Report to the Government of ECUADOR

FFHC/AD FERTILIZER PROGRAMME

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
ROME, 1974

FERTILIZER PROGRAMME

FH/INT.1 - Ecuador

REPORT

to the

GOVERNMENT OF ECUADOR

on the

FFHC FERTILIZER PROGRAMME

based on the work of

Hans-Henrik Sass
Associate Fertilizer Expert

FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS

Rome, 1974

FAO. Report to the Government of Ecuador on the FFHC Fertilizer Programme, based on the work of Hans-Henrik Sass. Rome, 1974. 48 pp. 7 annexes. FAO report No. 94.

SUMMARY

The report describes the operations of the FAO-assisted Fertilizer Programme in Ecuador from October 1970 through September 1973.

72 fertilizer demonstration results are reported in detail. The results of a fertilizer distribution and credit scheme for small holders in three pilot acres are given.

The reported operations have been conducted in cooperation with the Ministry of Agriculture (MAG) ex-Mission Andina (ex-MAE) and INERHI (Ecuadorian Institute of Hydraulic Resources).

CONTENTS

GLOSSARY

1 U.S. $	25 Sucres (S/.)
1 Kilo	2.2 Libras
45.36 Kilos	1 qq. (Quintal, 100 Libras)
1 bag	50 kg
1 Hectare	1.25 Cuadra
MAG	Ministry of Agriculture and Livestock
Ex-MAE	Ex-Andean Mission of Ecuador
INERHI	Ecuadorian Institute of Hydraulic Resources
FECOAC	National Federation of Savings and Credit Cooperatives
INIAP	National Institute of Agricultural Investigation
FERTISA	The National Fertilizer Factory, Fertilizantes Ecuatorianos S.A.

CHAPTER I

1. Background

After a request from the Government of Ecuador a Freedom from Hunger Campaign Fertilizer Programme was initiated in Ecuador in October 1962 with Mr. J. Aramburo, Soil Fertility Expert, who remained in the country until December 1967.

The programme was continued by Miss A. van Helsdingen, Soil Fertility Expert, who worked in Ecuador from July 1967 till December 1970. In order to continue the Fertilizer Programme, FAO appointed Mr. H.H. Sass, Associate Expert in Soil Fertility, who worked in Ecuador from October 1970 till September 1973.

Mr. H. Sass's terms of reference were to assist in:

(a) Conducting a large number of fertilizer demonstrations consisting of 2-4 plots, demonstrating fertilizer rates already known to be effective.

(b) Establishing field trials on farmers' fields consisting of 6-12 plots with varying rates of fertilizer applications to determine the most efficient fertilizer use.

(c) Strengthening or initiating at experimental stations, when necessary and possible, fertilizer experimentation with some complex designs.

(d) Strengthening or initiating soil testing services which would assist in advising on fertilizer use based on soil analyses.

(e) Summarizing and correlating the fertilizer response data.

(f) Collecting information on economic and social obstacles to fertilizer use, such as lack of adequate distribution facilities, lack of credit, and the level of stability of crops and fertilizer prices.

(g) Supervising pilot-schemes for fertilizer distribution and credit.

(h) Training local personnel to do field demonstrations and trials.

2. Acknowledgements

FAO is greatly indebted to the many people who collaborated with the associate expert during his assignment.

Acknowledgements are due to the personnel of the Department of Rural Development and the Soils Department, both in the Ministry of Agriculture and Livestock (MAG); Ex-Misión Andina of Ecuador (MAE) which is now incorporated into the Department of Rural Development, MAG; Instituto Ecuatoriano de Recursos Hidráulicos (INERHI), Federación Nacional de

Cooperativas de Ahorro y Crédito del Ecuador (FECOAC), Instituto Nacional de Investigaciones Agropecuarias (INIAP), Fertilizantes Ecuatorianos S.A. (FERTISA) and to FAO.

Special thanks for his helpful advice and assistance are given to Mr. G. Van Renterghem, Soil Fertility Expert who came to Ecuador in September 971 and has since then been in charge of the Fertilizer Programme work with INERHI in the UN Development Programme project ECU-522.

CHAPTER II

GENERAL INFORMATION

1. The Size of the Country and Number of Farms

The total area of Ecuador is 6 937 520 ha, of which 3 815 520 ha are available land. Total number of farms is 633 218.

2. Natural Regions, Size and Climate

The country is divided into three very different regions: the tropical "Coastal lowlands", the temperate "Sierra highlands" and the "Oriente" which is tropical jungle. The main rainy season in the Sierra lasts from October to December and from January to mid-May. In the coastal region the main rainy season lasts from January to June.

