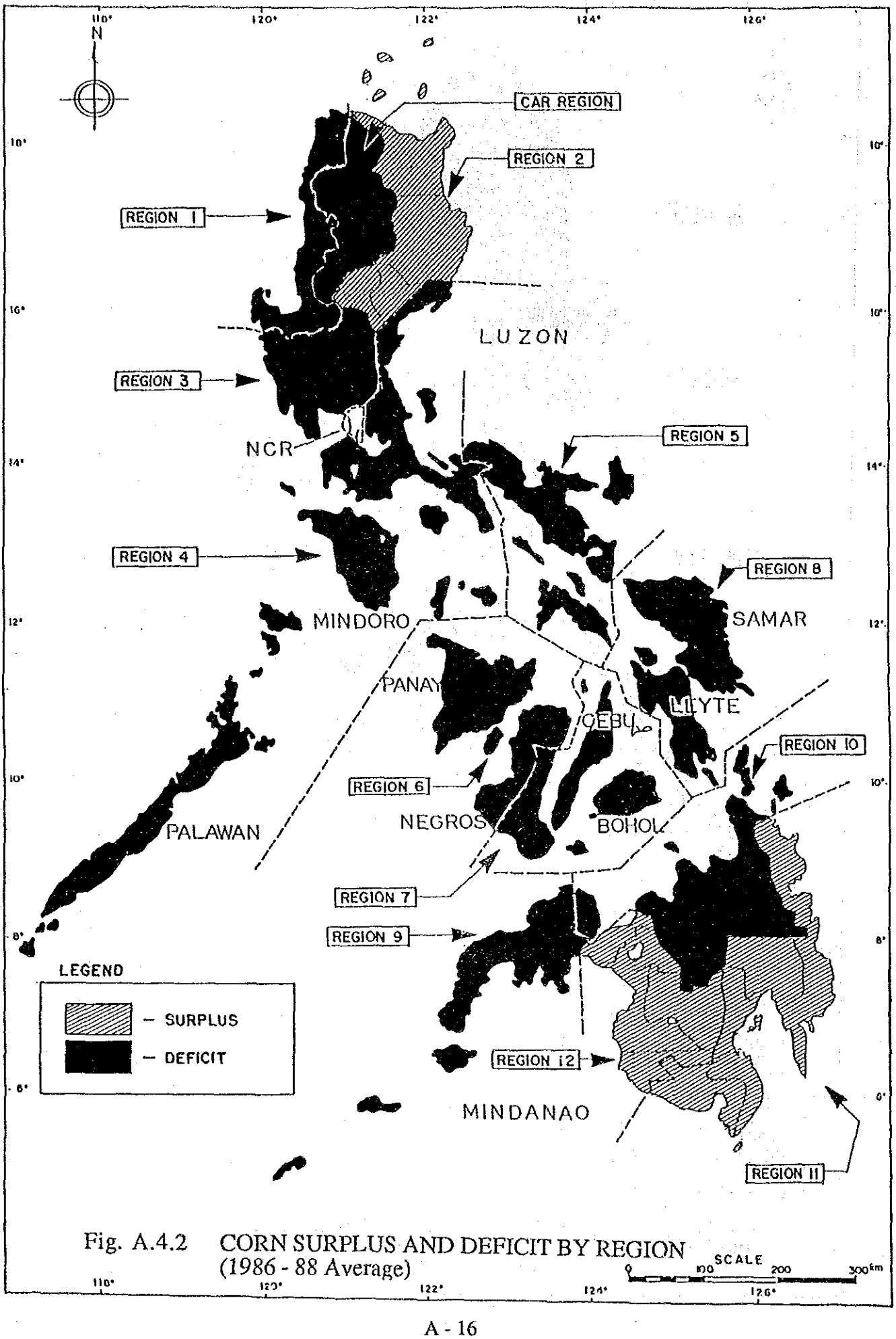

Fig. A.4.2 CORN SURPLUS AND DEFICIT BY REGION
(1986 - 88 Average)

Annex B

Organization, Policies and Development Plan of Seed Production and Distribution

ANNEX B ORGANIZATION, POLICIES AND DEVELOPMENT PLAN OF SEED PRODUCTION AND DISTRIBUTION

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1. ORGANIZATION OF SEED PRODUCTION AND DISTRIBUTION

The Department of Agriculture (DA) has been promoting the seed industry in the country including the private sector. The present organization of the DA is shown in Fig. B.1.1. The Bureau of the Plant Industry (BPI) in the DA has responsibility for formulation, implementation, monitoring and evaluation of seed production and distribution programs in the country. The BPI is supervised by the Undersecretary for Regional Operations and administration of seed production and distribution is managed by the Crop Production Division of the BPI as shown in Fig. B.1.2. The functions of regional agricultural offices established in each region have been strengthened in accordance with the government's decentralization policy. Regional and provincial seed coordinators designated in regional and provincial agricultural offices are planning and coordinating seed production and distribution activities at the regional level. Organization of regional agricultural offices is outlined as shown in Fig. B.1.3.

BPI was assigned as the lead agency to implement the seed production and distribution program of DA by virtue of Special Order No. 298 in 1989. The Central Office including nursery, seed testing laboratory and storage facilities in Manila, Central Nursery in Quezon City and four National Crop Centers consisting of Buguias/Baguio in Benguet, Economic Garden in Laguna, La Granja in Negros Occidental and Davao in Davao Del Sur are under the administrative management of BPI at present. Buguias /Baguio NCC is concentrating on highland agricultural research and development activities and not engaged in producing rice, corn and peanut seeds.

The Philippine Rice Research Institute (Phil Rice) was established in 1985 for the strengthening of rice research and development (R & D) activities in the country. Phil Rice R & D network comprises 4 entities: the Central Experiment Station at Munoz, Nueva Ecija; four branch stations, namely Cagayan Valley Experiment Station, Bicol Experiment Station, Visayas Experiment Station and Mindanao Experiment Station; regional research centers consisting of state colleges and universities; and cooperating stations under the DA.

Apart from the stations under BPI and Phil Rice, there are another twenty nine (29) stations or seed farms in the country which consist of twelve (12) experiment stations, fifteen (15) seed farms and two (2) agricultural centers as shown in Table B.1.1. These twenty nine stations are directly managed by Regional Agricultural Offices. Guimaras Seed Farms in Region VI conducts the research and development for fruit trees only, while the other stations are engaged in seed production and distribution of food crops including rice, corn and/or peanuts.

The Philippine Seed Board is organized to promote and coordinate breeding activities both in public and private sectors. The functions of the Board are (a) to support DA in the formulation of seed policies, (b) development of systems and procedures for nomination, review, approval, release entry and discontinuation of crop varieties, and (c) determination of recommended varieties. The Board is composed of eleven (11) members chaired by the Director of BPI. The Board is assisted by Recommending Committee in formulating policies, rules and regulations to carry out the national crop development program. Under the Recommending Committee, Technical Committees consisting of the Technical Working Group such as seed production / distribution / storage group and seed certification / standard group are organized. The Technical Working Group conducts testing program in the experiment stations involved to evaluate and determine performance of new crop varieties. The Recommending Committee submits the evaluation results of new varieties to the Board for approval as recommended varieties for commercial plants.

Breeder seeds are produced by the Phil Rice Central Station and IRRI for rice, Institute of Plant Breeding(IPB) and Ilagan Experiment Station for corn, and IPB and Economic Garden for peanut. Government corn breeding activities are mainly concentrated on open pollinated varieties based on the agricultural development policy. Hybrid corn varieties are produced by private seed companies like Pioneer, San Miguel, Cargill, etc. Agricultural Colleges and Universities also participate in breeding of rice, corn and peanuts. Multiplication of foundation seeds for rice, open pollinated corn and peanuts are done by the government agencies

Members of the seed producers association designated by the DA Regional Office and the association in provinces not covered by the stations or seed farms are provided with foundation seeds for multiplication of registered seeds needed in each province. For registered seeds requirements, production is not only done by stations and seed farms but also by the designated members of the seed producers association in the province. Certified seeds are mainly produced by private seed growers which are also the members of seed producers association in the respective provinces.

The main participating agencies in seed production and distribution are outlined in Fig. B.1.4 and the agencies related to rice, open pollinated corn and peanut may be summarized as follows :

Seed Production Stage	Rice	Corn (Open Pollinated)	Peanuts
Breeder Seed	Phil Rice Central E.S, IRRI	IPB, Ilagan E.S	IPB, Economic Garden
	------- Agricultural Colleges and Universities --------		
Foundation Seed	Phil Rice E.S La Granja E.S	--- BPI National Crop Centers ---	
Registered Seed	(1) Experiment Stations and Seed Farms, others (2) Selected seed farmers in provinces without experiment stations		
Certified Seed	Private Seed Growers(Members of seed growers association)		

2. POLICIES AND DEVELOPMENT PLANS

2.1 Seed Production and Distribution Policies and Regulations

At present, there is no law to regulate production and distribution of seeds in the Philippines. The Department of Agriculture proposed a Philippine Seed Act to congress in 1987. However, the proposed Act is still pending in the legislative department. Therefore, the seed production and distribution policies are generally stipulated through Executive Order, Special Order, Administrative Order and Memorandum Circular, each order is being issued by the President, the Secretary of DA, the Undersecretary of Department of Agriculture and the Director of Bureau of Plant Industry, respectively. The list of Orders related to production and distribution of seeds is shown in Table B.2.1.

The basic Order for stipulating general policies on seed is the "Revised Policies and Guidelines on Seed Production and Distribution System "Administration Order No. 32, Series of 1988. The outline of this Order is as follows :

(1) Production of breeder seeds shall be the responsibility of institutions that developed the variety such as: Bureau of Plant Industry, University of the Philippines at Los Baños (UPLB), International Rice Research Institute (IRRI), Agricultural Colleges Association of the Philippines (ACAP), and other private agencies are involved in the varietal improvement program.

(2) Purification of breeder to foundation seeds shall be done by major Experiment Stations and Seed Farms of the BPI.

(3) Multiplication and maintenance of breeder seeds shall be the responsibility of the plant breeder.

(4) The Stations/Institutions and Seed Growers designated to multiply different classes of seeds (foundation and registered seed) shall produce and maintain 10 percent buffer stock in addition to the seed production program targets for contingency use.

(5) As a general rule, the production of certified seeds shall be done by members of the Seed Producers Association and the program shall recognize only one Seed Association in each province. However, in a Province with five (5) or less seed growers, a farmer could be allowed to produce which will be sold within his area and properly monitored subject to the recommendation of seed coordinators.

(6) Breeder, foundation and registered seed classes shall be allocated proportionately to stations/regions/province through the Regional Seed Coordinators in coordination with the Regional President of Seed Growers Association.

(7) Registered seed shall be distributed to bonafide certified seed producers designated by Provincial Seed Coordinators.

(8) Only analyzed, tested, certified, tagged and sealed seeds shall be distributed.

(9) No breeder and foundation seeds shall be distributed by the breeding institutions without proper clearance from the BPI.

(10) Only the PSB approved varieties will be recommended for distribution.

(11) The Regional Seed Coordinator shall be responsible for monitoring the seed distribution and production program of Experiment Stations, Seed Farms, Private Seed Companies, and other seed production entities in their area.

2.2 Development Plans

2.2.1 Role of Seed Industry

The new emphasis on the development of agriculture as outline in the Medium-Term Development Plan (1987-1992), policies, priorities and programs of action shall concentrate on the following objectives.

a. To increase farmers income,

b. To sustain the increase in farm productivity,

c. To effect equitable distribution of the factors and return to production,

d. To attain food self-sufficiency, and

e. To create/increase agro-based employment opportunities among rural population particularly landless workers.

In order to attain food self-sufficiency through the increase in farm productivity, one of key policies and strategies will be the increase high quality seed production. Utilization of high quality seeds is a very important factor in increasing productivity and profitability of farm management. The cost for adoption of high quality seeds needs only a small part of the total production costs which is estimated at 5% for rice, 10% for corn, 6% for peanuts. At present use of high quality seeds in the country is still low among the majority of farmers : 15 % for rice, 10 % for corn and less than 5 % for peanuts and other legumes according to the BPI monitoring. For the effective and economical increase in farm productivity, increase in production and extension of high quality seeds will be indispensable.

High quality seed production requires proper farm management and post harvest activities ; reduction of field harvesting losses, proper drying and quality control during seed processing and storage. These technologies for seed production would be utilized for the ordinary crops production done by the majority of farmers. The quality of end products produced from the high quality seeds will be increased through the reduction of damage from pests and diseases. Seed processing and marketing industries would contribute to the rural economy through the expansion of employment opportunities.

Another important aspect of the seed industry is its linkage and coordination with the Comprehensive Agrarian Reform Program (CARP). This Program aims at the improvement of social and economic situations of landless farmers in the rural areas through the establishment of owner cultivationship with economic size of farm, promotion of agro-based industry for increase in employment opportunities, and development of social and economic infrastructure as required. High quality seed distribution will be indispensable for the establishment of owner cultivators through increase in farm productivity.

2.2.2 Seed Production and Distribution Plans

The BPI has been playing the role of lead agency for seed production and distribution in the country. Since the establishment of the BPI, seed production and

distribution programs have been implemented in coordination with crop production programs ; Masagana 99, Intensified Rice Production Program and Rice Action Program for rice, Maisagana 99, Expanded Corn Program and Corn Productivity Enhancement Program for corn. The BPI prepares the annual seed production and distribution plans which include the target areas and production in every seed class for stations and seed farms, and seed growers in each region together with a seed inspection program both in fields and laboratories.

Seed production and distribution activities including rice, corn and peanut seeds together with other crops, i.e. vegetables, field legumes, fruit trees, ornamental and medical plants, are basically implemented under the National Seed and Plant Materials Production and Distribution Program of BPI. The Program covers seed production and distribution activities in the National Crop Centers under BPI, Phil Rice Central and Branch Stations, and other stations and seed farms under the Regional Agricultural Offices. The BPI coordinates and monitors seed production, procurement and distribution activities by the government stations and private seed growers. Objectives of the Program may be summarized as follows :

(a) To produce adequate quantities of basic seed (breeder, foundation, registered) including security stock for timely production of certified seed,

(b) To produce high quality certified seed on a continuing supply basis,

(c) To improve efficiency in production of high quality seeds,

(d) To preserve the viability and quality of basic and certified seeds while in storage, and

(e) To intensify promotion of farmers adoption of high quality seeds.

The Intensified Rice Seed Production and Distribution Program under BPI have been implemented since May 1989 as one of the components of the Rice Production Enhancement Program II (RPEP II). For the increase in certified seed production and achievement of scheduled seed distribution, 800 thousand cavans of certified seed producing in 100 thousand ha of seed fields, which is required for the planned 800 thousand ha under the RPEP II, is programed under the Intensified Rice Seed Production and Distribution Program. PREP II program covers the 800 thousand ha of irrigated paddy fields involving 400 thousand farmers during dry season of November 1989 to April 1990, and intends to increase paddy production to 9.7 million tons in 1990 from the projected 9.3 million tons in 1989. Under this program, certified seeds will be purchased by DA from seed growers and

distributed to farmers together with fertilizer through NFA warehouses and exchange stations. Three bags of paddy (around 150 kg) from farmers will be exchanged into one bag of certified seeds (45 kg) and four bags of fertilizers (200 kg).

Production targets of rice, corn and peanut seeds under the Programs in 1988 and 1989 are as shown in Table B.2.2 to B.2.4 respectively and summarized as follows :

(Unit: t)

Seed Class	1988	1989
Rice		
Foundation	27	32
Registered	2,327	2,520
Certified	34,914	26,374*
Corn		
Foundation	15	15
Registered	102	229
Certified	84	188
Peanut		
Foundation	168	10
Registered	143	310
Certified	2,778	2,550

* Based on the Rice Production Enhancement Program

In addition to the above programs, the DA appropriates the investment outlay of ₱15 to 19 million/year during recent three years for procurement of seed buffer stock mainly for rice, corn and legumes. The DA has procured certified seed as emergency measures in order to supply required seed to farmers suffered from natural calamities. The DA proposes seed buffer stock for timely seed supply consisting of 100% of foundation seed, 20% of registered seed and 10% of certified seed under the programs. While appropriate storage system and concrete procedures for the implementation are not prepared.

2.2.3 Seed Related Agricultural Development Plans

Department of Agriculture is implementing agricultural development plans and projects for the achievement of the targets of the Medium-Term Development Plan. Out of the several projects, the followings will require close coordination with the seed production and distribution program under the BPI :

1) Crop Production and Diversification
   a. Accelerated Agricultural Production Project (AAPP), Research and Outreach
   b. Rice Production Enhancement Program Phase II

2) Procurement and Distribution of Farm Inputs
   a. Farm - level survey on farm inputs

3) Crop Marketing
   a. Accelerated Agricultural Production Project (AAPP), Market Development
   b. Business Development and Promotion Program
   c. Farmers Cooperative Development for Crop Production and Marketing
   d. Cooperation Marketing Project

4) Farmers Credit Program
   a. Comprehensive Agricultural Loan Fund Guarantee Program
   b. Agricultural Lending Program
   c. Livelihood Enhancement for Agricultural Development Program

5) Crop Insurance
   a. Rice Crop Insurance Program
   b. Corn Crop Insurance Program

The following Integrated Area Development Projects are being implemented by various agencies. Most of the projects are targeted to improve farmers' income through increase in crop productivity by development of infrastructures and support services. Promotion of seed production and distribution programs are required for the smooth implementation of the projects.

1) Aurora Integrated Area Development Project
2) Bicol River Basin Development Program
3) Bohol Integrated Agricultural Development Project
4) Cagayan Integrated Agricultural Development Project
5) Mindoro Integrated Rural Development Project
6) Palawan Integrated Area Development Project
7) Samar Integrated Rural Development Project
8) Sorsogon Integrated Area Development Project

Table B.1.1 **SEED RESEARCH AND PRODUCTION FACILITIES UNDER DEPARTMENT OF AGRICULTURE**

Region / Experiment Station & Seed Farm	Location: Province	Location: Municipality	Area (ha)	Main Research/ Production Crops	Note
CAR					
Buguias/Baguio NCC	Benguet	Buguias	36.0	Except rice	BPI National Crop Center
		Baguio City	9.4	Except rice	Focused on highland agriculture
Luna Seed Farm	Kalinga-Apayao	Luna	250.7	Upland crops,others	DA Regional Office
Region I					
Dingras Expt. Station	Ilocos Norte	Dingras	5.0	Crops general	DA Regional Office
Region II					
Agricultural Pilot Center	Cagayan	Iguig	4.6	Paddy, others	DA Regional Office
Ilagan Expt. Station	Isabela	Ilagan	107.3	Paddy, others	DA Regional Office
Cagayan Valley Expt. Station	Isabela	San Mateo	24.4	Paddy	PhilRice Branch Expt. Station
Abulog Seed Farm	Cagayan	Abulug	26.5	Paddy, others	DA Regional Office
Region III					
PhilRice Central Expt. Station	Nueva Ecija	Munos	98.4	Paddy	PhilRice
NCR					Central Research Station
BPI Central Office	Manila	Malate	4.0	Vegetable & fruits	BPI Central Experiment Station
Quezon City Central Nursery	Manila	Quezon City	3.0	Fruit tree, others	BPI Seed Farm
Region IV					
Economic Garden NCC	Laguna	Los Banos	46.2	Except paddy & fruits	BPI National Crop Center
Dr M.L. Roxas Memorial Expt. Station	Batangas	Lipa City	48.4	Fruit tree, others	DA Regional Office
Tiaong Expt. Station	Quezon	Tiaong	49.0	Crops general	DA Regional Office
Mindoro Horticultural Center	Oriental Mindoro	Victoria	285.0	Vegetables, paddy, others	DA Regional Office
Tanay Seed Farm	Rizal	Tanay	20.5	Crops general	DA Regional Office
Palawan Seed Farm	Palawan	Puerto Princesa	68.4	Crops general	DA Regional Office
Region V					
Bicol Expt. Station	Camarines Sur	Pili	70.0	Paddy	PhilRice Branch Expt. Station
Albay Expt. Station	Albay	Tobaco	50.2	Crops general	DA Regional Office
Daet Seed Farm	Camarines Norte	Daet	56.9	Crops general	DA Regional Office
Virac Seed Farm	Catanduanes	Virac	73.8	Crops general	DA Regional Office
Region VI					
La Granja NCC	Negros Occidental	La Carlota	96.0	Crops includes paddy	BPI National Crop Center
Visayas Expt. Station /_1	Iloilo	Iloilo City	62.5	Paddy	PhilRice Branch Expt. Station
Iloilo Seed Farm /_1	Iloilo	Sta. Barbara	8.3	Crops general	DA Regional Office
Guimaras Seed Farm	Guimaras	Jordan	8.9	Fruit tree (National Mango Research Expt. Center)	DA Regional Office
Region VII					
Mandaue Expt. Station	Cebu	Mandaue	7.9	Crops general	DA Regional Office
Bohol Expt. Station	Bohol	Ubay	100.0	Crops general	DA Regional Office
Agricultural Productivity Center	Bohol	Tagbilaran	-	Paddy, vegetable	DA Regional Office
Region VIII					
Romualdez Expt. Station	Leyte	Babatngon	27.4	Crops general	DA Regional Office
Abuyog Expt. Station	Leyte	Abuyog	145.3	Crops general	DA Regional Office
Gandara Seed Farm	Western Samar	Gandara	85.0	Crops general	DA Regional Office
Salcedo Seed Farm	Eastern Samar	Salcedo	20.0	Crops general	DA Regional Office
Region IX					
Ipil Expt. Station	Zamboanga Del Sur	Ipil	24.0	Crops general	DA Regional Office
Region X					
Dalwangan Expt. Station	Bukidnon	Dalwangan	120.0	Crops general	DA Regional Office
Bukidnon Seed Farm	Bukidnon	Kibawe	30.0	Crops general	DA Regional Office
Region XI					
Davao NCC	Davao Del Sur	Davao City	1,004.9	Fruit tree crops, others	BPI National Crop Center
Tupi Seed Farm	South Cotabato	Tupi	42.0	Crops general	DA Regional Office
Region XII					
Mindanao Expt. Station	North Cotabato	Midsayap	94.1	Paddy	PhilRice Branch Expt. Station
Aroman Seed Farm	North Cotabato	Kabacan	485.1	Crops general	DA Regional Office
Kidapawan Seed Farm /_2	North Cotabato	Kidapawan	50.0	Crops general	DA Regional Office
Amas Seed Farm /_2	North Cotabato	Amas	280.5	Crops general	DA Regional Office

Note : /_1, /_2 ; Supervised by the same superintendent as a complex

Table B.2.1 **LIST OF ORDERS RELATED SEED PRODUCTION AND DISTRIBUTION**

No. of Order	Subject
Executive Order No. 116	Renaming the Minister of Agriculture and Food as Minister of Agriculture
Special Order No. 335, Series of 1982	Amending Special Order No. 223 series of 1966. Regarding Objectives Function and Membership of the Philippine Seed Board
Special Order No. 298, Series of 1988	Assigning the Seed Production and Distribution Program to the Bureau of Plant Industry as the Lead Agency
Special Order No. 305 Series of 1989	Strengthening the Procurement and Distribution Systems of Quality Seeds and Plant Materials
Administration Order No. 32 Series of 1986	Revised Policies and Guidelines on Seed Production and Distribution System
Memorandum Circular No. 1 Series of 1988	Implementing Guidelines on the Implementation of Seed and Plant Materials
Memorandum Circular No. 7 Series of 1989	Amendment of Item I-C of Memorandum Circular No. 1, Series of 1988