Table 1

AREA OF THE THREE DIFFERENT REGIONS OF ECUADOR AND NUMBER OF FARMS

	Total Ha	Arable	Number of Farms
SIERRA	2 842 182	1 314 487	416 589
COSTA	3 701 044	2 351 747	207 592
ORIENTE	341 445	145 897	8 796

SOURCE: Junta Nacional de Planificación: Encuesta Agropecuaria 1968

3. Land Distribution According to Farm Size

Table 2

LAND DISTRIBUTION ACCORDING TO FARM SIZE

Size of Farms (ha)	No. of Farms	% of Total No. of Farms	Area ha	% of Total Area
From less than 1 - 5	470 347	74	708 574	10
5 - 10	68 527	11	466 315	7
10 - 50	68 974	11	1 503 887	22
50 - 100	19 022	3	2 624 557	37
500-more than 1000	1 348	0.2	1 634 187	24

SOURCE: Junta Nacional de Planificación: Encuesta Agropecuaria 1968

As suggested by the figures given in Table 2, Ecuador urgently needs a land reform for redistribution of land.

4. Population

Table 3

POPULATION

	Total	% Employed Directly in Agriculture	% Employed Indirectly in Agriculture
1962	4 721 100	55	10
1972	6 598 300	50	10

SOURCE: Verbal Communication

5. Fertilizer Import and Consumption

The Fertilizer consumption during the last five years has fluctuated, but shown in a gradual increase. It can be seen from annexes 1 and 2, that there has been a change in the National Fertilizer Factory, FERTISA, which is now a "mixed enterprise" with a strong Government interest. Furthermore the Banco de Fomento is importing large quantities through FERTISA for their credit schemes (see Annex 2).

Table 4

FERTILIZER IMPORTS BY CONCERNS OTHER THAN FERTISA

Year	Tons N	Tons P_2O_5	Tons K_2O	Total Tons Pure Nutrients
1968	3 472	2 672	4 311	10 455
1969	5 690	2 806	3 655	12 151
1970	6 461	1 811	2 735	11 007
1971	5 143	1 928	1 798	8 869
1972	6 277	1 567	1 737	9 581

SOURCE: Empresa de Manifiestos, Guayaquil: Estadisticas de Importación de Abonos.

Table 5

FERTILIZER SALES BY FERTISA

Year	Tons N	Tons P_2O_5	Tons K_2O	Total Tons Pure Nutrients
1968	2 856	2 901	2 858	8 615
1969	3 135	4 840	3 566	11 541
1970	3 470	5 279	3 443	12 192
1971	3 335	4 125	2 362	9 822
1972	6 726	7 010	3 507	17 243

SOURCE: FERTISA

Table 6

FERTILIZER CONSUMPTION IN ECUADOR

Year	Tons Pure Nutrients N + P O + K O	Kg Pure Nutrients N + P O + K O per ha Cultivated Land
1968	19 070	5.0
1969	23 665	6.2
1970	23 199	6.1
1971	18 691	4.9
1972	25 824	6.8

6. FERTISA's Import Rights

According to Law No. 787 of 4 July 1971, Art. No. 6, (Annex No. 1), Fertilizantes Ecuatorianos S.A. is exempted and it will virtually have a monopoly.

CHAPTER III

RECOMMENDATIONS

It is recommended that:

a. the National Committee on Fertilizers and Fertilization be given official status as soon as possible, so that this committee can coordinate and intensify all activities in the field of fertilizer investigation, promotion and marketing.

b. in order to secure a high standard of field work, yearly training courses be organized for the field personnel and that individual parts of these courses be repeated during regular supervisory field-trips.

c. for maximum effect, each demonstration should be used for at least two well planned, advertised and prepared field days, one at the laying out and one at harvest.

d. a small team of full time fertilizer subject matter specialists be established all with helpers and transport facilities to work only in the fertilizer promotion programme. They should use posters, leaflets, radio and any opportunity to set up a "fertilizer stand" at local markets.

e. the present level of fertilization in the demonstrations be maintained for two years more in order to get a better basis for judgement of the results.

f. the number of demonstrations be increased greatly.

g. that at least bi-monthly reports should be sent to the main offices, giving full information on demonstration and revolving fund movements.

h. that the revolving funds have their own bank accounts and that recuperated funds be reinvested every time enough money has accumulated to buy two hundred bags of fertilizer.

i. that a net of warehouses for fertilizer be built all over the country and that importation and distribution should be organized to meet and satisfy the rapidly growing demand.

j. better credit facilities be organized especially for small to medium farmers and in particular tenant farmers.