Table B.2.2 RICE SEED PRODUCTION PROGRAM (1988-1989)

Region/Year		Foundation Seed National Seed Center		Registered Seed Regional Seed Farm		Registered Seed Seed Grower		Certified Seed Seed Grower	
		Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)
Philippines	1988	41	27	405	1,459	2,812	868	215,335	34,914
	1989	10	32	478	1,721	222	799	6,762	26,374
	Average	26	29	442	1,590	1,517	833	111,049	30,644
I	1988	-	-	2	7	21	76	277	998
	1989	-	-	2	7	21	76	227	998
	Average	-	-	2	7	21	76	252	998
II	1988	2	6	62	223	25	90	1,026	3,692
	1989	2	6	62	223	25	90	1,026	3,692
	Average	2	6	62	223	25	90	1,026	3,692
III	1988	2	6	95	342	30	108	2,097	7,549
	1989	2	6	95	342	30	108	2,097	7,549
	Average	2	6	95	342	30	108	2,097	7,549
IV	1988	-	-	33	119	23	83	743	2,673
	1989	-	-	33	119	23	83	243	2,673
	Average	-	-	33	119	23	83	493	2,673
V	1988	2	6	81	292	22	79	611	2,201
	1989	2	6	81	292	22	79	611	2,251
	Average	2	6	81	292	22	79	611	2,226
VI	1988	2	6	71	256	30	108	620	2,230
	1989	2	6	71	256	30	108	620	2,231
	Average	2	6	71	256	30	108	620	2,230
VII	1988	-	-	13	47	15	54	191	687
	1989	-	-	13	47	15	54	191	687
	Average	-	-	13	47	15	54	191	687
VIII	1988	-	-	24	86	13	46	294	1,057
	1989	-	-	24	86	13	47	294	1,057
	Average	-	-	24	86	13	46	294	1,057
IX	1988	-	-	7	25	9	32	561	2,020
	1989	-	-	7	25	9	32	561	2,020
	Average	-	-	7	25	9	32	561	2,020
X	1988	-	-	4	15	10	35	272	979
	1989	-	-	4	15	10	35	272	979
	Average	-	-	4	15	10	35	272	979
XI	1988	-	-	13	47	11	40	405	1,458
	1989	-	-	13	47	11	40	405	1,458
	Average	-	-	13	47	11	40	405	1,458
XII	1988	33	1			2,603	117	208,240	9,371
	1989	2	6	73	263	13	47	217	781
	Average	18	4	73	263	1,308	82	104,229	5,076

Source: BPI

Table B.2.3 CORN SEED PRODUCTION PROGRAM (1988-1989)

Region/Year		Foundation Seed National Seed Center		Registered Seed Regional Seed Farm		Registered Seed Seed Grower		Certified Seed Seed Grower	
		Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)
Philippines	1988	6.0	15.0	24.5	32.6	52.0	69.3	62.8	83.7
	1989	6.0	15.0	24.5	73.4	52.0	156.0	62.8	188.3
	Average	6.0	15.0	24.5	53.0	52.0	112.7	62.8	136.0
I	1988	-	-	-	-	-	-	2.0	2.7
	1989	-	-	-	-	-	-	2.0	6.0
	Average	-	-	-	-	-	-	2.0	4.3
II	1988	1.0	2.5	3.0	4.0	10.0	13.3	11.8	15.7
	1989	1.0	2.5	3.0	9.0	10.0	30.0	11.8	35.3
	Average	1.0	2.5	3.0	6.5	10.0	21.7	11.8	25.5
III	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
IV	1988	2.0	5.0	2.0	2.7	15.0	20.0	27.0	36.0
	1989	2.0	5.0	2.0	6.0	15.0	45.0	27.0	81.0
	Average	2.0	5.0	2.0	4.3	15.0	32.5	27.0	58.5
V	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
VI	1988	1.0	2.5	9.0	12.0	12.0	16.0	7.0	9.3
	1989	1.0	2.5	9.0	27.0	12.0	36.0	7.0	21.00
	Average	1.0	2.5	9.0	19.5	12.0	26.0	7.0	15.2
VII	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
VIII	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
IX	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
X	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
XI	1988	2.0	5.0	10.5	13.9	15.0	20.0	15.0	20.0
	1989	2.0	5.0	10.5	31.4	15.0	45.0	15.0	45.0
	Average	2.0	5.0	10.5	22.6	15.0	32.5	15.0	32.5
XII	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-

Source: BPI

Table B.2.4 PEANUT SEED PRODUCTION PROGRAM (1988-1989)

Region/Year		Foundation Seed National Seed Center		Registered Seed Regional Seed Farm		Registered Seed Seed Grower		Certified Seed Seed Grower	
		Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)	Area (ha)	Prod. (t)
Philippines	1988	151	168	119	132	100	11	2,500	2,778
	1989	10	10	260	260	50	50	2,550	2,550
	Average	81	89	190	196	75	31	2,525	2,664
I	1988	-	-	5	6	-	-	50	56
	1989	-	-	5	5	50	50	-	-
	Average	-	-	5	5	50	50	50	56
II	1988	2	2	60	67	-	-	600	667
	1989	2	2	60	60	-	-	600	600
	Average	2	2	60	63	-	-	600	633
III	1988	-	-	-	-	-	-	-	-
	1989	-	-	-	-	-	-	-	-
	Average	-	-	-	-	-	-	-	-
IV	1988	4	4	21	23	-	-	210	233
	1989	4	4	21	21	-	-	210	210
	Average	4	4	21	22	-	-	210	222
V	1988	-	-	13	14	-	-	130	144
	1989	-	-	13	13	-	-	130	130
	Average	-	-	13	14	-	-	130	137
VI	1988	4	4	20	22	-	-	200	222
	1989	4	4	20	20	-	-	200	200
	Average	4	4	20	21	-	-	200	211
VII	1988	10	11	-	-	100	11	-	-
	1989	-	-	10	10	-	-	100	100
	Average	10	11	10	10	100	11	100	100
VIII	1988	38	42	-	-	-	-	380	422
	1989	-	-	38	38	-	-	380	380
	Average	38	42	38	38	-	-	380	401
IX	1988	15	17	-	-	-	-	150	167
	1989	-	-	15	15	-	-	150	150
	Average	15	17	15	15	-	-	150	158
X	1988	28	31	-	-	-	-	280	311
	1989	-	-	28	28	-	-	280	280
	Average	28	31	28	28	-	-	280	296
XI	1988	10	11	-	-	-	-	100	111
	1989	-	-	10	10	-	-	100	100
	Average	10	11	10	10	-	-	100	106
XII	1988	40	44	-	-	-	-	400	444
	1989	-	-	40	40	-	-	400	400
	Average	40	44	40	40	-	-	400	422

Source: BPI

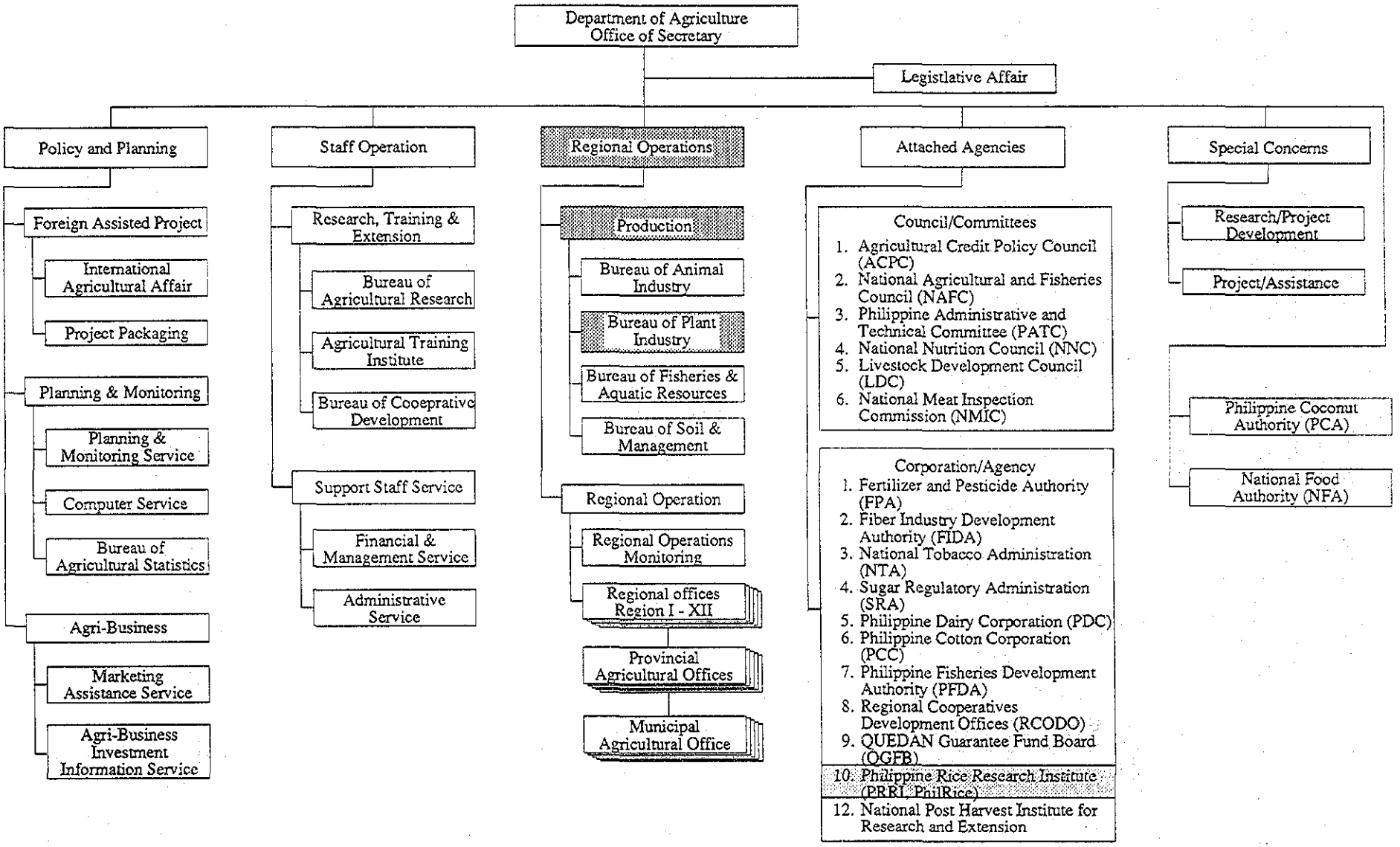

Fig. B.1.1 ORGANIZATION CHART OF DEPARTMENT OF AGRICULTURE, PHILIPPINE

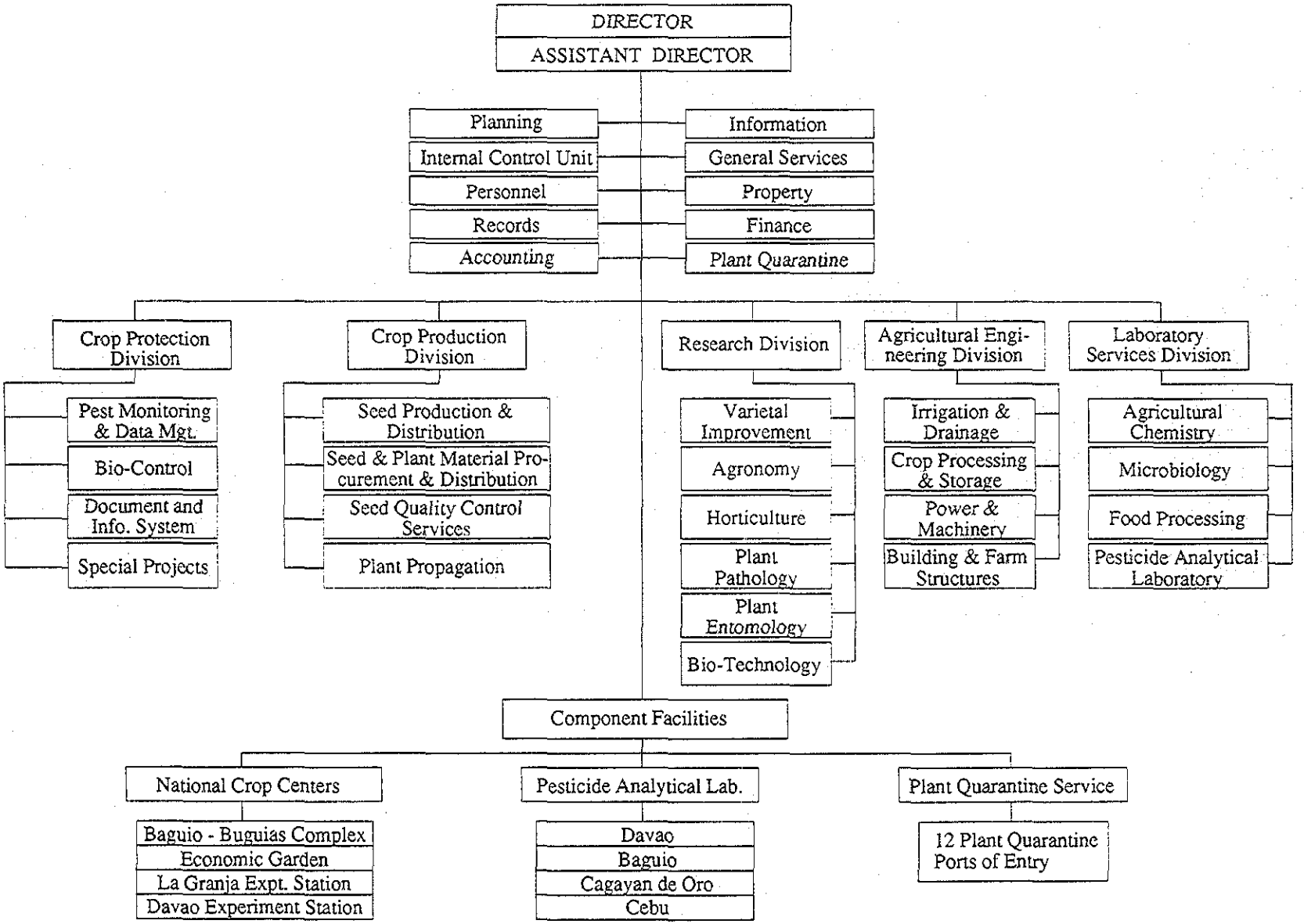

Fig. B.1.2 ORGANIZATION STRUCTURE OF BUREAU OF PLANT INDUSTRY (BPI)

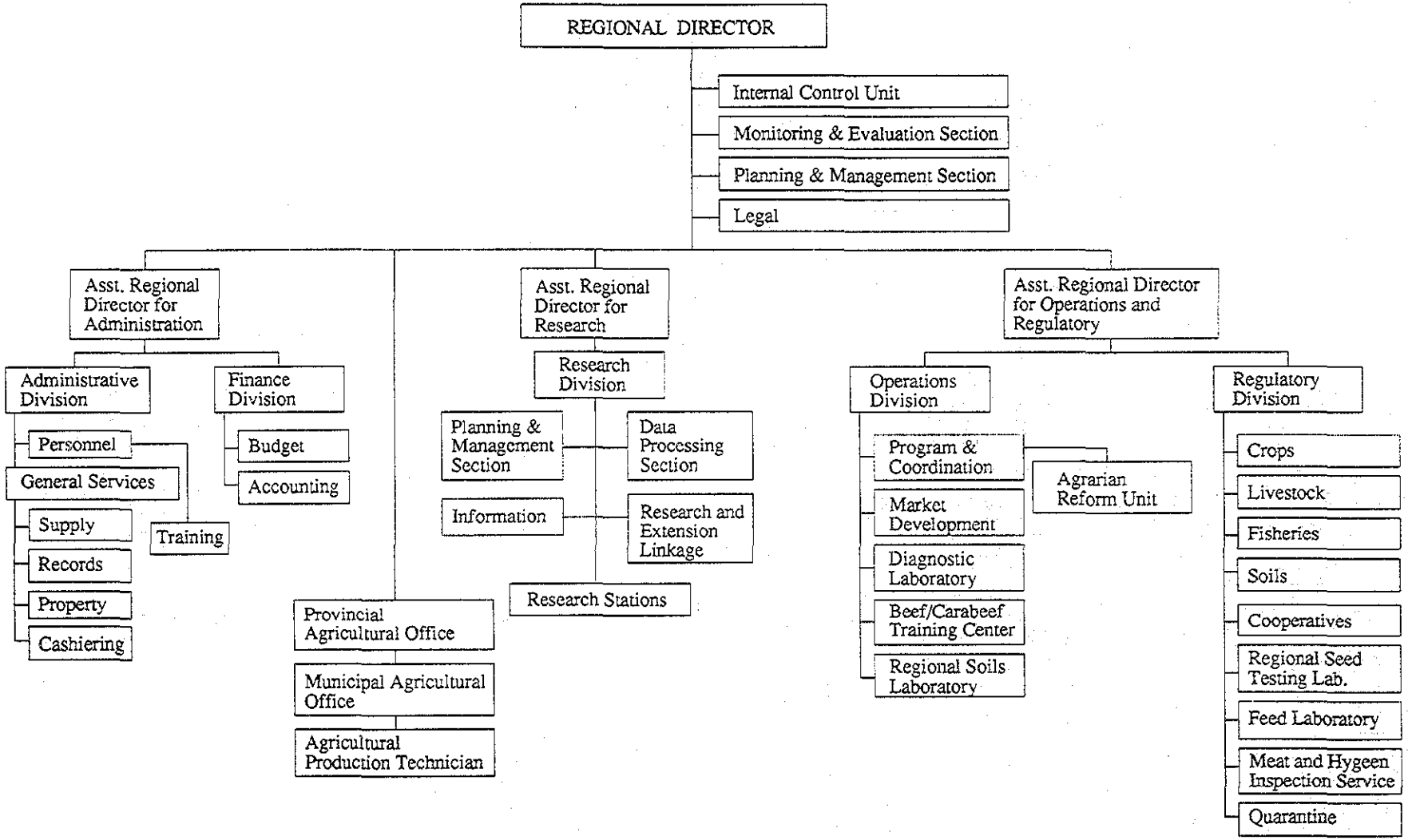

Fig. B.1.3 ORGANIZATION STRUCTURE OF DA REGIONAL OFFICE

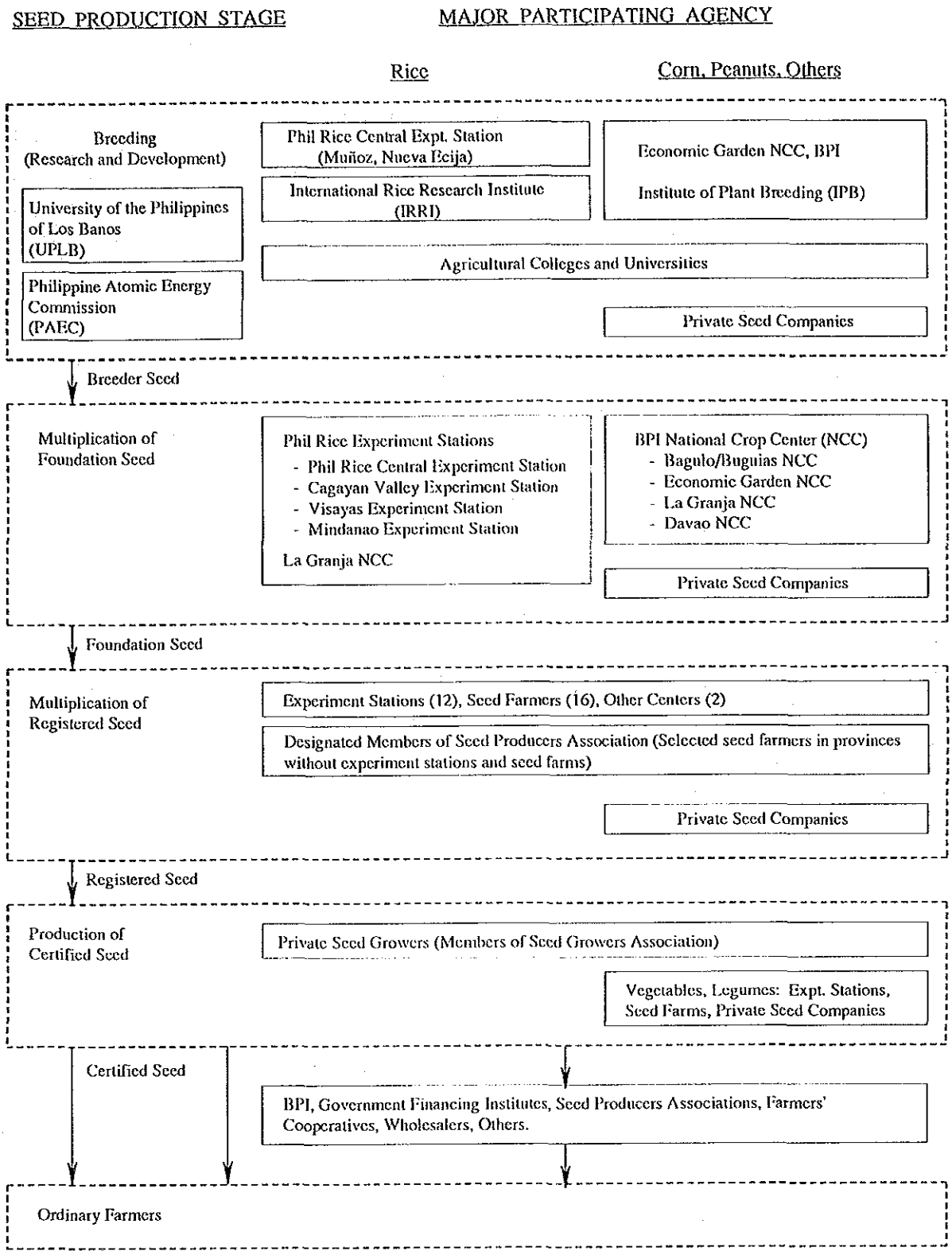

Fig. B.1.4 OUTLINE OF SEED PRODUCTION AND DISTRIBUTION SYSTEM

Annex C

Seed Production

FEASIBILITY STUDY ON
IMPROVEMENT OF SEED PRODUCTION AND DISTRIBUTION, AND
ESTABLISHMENT OF
APPROPRIATE SEED STORAGE SYSTEM

ANNEX C SEED PRODUCTION

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1. PRESENT CONDITION OF THE COUNTRY

1.1 Seed Production

Since basic seed production such as foundation and registered seeds of rice, corn and peanuts is government responsibility, the following number of experiment stations and seed farms has produced basic seed since 1984, and selected private seed growers are allowed to produce registered seed:

(Unit : Number of Experiment Stations and Seed Farms)

Seed Class	Lowland Rice	Upland Rice	Corn	Peanuts
Breeder	2(IRRI)	2(IRRI)	2(IPB)	2(IPB)
Foundation	11	3	8	8
Registered	22	8	21	11
(Foundation & Registered)	(23)	(9)	(22)	(17)

Seed production data and informations of stations, seed farms and private seed growers were based on the BPI Annual Report in 1984 to 1988. There are no seed production records from some stations and seed farms, hence average production record in the above five years can be estimated by two ways, i.e. considered no production (minimum average) or produced with average yields in the other years reported (maximum average). Seed production data by region are prepared as shown in Table C.1.1 to C.1.5 for stations and Table C.1.6 to C.1.10 for seed growers. Seed production and their trend are summarized in Table C.1.11 and C.1.12 for stations and Table C.1.13 and C.1.14 for seed growers. The average of maximum and minimum seed productions may be summarized as follows :

Kind of Seed	Harvested Area(ha)		Crude Production(t)		CrudeYield(t/ha)	
	Station	*Grower*	*Station*	*Grower*	*Station*	*Grower*
Lowland Rice						
Foundation	35	-	106	-	3.0	-
Registered	145	510	368	1,886	2.5	3.7
Certified	41	3,386	95	12,273	2.3	3.6
Upland Rice						
Foundation	2.3	-	4.3	-	1.9	-
Registered	9.6	14.8	17.1	47.4	1.8	3.2
Certified	1.7	22.0	3.3	76.9	1.9	3.5
Corn						
Foundation	12	-	15	-	1.3	-
Registered	65	108	69	272	1.1	2.5
Certified	53	91	46	233	0.9	2.6
Peanut						
Foundation	2.6	-	0.6	-	0.2	-
Registered	11.0	2.0	8.4	0.4	0.8	0.2
Certified	7.7	3.0	7.1	3.2	0.9	1.1

Net seed production is considered as quantity of approved seed through field inspection and laboratory test. Percentage of approved seed to total crude seed production and net seed yields are estimated in Table C.1.15 and summarized as follows :

Kind of Seed	Approved Seed (%)		Net Seed Yield (t/ha)		
	Station	Grower	Station	Grower	BPI Target
Lowland Rice					
Foundation	62	-	1.9	-	3.15
Registered	69	46	1.8	1.6	3.6
Certified	61	45	1.4	1.6	3.6
Corn /_1					
Foundation	57(94)	-	1.1(0.9)	-	2.5
Registered	70(78)	56(46)	1.1(1.1)	1.6(0.7)	3.0
Certified	50(92)	32(68)	0.6(1.1)	0.9(1.8)	3.0
Peanuts					
Foundation	39	-	0.1	-	1.0
Registered	93	0	0.7	0	1.0
Certified	78	0	0.7	0	1.0

Note : /_1 ; Yellow Corn (White Corn)

The above remarkably low percentage of approved seed and low net seed yields may be attributed to mixture with foreign elements and inferior seeds suffered from calamities such as typhoon, flood, drought, water shortage, pests and diseases and low germination rate due to high moisture content of seeds. The BPI target yields are set at higher level compared with the actual seed yields.

The seed production target of BPI program in 1989 and actual seed production are shown in Table C.1.16 and summarized as follows :

Kind of Seed	BPI Target Area and Production		Actual Area and Production		Actual Record to Target (%)		
	Station	Grower	Station	Grower	Station	Grower	Total
Lowland Rice							
Harvested Area (ha)							
Foundation	10	-	35	-	350	-	350
Registered	478	222	144	510	30	230	93
Certified	-	7,312	41	3,386	-	47	47
Production (t)							
Foundation	32	-	66	-	206	-	206
Registered	1,721	799	255	876	15	110	45
Certified	-	26,324	58	5,565	-	21	21
Corn							
Harvested Area (ha)							
Foundation	5	-	12	-	240	-	240
Registered	25	52	65	108	260	208	225
Certified	-	124	53	91	43	74	116
Production (t)							
Foundation	15	-	12	-	80	-	80
Registered	73	156	73	147	100	94	96
Certified	-	371	45	105	12	28	40
Peanuts							
Harvested Area (ha)							
Foundation	10	-	2.6	-	26	-	26
Registered	260	-	11.0	2.0	4	-	5
Certified	-	2,600	7.7	3.0	-	0.1	0.4
Production (t)							
Foundation	10	-	0.3	-	3	-	3
Registered	260	-	8.0	-	3	-	3
Certified	-	2,600	5.5	-	-	-	0.2

From the above comparison data of lowland rice seed, the actual harvested area and production of foundation seed are more than three and two times of the target respectively. Around 70 % of registered seed should be produced by the stations according to the BPI target, while actual registered seed production by the stations and growers is reversed, i.e. the actual area of the stations and growers is 30 % and 230 % of the target area respectively. The actual production of registered and certified seed is limited to 45 % and 21 % of the target production respectively. Regarding corn seed production, the actual area of foundation seed is more than two times of the target area, while the production is limited to 80 %. The actual area of registered seed both of stations and growers is more than two times of the target and the production attains to the target. While certified seed production is limited to 40% of the target of open pollinated varieties. As to peanut seed, production activity is limited in the stations , and not achieved to the target. Growers' production is negligibly small.

1.2 Seed Production Practices

The effects of day length and temperature on crop cultivation do not differ much between the regions except in mountain areas, while water conditions such as rainfall patterns

and irrigation systems are greatly affecting crop production. Recommended planting methods of rice, corn and peanut seed are summarized in Table C.1.17 to C.1.20.

As for rice, nearly the same rice varieties are grown throughout in the country. Old varieties such as IR36 are still grown for seed production due to its early maturity with around 111 maturity days and high productivity. The varieties having traits of early maturity such as IR60, 62, 64, 66, 72 with around 113 - 117 maturity days are widely planted for seed production. Also, IR 64, 70, 74 are commonly multiplying the seed for their good eating quality with high yield. The potential yield of these varieties ranges from 4 - 5.7 t/ha. The seed bed of 400 m^2 must be prepared for one ha of paddy field sowing 45 kg of seeds. The seedlings are planted one per hill after 20 to 25 days from sowing. Rice crops in Regions I, II, III, IV and VIII are seriously affected by typhoons, especially during September to November. It is desirable to ensure rice heading or maturing before these months. In this sense varieties having the trait of early maturity are needed.

In case of corn seed , the seed requirement is 20 kg/ha with rows 75 cm apart, 2 seeds/hill spaced 50 cm or one seed/hill spaced about 25 cm. Harvesting is done by plucking the ears or by machine when the corn silks and husks are thoroughly dried. The ears are dried for 2 - 3 days under sun and shelled. The shelled grain seed then dried to 14% of moisture content. Open-pollinated corn varieties currently being used in seed production are IPB Var. 1 (Ginintuan, maturity 105 - 110 days), super sweet yellow corn, IPB Var. 2 (Tonco white, maturiy 97 - 107 days) and glutinous white corn. Recently (1989) IES Cn 2 (Isabela white Cn 2, maturity 87 - 89 days) developed by Ilagan Experiment Station was approved and recommended by the Seed Board for commercial production in future years.

Regarding peanuts, seed treatment with fungicide is recommended to prevent rotting. Usually 100 kg (65 kg shelled)/ha of seed are needed, while the seed requirement for small seeded varieties is less and are planted more densely. On soil with pH below 5.8 or low in calcium, liming should be done to promote the proper development of pods. Peanuts should be harvested when leaves begin to turn yellow or viens of the shells begin to clear, by pulling the plant or pulling up after loosening the soil with animal-drawn plowing on both sides of furrow. The pods are picked from the plants after drying for 2 - 3 weeks and pods are dried again up to the moisture content of about 12%. Varieties of peanut seed are BPI-Pn 9 (maturity 104 - 119 days), UPL-Pn 2 (Maturity 104 - 110), UPL-Pn 4 (Biyaya 4, maturity 105 - 110 days) and UPL-Pn 6 (Biyaya 6, maturity 101 - 102 days). Recently (1989), BPI-Pn 2 (Mothi, maturity 100 - 103 days) and UPL-Pn 8 (Biyaya 8, maturity 100 - 110 days) have been recommended by the Seed Board. BPI-Ph 9 gives a large shelled seed and is

favpred by farmers. UPL-Pn 8 is tolerant to partial shade and is suitable for mix cropping. The potential yield of these varieties is about 2 t/ha.

2. ASSESSMENT OF SEED PRODUCTION IN THE COUNTRY

2.1 Seed Production

From the viewpoint of crop cultivation, low yield of the crops is one of the most important problems in seed production. The potential yield of varieties was tested in the stations under the seed production program, and the result showed 4 - 5.7 t/ha in rice, 4 - 5 t/ha in corn and 2 t/ha in peanuts. These values were obtained by yield performance tests in the process of breeding. However, according to a report on seed production by BPI the average yield was very low, i.e. 2.5 - 3.1 t/ha in rice, 1.1 - 1.3 t/ha in corn and about 0.7 t/ha in peanuts, this might be attributed to typhoon, flood, shortage of soil moisture, drought, insect pests and diseases, and might be related to planting in unsuitable fields and miss-management of cultivation on critical points.

The second problem in seed production is low seed yield owing to the low percentage of screened and approved seed as certified seed. Namely, 1.8 - 1.9 t/ha in rice, 1.1 t/ha in corn and less than 0.7 t/ha in peanuts, this might be attributed to mixture of inferior seed, owing to natural calamities, insect pests and diseases, and contamination of off-types, foreign elements in the field or during processing, and degradation of seed quality under unsuitable conditions.

2.2 Seed Demand and Supply Condition

Stations/farms produce more foundation seed than the target set in BPI seed production program, but they produce remarkably less registered seed than the BPI target. Similarly, private seed growers are producing registered seed beyond the their quota, while producing the certified seed in very small quantities, showing an inclination to seed production but definitely low in certified seed production. This may due to the higher profitability of the higher class of seed in marketing.

Though the BPI seed production program target for certified seed production is very small quantity compared with the target for registered seed production, the actual quantity of certified seed produced by seed growers is smaller than the BPI target. There is no relationship between the quantity of registered seed produced and the planted area for the certified seed production. Presumably a large quantity of the registered seed was not used for

the certified seed production within the country. It seems also related to that ordinary farmers want to procure the seed at cheaper price ahead in time, supposedly, some part of products of seed growers are also purchased before certification at the seed testing laboratory.

The coverage percentage of the certified seed in BPI program for the harvested area of the objective crop was 16.6% in rice, 10.8% in corn total, 0.5% in open-pollinated corn and 49.6% in peanuts. While the coverage of certified seed actually produced was 3.6% in rice, 0.3% in open-pollinated corn and 0% in peanuts. Thus, production of certified seed was very low. Especially there was no production of the certified seed in peanuts.

Certified seed production is one of the commercial activities for seed growers, therefore, the trend of their activities is influenced greatly by socio-economic condition, such as marketing demand, abilities of seed growers and seed inspectors, government support and etc. as well as agricultural technology. So that, for improvement of certified seed production, it is needed to raise efficiency of seed production with the right application of cultivation management and suitable varieties, as well as study and analysis of socio-economic conditions concerned.

Dry season crops are planted at the beginning of the season for effective use of water in the wet season. Usually seed for dry season crops are produced in the wet season. It often happens that planting is miss-timed owing to delay in seed supply due to the very short time between harvesting of the wet season crop and planting of the next dry season crop. To solve this problem the BPI tried early planting of wet season rice to advance the harvesting time, but this does not seem to have been achieved yet.

2.3 *Seed Production Technology*

It is considered that the level of seed production technology in the Philippines is generally high owing to the activities of IRRI, Universities and other research institutions, however because of unfavorable climatic conditions from time to time, the yields of crops remain low due to frequent calamities. In particular crops are damaged heavily by typhoons which visit usually during September to November in Regions I, II, IV, VIII.

Crops harvested in the wet season are dried only by sun, and sometimes the seeds deteriorate due to the unfavorable drying condition. This is one of the serious problems of peanut seed production especially.

Although several varieties of rice are planted by the same seed grower probably to decrease the risks of calamities, this system increases the possibility of mixture with volunteer plants from the previous season, seedlings from other plots as well as the risk of careless management during harvesting and processing.

Since diseases deal fatal blows to seed production, careful inspection and management is needed to eliminate the problem, especially since there is a high possibility of virus contamination of peanuts production in certain fields.

Corn is a cross-pollination crop, therefore special attention is required to prevent out-crossing with other varieties. High possibility of out-crossing can be expected for open-pollinated corn seed production in the field in an open area without any isolation facilities in a corn productive area of hybrid or local varieties.

3. BASIC IMPROVEMENT PLAN OF SEED PRODUCTION IN THE COUNTRY

3.1 Seed Production Practices

For improvement of low yield in seed production, it is important to select fields with fertile soil in suitable locations for crop management, and to prepare seed and fertilizer, etc. ahead of time, also in upland crops to avoid repeat planting of the same kind of crop on the same field to prevent outbreak of insect pests and diseases and an imbalance in nutrient conditions in the soil.

Typhoons seem to be the main factor causing low yields in seed production, therefore cultivation techniques are required to avoid the damage by typhoons. These are to plant suitable varieties which flower, mature and can be harvested before the high season of typhoons.

For raising the approved seed percentage, it is important to do thorough roguing of off-types and removal of undesirable plants as well as to manage effectively weeding, plant protection, and to prevent contamination with inferior seed and inert matter, especially when dealing with several varieties, equipment and workshops should be cleaned for the seed treatment and processing. Furthermore, border areas of adjacent fields of different varieties should not be harvested for seed to avoid mechanical mixture and from the seed of natural crossings.

3.2 Basic Conditions for Improvement

To secure stable provision of seeds of rice, corn and peanuts, the following improvement plan is considered :

(a) The following target seed yields under the BPI program should be achieved throught the improvement of seed production technologies.

(t/ha)

Kind of Seed	Rice	Corn	Peanut
Foundation	3.15	2.5	1.0
Registered, Certified	3.60	3.0	1.0

(b) The nationwide long term target of seed renewal rates could be set at thirty (30) to in all objective crops. For the achievement of the target, the government should improve and strengthen the seed production and distribution system as well as the other agricultural support services step by step. On the basis of the present low renewal rates of seed use comprising 3.6% in rice, 0.3% in open-pollinated corn and 0% in peanuts, the present target in BPI program; 17% in rice, 11% in corn and 10% in peanuts, should be achieved firstly.

(c) Buffer stock rate is set up at 100% for foundation seed, 20% for registered seed, 10% for the certified seed on the basis of the BPI program.. These basic factors for the proposed seed production plan are summarized as follows :

	Lowland Rice	Upland Rice	Corn (O.P)	Peanuts
Seed rate (kg/ha)	45	100	20	100
Renewal rate (%)	17	17	11	10
Average yield (t/ha)				
Foundation seed	3.15	3.15	2.5	1.0
Registered, Certified	3.6	3.6	3.0	1.0
Buffer stock (%)/1				
Foundation	100	100	100	100
Registered	20	20	20	20
Certified seed	10	10	10	10

/1: The rate of buffer stock is against the quantity of the required certified seed.

(d) Seed production plan will be improved to set guidelines for stations and seed farms to produce more registered seed, and for the private seed growers to produce more certified seed to meet the requirements.

(e) To raise the screened (or approved) seed rate through applying the appropriate cultivation practices.

(f) Buffer stock of the foundation and registered seed has to be procured by season and kept for 12 months. Buffer stock will be used in case of crop failure due to calamities or replaced by the new stock in the next same season. In case, old buffer could be used as seed in the following season.

(g) Buffer stock of certified seed has to be procured by season and kept at least for 6 months for emergency use.

3.3 Seed Requirement by Region

The seed requirements of objective crops is estimated based on the average harvested areas during 1986 to 1988 by region and season, and showed in Table C.3.1 to C.3.4.

As a principal rule, the required seed is to be produced within the region for the next season. The seed requirement of corn is estimated tentatively based on the total harvested area including the area for hybrid corn.

The seed requirement showed in the Tables is tentatively estimated one based on the harvested area in the past years, therefore it is necessary to be revised after fixing the production target of the objective crops for future.

4. PRESENT CONDITION OF THE MODEL AREAS

4.1 Production of Study Crops

1) Peanut Region II (Cagayan Valley)

The land for diversified crops occupies 9% or 200,000 ha of total land area in this region, among this acreage peanut is grown on 4,488 ha in wet season (June, July - Sept.,

Oct.) and on 21,250 ha in dry season (Nov., Dec. - Mar., April). Isabela province has the largest peanut planting area covering 83% of total acreage of peanut growing (Table C.4.1).

Ilagan Experiment Station takes important part of peanut seed production in this model region multiplying of foundation, registered and certified seed of several varieties using 1-2 ha in wet season and 4-5 ha in dry season.

The varieties growing in this experiment station are BPI Pn 9, UPL Pn 2, UPL Pn 4, UPL Pn 6 and UPL Pn 8 but mostly BPI P 9 is distributing to the farmers since the variety is favored by the farmers for its large seed size and high seed quality.

The average yield of foundation, registered and certified seed in the experiment station is 1.0 - 1.7 t/ha.

There are 13 private peanut seed growers in the region but it considered no certified seed is produced by seed growers since they did not receive certification for their products by seed quality control services until now.

Most of the peanut seed growers grow peanut on the field after corn harvested without any application of fertilizer and pesticide and have seed yield 0.7 - 1.7 t/ha in average.

In the case of ordinary farmer planted non certificated seed the yield is said about 1/2 of that planted certified seed of recommended variety.

2) Rice Region VI (Western Visayas)

Paddy field in this region is estimated at 372,000 ha which is around 18% of the total land area of the region. Irrigated and rainfed rice growing area are about 185,000 ha and 187,000 ha respectively. In addition to this, there is about 20,000 ha of upland rice field. Since the model region of this rice seed production study exclude Negros Occidental province from Western Visayas region irrigated, rainfed and upland rice field are estimated at 142,000 ha, 165,000 ha and 10,000 ha respectively. Rice crop is plated in wet (May, June, July - Sept., Oct.) and dry season (Oct., Nov., Dec. - Feb., Mar.).

Recent situation of rice production in this model region has shown in table C.4.2. Rice planted area is estimated 359,680 ha in average of 1987 to 1989, among the provinces Iloilo is the largest rice growing province covers 57% of rice growing area, and followed by Capiz province.

Visayas Experiment Station has an important part on rice seed production in the region producing foundation and registered seed in wet and dry season. Although it varies year by year, recently it multiplies foundation seed of IR 60, 70, 72, 74 on 2 ha of field and registered seed of IR 36, 58, 60, 64, 68, 70, 72, 74 on 30 ha in wet season, registered seed of IR 36, 60, 70, 72, 74 on 5 ha in dry season. Among the varieties IR 36, 64, 70, 72, 74 are common for their favorable traits such as high yield, pest resistance, early maturity or good eating quality.

Average yield in the station was 1.7 t/ha for foundation seed and 2.5 t/ha for registered seed, but it seems to includes suffered year of calamity, it is said 2.9 - 3.15 t/ha in normal year.

In 5 year average of 1984 to 1988 the experiment station produced 11.79 t of foundation seed and 71.07 t of registered seed, while in addition to this, 131.9 t of registered seed was produced by selected seed growers.

As for certified seed in 5 year average it was produced 1,196 t from 723 ha corresponds 117% in area and 54% in production as of BPI target. Certified seed production area in wet season of 1989 by province was as follows. The area in dry season was about 1/3 of that.

Aklan	60	ha
Capiz	80	
Antique	60	
Iloilo	300	
Guimaras	55	
Sub total	555	
Negros Occi.	120	
Total	675	

Some quantity of foundation, registered and certified seeds are distributed to the other regions every year.

Area seed growers' production field varies 1-4 ha by grower. Generally several varieties (2-5) are grown by the same grower. Especially following varieties are mainly grown for their favorable traits, IR 36: constant high yield, IR 64: good eating quality, IR 70: pest resistant, high yield and good eating quality, IR 72: early maturity and high yield and IR 74: high yield and good eating quality.

Seed growers' field are managed appropriately, but planting density is seemed rather high 15 x 15 cm to 18 x 18 cm though recommendation is 20 x 20 cm. Weeding is doing by herbicide and hand needed much of labors. Average yield of seed growers' field is said 4.0 - 4.3 t/ha. Superiority of certified seed is recognized widely as that when ordinary farmer grown non certificated seed the yield is said 70 - 80%, 60 - 70% in some place, of that planted certified seed on the same field.

3) Corn Region XI (Southern Mindanao)

Situation of corn production in Southern Mindanao has shown in table C.4.3. In 3 year average 1987 to 1989, it was grown 602,000 ha in wet season (May, June - Aug., Sept.) and 174,000 ha in dry season (Nov. - Feb., Mar.) white corn which is mainly used for food was cultivated wider than yellow covering 68% of planted area in wet season and 90% of area in dry season respectively. Among the provinces South Cotabato is the largest corn growing province in the region, it covers 91% of yellow and 53% of white corn of total. Recently yellow hybrid corn is increasing in planting area estimated about 10% of total planted area of yellow corn.

Davao National Crop Center (NCC) and Tupi Seed Farm are producing foundation and registered seed of open pollinated corn for this region. In 1989 it planted white corn 2 ha each in wet and dry season, and Tupi Seed Farm planted yellow corn 1.5 ha in wet season and 2.5 ha in dry season for seed production. Average yield in the station is 2-3 t/ha. At present, only 2 varieties, IPB Var 1 of yellow corn and IPB Var 2 of white corn are produced and distributed under seed production program in this region.

In 5 year average 1984 to 1988, private seed growers produced registered seed of open pollinated yellow corn 9.5 t from 10.1 ha and certified seed of that 12.7 t from 12.5 ha and for white corn they produced registered seed 6.1 t from 4.1 ha and certified seed 2.8 t from 4.5 ha of field.

Recently, as a part of corn productivity enhancement program, DA Regional Office made a program to increase in number of seed grower and following certified seed production plan in 1990.

South Cotabato	wet. 23 ha	dry. 35 ha	147 t
Davao Norte	–	24	60
Davao Sur	15	25	100
Davao Oriental	–	5	12.5
Davao City	–	5	12.5
Surigao Sur	–	35	87
Total	38	129	419

Seed production of white corn is about the same quantity with that of yellow one though the coverage of white corn is 74% of total corn planted area.

Field management by seed growers such as fertilizer application and pest control is doing well, in some place corn is grown strip intercropping with mungbean or vegetables for the sake of crop protection. It is said the yield of corn in ordinary farmer's field grown non certificated seed is about 2/3 of that used certified seed in the same field.

4.2 Constraints of Seed Production

1) Peanut

Seed production in wet season of model region is very difficult due to unfavorable condition such as excessive soil moisture content, less amount of solar radiation and high humidity for dry the products. Therefor, seed production in wet season at Ilagan Experiment Station is strictly limited, and quality of products by seed growers are very low caused seed shortage for next dry season. All private peanut seed growers in this region did not received certification for their products by seed quality control services.

Ilagan Experiment Station some times could not produce foundation seed owing to no distribution of breeder seed. Most of peanut seed growers grow peanut without any application of fertilizer and pesticide.

2) Rice

There is no suffering from typhoon except northern part of the region, while water shortage affects seed production in dry season. In Visayas Experiment Station 32 ha of field is available in wet season but it is limited to only 5 ha owing to water shortage in dry season, then most of registered seed production is depending on the efforts of selected rice seed growers.