CHAPTER IV

OPERATION

1. Working Group

a. FECOAC

Within FECOAC the Working Group now consists of 13 part-time agronomists. The counterpart for Fertilizer Programme was Ing. A. Ibarra, Coordinator from Agricultural Extension to FECOAC, followed by Ing. R. Cruz Polanco who is part-time Coordinator and Agricultural Advisor for FECOAC, part-time Chief of the Section of Rural Capacitation.

b. INERHI

In INERHI the Working Group consists of 9 part-time engineer agronomist under the supervision of Ing. J. Sotomayor, Chief of Agricultural Investigation and Technical Assistance, and part-time counterpart for the FFHC-AD/FP, part-time counterpart for the ECU/522/FP.

c. EX-MAE

In Ex-MAE the Working Group consisted of 12 agronomists until the beginning of 1973 when the number was increased to 20 agronomists.

The counterpart of the FP and Supervisor of the Agronomists was Mr. F. Terán, followed by Ing. R. del Salto, followed by the present counterpart Ing. M. Morales, Chief of the Section of Technical Assistance and Credit in the Department of Rural Development of MAG, and part-time counterpart of the FP.

2. Training and Information

During his stay in Ecuador the associate expert gave two courses each of half a day for the field personnel (total 36).

The associate expert helped in the preparation of a report on the FFHC-AD/FP and acted as a lecturer at the First International Meeting on Soil Fertility and Fertilizatior at Sta. Catalina, INIAP Research Station.

The Associate Expert parepared a "Newsletter" with detailed instruction on the layout of demonstrations.

During frequent field trips the Associate Expert gave the field personnel thorough on-the-spot training in demonstrations and fertilizers as well as in extension work, and he engaged in conversation or discussion with local farmers at every opportunity.

3. Demonstrations

Four-plot demonstrations were laid out so that farmers could see with their own eyes the benefit of fertilizer application. Furthermore, in a simple way, these demonstrations help to gather the information needed in order to find profitable levels of fertilizer application in different regions and soils.

Each year the agronomists were asked to send a plan of demonstrations stating number, crops and months of installation. These plans were then discussed with each agronomist in order to stimulate his interest in the FP and to adjust the crops to the most important crops of the area and, on occasions, to establish a more reasonable number.

The fertilizer demonstrations were to a large extent carried out using related vegetable insecticides, fungicides and selected or certified seed.

Table 7

DEMONSTRATIONS 1971 - 1973

Crop	Planned	Laid out	Results recorded
Potatoes	164	126	26
Maize	129	91	30
Oats	2	2	-
Barley	13	13	-
Wheat	23	15	-
Rice	22	18	10
Sugar cane	32	15	-
Banana	16	10	-
Broad bean	15	10	-
Onion	29	23	-
Bean	9	8	-
Pea	5	5	-
Cotton	10	6	6
Pyrethrum	12	12	-
	481	335	72

Of the total number laid out, so far harvest data is only available from 72 demonstrations.

3.1 Obstacles to Demonstration Work

This low figure is due largely to frequent transfer of high-level and field officers with a subsequent suspension of activities and changes in the field work. For these reasons at least 116 laid out demonstrations have not been harvested.

However, a number of harvest results can still be expected from some districts as not all results for 1972 were sent to Quito and the results of demonstrations for 1973 have hardly been reported, as many have only just been harvested, and others are still to be sown. A summary of results by zones is given in Annex 3.

3.2 Levels of Fertilization in Demonstrations

The level of fertilization in the demonstrations, has been based on the results of trials/demonstrations in previous years and since 1970 has been as follows:

Table 8

FOUR PLOT DEMONSTRATIONS (EACH PLOT 100 m^2)
LEVELS OF PURE NUTRIENTS KG/HA $N/P_2O_5/K_2O$

Crop	Plot 1	Plot 2	Plot 3	Plot 4
Sesame	0-0-0	45-45-45	67.5-45 -45	90- 45 -45
Alfalfa	0-0-0	0-90-0	0-90 -45	0-135 -45
Cotton	0-0-0	45-45-22.5	67.5-45 -22.5	90-67.5-45
Rice	0-0-0	45-45-45	90-45 -45	90- 90 -45
Banana	0-0-0	90-45-22.5	90-90 -22.5	135- 90 -22.5
Sugar Cane	0-0-0	45-90-45	90-90 -45	135- 90 -45
Onion	0-0-0	45-45-45	45-90 -45	90- 90 -45
Bean, Pea	0-0-0	22.5-45-45	22.5-67.5-45	22.5-67.5-67.5
Broad Bean (Vicia faba)	0-0-0	22.5-45-45	22.5-67.5-45	22.5- 90 -45
Maize	0-0-0	45-45-22.5	45-90 -22.5	90- 90 -45
Potato	0-0-0	45-90-45	90-90 -45	90-135 -45
Pyrethrum	0-0-0	45-45-45	45-90 -45	45-135 -45
Tomato	0-0-0	45-90-45	45-90 -45	90- 90 -45
Wheat, Barley, Oats	0-0-0	45-90-45	45-90 -0	90-135 -45