Because of labor shortage in rural community, direct planting of rice is increasing in the field of ordinary farmers. It is said, direct planting covers 90 - 95% of wet season rice in Iloilo, 80% in Capiz and 50% in Aklan province. They broadcast seed 3 - 4 times more than transplanting method, and 1.5 to 2 times of standard seed rate (90 kg/ha) in direct planting. So, seed requirement will be increase in near future.

Each seed grower is mostly growing several number of varieties in the same season, this involves a risk of varietal mixture during field management and seed processing.

3) Corn

Ratio of growing area between white corn and yellow one is about 74:26, while their seed production is about the same quantity, this means insufficiency in extension of recommended white corn variety to the farmers.

Damage by corn borer and corn earworm are major problem corn seed production in the field, and insufficient drying of wet season products is another problem for seed quality.

5. MODEL IMPROVEMENT PLANS

5.1 Basic Condition for the Improvement

To secure stable provision of seed of rice, corn and peanut, the following improvement plan is considered.

	Rice	Corn	Peanut
Seed rate (kg/ha)	45	20	100
Renewal rate (%)	20	11	10
Average yield (t/ha)			
Foundation	3.15	2.5	1.0
Registered, Certified	3.6	3.0	1.0
Buffer stock (%)			
Foundation	100	100	100
Registered	20	20	20
Certified	10	10	10

Seed rate and average yield of objective crops followed in the figure of BPI program.

Renewal rate raised for rice and lowered for peanut as compared with BPI program based on the field study.

Buffer stock is set up at 100% of required seed for foundation seed, since it is very important and enough in small quantity. For registered and certified seed it is set up 20% and 10% respectively though in present program it is 15 - 20% of required seed.

Buffer stock has to be produced by season and kept foundation and registered seeds for 12 months, and at least 6 month for certified seed as a reserve for crop failure due to calamities.

5.2 Seed Requirement of the Model Areas

The seed requirement of objective crops is estimated based on the recent 3 years 1987 to 1989 (1986 - 88 for peanut) average harvested area and basic factors mentioned above.

As for rice, the area of direct planting and transplanting is estimated at 80% and 20% respectively. Average seed rate of direct planting is set up at 90 kg/ha. More over, 10% of certified seed shall be distribute to other regions for supply their seed shortage.

As for corn, the model region is divided into two parts South Cotabato where is the most productive province and the others and quantity of required seed is calculated separately.

Planted area of hybrid corn and open pollinated yellow corn is estimated at 20% and 80% of total yellow corn planted area, and calculated required seed of open pollinated yellow corn.

For set up renewal rate of certified seed alternative study was made with several different figures and paid consideration about the required field area, seed quantity to be stored and cultivation (table C.5.1 - C.5.3).

Required seeds in model region of objective crops are showed in table C.5.4 - C.5.6.

5.3 Proposed Seed Production Practices and Suggestion for the Improvement

It is urgently needed to settle the peanut seed production system in wet season by preparation of drainage system in the field of Ilagan Experiment Station or selection the suitable field out side the station. Also it is needed to make study on the peanut cultivation method in wet season and on the simple method to keep the seed harvested in dry season until next dry season.

For constant keep the peanut breeder seed, it is advisable to produce breeder seed at Ilagan Experiment Station under technical supervision of breeder who released the variety.

It is necessary to investigate the peanut growing practices including preceding crop in the seed growers' field and to give adequate recommendation, since most of peanut seed growers did not apply any fertilizer and pesticide.

Because of limited area of available field in dry season in Visayas Experiment Station, rice registered seed production is depending on the effort of selected rice seed growers, in view of government responsibility of basic seed production, it is desired to settle the irrigation facility to produce total required registered seed at the experiment station.

It is desired to reduce the number of varieties to be grown by a rice seed grower to minimize the risk of varietal mixture during field management and seed processing.

It is worth due consideration that seed requirement will be increase in the future by reason of recent increase in direct planting of rice, using more seed than transplanting owing to a shortage of labor in the rural community. And it is also desirable to mechanize the field management such as weeding, laborious work in the seed production, as a countermeasure for the shortage of labor.

Extension of recommended white corn variety seems to be insufficient more efforts is needed on production and extension of white corn variety.

Peanut and corn to be rotated to grow once in 3-4 years on the same field in view of plant protection and nutritional physiology.

Table C.1.1 STATIONS' LOWLAND RICE SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Foundation	0.3	0.7	2.3	0.7	100
	Registered	2.3	6.6	2.9	3.3	50
	Certified	1.4	4.2	3.0	3.5	83
II	Foundation	6.3	20.2	3.2	16.5	81
	Registered	36.5	110.9	3.0	80.7	72
	Certified	2.0	5.2	2.6	5.2	100
III	Foundation	9.7	30.0	3.1	27.0	90
	Registered	22.8	49.2	2.2	37.7	76
	Certified	4.3	11.3	2.6	9.1	80
	Other	1.4	1.8	1.3	1.8	100
IV	Foundation	3.1	2.2	0.7	0.7	31
	Registered	20.4	32.0	1.6	21.5	67
	Certified	3.8	9.5	2.5	1.2	12
	Good	2.4	3.8	1.6	0.2	5
V	Foundation	8.5	29.3	3.4	7.3	24
	Registered	12.1	38.4	3.2	13.9	36
	Certified	3.8	12.6	3.3	7.5	59
	Good	1.1	4.0	3.6	1.7	42
VI	Foundation	6.7	20.2	3.0	12.8	63
	Registered	25.7	51.7	2.0	35.4	68
	Certified	11.8	12.2	1.0	9.5	77
	Good	3.0	3.5	1.2	0.6	17
VII	Registered	3.4	12.9	3.8	9.7	75
	Certified	2.4	8.5	3.5	3.8	44
VIII	Foundation	0.3	0.7	2.3	0.7	100
	Registered	5.6	17.3	3.1	12.0	69
	Certified	2.6	8.8	3.4	3.8	43
IX	Registered	2.6	4.1	1.6	3.9	95
	Certified	1.3	1.6	1.2	1.1	68
	Good	0.6	1.6	2.7	1.6	100
X	Registered	1.0	3.0	3.0	3.0	100
XI	Registered	5.2	14.6	2.8	10.1	69
	Certified	3.0	9.7	3.2	9.7	100
XII	Foundation	2.1	6.8	3.2	3.4	50
	Registered	12.9	45.3	3.5	35.9	79
	Certified	12.0	28.6	2.4	14.1	49
	Other	5.7	6.6	1.2	0.0	0
Grand Total						
	Foundation	37.0	110.1	3.0	69.1	62
	Registered	150.5	386.0	2.6	267.1	69
	Certified	48.4	112.2	2.3	68.5	61
	Good	7.1	12.9	1.8	4.1	31
	Others	7.1	8.4	1.2	1.8	21

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Foundation	0.1	0.1	2.3	0.1	100
	Registered	1.5	4.2	2.9	2.1	50
	Certified	0.9	2.5	3.0	2.1	83
II	Foundation	5.2	17.6	3.2	14.3	81
	Registered	31.9	95.9	3.0	69.0	72
	Certified	2.3	5.4	2.6	5.4	100
III	Foundation	9.7	30.0	3.1	27.0	90
	Registered	22.8	49.2	2.2	37.4	76
	Certified	1.7	4.5	2.6	3.6	80
	Other	0.3	0.4	1.3	0.4	100
IV	Foundation	1.9	1.3	0.7	0.4	31
	Registered	18.9	30.8	1.6	20.6	67
	Certified	3.6	8.9	2.5	1.1	12
	Good	0.5	0.7	1.6	0	5
V	Foundation	7.3	26.8	3.4	6.4	24
	Registered	12.0	38.3	3.2	13.8	36
	Certified	2.2	7.3	3.3	4.3	59
	Good	0.2	0.8	3.6	0.3	42
VI	Foundation	6.7	20.2	3.0	12.7	63
	Registered	25.4	51.1	2.0	34.7	68
	Certified	7.0	6.8	1.0	5.2	77
	Good	1.8	2.1	1.2	0.4	17
VII	Registered	1.3	5.2	3.8	3.9	75
	Certified	1.9	6.8	3.5	3.0	44
VIII	Foundation	0.1	0.1	2.3	0.1	100
	Registered	5.3	16.1	3.1	11.1	69
	Certified	1.1	3.5	3.4	1.5	43
IX	Registered	1.5	2.5	1.6	2.4	95
	Certified	1.0	1.3	1.2	0.9	68
	Good	0.1	0.3	2.7	0.3	100
X	Registered	0.4	1.2	3.0	1.2	100
XI	Registered	4.0	10.9	2.8	7.5	69
	Certified	0.6	2.0	3.2	2.0	100
XII	Foundation	1.7	5.4	3.2	2.7	50
	Registered	12.9	45.3	3.5	35.8	79
	Certified	12.0	28.6	2.4	14.0	49
	Other	2.3	2.6	1.2	0	0
Grand Total						
	Foundation	32.7	101.5	3.1	62.9	62
	Registered	138.0	350.7	2.5	242.0	69
	Certified	34.3	77.6	2.3	47.3	61
	Good	2.6	3.9	1.5	1.2	31
	Others	2.6	3.0	1.2	0.6	21

Table C.1.2 STATIONS' UPLAND RICE SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Certified	0.5	1.8	3.6	1.8	100
II	Foundation	1.0	2.3	2.3	0	0
	Registered	5.0	8.7	1.7	6.3	72
	Certified	0.8	1.4	1.8	0.9	64
	Other	0.8	0.4	0.5	0	0
III	Foundation	1.2	2.6	2.2	2.5	96
	Other	4.0	4.5	1.1	4.5	100
IV	Registered	3.7	7.9	2.1	5.7	72
V	Registered	2.3	6.8	3.0	4.9	72
	Certified	1.0	1.8	1.8	1.8	100
	Good	0.3	0.5	1.7	0.5	100
VI	Foundation	1.4	1.8	1.3	1.8	100
	Registered	4.0	2.0	0.5	2.0	100
	Certified	0.3	0.4	1.3	0	0
	Good	0.4	0.4	1.0	0	0
	Other	0.9	1.0	1.1	0	0
VII	NO REPORT					
VIII	Good	0.5	0.1	0.2	0	0
IX	Registered	0.4	1.5	3.8	1.4	93
	Good	0.3	0.2	0.7	0	0
X	Good	0.8	0.8	1.0	0	0
	Other	1.8	1.6	0.9	0	0
XI	NO REPORT					
XII	NO REPORT					
Grand Total						
	Foundation	3.6	6.7	1.9	4.3	64
	Registered	15.4	26.9	1.7	20.3	75
	Certified	2.6	5.4	2.1	4.5	83
	Good	2.0	1.8	0.9	0.5	27
	Others	7.5	7.5	1.0	4.5	60

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Certified	0.1	0.1	3.6	0.1	100
II	Foundation	0.2	0.5	2.3	0	0
	Registered	1.2	2.5	1.7	1.8	72
	Certified	0.3	0.5	1.8	0.3	64
	Other	0.3	0.2	0.5	0	0
III	Foundation	0.5	1.0	2.2	1.0	96
	Other	0.8	0.9	1.1	0.9	100
IV	Registered	1.1	2.4	2.1	1.7	72
V	Registered	0.5	1.4	3.0	1.0	72
	Certified	0.2	0.4	1.8	0.4	100
	Good	0.04	0.1	1.7	0.1	100
VI	Foundation	0.3	0.4	1.3	0.4	100
	Registered	0.8	0.4	0.5	0.4	100
	Certified	0.1	0.1	1.3	0	0
	Good	0.1	0.1	1.0	0	0
	Other	0.2	0.2	1.1	0	0
VII	NO REPORT					
VIII	Good	0.1	0.03	0.2	0	0
IX	Registered	0.2	0.6	3.8	0.6	93
	Good	0.1	0.04	0.7	0	0
X	Good	0.2	0.2	1.0	0	0
	Other	0.4	0.4	0.9	0	0
XI	NO REPORT					
XII	NO REPORT					
Grand Total						
	Foundation	1.0	1.9	1.9	1.2	64
	Registered	3.8	7.3	1.9	5.5	75
	Certified	0.7	1.1	1.6	0.9	83
	Good	0.4	0.4	1.0	0.1	27
	Others	1.7	1.7	1.0	1.0	60

Table C.1.3 STATIONS' YELLOW CORN SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	NO REPORT					
II	Foundation	5.0	9.8	2.0	8.4	85
	Registered	20.6	48.4	2.3	40.8	84
	Certified	2.3	5.1	2.2	4.6	90
	Other	4.0	10.9	2.7	0.4	3
III	NO REPORT					
IV	Foundation	5.6	6.7	1.2	2.0	29
	Registered	16.9	15.7	0.9	9.7	61
	Certified	6.8	4.3	0.6	2.4	55
	Good	1.5	0.5	0.3	0.5	100
	Other	0.6	0.2	0.3	0	0
V	Foundation	1.0	5.2	5.2	1.5	28
	Registered	8.9	14.4	1.6	11.3	78
	Certified	6.0	4.2	0.7	0.6	14
	Other	0.3	0.1	0.3	0	0
VI	Foundation	0.6	1.1	1.8	1.1	100
	Registered	7.0	9.3	1.3	4.6	49
	Certified	1.0	0.6	0.6	0.6	100
	Other	3.5	3.6	1.0	0.6	16
VII	Certified	1.0	1.8	1.8	0	0
VIII	Registered	3.3	4.9	1.5	2.5	51
	Certified	0.8	1.1	1.4	0.1	9
	Good	1.0	0.4	0.4	0	0
	Other	1.0	2.1	2.1	2.1	100
IX	Registered	1.8	0.9	0.5	0.4	44
	Certified	3.3	2.1	0.6	1.1	52
X	Registered	0.8	0.6	0.8	0.6	100
	Certified	2.5	3.0	1.2	0.7	23
	Good	2.5	6.2	2.5	0	0
XI	Registered	6.5	7.9	1.2	3.8	48
	Certified	4.4	8.2	1.9	1.5	18
XII	Registered	6.4	7.9	1.2	3.8	48
	Certified	5.8	8.0	1.4	8.0	100
Grand Total						
	Foundation	12.2	22.8	1.9	13.0	57
	Registered	72.2	110.0	1.5	77.5	70
	Certified	33.9	39.1	1.2	19.6	50
	Good	5.0	7.1	1.4	0.5	7
	Others	6.9	13.9	2.0	3.1	22

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	NO REPORT					
II	Foundation	2.8	7.6	2.0	6.5	85
	Registered	6.9	19.6	2.3	16.5	84
	Certified	0.9	1.1	2.2	1.0	90
	Other	0.8	2.2	2.7	0.1	3
I	NO REPORT					
IV	Foundation	2.8	2.6	1.2	0.8	29
	Registered	6.7	6.7	0.9	4.1	61
	Certified	1.9	1.2	0.6	0.7	55
	Good	0.3	1.1	0.3	1.1	100
	Other	0.2	0.7	0.3	0	0
V	Foundation	0.2	1.0	5.2	0.3	28
	Registered	5.4	8.6	1.6	6.7	78
	Certified	1.3	0.9	0.7	0.1	14
	Other	0.1	0.2	0.3	0	0
VI	Foundation	0.1	0.2	1.8	0.2	100
	Registered	4.2	5.6	1.3	2.7	49
	Certified	0.2	0.1	0.6	0.1	100
	Other	0.5	0.6	1.0	0.1	16
VII	Certified	0.2	0.4	1.8	0	0
VIII	Registered	1.6	2.5	1.5	1.3	51
	Certified	0.3	0.4	1.4	0.04	9
	Good	0.2	0.1	0.4	0	0
	Other	0.2	0.4	2.1	0.4	100
IX	Registered	1.4	0.7	0.5	0.3	44
	Certified	1.3	0.8	0.6	0.4	52
X	Registered	0.3	0.2	0.8	0.2	100
	Certified	1.0	1.2	1.2	0.3	23
	Good	0.5	1.2	2.5	0	0
XI	Registered	3.7	4.6	1.2	2.2	48
	Certified	1.8	3.9	1.9	0.7	18
XII	Registered	3.0	7.0	1.2	3.4	48
	Certified	3.5	4.8	1.4	4.8	100
Grand Total						
	Foundation	5.9	11.4	1.9	6.5	57
	Registered	33.2	55.5	1.7	38.9	70
	Certified	12.4	15.5	1.3	7.8	50
	Good	1.0	2.4	2.3	0.2	7
	Others	1.5	3.6	2.5	0.8	22

Table C.1.4 STATIONS' WHITE CORN SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
II	Foundation	0.8	2.0	2.5	1.8	90
	Registered	1.5	4.4	2.9	3.3	75
	Certified	2.0	6.0	3.0	6.0	100
IV	Foundation	0.02	0.04	2.0	0.04	100
	Other	0.5	0.6	1.2	0.6	100
V	Foundation	0.4	0.2	0.5	0.2	100
	Certified	0.5	0.4	0.8	0.4	100
VI	Foundation	2.5	1.4	0.6	1.4	100
	Certified	6.0	8.1	1.4	8.1	100
VII	Registered	1.3	2.0	1.5	2.0	100
	Certified	0.4	1.0	2.5	0.5	50
	Good	2.0	1.5	0.8	1.5	100
	Other	0.1	0.1	1.0	0	0
VIII	Registered	4.1	7.2	1.8	6.6	91
	Certified	2.2	2.2	1.0	1.1	50
	Good	1.0	0.8	0.8	0.3	37
	Other	1.0	0.9	0.9	0.9	100
IX	Registered	0.1	0.1	1.0	0.1	100
	Certified	1.0	1.1	1.1	0	0
X	Registered	2.0	3.9	2.0	0.8	20
	Certified	8.0	8.3	1.0	7.4	89
	Good	2.0	4.6	2.3	4.6	100
	Other	1.8	1.8	1.0	0.7	38
XI	Registered	2.0	2.7	1.4	2.2	81
	Certified	2.4	3.7	1.5	2.7	72
	Good	1.8	2.3	1.3	1.3	56
	Other	3.0	2.5	0.8	2.5	100
XII	Registered	6.8	4.9	0.7	4.9	100
	Certified	20.5	19.5	1.0	15.8	81
	Good	1.0	2.2	2.2	2.2	100
Grand Total						
	Foundation	3.7	3.6	1.0	3.4	94
	Registered	17.8	25.2	1.4	19.9	78
	Certified	43.0	50.3	1.2	46.5	92
	Good	7.8	11.4	1.5	9.9	86
	Others	6.4	5.9	0.9	4.7	79

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
II	Foundation	0.3	0.8	2.5	0.7	90
	Registered	0.6	1.8	2.9	1.4	75
	Certified	0.4	1.2	3.0	1.2	100
IV	Foundation	0.01	0.02	2.0	0.02	100
	Other	0.1	0.1	1.2	0.1	100
V	Foundation	0.1	0.1	0.5	0.1	100
	Certified	0.1	0.1	0.8	0.1	100
VI	Foundation	1.0	0.5	0.6	0.5	100
	Certified	1.2	1.6	1.4	1.6	100
VII	Registered	0.3	0.4	1.5	0.4	100
	Certified	0.1	0.2	2.5	0.2	100
	Good	0.2	0.2	0.8	0.2	100
	Other	0.02	0.01	1.0	0	0
VIII	Registered	2.1	4.2	1.8	3.8	91
	Certified	3.3	0.8	1.0	0.4	50
	Good	0.4	0.3	0.8	0.1	37
	Other	0.2	0.2	0.9	0.2	100
IX	Registered	0.02	0.02	1.0	0.02	100
	Certified	0.2	0.2	1.1	0	0
X	Registered	0.8	1.6	2.0	0.3	20
	Certified	1.6	1.7	1.0	1.5	89
	Good	0.4	0.9	2.3	0.9	100
	Other	0.6	0.5	1.0	0.2	38
XI	Registered	0.4	0.5	1.4	0.4	81
	Certified	1.4	2.3	1.5	1.7	72
	Good	0.7	0.9	1.3	0.5	56
	Other	1.2	1.0	0.8	1.0	100
XII	Registered	1.7	1.4	0.7	1.4	100
	Certified	8.2	7.8	1.0	6.3	81
	Good	0.2	0.4	2.2	0.4	100
Grand Total						
	Foundation	1.4	1.4	1.0	1.3	94
	Registered	5.9	9.9	1.7	7.7	78
	Certified	16.5	15.9	1.0	14.6	92
	Good	1.9	2.7	1.4	2.3	86
	Others	2.1	1.8	0.9	1.4	79

Table C.1.5 STATIONS' PEANUT SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Others	0.2	0.03	0.2	0.03	100
II	Foundation	0.4	0.1	0.2	0.1	100
	Registered	10.1	9.2	0.9	8.7	94
	Certified	2.9	4.5	1.6	3.7	82
	Other	0.1	0.1	1.0	0.1	100
IV	Foundation	2.4	0.7	0.3	0.3	42
	Good	0.8	0.4	0.5	0.4	100
	Others	0.6	0.3	0.5	0.1	30
V	Registered	1.2	0.3	0.3	0.3	100
	Certified	0.6	0.3	0.5	0.3	100
	Others	1.5	0.7	0.5	0.6	85
VI	Foundation	1.5	0.2	0.1	0	0
	Registered	2.1	0.9	0.4	0.9	100
	Certified	1.3	1.0	0.8	1.0	100
	Good	0.5	0.1	0.2	0.1	100
	Others	8.0	3.4	0.4	0	0
VII	Certified	1.2	1.1	0.9	1.1	100
VIII	Certified	1.9	1.6	0.8	0.7	43
	Good	2.0	0.3	0.2	0.3	100
	Others	7.8	4.0	0.5	1.0	25
IX	Registered	0.1	0.2	2.0	0.2	100
	Certified	1.0	0.2	0.2	0	0
	Others	1.0	0.2	0.2	0	0
X	Registered	1.3	0.2	0.2	0	0
	Certified	2.1	0.6	0.3	0.5	83
XII	Good	1.4	0.8	0.6	0.7	87
	Others	2.8	3.4	1.2	3.3	97
XI	Good	2.5	2.0	0.8	1.6	80
	Others	0.4	0.04	0.1	0.02	50
XII	Good	1.0	0.3	0.3	0.1	30
	Others	3.8	2.0	0.5	0.3	15
Grand Total						
	Foundation	4.3	1.0	0.2	0.4	39
	Registered	14.8	10.8	0.7	10.1	93
	Certified	11.0	9.3	0.8	7.3	78
	Good	8.2	3.9	0.5	3.2	81
	Others	26.2	14.2	0.5	5.4	38

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Others	0.1	0.02	0.2	0.03	100
II	Foundation	0.2	0.04	0.2	0.04	100
	Registered	6.1	5.5	0.9	5.2	94
	Certified	2.3	3.6	1.6	3.0	82
	Other	0.02	0.02	1.0	0.02	100
IV	Foundation	0.3	0.1	0.3	0.03	42
	Good	0.2	0.1	0.5	0.1	100
	Others	0.2	0.4	0.5	0.1	30
V	Registered	0.4	0.1	0.3	0.1	100
	Certified	0.1	0.1	0.5	0.1	100
	Others	0.4	0.1	0.5	0.1	85
VI	Foundation	0.3	0.0	0.1	0	0
	Registered	0.4	0.2	0.4	0.2	100
	Certified	0.2	0.2	0.8	0.2	100
	Good	0.1	0.02	0.2	0.0	100
	Others	1.6	0.7	0.4	0	0
VII	Certified	0.2	0.2	0.9	0.2	100
VIII	Certified	0.7	0.6	0.8	0.3	43
	Good	0.4	0.1	0.2	0.1	100
	Others	2.2	1.1	0.5	0.3	25
IX	Registered	0.02	0.03	2.0	0.03	100
	Certified	0.02	0.03	0.2	0	0
	Others	0.2	0.03	0.2	0	0
X	Registered	0.3	0.1	0.2	0	0
	Certified	0.8	0.2	0.3	0.2	83
	Good	0.3	0.1	0.6	0.1	87
	Others	0.7	0.8	1.2	0.7	97
XI	Good	0.5	0.4	0.8	0.3	80
	Others	0.2	0.02	0.1	0.02	50
XII	Good	0.4	0.1	0.3	0.03	30
	Others	0.3	0.2	0.5	0.03	15
Grand Total						
	Foundation	0.8	0.2	0.2	0.1	39
	Registered	7.2	5.9	0.8	5.5	93
	Certified	4.3	4.9	1.1	3.8	78
	Good	1.9	0.8	0.4	0.7	81
	Others	6.0	3.4	0.6	1.3	38

Table C.1.6 GROWERS' LOWLAND RICE SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	15.8	59.0	3.7	29.3	49
	Certified	107.4	683.7	6.4	280.3	40
	Good	22.1	90.7	4.1	68.4	75
	Others	4.0	8.5	2.1	8.5	100
II	Registered	32.2	146.2	4.5	85.1	58
	Certified	278.7	918.1	3.3	636.1	69
	Good	7.9	18.2	2.3	11.2	61
III	Registered	111.6	500.0	4.5	221.4	44
	Certified	1,016.2	3,556.2	3.4	1,153.7	32
	Good	64.5	115.9	1.8	4.5	3
IV	Registered	68.7	244.5	3.6	136.1	55
	Certified	196.8	710.1	3.6	478.9	67
	Good	23.9	48.7	2.0	45.1	92
V	Registered	81.9	278.0	3.4	85.5	30
	Certified	123.8	451.2	3.6	159.2	35
	Good	12.8	55.5	4.3	5.9	10
	Others	2.5	8.6	3.4	0	0
VI	Registered	73.0	295.3	4.0	131.9	45
	Certified	722.9	3,076.5	4.3	1,195.7	38
	Good	2.0	5.8	2.9	5.8	100
	Other	26.0	100.3	3.9	0	0
VII	Registered	24.7	70.4	2.9	28.6	40
	Certified	24.8	78.7	3.2	36.1	45
	Good	9.3	29.6	3.2	12.0	40
VIII	Registered	28.9	75.8	2.6	38.0	50
	Certified	285.4	370.8	1.3	187.0	50
	Good	10.5	39.0	3.7	7.0	17
	Others	1.0	2.3	2.3	0	0
IX	Registered	19.0	70.3	3.7	34.4	48
	Certified	148.2	562.8	3.8	185.5	32
	Good	8.0	38.3	4.8	11.3	29
	Others	2.0	6.8	3.4	4.5	66
X	Registered	13.9	43.2	3.1	27.0	62
	Certified	124.7	422.5	3.4	278.0	65
	Good	26.4	104.5	4.0	40.4	38
XI	Registered	33.8	74.9	2.2	50.8	67
	Certified	442.0	1,795.3	4.1	1,128.3	62
	Good	19.6	80.0	4.1	28.7	35
XII	Registered	10.7	42.6	4.0	21.6	50
	Certified	71.3	273.6	3.8	107.3	39
	Good	7.0	28.1	4.0	0	0
Grand Total						
	Registered	514.2	1,900.2	3.7	889.7	46
	Certified	3432.0	12,375.0	3.6	5,651.9	45
	Good	214.0	654.3	3.1	240.3	36
	Others	35.5	126.5	3.6	13.0	10

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	16.0	59.0	3.7	28.9	49
	Certified	107.0	683.7	6.4	273.5	40
	Good	18.0	72.5	4.1	54.4	75
	Other	1.0	1.7	2.1	1.7	100
II	Registered	32.0	146.2	4.5	84.8	58
	Certified	279.0	918.1	3.3	633.5	69
	Good	6.0	14.5	2.3	8.8	61
III	Registered	112.0	500.0	4.5	220.0	44
	Certified	1046.0	3,556.2	3.4	1,138.0	32
	Good	65.0	115.9	1.8	3.5	3
IV	Registered	69.0	244.5	3.6	134.5	55
	Certified	197.0	710.1	3.6	475.8	67
	Good	19.0	39.0	2.0	35.9	92
V	Registered	82.0	278.0	3.4	83.4	30
	Certified	124.0	451.2	3.6	157.9	35
	Good	10.0	4.4	4.3	0.4	10
	Other	1.0	1.7	3.4	0	0
VI	Registered	73.0	295.3	4.0	131.9	45
	Certified	723.0	3,076.5	4.3	1,169.1	38
	Good	0.4	1.2	2.9	1.2	100
	Other	5.0	22.1	3.9	0	0
VII	Registered	20.0	56.3	2.9	22.5	40
	Certified	20.0	62.9	3.2	28.3	45
	Good	6.0	17.8	3.2	7.1	40
VIII	Registered	23.0	60.6	2.6	30.3	50
	Certified	228.0	296.6	1.3	148.3	50
	Good	6.0	23.4	3.7	4.0	17
	Other	0.2	0.5	2.3	0	0
IX	Registered	19.0	70.3	3.7	33.7	48
	Certified	149.0	562.8	3.8	180.1	32
	Good	2.0	7.7	4.8	2.2	29
	Other	0.4	1.4	3.4	0.9	66
X	Registered	14.0	43.2	3.1	26.8	62
	Certified	100.0	338.0	3.4	219.7	65
	Good	16.0	62.7	4.0	23.8	38
XI	Registered	34.0	74.9	2.2	50.2	67
	Certified	442.0	1,795.3	4.1	1,113.1	62
	Good	15.0	64.0	4.1	22.4	35
XII	Registered	11.0	42.6	4.0	21.3	50
	Certified	71.0	275.6	3.8	107.5	39
	Good	3.0	11.2	4.0	0	0
Grand Total						
	Registered	505.0	1,870.9	3.7	860.6	46
	Certified	3,339.0	12,171.9	3.6	5,477.4	45
	Good	166.4	434.3	2.6	156.3	36
	Others	7.6	27.4	3.6	2.7	10

Table C.1.7 GROWERS' UPLAND RICE SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	1.0	4.5	4.5	4.5	100
II	Registered	1.0	2.9	2.9	2.4	82
	Certified	2.3	15.0	6.5	0.8	5
III	Registered	9.0	27.7	3.1	16.4	59
	Certified	3.5	15.6	4.5	10.2	65
IV	Registered	1.3	2.0	1.5	1.6	80
	Certified	6.0	2.7	0.5	2.7	100
	Good	0.2	0.1	0.5	0.1	100
V	Registered	0.9	3.3	3.7	0	0
	Certified	10.0	37.1	3.7	13.2	35
VI	Registered	2.9	15.8	5.4	6.8	43
	Certified	2.8	9.8	3.5	2.9	29
VII	Registered	1.0	4.1	4.1	0	0
VIII	Registered	1.0	3.6	3.6	2.3	63
IX	Registered	3.0	9.0	3.0	9.0	100
	Certified	8.0	38.7	4.8	15.3	39
XI	Certified	2.0	1.1	0.6	0	0
Grand Total						
	Registered	21.1	72.9	3.5	43.0	58
	Certified	34.6	120.0	3.5	45.1	37
	Good	0.2	0.1	0.5	0.1	100

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	0.2	0.9	4.5	0.9	100
II	Registered	0.4	1.2	2.9	1.0	82
	Certified	1.0	9.0	6.5	0.5	5
III	Registered	4.0	11.1	3.1	6.5	59
	Certified	1.0	3.1	4.5	2.0	65
IV	Registered	1.0	0.8	1.5	0.6	80
	Certified	1.0	0.5	0.5	0.5	100
	Good	0.04	0.03	0.5	0.03	100
V	Registered	0.4	1.3	3.7	0	0
	Certified	2.0	7.4	3.7	2.6	35
VI	Registered	1.0	3.2	5.4	1.4	43
	Certified	2.0	5.9	3.5	1.7	29
VII	Registered	0.2	0.8	4.1	0	0
VIII	Registered	0.2	0.7	3.6	0.4	63
IX	Registered	1.0	1.8	3.0	1.8	100
	Certified	2.0	7.7	4.8	3.0	39
XI	Certified	0.4	0.2	0.6	0	0
Grand Total						
	Registered	8.4	21.8	2.6	12.6	58
	Certified	9.4	33.8	3.6	12.5	37
	Good	0.04	0.03	0.8	0.03	100

Table C.1.8 GROWERS' YELLOW CORN SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	10.5	19.0	1.8	11.4	60
	Certified	3.0	1.5	0.5	0	0
II	Registered	7.5	20.3	2.7	17.3	85
	Certified	11.8	60.1	5.1	8.9	14
III	Registered	4.0	11.0	2.8	11.0	100
	Certified	1.0	12.0	12.0	0	0
IV	Registered	20.0	60.5	3.0	8.3	13
	Certified	18.8	28.3	1.5	7.4	26
	Good	7.6	12.7	1.7	12.4	97
V	Registered	10.2	20.8	2.0	4.3	20
	Certified	7.1	7.2	1.0	2.4	33
VI	Registered	17.1	80.5	4.7	73.0	90
	Certified	7.0	10.9	1.6	0	0
VII	Registered	20.0	43.6	2.2	21.0	48
	Certified	13.0	39.8	3.1	25.0	62
	Good	1.5	3.5	2.3	0	0
VIII	NO REPORT					
IX	Registered	4.7	23.0	4.9	8.2	35
	Certified	9.2	29.6	3.2	15.8	53
	Good	1.5	3.5	2.3	0	0
X	Certified	0.5	1.0	2.0	0	0
XI	Registered	10.1	19.1	1.9	9.5	49
	Certified	12.5	28.8	2.3	12.7	44
XII	Registered	3.0	12.5	4.2	10.0	80
Grand Total						
	Registered	107.1	310.3	2.9	174.0	56
	Certified	83.9	219.2	2.6	72.2	32
	Good	10.6	19.7	1.9	12.4	62

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	4.0	7.6	1.8	4.6	60
	Certified	1.0	0.3	0.5	0	0
II	Registered	2.0	4.1	2.7	3.5	85
	Certified	7.0	36.1	5.1	5.1	14
III	Registered	1.0	2.2	2.8	2.2	100
	Certified	0.2	2.4	12.0	0	0
IV	Registered	8.0	24.2	3.0	3.1	13
	Certified	8.0	11.3	1.5	2.9	26
	Good	5.0	7.6	1.7	7.4	97
V	Registered	6.0	12.5	2.0	2.5	20
	Certified	6.0	5.8	1.0	1.9	33
VI	Registered	7.0	32.2	4.7	29.0	90
	Certified	1.0	2.2	1.6	0	0
VII	Registered	4.0	8.7	2.2	4.2	48
	Certified	3.0	8.0	3.1	5.0	62
	Good	0.3	0.7	2.3	0	0
VIII	NO REPORT					
IX	Registered	3.0	13.8	4.9	4.8	35
	Certified	4.0	11.8	3.2	6.3	53
	Good	0.3	0.7	2.3	0	0
X	Certified	0.1	0.2	2.0	0	0
XI	Registered	4.0	7.6	1.9	3.7	49
	Certified	5.0	11.5	2.3	5.1	44
XII	Registered	1.0	2.5	4.2	2.0	80
Grand Total						
	Registered	40.0	115.4	2.9	64.6	56
	Certified	35.3	89.6	2.5	28.7	32
	Good	5.6	9.0	1.6	5.6	62

Table C.1.9 GROWERS' WHITE CORN SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	1.5	5.1	3.4	2.8	54
	Certified	15.5	38.3	2.5	24.6	64
	Good	2.5	0.4	0.2	0.4	100
II	Registered	2.0	4.0	2.0	4.0	100
	Certified	0.7	1.9	2.7	1.0	52
III	No Report					
IV	Registered	1.5	5.1	3.4	2.8	54
	Certified	15.5	38.3	2.5	24.6	64
	Good	1.8	0.9	0.5	0.9	100
V	No Report					
VI	Registered	7.8	30.0	0.4	6.3	21
VII	Registered	30.0	42.1	1.4	12.8	30
	Certified	5.3	4.1	0.8	3.7	90
VIII	Registered	1.0	0.7	0.7	0	0
IX	Registered	1.5	8.4	5.6	0.6	7
	Certified	9.0	44.5	4.9	32.6	73
	Good	7.3	0.6	0.1	0.3	50
X	No Report					
XI	Registered	4.1	7.4	1.8	6.1	82
	Certified	4.5	2.8	0.6	2.8	100
XII	Others	1.0	4.5	4.5	4.5	100
Grand Total						
	Registered	49.4	75.8	1.5	35.4	46
	Certified	50.5	129.9	2.6	89.3	68
	Good	11.6	1.9	0.2	1.6	84
	Others	1.0	4.5	4.5	4.5	100

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	Registered	0.3	1.0	3.4	0.5	54
	Certified	3.1	7.7	2.5	4.9	64
	Good	0.5	0.1	0.2	0.1	100
II	Registered	0.4	0.8	2.0	0.8	100
	Certified	0.1	0.4	2.7	0.2	52
III	NO REPORT					
IV	Registered	0.3	1.0	3.4	0.5	54
	Certified	3.1	7.7	2.5	4.9	64
	Good	0.7	0.4	0.5	0.4	100
V	No Report					
VI	Registered	4.7	18.0	0.4	3.8	21
VII	Registered	12.0	16.8	1.4	5.0	30
	Certified	3.2	2.5	0.8	2.3	90
VIII	Registered	0.2	0.01	0.7	0	0
IX	Registered	0.3	1.7	5.6	0.1	7
	Certified	1.8	8.9	4.9	6.5	73
	Good	1.5	0.1	0.1	0.1	50
X	No Report					
XI	Registered	1.7	3.0	1.8	2.5	82
	Certified	0.9	0.6	0.6	0.6	100
XII	Others	0.2	0.9	4.5	0.9	100
Grand Total						
	Registered	19.9	42.3	2.1	19.5	46
	Certified	12.2	27.8	2.3	18.9	68
	Good	2.7	0.6	0.2	0.5	84
	Others	0.2	0.9	4.5	0.9	100

Table C.1.10 GROWERS' PEANUT SEED PRODUCTION BY REGIONS

1. MAXIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	No Report					
II	Registered	0.8	0.7	0.9	0	0
	Certified	4.3	4.5	1.0	0	0
III	No Report					
IV	No Report					
V	No Report					
VI	No Report					
VII	No Report					
VIII	*Registered*	*2.5*	*0.005*	*0*	*0*	*0*
IX	No Report					
X	No Report					
XI	No Report					
XII	No Report					
Grand Total						
	Registered	3.3	0.7	0.2	0	0
	Certified	4.3	4.5	1.0	0	0

2. MINIMUM AVERAGE OF 1984 - 1988

Region	Kind of Seed	Harvested Area (ha)	Produced (t)	Yield (t/ha)	Approved Seed (t)	Approved Seed (%)
I	No Report					
II	Registered	0.2	0.1	0.9	0	0
	Certified	1.7	1.8	1.0	0	0
III	No Report					
IV	No Report					
V	No Report					
VI	No Report					
VII	No Report					
VIII	*Registered*	*0.5*	*0.001*	*0*	*0*	*0*
IX	No Report					
X	No Report					
XI	No Report					
XII	No Report					
Grand Total						
	Registered	0.7	0.1	0.1	0	0
	Certified	1.7	1.8	1.1	0	0

Table C.1.11 SUMMARY OF STATIONS' SEED PRODUCTION (1984-1988 Average)

Crop	Kind of Seed	Harvested Area (ha)		Produced (t)		Yield (t/ha)	Approved Seed (t)		
		Minimum	Maximum	Minimum	Maximum		Minimum	Maximum	(%)
Rice									
	Lowland Rice								
	Foundation	32.7	37.0	101.5	110.1	3.0-3.1	62.9	69.1	62
	Registered	138.0	150.5	350.7	386.0	2.5-2.6	242.0	267.1	69
	Certified	34.3	48.4	77.6	112.2	2.3	47.3	68.5	61
	Good	2.6	7.1	3.9	12.9	1.5-1.8	1.2	4.1	31
	Others	2.6	7.1	3.0	8.4	1.2	0.6	1.8	21
	Upland Rice								
	Foundation	1.0	3.6	1.9	6.7	1.9	1.2	4.3	64
	Registered	3.8	15.4	7.3	26.9	1.7-1.9	5.5	20.3	75
	Certified	0.7	2.6	1.1	5.4	1.6-2.1	0.9	4.5	83
	Good	0.4	2.0	0.9	1.8	0.9-1.0	0.1	0.5	27
	Others	1.7	7.5	1.0	7.5	1.0	1.0	4.5	60
	Total Rice								
	Foundation	33.7	40.6	103.4	116.8	3.0	64.1	73.4	62
	Registered	141.8	165.9	358.0	412.9	2.5	247.5	287.4	69
	Certified	35.0	51.0	78.7	117.6	2.3	48.2	73.0	62
	Good	3.0	9.1	4.8	14.7	1.6	1.3	4.6	30
	Others	4.3	14.6	4.0	15.9	1.1	1.6	6.3	40
Corn									
	Yellow Corn								
	Foundation	5.9	12.2	11.4	22.8	1.9	6.5	13.0	57
	Registered	33.2	72.2	55.5	110.0	1.5-1.7	38.9	77.5	70
	Certified	12.4	33.9	15.5	39.1	1.2-1.3	7.8	19.6	50
	Good	1.0	5.0	2.4	7.1	1.4-2.3	0.2	0.5	7
	Others	1.5	6.9	3.6	13.9	2.0-2.5	0.8	3.1	22
	White Corn								
	Foundation	1.4	3.7	1.4	3.6	1.0	1.3	3.4	94
	Registered	5.9	17.8	9.9	25.2	1.4-1.7	7.7	19.9	78
	Certified	16.5	43.0	15.9	50.3	1.0-1.2	14.6	46.5	92
	Good	1.9	7.8	2.7	11.4	1.4-1.5	2.3	9.9	86
	Others	2.1	6.4	1.8	5.9	0.9	1.4	4.7	79
	Corn Total								
	Foundation	7.3	15.9	12.8	26.4	1.3	7.8	16.4	62
	Registered	39.1	90.0	65.4	135.2	1.1	46.6	97.4	72
	Certified	28.9	76.9	31.4	89.4	0.9	22.4	66.1	72
	Good	2.9	12.8	5.1	18.5	1.4	2.5	10.4	53
	Others	3.6	13.3	5.4	19.8	1.3	2.2	7.8	40
Peanut									
	Foundation	0.8	4.3	0.2	1.0	0.2	0.1	0.4	45
	Registered	7.2	14.8	5.9	10.8	0.7-0.8	5.5	10.1	93
	Certified	4.3	11.0	4.9	9.3	0.8-1.1	3.8	7.3	78
	Good	1.9	8.2	0.8	3.9	0.4-0.5	0.7	3.2	85
	Others	6.0	26.2	3.4	14.2	0.5-0.6	1.3	5.4	38

Source : BPI Annual Report

Table C.1.12 TREND OF STATIONS' SEED PRODUCTION (1984-1988)

Seed Class/ Region/ Item	Year				
	1984	1984	1986	1987	1988
Lowland Rice					
Foundation Seed					
Harvested Area (ha)	45.3	45.3	32.3	21.7	23.4
Production (t)	149.1	149.1	94.7	65.8	60.6
Yield (t/ha)	3.3	3.3	2.9	3.0	2.6
Registered Seed					
Harvested Area (ha)	169.3	169.3	135.9	127.1	136.2
Production (t)	490.0	490.0	302.5	323.5	356.7
Yield (t/ha)	2.9	2.9	2.2	2.5	2.6
Upland Rice					
Foundation Seed					
Harvested Area (ha)	0.4	0.4	0	0	0
Production (t)	0.4	0.4	0	0	0
Yield (t/ha)	1.0	1.0	0	0	0
Registered Seed					
Harvested Area (ha)	9.5	9.5	4.4	1.6	0
Production (t)	12.9	12.9	11.4	3.3	0
Yield (t/ha)	1.4	1.4	0	2.1	0
Yellow Corn					
Foundation Seed					
Harvested Area (ha)	22	22	0	48.72	23.65
Production (t)	33.5	33.5	0	206.3	39.3
Yield (t/ha)	1.5	1.5	0	4.2	1.7
Registered Seed					
Harvested Area (ha)	8.2	8.2	5.1	1.5	2.1
Production (t)	13.2	13.2	2.6	1.3	2.4
Yield (t/ha)	1.6	1.6	0.5	0.9	1.1
White Corn					
Foundation Seed					
Harvested Area (ha)	0.02	0.02	0	2	0.03
Production (t)	0.04	0.04	0	2.2	0.04
Yield (t/ha)	2.0	2.0	0	1.1	1.3
Registered Seed					
Harvested Area (ha)	10.0	10.0	3.8	0.6	6.0
Production (t)	13.3	13.3	4.4	0.8	10.4
Yield (t/ha)	1.3	1.3	1.2	1.3	1.7
Peanut					
Foundation Seed					
Harvested Area (ha)	1.90	1.90	1.24	3.03	.50
Production (t)	0.70	0.70	0.41	0.88	0.15
Yield (t/ha)	0.4	0.4	0.3	0.3	0.3
Registered Seed					
Harvested Area (ha)	9.35	9.35	10.10	1.45	3.60
Production (t)	13.05	13.05	2.68	1.28	1.92
Yield (t/ha)	1.4	1.4	0.3	0.9	0.5

Table C.1.13 SUMMARY OF GROWERS' SEED PRODUCTION (1984-1988 Average)

Crop	Kind of Seed	Harvested Area (ha)		Produced (t)		Yield (t/ha)	Approved Seed (t)		
		Minimum	Maximum	Minimum	Maximum		Minimum	Maximum	(%)
Rice									
	Lowland Rice								
	Registered	505.0	514.0	1,870.9	1,900.2	3.7	860.6	889.7	46
	Certified	3,339.0	3,432.0	12,171.9	12,375.0	3.6	5,477.4	5,651.9	45
	Good	166.4	214.0	434.3	654.3	2.6-3.1	156.3	240.3	36
	Others	7.6	35.5	27.4	126.5	3.6	2.7	13.0	10
	Upland Rice								
	Registered	8.4	21.1	21.8	72.9	2.6-3.5	12.6	43.0	58
	Certified	9.4	34.6	33.8	120	3.5-3.6	12.5	45.1	37
	Good	0.04	0.2	0.03	0.1	0.5-0.8	0.03	0.1	100
	Total Rice								
	Registered	513.4	535.1	1,892.7	1,973.1	3.7	873.2	932.7	47
	Certified	3,348.4	3,466.6	12,205.7	12,495.0	3.6	5,489.9	5,697.0	45
	Good	166.4	214.2	434.3	654.4	2.9	156.3	240.4	36
	Others	166.4	214.2	434.3	654.4	2.9	156.3	240.4	36
Corn									
	Yellow Corn								
	Registered	40.0	107.1	115.4	310.3	2.9	64.6	174.0	56
	Certified	35.3	83.9	89.6	219.2	2.5-2.6	28.7	72.2	32
	Good	7.6	10.6	9.0	19.7	1.6-1.9	5.6	12.4	62
	White Corn								
	Registered	19.9	49.4	42.3	75.8	1.5-2.1	19.5	35.4	46
	Certified	12.2	50.5	27.8	129.9	2.3-2.6	18.9	89.3	68
	Good	2.7	11.6	0.6	1.9	0.2	0.5	1.6	84
	Others	0.2	1.0	0.9	4.5	4.5	0.9	4.5	100
	Corn Total								
	Registered	59.9	156.5	157.7	386.1	2.5	84.1	209.4	54
	Certified	47.5	134.4	117.4	349.1	2.6	47.6	161.5	45
	Good	10.3	22.2	9.6	21.6	1.0	6.1	14.0	64
	Others	0.2	1.0	0.9	4.5	4.5	0.9	4.5	100
Peanut									
	Registered	0.7	3.3	0.1	0.7	0.1	0	0	0
	Certified	1.7	4.3	1.8	4.5	1.1	0	0	0