3.3 Soils of Ecuador and their Response to N, P and K

As stated at the First International Meeting on Soil Fertility and Soil Fertilization held at Sta. Catalina, INIAP Research Station in August 1972, the soils of the Ecuadorian Sierra highland and coastal lowlands have a medium-high content of K, but are poor in N and P. Therefore N and P applications usually give a clear response, though this is not always the case with application of K.

3.4 Profitable levels of Fertilization

Experience has shown that the average economical profitable level of fertilization for major grain crops and potatoes is approximately 67 - 100 - 33 in kg/ha, the N level varying from 75 - 135 kg/ha and K_2O not over 45 kg/ha.

For the most common leguminous crops in the Sierra, the same levels in P and K, but not more than about 23 kg N/ha, usually pay well.

3.5 Fertilizer Prices

Fertilizer prices calculated in pure nutrients are given in the following table.

Table 9

FERTILIZER PRICES IN SUCRES FOR BASIC FORMULAS
IN DIFFERENT PARTS OF THE COUNTRY

Zone	Treatment NK kg/ha	Oct. Nov. Dec. 1970	1971	1972	1973
Carchi	45- 0- 0	400	391	468	512
	0-45- 0	300	371	410	378
	0- 0-45	150	173	170	173
Pichincha, Imbabura	45- 0- 0	390	382	458	503
	0-45- 0	290	361	400	374
	0- 0-45	147	153	170	173
Cotopaxi, Tungurahua, Chimborazo	45- 0- 0	380	372	448	494
	0-45- 0	280	351	390	370
	0- 0-45	143	167	166	170
Loja, Zamora	45- 0- 0	400	391	468	512
	0-45- 0	300	371	410	378
	0- 0- 0	150	173	173	176
St. Domingo, Milagro M. J. Calle	45- 0- 0	375	366	443	489
	0-45- 0	275	346	385	368
	0- 0-45	142	153	164	159
Guayaquil	45- 0- 0	340	331	408	458
	0-45- 0	260	311	350	354
	0- 0-45	107	153	152	158

4. Pilot Credit Schemes for Fertilizer and their Objectives

The first Pilot Credit Scheme (PCS) was started with FECOAC in 1967; the second with Ex-MAE in 1970 and the third with INERHI in 1971.

The objectives of these schemes are:

a. to improve credit facilities for fertilizer, so that farmers will be able to buy fertilizers in adequate amounts, according to the recommendations for specific areas and crops.

b. to improve the distribution and timely supply of fertilizer.

c. to establish a Revolving Fund for Fertilizers, based on the funds recuperated from the sale of the fertilizers originally donated to the Pilot Credit Scheme. The recuperated money will be used for new fertilizer purchases.

d. To increase the production of crops through the efficient use of fertilizers, using rates and methods previously investigated and proved to be technically and economically practicable.

e. to start or strengthen farmers associations.

4.1 The Pilot Credit Scheme of FECOAC

The PCS of FECOAC started with an initial donation of 20 tons of fertilizer from FAO and only one cooperative involved. Now, after six years, it has grown rapidly and 29 cooperatives are working with FAO donations as a basis for their Revolving Funds. The total quantity received by FECOAC through FAO equals 6 740 qq which corresponds to 305 726 kg, while the total quantity directly involved in FECOAC's actual Revolving Fund is 10 504 qq including the reinvestments.

The consumption of fertilizers in the affiliated cooperatives reached an estimated 1 250 metric tons in 1972.

FECOAC's Pilot Credit Schemes or as they are called by FECOAC "Pilot Schemes of Supervised Credit" are now working not only with fertilizers, but also with other inputs such as insecticides, fungicides, etc. Furthermore, FECOAC has now started to plan a demonstration programme, so that each cooperative will lay out fertilizer demonstrations, using insecticides, fungicides and certified seed (if possible).

It is the opinion of the staff in FECOAC and of the associate expert, that such a demonstration programme would strengthen the PCS, educate the farmers and stimulate their interest.