Source : BPI Annual Report

Table C.1.14 TREND OF GROWERS' SEED PRODUCTION (1984-1988)

Seed Class/ Region/ Item	Year				
	1984	1985	1986	1987	1988
Lowland Rice					
Registered Seed					
Harvested Area (ha)	412.3	482.3	721.8	482.6	419.1
Produced (t)	1,634.5	1,790.1	2,676.0	1,960.6	1,293.8
Yield (t/ha)	4.0	3.7	3.7	4.1	3.1
Certified Seed					
Harvested Area (ha)	2,629.0	3,106.1	4,296.2	3,270.8	4,125.6
Produced (t)	11,288.8	13,375.7	18,265.6	6,865.5	11,736.6
Yield (t/ha)	4.3	4.3	4.3	2.1	2.8
Upland Rice					
Registered Seed					
Harvested Area (ha)	4.0	11.5	0	15.9	1.8
Produced (t)	10.6	27.9	0	63.2	7.0
Yield (t/ha)	2.7	2.4	0	4.0	4.0
Certified Seed					
Harvested Area (ha)	7.0	3.0	0	31.0	4.0
Produced (t)	4.5	8.1	0	131.2	25.7
Yield (t/ha)	0.6	2.7	0	4.2	6.4
Yellow Corn					
Registered Seed					
Harvested Area (ha)	22	100.43	0	48.72	23.65
Produced (t)	33.5	297.7	0	206.3	39.3
Yield (t/ha)	1.5	3.0	0	4.2	1.7
Certified Seed					
Harvested Area (ha)	32.1	72.3	0	34.3	37.5
Produced (t)	38.5	165.9	0	65.1	182.2
Yield (t/ha)	1.2	2.3	0	1.9	4.9
White Corn					
Registered Seed					
Harvested Area (ha)	3.0	23.0	0	67.3	9.0
Produced (t)	10.2	53.0	0	127.5	55.6
Yield (t/ha)	3.4	2.3	0	1.9	6.2
Certified Seed					
Harvested Area (ha)	31.0	20.5	0	2.7	7
Produced (t)	76.6	51.4	0	6.6	3.7
Yield (t/ha)	2.5	2.5	0	2.4	0.5
Peanut					
Registered Seed					
Harvested Area (ha)	0	0	0	1	0
Produced (t)	0	0	0	0.7	0
Yield (t/ha)	0	0	0	0.7	0
Certified Seed					
Harvested Area (ha)	0	10	0	2	0
Produced (t)	0	4.9	0	4.0	0
Yield (t/ha)	0	0.5	0	2.0	0

Table C.1.15 PERCENTAGE OF APPROVED SEED AND NET SEED YIELD (1984-1988 Average)

Seed Class	Station		Seed Grower	
	Approved Seed (%)	Net Seed Yield (kg/ha) /1	Approved Seed (%)	Net Seed Yield (kg/ha) /1
Lowland Rice				
Foundation	62	1.9	-	-
Registered	69	1.8	46	1.6
Certified	61	1.4	45	1.6
Upland Rice				
Foundation	64	1.3	-	-
Registered	75	1.3	58	2.0
Certified	83	1.7	37	1.3
Yellow Corn				
Foundation	57	1.1	-	-
Registered	70	1.1	56	1.6
Certified	50	0.6	32	0.9
White Corn				
Foundation	94	0.9	-	-
Registered	78	1.1	46	0.7
Certified	92	1.1	68	1.8
Peanut				
Foundation	39	0.1	-	-
Registered	93	0.7	0	0.0
Certified	78	0.7	0	0.0

Note: /_1: Maximum average yield

Table C.1.16 SEED PRODUCTION AND BPI SEED PRODUCTION TARGET (1984-1988 Average)

Item	Foundation Seed		Registered Seed		Certified Seed	
	Harvested Area (ha)	Production Approved (t)	Harvested Area (ha)	Production Approved (t)	Harvested Area (ha)	Production Approved (t)
Rice Seed /_1						
Station/Seed Farm	32-37	63-69	138-151	242-267	34-48	47-69
Seed Grower	-	-	505-514	861-890	3,339-3,432	5,477-5,652
Total	32-37	63-69	643-665	1,103-1,157	3,373-3,480	5,524-5,721
BPI Target 1989	10	32	700	2,520	7,312	26,324
		(Station	478	1,721)		
		(Seed Grower	222	799)		
Corn Seed						
Station/Seed Farm						
Yellow corn	6-12	6-13	33-72	39-78	12-34	8-20
White corn	1- 4	1- 3	6-18	8-20	17-43	15-47
(Sub total)	(7-16)	(7-16)	(39-90)	(47-98)	(29-77)	(23-67)
Seed Grower						
Yellow corn	-	-	40-107	65-174	35-84	29-72
White corn	-	-	20-49	20- 35	12-51	19-89
(Sub total)	(-)	(-)	(60-156)	(85-209)	(47-135)	(48-161)
Total	(7-16)	(7-16)	99-246	132-307	76-212	71-228
BPI Target 1989	5	15	77	229	2,621	7,862
		(Station	25	73) (O.P	124	371)
		(Seed Grower	52	156) (Hyb.	2497	7,491)
Peanut Seed						
Station/Seed Farm	1- 4	0.1-0.4	7- 15	6- 10	4- 11	4- 7
Seed Grower	-	-	0.7-3.3	0	1.7-4.3	0
Total	1- 4	0.1-0.4	7.7-18.3	6- 10	5.7-15.3	4- 7
BPI Target 1989	10	10	260	260	2,600	2,600

Note : /_1 ; Lowland rice seed
Source : BPI Annual Report, 1984-1988

Table C.1.17 PLANTING METHOD OF LOWLAND RICE SEED

Seed Preparation	Soaking 24 hours in clean water Incubation 36-48 hours in warm shady place	Transplanting	Wet, dry seed bed 20-25 days after sowing Dapog seed bed 12-18 days after sowing 20 x 20 cm. 25 x 15 cm, 1 seedling/hill.
Seedbed Preparation (30-35 days before planting)	Plow and harrow the field 2-3 times constract raised 4-5 cm. above the original level. 1-1.5 m x 400-267 m; 400 sq.m./ha. of field. Fertilizer 4 kg (14-14-11) or Am. phos. (16-20-0)/100 sq.m.	Crop management	Water management Start 2 cm., gradually increase up to 5 cm. Replanting Within 10 days after transplanting Weed control 3-6 days after transplanting. Pre-emergence herbicide About 25 days after transplanting Hand weeding or post-emergence herbicide Protection 3 and 5 days after transplanting Insecticide spray (granular carbofuran or diazinon) every other day Note the presence of insect pests. If insects are prevalent apply insecticide. Nitrogen topdressing Urea 1 bag about 5 days before panicle initiation stage early varities - about 45 days from sowing later varities - 55-60 days Roguing or removal Off-typs and other varities. Weeding
Sowing Land Preparation	Seed : 45 kg/400 sq. m. (wet bed, dry bed) 60 kg/400 sq. m. (dapog bed) Plowing or rotovating		
	3 weeks before transplanting Harrowing 1st within 3-5 days after plowing 2nd 5-7 days after the first harrowing Basal Fertilizer for N Zn deficient soil Am. Sulf (21-0-0) 1 bag (50 kg.) Urea (46-0-0) 1 bag (2 bags for dry season) Zn SO4 5 kg. for N P.Zn. deficient Soil Am. Phos. (16-20-0) 1 bag A.S. 1 bag Urea (1 bag for dry season) ZnSO4 5 kg. for N.P.K. Zn deficient soil A.P. 3 bags A.S. 1 bag Urea (1 bag for dry season) 0-0-60 1 bag ZnSO4 5 kg.		
		Harvesting	80% panicles are straw colored Border area (1 m.) of adjacent field of different varieties should not be harvested.
		Threshing	Avoid mixing one variety to the other.
		Drying	Dry to 12-14% moisture

Table C.1.18 PLANTING METHOD OF UPLAND RICE SEED

Land Preparation (As soon as enough rain has fallen)	Plowing, harrowing Furrows 30 cm. apart	Crop management	Weed control Hand Weeding 3-5 days after planting, Machete 2 kg. a.i/ha. 20-25 days after planting. Agroxone 2 kg. a.i./ha Pest and disease control Systemic insecticides foliage or granular application Roguing
Planting	Seed 100 kg/ha. (2 g/linea m or 4-5 seeds/hill)		
Fertilization	Basal fertilizer (planting time) 80-30-30 kg N P2 O5 k20/ha. Side dressing 40 days after emergence 30 kg. N./ha. 55 days after emergence 20 kg. N/ha.	Harvesting and Processing	Harvest when 80 % of the panicles show yellowing or hardening the grains. Thresh and winnow. Sundry 2-3 times to 12-13 % moisture

Table C.1.19 PLANTING METHOD OF CORN SEED

Land Preparation (18-20 days before planting)	The field separate more than 200 m from other kind and varieties of corn Plowing 1-2 times Harrowing 2-3 times
Planting	Seed 15-20 kg/ha. 50,000 - 60,000 plants/ha. 75 x 50 cm. 2-3 plants/hill or 75 x 25 cm. 1 plant/hill
Fertilization	Basal Fertilizer Triple 14 4 bags/ha (about 28 kg each N.P2 05 K20/ha) or Triple 14 6 bags/hr (about 46 kg each N.P2 05 K20/ha)
Crop management	Weed control 1st Just after planting Pre-emergence herbicides spray (Atrazin 3 kg. a.i./ha.) or pendimenthalin 1 kg a.i./ha.) 2nd 12 days after planting Shallow cultivation 3rd 20 days after planting Cultivation or spray 2.4 doamin or MCPA 1 l/ha. Side dressing of fertilizer (25 days after planting) Ammonium Sulfate 4-5 bags/ha. or Urea 2-3 bags/ha. Application of insecticides 1st Within 10 days from planting spoons/5 gallons water 2nd 30-35 days after planting Carbofuran (Furadan 3 G) 16.7 kg/ha Endosulfan or Methomyl 1 l/ha or 3-4 table spoons/5 gallons water. 3rd 45-55 days after planting (silking stage) If infestation of insects continue Endosulfan or Methomyl 1 l/ha. Roguing
Harvesting and drying (100-105 days after planting)	Hand picking or mechanical harvester. Sun drying 3-4 days or heated forced air drying to about 15% moisture 40 days after emergence 30 kg. N./ha. 55 days after emergence 20 kg. N/ha.

Table C.1.20 PLANTING METHOD OF PEANUT SEED

Land Preparation	Plowing and harrowing 2-3 times
Planting	Seed treatment for prevent rotting Arasan SF 3g or Captan 5g/gant (about 3 kg) Inoculation (if necessary) Seed treatment showed not be done when the seed are to be inoculated 100 kg. (unshell) 65 kg (shelled seed) Seed 102-107 kg/ha medium and large seeded varieties 50-55 kg/ha small seeded varieties 60-70 x 7.5-10 cm drill (dry season) 70-80 x 7.5-10 cm drill (wet season)
Fertilization	Liming (before planting) On soils below pH 5.8 or low Ca Basal fertilizer Complete fertilizer (14-14-14) 4 bags Top dressing Early bloom stage. CaSO4 320 kg/ha 3 weeks after 1st top dressing 320 kg/ha.
Crop management	Cultivation Until 5 weeks after plating Weed control Cultivation and hand weeding or use selective pre-emergency herbicides Application granular insecticides during vegetative period. Spray fungicides for respective diseases. Roguing
Harvesting	Time when leaves begin to turn yellow Early maturing varieties or bunch types 104-110 days from planting Later maturing varieties or runner types 120-140 days after planting Hand pulling. Sometimes animal drawn plowing both side of furrow before hand pulling Pods are picked from the plants after drying 2-3 weeks in the field or just after pulling.
Drying	Sun dry 3-5 days or using dryers to 12% moisture.

Table C.3.1 BASIC PRODUCTION PLAN FOR LOWLAND RICE SEED

Item	Unit	Philippines		CAR		I		II		III		IV		V	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(1000ha)	1,330	1,913	27	43	51	247	189	155	158	323	144	217	140	164
B. Total seed requirement (45kg/ha)	(ton)	59,850	86,085	1,215	1,935	2,295	11,115	8,505	6,975	7,110	14,535	6,480	9,765	6,300	7,380
C. CS for next season (renewal rate of 17%)	(ton)	14,634	10,175	329	207	1,890	390	1,186	1,446	2,471	1,209	1,660	1,102	1,255	1,071
D. Buffer stock for next season (10%of C)	(ton)	2,195	1,526	49	31	284	59	178	217	371	181	249	165	188	161
E. Field area for CS production (yield 3.6 t/ha)	(ha)	4,065	2,826	91	58	525	108	329	402	686	336	461	306	349	298
F. RS for next season (45kg/ha)	(ton)	127	183	3	4	5	24	18	15	15	31	14	21	13	16
G. Buffer stock of RS (20%of F)	(ton)	25	37	1	1	1	5	4	3	3	6	3	4	3	3
H. Field area for RS production (yield 3.6 t/ha)	(ha)	35	51	1	1	1	7	5	4	4	9	4	6	4	4
I. FS for next season (45kg/ha)	(kg)	2,295	1,575	45	45	315	45	180	225	405	180	270	180	180	180
J. Buffer stock of FS (100%of I)	(kg)	2,295	1,575	45	45	315	45	180	225	405	180	270	180	180	180
K. Field area for FS production (yield 3.15 t/ha	(sq.m)	7,300	5,000	100	100	1,000	100	600	700	1,300	600	900	600	600	600
L. BS for next season (45kg/ha)	(kg)	23	33	0.45	0.45	0.45	4.50	3.15	2.70	2.70	5.85	2.70	4.05	2.70	2.70

Item	Unit	VI		VII		VIII		IX		X		XI		XII	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(1000ha)	186	257	47	54	118	89	42	78	55	55	100	88	75	152
B. Total seed requirement (45kg/ha)	(ton)	8,370	11,565	2,115	2,430	5,310	4,005	1,890	3,510	2,475	2,475	4,500	3,960	3,375	6,840
C. CS for next season (renewal rate of 17%)	(ton)	1,966	1,423	413	360	681	903	597	321	421	421	673	765	1,163	574
D. Buffer stock for next season (10%of C)	(ton)	295	213	62	54	102	135	90	48	63	63	101	115	174	86
E. Field area for CS production (yield 3.6 t/ha)	(ha)	546	395	115	100	189	251	166	89	117	117	187	213	323	159
F. RS for next season (45kg/ha)	(ton)	18	25	5	5	11	9	4	7	5	5	10	8	7	15
G. Buffer stock of RS (20%of F)	(ton)	4	5	1	1	2	2	1	1	1	1	2	2	1	3
H. Field area for RS production (yield 3.6 t/ha)	(ha)	5	7	1	1	3	3	1	2	1	1	3	2	2	4
I. FS for next season (45kg/ha)	(kg)	315	225	45	45	135	135	90	45	45	45	90	135	180	90
J. Buffer stock of FS (100%of I)	(kg)	315	225	45	45	135	135	90	45	45	45	90	135	180	90
K. Field area for FS production (yield 3.15 t/ha	(sq.m)	1,000	700	100	100	400	400	300	100	100	100	300	400	600	300
L. BS for next season (45kg/ha)	(kg)	3.15	4.50	0.45	0.45	1.80	1.80	0.45	1.35	0.45	0.45	1.80	1.35	1.35	2.70

Table C.3.2 BASIC PRODUCTION PLAN FOR UPLAND RICE SEED

Item	Unit	Philippines		CAR		I		II		III		IV		V	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(1000ha)	0	127.7	0	1.5	0	2.0	0	2.5	0	0.4	0	29.1	0	11.5
B. Total seed requirement (45kg/ha)	(ton)	0	5,747	0	68	0	90	0	113	0	18	0	1,310	0	518
C. CS for next season (renewal rate of 17%)	(ton)	977	0	11.48	0	15.30	0	19.13	0	3.06	0	222.62	0	87.98	0
D. Buffer stock for next season (10%of C)	(ton)	147	0	1.72	0	2.30	0	2.87	0	0.46	0	33.39	0	13.20	0
E. Field area for CS production (yield 3.6 t/ha)	(ha)	271	0	3.19	0	4.25	0	5.31	0	0.85	0	61.84	0	24.44	0
F. RS for next season (45kg/ha)	(ton)	0	12	0	0.14	0	0.19	0	0.24	0	0.04	0	2.78	0	1.10
G. Buffer stock of RS (20%of F)	(ton)	0	2	0	0.03	0	0.04	0	0.05	0	0.01	0	0.56	0	0.22
H. Field area for RS production (yield 3.6 t/ha)	(ha)	0	3	0	0.04	0	0.05	0	0.07	0	0.01	0	0.77	0	0.31
I. FS for next season (45kg/ha)	(kg)	135	0	1.79	0	2.39	0	2.99	0	0.48	0	34.78	0	13.75	0
J. Buffer stock of FS (100%of I)	(kg)	135	0	1.79	0	2.39	0	2.99	0	0.48	0	34.78	0	13.75	0
K. Field area for FS production (yield 3.15 t/ha	(sq.m)	400	0	5.69	0	7.59	0	9.49	0	1.52	0	110.42	0	43.64	0
L. BS for next season (45kg/ha)	(kg)	0	2	0	0.03	0	0.03	0	0.04	0	0.01	0	0.50	0	0.20

Item	Unit	VI		VII		VIII		IX		X		XI		XII	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(1000ha)	0	12.40	0	0.80	0	4.40	0	19.00	0	11.50	0	5.90	0	26.70
B. Total seed requirement (45kg/ha)	(ton)	0	558	0	36	0	198	0	855	0	518	0	266	0	1,202
C. CS for next season (renewal rate of 17%)	(ton)	94.86	0	6.12	0	33.66	0	145.35	0	87.98	0	45.14	0	201.26	0
D. Buffer stock for next season (10%of C)	(ton)	14.23	0	0.92	0	5.05	0	21.80	0	13.20	0	6.77	0	30.64	0
E. Field area for CS production (yield 3.6 t/ha)	(ha)	26.35	0	1.70	0	9.35	0	40.38	0	24.44	0	12.54	0	56.74	0
F. RS for next season (45kg/ha)	(ton)	0	1.19	0	0.08	0	0.42	0	1.82	0	1.10	0	0.56	0	2.55
G. Buffer stock of RS (20%of F)	(ton)	0	0.24	0	0.02	0	0.08	0	0.36	0	0.22	0	0.11	0	0.51
H. Field area for RS production (yield 3.6 t/ha)	(ha)	0	0.33	0	0.02	0	0.12	0	0.50	0	0.31	0	0.16	0	0.71
I. FS for next season (45kg/ha)	(kg)	14.82	0	0.96	0	5.26	0	22.71	0	13.75	0	7.05	0	31.91	0
J. Buffer stock of FS (100%of I)	(kg)	14.82	0	0.96	0	5.26	0	22.71	0	13.75	0	7.05	0	31.91	0
K. Field area for FS production (yield 3.15 t/ha	(sq.m)	47.05	0	3.04	0	16.70	0	72.10	0	43.64	0	22.39	0	101.32	0
L. BS for next season (45kg/ha)	(kg)	0	0.21	0	0.01	0	0.08	0	0.32	0	0.20	0	0.10	0	0.46

Table C.3.3 BASIC PRODUCTION PLAN FOR CORN SEED

Item	Unit	Philippines		CAR		I		II		III		IV		V	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(1000ha)	1,195	2,479	8	13	52	20	202	133	6	5	181	70	63	125
B. Total seed requirement (20kg/ha)	(ton)	23,902	49,584	156	260	1,036	390	4,042	2,660	126	92	3,628	1,400	1,254	2,492
C. CS for next season (renewal rate of 11%)	(ton)	5,454	2,629	29	17	43	114	293	445	10	14	154	399	274	138
D. Buffer stock for next season (10%of C)	(ton)	545	263	3	2	4	11	29	44	1	1	15	40	27	14
E. Field area for CS production (yield 3.0 t/ha)	(ha)	1,818	876	10	6	14	38	98	148	3	5	51	133	91	46
F. RS for next season (20kg/ha)	(ton)	18	36	0.11	0.19	0.76	0.29	2.96	1.95	0.09	0.07	2.66	1.03	0.92	1.83
G. Buffer stock of RS (20%of F)	(ton)	3.5	7.3	0.02	0.04	0.15	0.06	0.59	0.39	0.02	0.01	0.53	0.21	0.18	0.37
H. Field area for RS production (yield 3.0 t/ha)	(ha)	5.84	12.12	0.04	0.06	0.25	0.10	0.99	0.65	0.03	0.02	0.89	0.34	0.31	0.61
I. FS for next season (20kg/ha)	(kg)	242	117	1.27	0.76	1.91	5.06	13.00	19.76	0.45	0.62	6.84	17.74	12.18	6.13
J. Buffer stock of FS (100%of I)	(kg)	242	117	1.27	0.76	1.91	5.06	13.00	19.76	0.45	0.62	6.84	17.74	12.18	6.13
K. Field area for FS production (yield 2.5 t/ha)	(sq.m)	970	467	5.08	3.05	7.63	20.26	52.02	79.04	1.80	2.46	27.38	70.95	48.73	24.52
L. BS for next season (20kg/ha)	(kg)	0.93	1.94	0.01	0.01	0.04	0.02	0.16	0.10	0.00	0.00	0.14	0.05	0.05	0.10