The following information provided through the kind collaboration of Lic. Manuel Benitez and Ing. Roberto Cruz Polanco, Supervisor of the Agricultural Department of FECOAC, illustrates the work being carried out. In this case the example is the cooperative of "El Progreso" in Atahualpa, Pichincha, which was started in 1969. At the end of the same year the cooperative received 20 tons of fertilizer to start a Revolving Fund for Fertilizers. The fertilizers received in 1969 were sold in 1970, those received at the end of 1970 were sold in 1971 and those received at the end of 1971 were sold in 1972.

Table 10

FERTILIZER CONSUMPTION IN THE COOPERATIVE "EL PROGRESO"

	1969	1970	1971	1972
Fertilizers received from FAO/FECOAC, mt	20	20	20	-
Fertilizers consumed by the cooperative, qq	-	230	500	1 500 1/

1/ Approximate figure.

Credit terms are six months credit, paying an interest of one percent of the debt per month. The repayment is about 90 percent.

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The principal crops in the cooperative are: wheat, potatoes and maize and the levels of fertilization actually used are as follows:

Table 11

LEVEL OF FERTILIZATION IN "EL PROGRESO"

Crop	Bags of 10-30-10/ha	Bags of Urea/ha	Equivalent in kg pure nutrients $N-P_2O_5-K_2O$	Cost of Fertilizer S/. /ha
Wheat	4	1	43- 60- 20	927
Potatoes	10	3	129-150-150	2 307
Maize	3	1	38- 45- 15	740

When the prices received by the farmer are: wheat 2,20 S/./kg, potatoes 0,75 S/./kg and maize 1,75 S/./kg, it is possible to make the following economic evaluation, which partially illustrates the reason for the success of this cooperative.

Table 12

EVALUATION OF FERTILIZATION IN "EL PROGRESO"

Crop	Yield kg/ha without fertilizers	Yield kg/ha with fertilizers	Yield increase kg/ha	Value of yield increase S/./ha	Cost of fertilizer S/./ha	Net Gain S/./ha	V/C
Wheat	800	2 200	1 400	3 080	927	2 153	3.32
Potatoes	2 200	13 500	11 300	8 475	2 307	6 168	3.67
Maize	900	2 200	1 300	2 275	740	1 535	3.07

Other reasons for the success of the PCS are the interest and support of the cooperative leaders. These leaders are trained by FECOAC and the cooperatives are supervised administratively by FECOAC and technically by the extension agents of MAG.

A detailed description of FECOAC fertilizer distribution and the Revolving Fund are given in Annex 4.

4.2 The Pilot Credit Scheme of INERHI

The PCS of INERHI started with an initial FAO donation of 25 tons 12-24-12, 15 tons 10-30-10 and 43 tons Urea.

The information on distribution and sales, given in the following paragraphs and tables has been provided through the kind collaboration of Ing. Miguel Chehab, Chief of the Division of Drainage and Irrigation, Ing. Jorge Sotomayor, Chief of Investigation and Technical Assistance and Mr. Van Tenterhem, Soil Fertility Expert of ECU-522.

This information also illustrates the cooperation and continuity between the FFHC/AD Pilot Credit Scheme and the follow-up in the FCS of ECU-522.

Examples of the FCS in 3 Zones

a. Milagro — UREA

Total received 1971	660 bags/45 kg	62 700 S/.
13 July 1971, sent to M.J. Calle	270 " "	25 670 S/.
Rest	390 " "	37 030 S/.
Used for demonstrations	10 " "	950 S/.
Sold to 21 farmers	237 " "	31 995 S/.
Balance in warehouse	43 " "	4 085 S/.
Repaid		27 695 S/.
Repayment rate		87 %

12 - 24 - 12

Total received 1971	259 bags/45 kg	29 785 S/.
13 July 1971, sent to M.J. Calle	50 " "	5 750 S/.
Rest	209 " "	24 035 S/.
Used for demonstrations	15 " "	1 725 S/.
Sold to 15 farmers	171 " "	19 665 S/.
Balance in warehouse	23 " "	2 645 S/.
Repaid		16 905 S/.
Repayment rate		86 %

b. M. J. CALLE — UREA

Total received 1971/72	410 bags/45 kg	38 970 S/.
Used for demonstrations	2 " "	190 S/.
Sold to 42 farmers	408 " "	
Repaid		
Repayment rate		100 %

12 - 24 - 12

Total received 1971	170 bags/45 kg	20 400 S/.
Sold to 27 farmers	170 " "	21 463 S/.
Repaid		21 463 S/.
Repayment rate		100 %

c. PISQUE — UREA

Total received 1971/72	232 bags/45 kg	22 771 S/.
Used for demonstrations	27 " "	2 650 S/.
Sold to 25 farmers	205 " "	21 167 S/.
Repaid		21 167 S/.
Repayment rate		100 %

10 - 30 - 10

Total received 1971/72	73 bags/45 kg	8 770.80 $/.
Sold to 30 farmers	73 " "	9 227.00 $/.
Repaid		9 227.00 $/.
Repayment rate		100 %

12 - 24 - 12

Total received 1971	76 bags/45 kg	8 740.00 $/.
Sold to 15 farmers	76 " "	9 194.00 $/.
Repaid		9 194.00 $/.
Repayment rate		100 %

The four tables in Annex 5 give a biref description of the INERHI irrigation districts and a detailed description of the Revolving Fund.

4.3 The Pilot Credit Scheme of Ex-MAE (Now Department of Rural Development, MAG).

The PCS of Ex-MAE was started with an initial FAO donation of 44 qq sulphate of ammonia, 500 qq of single superphosphate and 100 qq of muriate of potash.

The following information on distribution and sales has been made available through the collaboration of Ing. Pascual Torres, Chief of the Section of Technical Assistance, Department of Rural Development MAG, and Ing. M. Morales, Chief of the Section of Technical Assistance and Credit, Department of Rural Development, MAG.

Table 13

AMOUNT OF FERTILIZERS IN REVOLVING FUND, EX-MAE 1970

Zone	Sulphate of Ammonia qq	Single Super-phosphate qq	Muriate of Potash qq
Imabura	236.50	353.75	73.38
Tungurahua	189.37	107.14	26.41
Chimborazo	40.70	61.20	7.20
T o t a l	466.57	522.09	106.99

Table 14

DISTRIBUTION OF DONATED FERTILIZERS, EX-MAE 1971

Zone	12-24-12 qq	10-30-10 50 kg bags	Urea 50 kg bags
Imbabura	85	80	30
Cotopaxi	50	40	10
Tungurahua	85	90	28
Chimborazo N.	90	90	30
Chimborazo S.	50	-	12
Saraguro	100	-	30

Forty bags 12-24-12 was used for demonstrations.

Table 15

DISTRIBUTION OF FERTILIZERS IN THE PCS OF MAG (EX-MAE)
INVESTMENT OF REVOLVING FUND 1973

Zone	10-30-10 bags of 50 kg	Urea bags of 50 kg
Cotopaxi	100	30
Tungurahua	135	30
Cañar	100	30
Loja	100	30

The zone of Cañar is a new one for a MAG (Ex-MAE) PCS, although demonstrations have been held there for some years. In Cañar, as all over the country, there is an increasing demand for fertilizers in quantities which could not be met up to the present time.

In the following tables some examples are given of Investment Plans for the Ex-MAE PCS in three zones.

Table 16

IMBABURA

Place	Crop	Ha	No. of benefitted	Estimated Yields qq/ha		Yield increase qq/ha
				without fertilz.	with fertilz.	
Pilascacho	Potatoes	10	37	70	160	90
El Abra	"	5	23	95	190	95
Sta. Roaa	"	16	16	70	200	130
Pilascacho	Maize	17	42	15	25	10
Pucará	"	7	21	15	25	10
Chirihuasi	Wheat	15	51	8	22	14
Rumipamba	"	7	35	5	15	10
Yanyuco	Beans	12	24	17	33	16
Cuicocha	Maize	4	6	10	25	15
Punge	"	2	2	10	24	14
Topo Chico	"	2	6	12	22	10
Chilcapamba	"	2	8	8	20	12
Inguinchala	"	2	4	10	25	15
T O T A L		101	275			

Table 17

TUNGURAHUA

Place	Crop	Ha	No. of benefitted	Estimated Yields qq/ha		Yield increase qq/ha
				without fertilz.	with fertilz.	
Hda.Sta.Anita	Potatoes	4	7	300	450	150
Hda. Colcha						
Verde	"	1	2	270	355	85
Llimpe	"	2	3	150	225	75
Pillato	"	1	1	120	150	30
Pinquilli	Onion	2	2	120	240	120
Yantzaputzan	Potatoes	4	6	400	500	100
Llangahua	"	3	86	450	550	100
Cotalé	"	4	18	400	700	300
T O T A L		21	125			

Table 18

CHIMBORAZO N.

Place	Crop	Ha	No. of benefitted	Estimated Yields qq/ha		Yield increase qq/ha
				without fertilz.	with fertilz.	
Calchi	Potatoes	6	10	190	260	70

Where possible, certified seed was used. The agronomists, through field-days and frequent supervisory visits gave instructioned in the use of insecticides and fungicides.