Item	Unit	VI		VII		VIII		IX		X		XI		XII	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(1000ha)	37	74	56	479	40	184	87	210	91	177	171	601	159	389
B. Total seed requirement (20kg/ha)	(ton)	734	1,488	1,120	9,580	800	3,686	1,734	4,190	1,822	3,548	3,412	12,012	3,172	7,784
C. CS for next season (renewal rate of 11%)	(ton)	164	81	1,054	123	405	88	461	191	390	200	1,321	375	856	349
D. Buffer stock for next season (10%of C)	(ton)	16	8	105	12	41	9	46	19	39	20	132	38	86	35
E. Field area for CS production (yield 3.0 t/ha)	(ha)	55	27	351	41	135	29	154	64	130	67	440	125	285	116
F. RS for next season (20kg/ha)	(ton)	0.54	1.09	0.82	7.03	0.59	2.70	1.27	3.07	1.34	2.60	2.50	8.81	2.33	5.71
G. Buffer stock of RS (20%of F)	(ton)	0.11	0.22	0.16	1.41	0.12	0.54	0.25	0.61	0.27	0.52	0.50	1.76	0.47	1.14
H. Field area for RS production (yield 3.0 t/ha)	(ha)	0.18	0.36	0.27	2.34	0.20	0.90	0.42	1.02	0.45	0.87	0.83	2.94	0.78	1.90
I. FS for next season (20kg/ha)	(kg)	7.27	3.59	46.84	5.48	18.02	3.91	20.48	8.48	17.35	8.91	58.73	16.68	38.06	15.51
J. Buffer stock of FS (100%of I)	(kg)	7.27	3.59	46.84	5.48	18.02	3.91	20.48	8.48	17.35	8.91	58.73	16.68	38.06	15.51
K. Field area for FS production (yield 2.5 t/ha)	(sq.m)	29.10	14.35	187.34	21.90	72.08	15.64	81.94	33.91	69.38	35.63	234.90	66.72	152.22	62.03
L. BS for next season (20kg/ha)	(kg)	0.03	0.06	0.04	0.37	0.03	0.14	0.07	0.16	0.07	0.14	0.13	0.47	0.12	0.30

Table C.3..4 BASIC PRODUCTION PLAN FOR PEANUT SEED

Item	Unit	Philippines		CAR		I		II		III		IV		V	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(ha)	38,000	15,000	130	190	5,480	750	22,110	4,620	1,320	230	1,640	1,450	740	520
B. Total seed requirement (100kg/ha)	(ton)	3,800	1,500	13	19	548	75	2211	462	132	23	164	145	74	52
C. CS for next season (renewal rate of 10%)	(ton)	150	380	1.9	1.3	7.5	54.8	46.2	221.1	2.3	13.2	14.5	16.4	5.2	7.4
D. Buffer stock for next season (10%of C)	(ton)	15	38	0.19	0.13	0.75	5.48	4.62	22.11	0.23	1.32	1.45	1.64	0.52	0.74
E. Field area for CS production (yield 1.0 t/ha)	(ha)	15	38	0.19	0.13	0.75	5.48	4.62	22.11	0.23	1.32	1.45	1.64	0.52	0.74
F. RS for next season (100kg/ha)	(kg)	3,800	1,500	13	19	548	75	2211	462	132	23	164	145	74	52
G. Buffer stock of RS (20%of F)	(kg)	760	300	2.60	3.80	109.60	15.00	442.20	92.40	26.40	4.60	32.80	29.00	14.80	10.40
H. Field area for RS production (yield 1.0 t/ha)	(ha)	3.8	1.5	0.01	0.02	0.55	0.08	2.21	0.46	0.13	0.02	0.16	0.15	0.07	0.05
I. FS for next season (100kg/ha)	(kg)	150	380	1.9	1.3	7.5	54.8	46.2	221.1	2.3	13.2	14.5	16.4	5.2	7.4
J. Buffer stock of FS (100%of I)	(kg)	150	380	1.9	1.3	7.5	54.8	46.2	221.1	2.3	13.2	14.5	16.4	5.2	7.4
K. Field area for FS production (yield 1.0 t/ha)	(sq.m)	1,500	3,800	19.0	13.0	75.0	548.0	462.0	2,211.0	23.0	132.0	145.0	164.0	52.0	74.0
L. BS for next season (100kg/ha)	(kg)	38	15	0.13	0.19	5.48	0.75	22.11	4.62	1.32	0.23	1.64	1.45	0.74	0.52

Item	Unit	VI		VII		VIII		IX		X		XI		XII	
		Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet	Dry	Wet
A. Area to be Planted	(ha)	1,510	1,120	900	2,010	990	940	870	1,210	570	540	550	650	780	600
B. Total seed requirement (100kg/ha)	(ton)	151	112	90	201	99	94	87	121	57	54	55	65	78	60
C. CS for next season (renewal rate of 10%)	(ton)	11.2	15.1	20.1	9	9.4	9.9	12.1	8.7	5.4	5.7	6.5	5.5	6	7.8
D. Buffer stock for next season (10%of C)	(ton)	1.12	1.51	2.01	0.90	0.94	0.99	1.21	0.87	0.54	0.57	0.65	0.55	0.60	0.78
E. Field area for CS production (yield 1.0 t/ha)	(ha)	1.12	1.51	2.01	0.90	0.94	0.99	1.21	0.87	0.54	0.57	0.65	0.55	0.60	0.78
F. RS for next season (100kg/ha)	(kg)	151	112	90	201	99	94	87	121	57	54	55	65	78	60
G. Buffer stock of RS (20%of F)	(kg)	30.20	22.40	18.00	40.20	19.80	18.80	17.40	24.20	11.40	10.80	11.00	13.00	15.60	12.00
H. Field area for RS production (yield 1.0 t/ha)	(ha)	0.15	0.11	0.09	0.20	0.10	0.09	0.09	0.12	0.06	0.05	0.06	0.07	0.08	0.06
I. FS for next season (100kg/ha)	(kg)	11.2	15.1	20.1	9	9.4	9.9	12.1	8.7	5.4	5.7	6.5	5.5	6	7.8
J. Buffer stock of FS (100%of I)	(kg)	11.2	15.1	20.1	9	9.4	9.9	12.1	8.7	5.4	5.7	6.5	5.5	6	7.8
K. Field area for FS production (yield 1.0 t/ha)	(sq.m)	112.0	151.0	201.0	90.0	94.0	99.0	121.0	87.0	54.0	57.0	65.0	55.0	60.0	78.0
L. BS for next season (100kg/ha)	(kg)	1.51	1.12	0.90	2.01	0.99	0.94	0.87	1.21	0.57	0.54	0.55	0.65	0.78	0.60

Table C.4.1 PEANUT PRODUCTION IN REGION II

Province	Harvested Area(ha) Average(1986-88)			Production (t) Average(1986-88)			Yield (t/ha) Average(1986-88)		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Cagayan	1,390	850	2,240	680	320	1,000	0.5	0.4	0.4
Isabela	2,890	18,720	21,610	1,620	15,220	16,840	0.6	0.8	0.8
Nueva Viscaya	40	40	80	30	20	50	0.8	0.5	0.6
Quirino	160	1,910	2,070	110	1,530	1,640	0.7	0.8	0.8
Total Region II	4,480	21,520	26,000	2,440	17,090	19,530	0.5	0.8	0.8

Note : Wet ; July to December Dry ; January to June

Source : BAS Region II

Table C.4.2 PADDY PRODUCTION IN REGION VI (1987-89 Average)

Province/ Condition	Area Harvest(ha)			Production (t)			Yield (t/ha)		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Aklan									
Irrigated	11,670	10,050	21,720	32,170	26,520	58,690	2.8	2.6	2.7
Rainfed	5,680	8,210	13,890	8,620	13,090	21,710	1.5	1.6	1.6
Total	17,350	18,260	35,610	40,790	39,610	80,400	2.4	2.2	2.3
Capiz									
Irrigated	6,900	6,520	13,420	25,600	18,790	44,390	3.7	2.9	3.3
Rainfed	34,120	34,680	68,800	88,670	78,250	166,920	2.6	2.3	2.4
Total	41,020	41,200	82,220	114,270	97,040	211,310	2.8	2.4	2.6
Antique									
Irrigated	10,210	11,280	21,490	33,270	29,800	63,070	3.3	2.6	2.9
Rainfed	12,840	3,170	16,010	24,410	4,460	28,870	1.9	1.4	1.8
Total	23,050	14,450	37,500	57,680	34,260	91,940	2.5	2.4	2.5
Iloilo									
Irrigated	32,300	26,950	59,250	110,790	77,810	188,600	3.4	2.9	3.2
Rainfed	85,630	59,470	145,100	196,570	116,900	313,470	2.3	2.0	2.2
Total	117,930	86,420	204,350	307,360	194,710	502,070	2.6	2.3	2.5
Sub-total									
Irrigated	61,080	54,800	115,880	201,830	152,920	354,750	3.3	2.8	3.1
Rainfed	138,270	105,530	243,800	318,270	212,700	530,970	2.3	2.0	2.2
Total	199,350	160,330	359,680	520,100	365,620	885,720	2.6	2.3	2.5
Negros Occidental									
Irrigated	25,600	19,390	44,990	88,450	61,160	149,610	3.5	3.2	3.3
Rainfed	29,220	14,960	44,180	72,150	29,120	101,270	2.5	1.9	2.3
Total	54,820	34,350	89,170	160,600	90,280	250,880	2.9	2.6	2.8
Total Region VI									
Irrigated	86,680	74,190	160,870	290,280	214,080	504,360	3.3	2.9	3.1
Rainfed	167,490	120,490	287,980	390,420	241,820	632,240	2.3	2.0	2.2
Total	254,170	194,680	448,850	680,700	455,900	1,136,600	2.7	2.3	2.5

Note : Wet ; July to December Dry ; January to June

Source : BAS Region VI

Table C.4.3 CORN PRODUCTION IN REGION XI (1987-89 Average)

Province/ Variety	Area Harvest(ha)			Production (t)			Yield (t/ha)		
	Wet	Dry	Total	Wet	Dry	Total	Wet	Dry	Total
Davao City									
White	4,750	1,410	6,160	4,080	1,090	5,170	0.9	0.8	0.8
Yellow	7,290	480	7,770	2,060	740	2,800	0.3	1.5	0.4
Total	12,040	1,890	13,930	6,140	1,830	7,970	0.5	1.0	0.6
Davao del Norte									
White	87,060	68,100	155,160	79,280	70,300	149,580	0.9	1.0	1.0
Yellow	0	50	50	0	110	110	-	2.2	2.2
Total	87,060	68,150	155,210	79,280	70,410	149,690	0.9	1.0	1.0
Davao Oriental									
White	56,250	5,670	61,920	60,940	3,320	64,260	1.1	0.6	1.0
Yellow	0	0	0	0	0	0	-	-	-
Total	56,250	5,670	61,920	60,940	3,320	64,260	1.1	0.6	1.0
Davao del Sur									
White	23,480	6,470	29,950	30,290	2,890	33,180	1.3	0.4	1.1
Yellow	8,910	510	9,420	810	80	890	0.1	0.2	0.1
Total	32,390	6,980	39,370	31,100	2,970	34,070	1.0	0.4	0.9
Surigao Sur									
White	14,360	2,880	17,240	17,280	1,800	19,080	1.2	0.6	1.1
Yellow	90	0	90	0	0	0	-	-	-
Total	14,450	2,880	17,330	17,280	1,800	19,080	1.2	0.6	1.1
Sub-total									
White	185,900	84,530	270,430	191,870	79,400	271,270	1.0	0.9	1.0
Yellow	16,290	1,040	17,330	2,870	930	3,800	0.2	0.9	0.2
Total	202,190	85,570	287,760	194,740	80,330	275,070	1.0	0.9	1.0
South Cotabato									
White	229,210	73,620	302,830	664,820	81,260	746,080	2.9	1.1	2.5
Yellow	171,580	14,920	186,500	283,020	13,100	296,120	1.6	0.9	1.6
Total	400,790	88,540	489,330	947,840	94,360	1,042,200	2.4	1.1	2.1
Total Region XI									
White	415,110	158,150	573,260	856,690	160,660	1,017,350	2.1	1.0	1.8
Yellow	187,870	15,960	203,830	285,890	14,030	299,920	1.5	0.9	1.5
Total	602,980	174,110	777,090	1,142,580	174,690	1,317,270	1.9	1.0	1.7

Note : Wet ; July to December Dry ; January to June

Source : BAS Region XI

Table C.4.4 PEANUT SEED PRODUCTION IN ILAGAN EXPERIMENT STATION

Year		Foundation Seed			Registered Seed			Certified Seed		
		Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)
1984	Wet	0	0	0	0	0	0	0	0	0
	Dry	3.0	3,380	1.1	0	0	0	0	0	0
	Total	3.0	3,380	1.1	0	0	0	0	0	0
1985	Wet	0	0	0	0	0	0	0	0	0
	Dry	3.0	4,000	1.3	3.0	4,000	1.3	1.0	600	0.6
	Total	3.0	4,000	1.3	3.0	4,000	1.3	1.0	600	0.6
1986	Wet	0	0	0	0.5	180	0	0	0	0
	Dry	0.4	60	0.2	3.0	1,500	0.5	6.0	2,991	0.5
	Total	0.4	60	0.2	3.5	1,680	0.5	6.0	2,991	0.5
1987	Wet	0	0	0	2.0	1000	0.5	2.0	1,267	0.6
	Dry	0.1	20	0.2	0	0	0	4.0	3,200	0.8
	Total	0.1	20	0.2	2.0	1,000	0.5	6.0	4,467	0.7
1988	Wet	0	0	0	2.5	500	0.2	1.0	330	0.3
	Dry	2.5	2,000	0.8	1.5	1,500	1.0	3.0	2,400	0.8
	Total	2.5	2,000	0.8	4.0	2,000	0.5	4.0	2,730	0.7
1989	Wet	0	0	0	2.0	1,100	0.6	0	0	0
	Dry	3.0	3,380	1.1	0	0	0	4.0	3,840	1.0
	Total	3.0	3,380	1.1	2.0	1,100	0.6	4.0	3,840	1.0
1990	Wet	-	-	-	-	-	-	-	-	-
	Dry	1.0	1,700	1.7	0	0	0	4.0	5,120	1.3
	Total	1.0	1,700	1.7	0	0	0	4.0	5,120	1.3
Average of Production Year	Wet	0	0	0	1.8	700	0.4	1.5	800	0.5
	Dry	1.9	2,080	1.1	2.5	2,330	0.9	3.7	3,030	0.8
	Total	1.9	2,080	1.1	4.3	3,030	0.7	5.2	3,830	0.7
Average for 6 - 7 Years	Wet	0	0	0	1.2	460	0.4	0.5	270	0.5
	Dry	1.9	2,080	1.1	1.1	1,000	0.9	3.1	2,590	0.8
	Total	1.9	2,080	1.1	2.3	1,460	0.6	3.6	2,860	0.8

Table C.4.5 RICE SEED PRODUCTION IN VISAYAS EXPERIMENT STATION

Year		Foundation Seed			Registered Seed			Certified Seed		
		Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)
1984	Wet	24.8	74,540	3.0	3.0	6,150	2.1	0	0	0
	Dry	5.0	13,210	2.6	0	0	0	0	0	0
	Total	29.8	87,750	2.9	3.0	6,150	2.1	0	0	0
1985	Wet	29.0	94,500	3.3	0	0	0	3.0	3,150	1.1
	Dry	5.5	14,580	2.7	0	0	0	0	0	0
	Total	34.5	109,080	3.2	0	0	0	3.0	3,150	1.1
1986	Wet	23.8	7,560	0.3	0	0	0	0	0	0
	Dry	4.0	9,090	2.3	0	0	0	0	0	0
	Total	27.8	16,650	0.6	0	0	0	0	0	0
1987	Wet	23.3	72,370	3.1	1.0	2,300	2.3	9.0	12,110	1.3
	Dry	1.5	3,330	2.2	0	0	0	0	0	0
	Total	24.8	75,700	3.1	1.0	2,300	2.3	9.0	12,110	1.3
1988	Wet	23.0	75,360	3.3	0	0	0	0	0	0
	Dry	0	0	0	0	0	0	0	0	0
	Total	23.0	75,360	3.3	0	0	0	0	0	0
1989	Wet	22.5	7,100	0.3	0	0	0	0	0	0
	Dry	0	0	0	0	0	0	0	0	0
	Total	22.5	7,100	0.3	0	0	0	0	0	0
1990	Wet	-	-	-	-	-	-	-	-	-
	Dry	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-
Average of Production Year	Wet	24.4	55,240	2.3	2.0	4,230	2.1	6.0	7,630	1.3
	Dry	4.0	10,050	2.5	0	0	0	0	0	0
	Total	28.4	65,290	2.3	2.0	4,230	2.1	6.0	7,630	1.3
Average for 6 - 7 Years	Wet	24.4	55,240	2.3	0.7	1,410	2.0	2.0	2,540	1.3
	Dry	2.7	6,700	2.5	0	0	0	0	0	0
	Total	27.1	61,940	2.3	0.7	1,410	2.0	2.0	2,540	1.3

Table C.4.6 CORN SEED PRODUCTION IN DAVAO NATIONAL CROP CENTER

Year		Foundation Seed			Registered Seed			Certified Seed		
		Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)
1984	Wet	-	-	-	1.0	2,490	2.5	0	0	0
	Dry	-	-	-	1.0	3,000	3.0	0	0	0
	Total	-	-	-	2.0	5,490	2.7	0	0	0
1985	Wet	-	-	-	2.0	5,350	2.7	0	0	0
	Dry	-	-	-	2.0	6,000	3.0	0	0	0
	Total	-	-	-	4.0	11,350	2.8	0	0	0
1986	Wet	-	-	-	1.0	2,280	2.3	0	0	0
	Dry	-	-	-	1.0	2,700	2.7	0	0	0
	Total	-	-	-	2.0	4,980	2.5	0	0	0
1987	Wet	-	-	-	3.3	9,720	2.9	0	0	0
	Dry	-	-	-	3.0	9,900	3.3	0	0	0
	Total	-	-	-	6.3	19,620	3.1	0	0	0
1988	Wet	-	-	-	1.5	3,160	2.1	0.5	1,080	2.2
	Dry	-	-	-	1.8	3,160	1.8	1.0	2,000	2.0
	Total	-	-	-	3.3	6,320	1.9	1.5	3,080	2.1
1989	Wet	-	-	-	1.0	2,750	2.8	0	0	0
	Dry	-	-	-	1.0	3,000	3.0	0	0	0
	Total	-	-	-	2.0	5,750	2.9	0	0	0
1990	Wet	-	-	-	-	-	-	-	-	-
	Dry	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-
Average of Production Year	Wet	-	-	-	1.6	4,290	2.7	0.5	1,080	2.2
	Dry	-	-	-	1.6	4,630	2.9	1.0	2,000	2.0
	Total	-	-	-	3.2	8,920	2.8	1.5	3,080	2.1
Average for 6 - 7 Years	Wet	-	-	-	1.6	4,290	2.7	0.1	180	1.8
	Dry	-	-	-	1.6	4,630	2.9	0.2	330	1.7
	Total	-	-	-	3.2	8,920	2.8	0.3	510	1.7

Table C.4.7 CORN SEED PRODUCTION IN TUPI SEED FARM

Year		Foundation Seed			Registered Seed			Certified Seed		
		Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)	Harvested Area (ha)	Net Production (kg)	Net Yield (t/ha)
1984	Wet	0	0	0	2.3	5,000	2.2	0	0	0
	Dry	0	0	0	3.0	3,230	1.1	1.0	495	0.5
	Total	0	0	0	5.3	8,230	1.6	1.0	495	0.5
1985	Wet	0	0	0	2.5	7,560	3.0	0	0	0
	Dry	0	0	0	2.5	4,950	2.0	0	0	0
	Total	0	0	0	5.0	12,510	2.5	0	0	0
1986	Wet	0	0	0	4.0	7,730	1.9	0	0	0
	Dry	0	0	0	2.8	6,350	2.3	0	0	0
	Total	0	0	0	6.8	14,080	2.1	0	0	0
1987	Wet	0	0	0	3.3	8,400	2.5	0	0	0
	Dry	0	0	0	3.3	6,360	1.9	0	0	0
	Total	0	0	0	6.6	14,760	2.2	0	0	0
1988	Wet	0.6	2,340	3.9	2.5	6,350	2.5	2.0	2,500	1.3
	Dry	0	0	0	1.5	3,060	2.0	0	0	0
	Total	0.6	2,340	3.9	4.0	9,410	2.4	2.0	2,500	1.3
1989	Wet	0.5	1,980	4.0	5.5	16,380	3.0	0	0	0
	Dry	0	0	0	2.0	6,530	3.3	0.5	2,480	5.0
	Total	0.5	1,980	4.0	7.5	22,910	3.1	0.5	2,480	5.0
1990	Wet	-	-	-	-	-	-	-	-	-
	Dry	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-
Average of Production Year	Wet	0.6	2,160	3.6	3.4	8,570	2.5	2.0	2,500	1.3
	Dry	-	-	-	2.5	5,080	2.0	0.8	1,490	1.9
	Total	0.6	2,160	3.6	5.9	13,650	2.3	2.8	3,990	1.4
Average for 6 - 7 Years	Wet	0.2	720	3.6	3.4	8,570	2.5	0.3	420	1.4
	Dry	0	0	0	2.5	5,080	2.0	0.3	500	1.7
	Total	0.2	720	3.6	5.9	13,650	2.3	0.6	920	1.5

Table C.5.1 ALTERNATIVE STUDY FOR PEANUT SEED MODEL IMPROVEMENT PLAN IN REGION II

Case	Renewal Rate (%)	R.S Production Area(ha) Station Wet S.	Station Dry S.	Seed Grower Wet S.	Seed Grower Dry S.	C. S Production Area (ha) /_1 Wet S.	C. S Production Area (ha) /_1 Dry S.	C. S Buffer Stock(t) Wet S.	C. S Buffer Stock(t) Dry S.
A	10	5.8	7.5	-	14.0	215	45	21.5	4.5
B	15	4.8	7.3	1.9	25.0	323	67	32.3	6.7
C	20	3.7	7.1	5.3	35.9	430	90	43.0	9.0
D	25	2.6	6.9	8.6	46.9	538	112	53.8	11.2

Case	Capacity of Conditioned Buffer Stock(t) F.S	R.S	C.S	Total	Capacity of Improved Warehouse in the Station(t) F.S/_2	R.S	C.S	Total
A	2.7	5.6	26.0	34.3	0.5	21.5	-	22.0
B	3.9	7.8	39.0	50.7	0.7	32.3	-	33.0
C	5.2	10.4	52.0	67.6	0.9	43.0	-	43.9
D	6.5	13.0	65.0	84.5	1.1	53.8	-	54.9

Note : Wet S ; Wet Season, Dry S ; Dry Season
F.S ; Foundation Seed, R.S ; Registered Seed, C.S ; Certified Seed
/_1 ; Seed Growers only
/_2 ; Capacity for dry season harvest

Table C.5.2 ALTERNATIVE STUDY FOR RICE SEED MODEL IMPROVEMENT PLAN IN REGION VI

Case	Renewal Rate (%)	Export of C.S to Other Region(t) Wet S.	Export of C.S to Other Region(t) Dry S.	C. S Buffer Stock(t) Wet S.	C. S Buffer Stock(t) Dry S.	R.S Production Area(ha) Station Wet S.	R.S Production Area(ha) Station Dry S.	R.S Production Area(ha) Seed Grower Wet S.	R.S Production Area(ha) Seed Grower Dry S.	C. S Production Area (ha) /_1 Wet S.	C. S Production Area (ha) /_1 Dry S.
A	20	260	323	286	355	17.8	4.5	-	5.4	794	987
B	20	519	646	312	388	19.9	4.4	-	6.4	866	1,076
C	25	325	404	357	444	23.5	4.3	-	8.1	992	1,234
D	25	649	807	390	484	26.1	4.3	-	9.2	1,082	1,346