Table 19

QUANTITIES AND COSTS IN RIOBAMBA (CHIMBORAZO N.)

12 - 24 - 12

Total received 1971/72	99 bags	12.771 S/.
Sold to 61 farmers	99 bags	12.771 S/.
Repaid		12.771 S/.
Repayment rate		100 %

UREA

Total received 1971/72	60 bags	5.640 S/.
Sold to 14 farmers	23 bags	2.162 S/.
Repaid		2.162 S/.
Repayment rate		100 %
Balance in warehouse	37 bags	3.478 S/.

Table 19 (contd.)

10 - 30 - 10		
Total received 1972	90 bags	11.520 $/.
Sold to 35 farmers	90 bags	11.520 $/.
Repaid		11.520 $/.
Repayment rate		100 %
Sulphate of Ammonia		
Total received 1970	40 bags	2.600 $/.
Sold to 7 farmers	40 bags	2.600 $/.
Repaid		2.320 $/.
Repayment rate		89 %

Tables with details of the Revolving Fund are given in Annex 6.

ANNEX 1

ARTICLES OF LAW NO. 787 OF 4 JUNE 1971

Art. 1.- It is authorized to the Minister of Production to subscribe stocks up to S/.4 000 000.00, in name and in representation of the National Government, owing to the capital increase that the Compañía de Fertilizantes Ecuatorianos S.A. (FERTISA) is going to accomplish in its new organization as Compañía de Economía Mixta.

The quantity mentioned in this article corresponds to the stocks subscription by equal parts for the Programas Nacionales de Granos de Clima Templado y Forrajes, del Banano y Frutas Tropicales, del Algodón y del Arroz, Maíz y Control de Piladoras y Molinos.

Art. 2.- It is authorized to the Minister of Production to subscribe, within the capital increase of FERTISA, stocks for the amount of S/.2 000 000.00 on behalf of the Consorcios de Centros Agrícolas of the Country; this benefit will be distributed to each one of them in proportion to the rural population of each Province, according to the last official census.

Art. 3.- To cover the contributions pointed out in the former articles, the Ministry of Production will take from the funds proceeding from the Decrete No. 152, Item "Proyectos Agro-Industriales - Empresas Mixtas", from the resources that its corresponding "Programas Especiales" dispose and from the product of profits and bonds raffle owning to the Ministry of Production.

Art. 4.- The instrument referring to the Statutes reform that is going to be accomplished by Fertilizantes Ecuatorianos S.A. (FERTISA), will be totally exempted from taxes, in the proportional part corresponding to the Estate, and other taxes which charge to this act, including those of inscription and Commerce register.

Art. 5.- When Fertilizantes Ecuatorianos S.A. (FERTISA) be established as Compañía Mixta, it will have exemption from all taxes and rights, wharfage, and fiscal, municipal, provincial contributions, and additional taxes (seals and especies), including customs taxes to importations, except those taxes that are actually paid to the Municipio de Alausí and to the Junta Central de Asistencia Social del Chimborazo, because of the minor concession of sulphur of Tixán.

Art. 6.- The competent Organisms will extend importation licence for fertilizer importations only in case that Fertilizantes Ecuatorianos S.A. (FERTISA) will not be able to supply the national market, and these importations will be made through FERTISA.

Art. 7.- FERTISA will be able to participate in the plans for the exportation of agricultural exceedings established by the Ministry of Production.

Art. 8.- The Ministry of Production will take care that the prices of the fertilizers sold by FERTISA be fixed at convenient levels for the agricultural sector, and the Instituto de Normalización will take care of the quality of these fertilizers.

Art. 9.- In the sales that FERTISA carries out, it is established a contribution of 2% that will be retained by the Enterprise to cover the stocks subscribed by the Ministry of Production, on behalf of the Consorcios de Centros Agrícolas of the Country, and to acquire stocks on behalf of the farmers who utilize its products. These stocks will be acquired by sale from stockholders or by capital increase of the Enterprise.

If there is a balance, it will be annually assured on behalf of the Consorcios de Centros Agrícolas.

Art.10.- The Minister of Production will establish rules for the use of assigned resources for the respective especial programmes and the Transference System of stocks to the Consorcious and to the farmers, duly qualified as such.

The amounts collected by the Ministry of Production by stocks transfer and also the part of profits designated by the Law, will come into the Fondo de Financiamiento.

Art.11.- The disposals of the present Decrete, as especial ones, will prevail over those that oppose.