Case	Surplus of F.S(kg) Wet S	Dry S	Total	Capacity of Conditioned Buffer Stock(t) F.S	R.S	Total	Capacity of Improved Warehouse in the Station(t) F.S	R.S/_2	C.S	Total
A	810	1,030	1,840	1.8	26.6	28.4	0.6	35.7	191.0	227.3
B	1,090	1,290	2,380	2.4	31.0	33.4	0.6	39.0	209.0	248.6
C	1,020	1,520	2,540	2.5	38.0	40.5	0.7	44.6	239.0	284.3
D	1,280	1,450	2,730	2.8	42.9	45.7	0.8	48.7	260.0	309.5

Note : Wet S ; Wet Season, Dry S ; Dry Season
F.S ; Foundation Seed, R.S ; Registered Seed, C.S ; Certified Seed
/_1 ; Seed Growers only
/_2 ; Capacity for dry season harvest

Table C.5.3 ALTERNATIVE STUDY FOR CORN SEED MODEL IMPROVEMENT PLAN IN REGION XI

Case	Renewal Rate (%)	Station	R.S Production Area/Station(ha) Wet S.	R.S Production Area/Station(ha) Dry S.	C. S Production Area (ha) Station Wet S.	C. S Production Area (ha) Station Dry S.	C. S Production Area (ha) Seed Grower Wet S.	C. S Production Area (ha) Seed Grower Dry S.
A	11	Davao/Manunburan	1.90	0.86	3.08	4.04	60.80	142.00 #
		Tupi S.F	3.50	0.80	2.50	5.20	60.20	263.50
B	15	Davao/Manunburan	2.70	1.24	2.28	3.70	84.20	195.30 #
		Tupi S.F	4.90	1.20	1.10	4.80	84.60	361.80
C	20	Davao/Manunburan	3.18	1.64	1.80	3.34	112.70	262.00 #
		Tupi S.F	6.00	1.50	0	4.50	114.00	484.20

Case	Renewal Rate (%)	Station	Capacity of Conditioned Buffer Stock(t) F.S	R.S	Total	Capacity of Improved Warehouse in the Station(t) F.S/R.S/_1	C.S	Total
A	11	Davao/Manunburan	0.3	4.2	4.5	1.5	43.8	45.3
		Tupi S.F	-	6.2	6.2	1.3	80.6	81.9
B	15	Davao/Manunburan	0.3	6.1	6.4	1.9	59.7	61.6
		Tupi S.F	-	9.3	9.3	1.7	110.0	111.7
C	20	Davao/Manunburan	0.3	7.0	7.3	2.5	79.6	82.1
		Tupi S.F	-	10.4	10.4	2.3	146.6	148.9

Note : Wet S ; Wet Season, Dry S ; Dry Season
F.S ; Foundation Seed, R.S ; Registered Seed, C.S ; Certified Seed
/_1 ; Capacity for dry season harvest

Table C.5.4 PEANUT SEED PRODUCTION PLAN IN REGION II

1. FRAMEWORK FOR PEANUT SEED PRODUCTION

Item	Factor			Unit	Region II	
					Wet	Dry
A. Area to be planted				ha	4,480	21,520
B. Total seed requirement	/seed rate	;	100 kg/ha	ton	448	2,152
C. CS for next season	/renewal rate	;	10 %	ton	215	45
D. Field area for CS production	/yield	;	1.0 t/ha	ha	215	45
E. RS requirement	/seed rate	;	100 kg/ha	ton	4.5	21.5
(Buffer stock of RS)	/Percentage to E	;	20 %	ton	(0.9)	(4.3)
F. Field area for RS production	/yield	;	1.0 t/ha	ha	4.5	21.5
G. FS requirement for next season	/seed rate	;	100 kg/ha	ton	2.2	0.5
(Buffer stock of FS)	/Percentage to G	;	100 %	ton	(2.2)	(0.5)
H. Field area for FS production	/yield	;	1.0 t/ha	ha	2.2	0.5
I. Requirement of BS for next season	/seed rate	;	100 kg/ha	kg	50	220

2. PEANUT SEED PRODUCTION PLAN BY PRODUCER

Item	Factor			Unit	Season	
					Wet	Dry
I. Ilagan Experiment Station						
	Available field for peanut seed production			ha	8.0	8.0
(1) FS Production						
Field area for FS production				ha	2.2	0.6
FS production	/yield	;	1.0 t/ha	ton	2.2	0.6
(2) RS Production						
Field area for RS production				ha	5.8	7.4
RS production	/yield	;	1.0 t/ha	ton	5.8	7.4
Surplus RS to the requirement				ton	1.3	-
II. Registered Seed Growers						
RS requirement for next season in Region II				ton	4.5	21.5
RS deficit to be produced by seed growers				ton	-	14.1
Field area for RS production by seed growers	/yield	;	1.0 t/ha	ha	-	14.1
III. Certified Seed Growers						
Field area for CS production				ha	215	45
CS production	/yield	;	1.0 t/ha	ton	215	45
(Buffer stock of CS)	/Percentage	;	10 %	ton	(21.5)	(4.5)

Table C.5.5 RICE SEED PRODUCTION PLAN IN REGION VI

1. FRAMEWORK FOR RICE SEED PRODUCTION

Item	Factor			Unit	Season	
					Wet	Dry
A. Area to be planted (Panay including Guimaras only / Commercial production area)				ha	199,350	160,330
B. Total seed requirement	/seed rate	;		ton	16,147	12,987
(Transplanting, 20% of the area)	/seed rate	;	45 kg/ha		1,794	1,443
(Broad Casting, 80% of the area)	/seed rate	;	90 kg/ha		14,353	11,544
C. CS for next season	/renewal rate	;	20 %	ton	2,597	3,229
D. CS for export to other regions	/percentage to C	;	10 %	ton	260	323
E. Total CS requirement				ton	2,857	3,552
F. Field area for CS production	/yield	;	3.6 t/ha	ha	794	987
G. RS requirement	/seed rate	;	45 kg/ha	ton	44.4	35.7
(Buffer stock of RS)	/percentage to G	;	20 %	ton	(8.9)	(7.1)
H. Field area for RS production	/yield	;	3.6 t/ha	ha	12.3	9.9
I. FS requirement for next season	/seed rate	;	45 kg/ha	kg	450	550
(Buffer stock of FS)	/percentage to I	;	100 %	kg	(450)	(550)
J. Field area for FS production	/yield	;	3.15 t/ha	ha	0.14	0.17
K. Requirement of BS for next season	/seed rate	;	15 kg/ha	kg	2.6	2.1

2. RICE SEED PRODUCTION PLAN BY PRODUCER

Item	Factor			Unit	Season	
					Wet	Dry
I. Visayas Experiment Station						
	Available field for rice seed production			ha	32.0	5.0
(1) FS Production						
Field area for FS production	/3 x area for FS			ha	0.4	0.5
FS production	/yield	;	3.15 t/ha	kg	1,260	1,580
Surplus FS to the requirement				kg	810	1,030
(2) RS Production						
Field area for RS production				ha	17.8	4.5
FS for RS production	/seed rate	;	45 kg/ha	kg	800	200
RS production	/yield	;	3.6 t/ha	ton	63.9	16.2
Surplus RS to the requirement				ton	19.5	-
II. Registered Seed Growers						
RS requirement for next season in Region VI				ton	44.4	35.7
RS deficit to be produced by seed growers				ton	-	19.5
Field area for RS production by seed growers	/yield	;	3.6 t/ha	ha	-	5.4
FS for RS production	/seed rate	;	45 kg/ha	kg	-	240
III. Certified Seed Growers						
Field area for CS production				ha	794	987
CS production	/yield	;	3.6 t/ha	ton	2,857	3,552
(Buffer stock of CS)	/Percentage	;	10 %	ton	(286)	(355)

TABLE C.5.6 CORN SEED PRODUCTION PLAN IN REGION XI

1. FRAMEWORK FOR CORN SEED PRODUCTION

Item	Factor			Unit	Southern Mindanao except South Cotabato				South Cotabato			
					Wet Season		Dry Season		Wet Season		Dry Season	
					Yellow	White	Yellow	White	Yellow	White	Yellow	White
A. Area to be planted (Commercial production area)												
A-1 Total area				ha	16,290	185,900	1,040	84,530	171,580	229,210	14,920	73,620
A-2 Area for hybrid variety	/percentage to A-1	;	20 %	ha	3,260	-	210	-	34,320	-	2,980	-
A-3 Area for open pollinated variety	/percentage to A-1	;	80 %	ha	13,030	185,900	830	84,530	137,260	229,210	11,940	73,620
B. Total seed requirement of OP var.	/seed rate	;	20 kg/ha	ton	261	3,718	17	1,691	2,745	4,584	239	1,472
C. CS for next season	/renewal rate	;	11 %	ton	2	186	29	409	26	162	302	504
D. Buffer Stock of CS	/percentage to C	;	10 %	ton	0.2	18.6	2.9	40.9	2.6	16.2	30.2	50.4
E. Field area for CS production	/yield	;	3.0 t/ha	ha	0.7	62.0	9.7	136.3	8.7	54.0	100.7	168.0
F. RS requirement	/seed rate	;	20 kg/ha	kg	190	2,730	10	1,240	2,010	3,360	170	1,080
(Buffer stock of RS)	/percentage to E	;	20 %	kg	(40)	(550)	(2)	(250)	(400)	(670)	(34)	(220)
G. Field area for RS production	/yield	;	3.0 t/ha	sq m	630	9,100	30	4,130	6,700	11,200	570	3,600
H. FS requirement for next season	/seed rate	;	20 kg/ha	kg	0.1	8.3	1.3	18.2	1.1	7.2	13.4	22.4
(Buffer stock of FS)	/percentage to I	;	100 %	kg	(0.1)	(8.3)	(1.3)	(18.2)	(1.1)	(7.2)	(13.4)	(22.4)
I. Field area for FS production	/yield	;	2.5 t/ha	sq m	0.4	33.2	5.2	72.8	4.4	28.8	53.6	89.6
J. Requirement of BS for next season	/seed rate	;	20 kg/ha	g	10.4	145.6	0.8	66.4	107.2	179.2	8.8	57.6

2. CORN SEED PRODUCTION PLAN IN DAVAO NCC AND MANANBURAN SEED FARM

Item	Factor			Unit	Davao NCC				Mananburan Seed Farm			
					Wet Season		Dry Season		Wet Season		Dry Season	
					Yellow	White	Yellow	White	Yellow	White	Yellow	White
I. FS Production												
FS requirement												
For South Cotabato				kg	1.1	7.2	13.4	22.4				
For other parts				kg	0.1	8.3	1.3	18.2				
Total				kg	1.2	15.5	14.7	40.6				
Field area required for FS production				sq m	4.8	62.0	58.8	162.4				
Field area planned for FS production				sq m	20	200	200	600				
FS production planned	/yield	;	2.5 t/ha	kg	5	50	50	150				
Surplus FS to the requirement				kg	3.8	34.5	35.3	109.4				
II. RS Production												
RS requirement				kg	-	2,730	-	1,240	190	-	10	-
Field area required for RS production				sq m	-	9,100	-	4,130	630	-	30	-
Field area planned for RS production				ha	-	1.8	-	0.8	0.1	-	0.06	-
RS production planned	/yield	;	3.0 t/ha	ton	-	5.4	-	2.4	0.3	-	0.18	-
Surplus RS to the requirement		;		ton	-	2.7	-	1.2	0.1	-	0.2	-
III. CS Production												
Field area for CS production				ha	-	1.18	-	2.14	1.9	-	1.9	-
CS production		;	3.0 t/ha	ton	-	3.5	-	6.4	5.7	-	5.7	-
VI. Total Area for Corn Production				ha	0.002	3.0	0.02	3.0	2.0	-	2.0	-

3. CORN SEED PRODUCTION PLAN IN TUPI SEED FARM

Item	Factor			Unit	Tupi Seed Farm			
					Wet Season		Dry Season	
					Yellow	White	Yellow	White
II. RS Production								
RS requirement in South Cotabato				kg	2,010	3,360	170	1,080
Field area required for RS production				sq m	6,700	11,200	570	3,600
Field area planned for RS production				ha	1.3	2.2	0.1	0.7
RS production planned	/yield	;	3.0 t/ha	ton	3.9	6.6	0.3	2.1
Surplus RS to the requirement		;		ton	1.9	3.2	0.1	1.0
III. CS Production								
Field area for CS production				ha	0.7	1.8	1.9	3.3
CS production		;	3.0 t/ha	ton	2.1	5.4	5.7	9.9
VI. Total Area for Corn Production				ha	2.0	4.0	2.0	4.0

4. CORN CERTIFIED SEED PRODUCTION PLAN BY SEED GROWER

Item	Factor			Unit	Southern Mindanao except South Cotabato				South Cotabato			
					Wet Season		Dry Season		Wet Season		Dry Season	
					Yellow	White	Yellow	White	Yellow	White	Yellow	White
I. CS Requirement												
Total requirement				ton	2.0	186.0	29.0	409.0	26.0	162.0	302.0	504.0
CS production in the station				ton	5.7	3.5	5.7	6.4	2.1	5.4	5.7	9.9
CS to be produced by seed growers				ton	-	182.5	23.3	402.6	23.9	156.6	296.3	494.1
II. Field Area for CS Production	/yield	;	3.0 t/ha	ha	-	60.8	7.8	134.2	8.0	52.2	98.8	164.7
III. RS for CS Production	/seed rate	;	20 kg/ha	kg	-	1,220	160	2,680	160	1,040	1,980	3,290

Annex D

Seed Quality Control

FEASIBILITY STUDY ON
IMPROVEMENT OF SEED PRODUCTION AND DISTRIBUTION, AND
ESTABLISHMENT OF
APPROPRIATE SEED STORAGE SYSTEM

ANNEX D SEED QUALITY CONTROL

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1. PRESENT SITUATION OF SEED QUALITY CONTROL SYSTEM

1.1 Executive Organization

Seed quality control is a basic function of the seed certification program. Achieving this objective will require cooperation and mutual trust of seed growers, dealers, and government officials concerned including seed inspectors. Government agencies concerned with the seed development program are shown in Fig.D.1.1. As shown in Fig.D.1.1, Seed Certification and Seed Standard Group, Technical Committee, Recommending Committee under the P.S.B. has responsibility for technical matters on seed quality control.

As shown in Fig.D.1.2, government and private agencies involved in the Varietal Improvement Program such as National Experimental Station/Seed Farm, UPLB, IPB, IRRI, ACAP and private seed companies all responsible for the production of Breeder Seed (BS), Foundation Seed (FS) and Registered Seed (RS). FS are distributed to selected seed producers for the production of RS through Regional Seed Coordinator based on Regional Seed Production Program. Registered Seed is also sold to selected seed producers for the production of certified seed to supply the requirements of farmers under supervision of provincial seed coordinator. The seed producers are under technical supervision of the agricultural farm technician and the seed inspector.

The BPI assigned the Seed Quality Control Services (SQCS) of Crop Production Division as the executive agency for the seed certification program. The organization of SQCS is shown as Fig. D.1.3. As shown in Fig. D.1.3, SQCS also functions as the Central Office of 17 Regional Seed Testing Laboratories (STL) as shown in Table D.1.1, Table D.1.2 and Fig. 1.4. It can be the said that seed certification system is maintained and operated by both the field activity of the seed inspector and the seed testing by STL under cooperation with SQCS.

The SQCS has been conducting research on improvement and development of quality control techniques as a concerned agency and also cooperates with research activities which are conducted by each regional STL.

The SQCS has been conducting training courses and workshops on seed pathology, seed production and distribution, processing and certification, etc. in coordination with regional agencies concerned every year.

1.2 Seed Inspector (SI)

As shown in Table D.1.3, 163 seed inspectors worked in the field in 1989,while at present they are 278 in total. Their activities are mainly as follows:

(1) In order to obtain the FS and/or RS, the person who intends to produce seeds should submit an application for seed production activity to the Regional Agricultural Office through the provincial seed coordinator and provincial agricultural officer. After receiving an application, a seed inspector will examine an applicant's qualifications and his proposed seed fields.

(2) During the growing period of seed crops, each stage of production of seed is inspected by the seed inspector to make sure that contamination is minimal and that varietal purity is maintained.

(3) The activity of the seed inspector is not only field inspection but also sampling for seed tests by the STL concerned, and tagging and sealing of certified seed bags are as shown in Fig. D.1.2.

The various inspections are conducted based on the field seed inspection manual which is authorized by the PSB. The seed inspector plays an important role in the seed certification system as seed quality control begins in the seed field, and ultimate quality depends on the quality of the seed coming from the field. Often varieties of the same species cannot be distinguished from one another in laboratory examination and the seed inspector plays a very important role in checking the maintenance of varietal purity during seed production process. Fig. D.1.5.shows procedure of field inspection in connection with laboratory tests.

The field standards for rice, corn and peanuts which is prescribed in the field inspection manual are as follows:

(1) For Rice Seed

a) Unit of Certification - The minimum area of field eligible for certification should be one hectare for foundation and registered seed production if enough seeds are available. The field should be bounded by a strip of uncropped land, big dikes, levees or an area planted to other crops.

b) Specific Field Standard - Field which does not meet the following requirements shall not be accepted for certification.

Factors	Tolerance and Requirements/100 sq.m		
	Foundation	Registered	Certified
Other varieties	0	1	3
Red rice	0	0	1
Objectionable weeds whose seeds are separable*	0	5	10

* Objectionable weed as designated by the certifying agency as Echinochloa crusgalli, Barnyard grass, Bayakibok, Cyperus iria, Payungan Monocharia vaginalis, Gabing uak, etc.

(2) For Open Pollinated Corn Seed

a) Unit of Certification - The minimum area of corn field intended for certification shall be one hectare.

b) Isolation

i. The area to be certified must not be less than 200 meters away from any kind of corn.

ii. The distance may be modified depending upon the size of the field by an adequate natural barrier and by time isolation.

c) Specific Standard

i. There shall not be more than 0.5% detectable mixture with plants of other varieties.

ii. There should not be more than 0.5% off-type ears or 1% ear with kernels of the wrong color at harvest time.

(3) For Peanut Seed

a) Unit of Certification - 0.5 hectare and or depending upon the availability of foundation seeds.

b) Specific Field Standard

Factors	Tolerance and Requirements/100 sq.m		
	Foundation	Registered	Certified
Other varieties	1	2	5
Other crops	0	1	2

Fig. D.1.5 shows the procedure of field inspection in connection with laboratory tests. All field inspections must be made by well-trained and qualified persons. The procedure and techniques to be used will help to avoid decisions based on personal opinion and the use of uniform criteria among seed inspectors working in different municipalities. The number of seed inspectors vary with the production area in municipality and province, and the present the number of inspectors are 273 at present.

1.3 Seed Testing Laboratory (STL)

At present, seed testing for seed certification is conducted in 18 operating STLs strategically stationed throughout the country as shown in Table D.1.1 and Fig. D.1.4. Of the 18 STLs, 15 STL are operating directly under the Regional Agricultural Office, while 2 STLs which are stationed in Naujan, Oriental Mindoro and San Jose, Occidental Mindoro, are operated directly under their Provincial Agricultural Office. These 2 STLs were established in 1981 under the Mindoro Integrated Area Development Project. In1990, new STL was established in the site of La Granja NCC, Negros Occ. as the 17th STL under the supervision of STL, No 9, Iloilo City. The remaining STL is located at the site of the BPI, Malate, Manila and has a specific function as the central office for operation of all STLs.

The establishment of new STL in 13 provinces is proposed under the Rice Action Program which will be commenced within 1990 fiscal year under the DA. When the above program is realized, it will be a strong lineup for the execution of the seed certification program.

Key personnels in the STL operation are the seed analysts. Seed tests are conducted by 92 of seed analysts based on the testing manual in 1990. However, each STL employs 4 or 5 technical personnels through a year as part-timers for services of seed certification. The improvement on such employment terms should be considered to perform the smooth operation.

Results of seed certification in 1989 is shown as Table D.1.5.. 30,690 of sample seeds are submitted by seed inspectors in total, and 82,405 tests with above submitted samples were conducted. Number of samples and quantity by seed class are as follows, (refer to table D.1.4).

	No. of Sample	Quantity (cavan)
Breeder Seed	83	79.00
Foundation Seed	200	4,518.32
Registered Seed	1,520	52,711.49
Certified Seed	4,102	378,529.50
Good Seed	303	29,950.00
Rejected Seed	711	57,737.20
Total	6,999	523,525.51

The procedure of seed tests are shown in Fig. D.1.5. Moisture determination of seed samples are conducted within 24 hours after receiving at the STL. Other necessary tests for seed evaluation are completed and evaluated within 7 days after receiving the samples. When additional tests such as seed health test are requested, the necessary days for additional testing will be extended.

Only varieties that are approved by the PSB are eligible for certification, four (4) classes of seeds are recognized in the seed certification program, namely: breeder (BS), foundation (FS), registered (RS) and certified seed (CS). However, planting stocks of newly developed promising varieties which are not yet passed by the PSB, may also be tested and certified as good seed (GS).

The procedure for testing of seed samples is based on the Rules of the International Seed Testing Association and those which have been locally adopted as the seed testing manual standard in the Philippines.

The seed standard as shown in Table D.1.6 is an excerpt from the Minimum Seed Certification Standard for Rice, Corn and other Crops in the Philippines, PSB. This standard is adopted by seed quality control services activities.

The rejection rate and tagging rate are as shown in Table D.1.7. The causes of rejection were mainly due to excessive occurrence of other varities and red rice, low

germination and high moisture contents in the case of rice seed, and corn and peanut seeds were rejected due to low germination.

The cause of low tagging rate seems that seeds are sold to the consumer before tagging by seed inspector owing to delay of tag issue. This delay of tag issue is mainly due to lack of tag printing machines. At present, tag contents are written by free hand by the STL staffs, so that it takes a lot of time. The printing machine was supplied about 10 years ago, but these machines are not functioning due to no available spare-parts at present, 10 years after the introduction. The replacement of printing machines should be considered to issue the tag promptly after completion of the seed certification.

It seems that existing offices of the STL, are classified into 2 types. The first type is where the STL occupies one structure on the site of agencies concerned such as Lab.No.2(C.V. ES), Lab.No. 6 (Barcenaga, Or.Mindoro), Lab.No.9 (Visayas ES), and Lab.No.15(Davao NCC). The second type is where the STL has exclusive use of rooms and/or spaces in other agency structures. There is no space for expansion in either type. At the STL visited, disorderly use of rooms and spaces, and tested samples piled outside the room were observed. Such a disorderly arrangement must be abolished. The sample storage room, though often neglected, is essential for a seed certification program. Tested samples must be retained by the STL for at least 2 years after the date of quality determination for reference according to the seed testing manual.

The team provided a questionnaire in order to collect information on existing main laboratory equipment. The collected data is shown in Table D.1.8. It appears that the STL do not have enough kinds and units of equipment for seed testing.

Almost all of the imported equipment is old, and spare parts needed for repair are not locally available. One seed testing laboratory that was visited by the team had only one portable moisture meter, a rough balance, and germination tests were conducted using sand media in an uncontrolled room. From the point of seed quality control and also as the executive agency for seed certification improvement such poor situation will be considered as soon as possible.

In the execution of official tests for seed certification, the laboratory is required to follow prescriptions given in the testing procedure and method which is authorized by the PSB. Seed testing is a strenuous task which needs to be eased by provision of appropriate equipment. The rules prescribe tests and methods that require certain equipments, such as