Art.12.- The Ministers of Production and Finances will be in charge of the execution of the present Decrete that will rule from this date on.

Signed in the Palacio Nacional, in Quito, June 2, 1971.

ANNEX 2

ARTICLES OF LAW NO. 598 OF 25 MAY 1973

THE MINISTER OF AGRICULTURE AND LIVESTOCK,

Considering:

That it is his responsibility to fix the prices of the inputs required by the agricultural sector;

That Fertilizantes Ecuatorianos S.A. (FERTISA), Compañía de Economía Mixta, produces and imports fertilizers to satisfy the demand of the national market;

That, according to the contract signed with the Banco Nacional de Fomento on 27 27 February 1973, this Enterprise should import and pack 34 000 metric tons of fertilizers, according to the following form:

Fertilizers	Metric Tons
Urea (46-0-0)	15 000
Ammonium sulphate (20-0-0)	8 000
Diamonium phosphate (18-46-0)	5 000
Triple Superphosphate (0-46-0)	2 000
Sulphate of magnesium	2 200

That because of the increase of the prices of fertilizers in the international market, and also of the maritime freights, mixed commissions, composed by funcionaries of the Banco Nacional de Fomento and of the Enterprise were disposed to carry out cost studies that could make it possible to regularize adequately the sale prices of fertilizers for the people, whose reports have been put into consideration of the Ministry.

Resolves:

Art. 1.- To fix in Guayaquil the following sale prices for the people, per bag of 50 net kilos:

a) For simple fertilizers

Product	Ex-fabric price	Cash sale price S/. per 50 kg
Urea	158.60	168.12
Sulphate of ammonium	95.98	101.74
Diamonium phosphate	180.61	191.45

Product	Ex-fabric price	Cash sale price S/. per 50 kg
Triple superphosphate	167.02	177.04
Muriate of Potash	99.42	105.38
Sulphate of Magnesium	94.54	100.22
b) For composed fertilizers		
10-30-10	167.23	177.25
12-24-12	158.07	167.55
5-20-20	149.82	158.82
8-24- 8	134.93	143.03

Art. 2.- In the different localities of the country, the prices will be established by adding to the prices in Guayaquil the values of the corresponding transport, that can be contracted by the Banco Nacional de Fomento or by FERTISA.

Art. 3.- The Banco Nacional de Fomento will sell the fertilizers to the farmers associations, giving priority to the specific projects in which the Ministry of Agriculture and Livestock is interested.

Art. 4.- The prices pointed out in this agreement will be in force till it be ratified or rectified through Resolution by the Superintendent of Prices.

Signed in Quito, 17 May 1973.

ANNEX 3

SUMMARY OF RESULTS BY ZONES

Plot No.	Treatment $N-P_2O_5-K_2O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase * $/ha	Cost of Fertilizer * $/ha	Net Return * $/ha	V/C
PISQUE (8 demonstrations)				IRRIGATED MAIZE (1969)			
T	0- 0- 0	903					-
2	45- 0- 0	1 876	973	1 284	325	959	3.95
3	45-45- 0	2 292	1 389	1 833	775	1 058	2.37
4	45-45-45	2 385	1 482	1 956	910	1 046	2.15
Level of fertilization giving highest Net Return: 45-45-0							
Level of fertilization giving highest V/C ratio: 45- 0-0							
PISQUE (7 demonstrations)				IRRIGATED MAIZE (1969)			
T	0- 0- 0	1 320	-	-	-	-	-
2	45- 0- 0	1 850	530	795	260	535	3.06
3	45-90- 0	2 490	1 170	1 755	860	895	2.04
4	45-90-45	2 101	781	1 172	1 000	172	1.17
Level of fertilization giving highest Net Return: 45-90-0							
Level of fertilization giving highest V/C ratio: 45- 0- 0							
PISQUE (5 demonstrations)				IRRIGATED MAIZE (1969)			
T	0- 0- 0	1 464	-	-	-	-	-
2	90- 0- 0	2 086	622	933	520	413	1.79
3	90-90- 0	2 794	1 330	1 995	1 120	875	1.78
4	90-90-45	2 797	1 333	2 000	1 260	740	1.59
Level of fertilization giving highest Net Return: 90-90-0							
Level of fertilization giving highest V/C ratio: 90-0-0							
TUMBACO (4 demonstrations)				IRRIGATED MAIZE (1969)			
T	0- 0- 0	2 681	-	-	-	-	-
2	90- 0- 0	4 309	1 628	2 865	800	2 065	3.58
3	90-45- 0	5 273	2 592	4 562	1 060	3 502	4.30
4	90-45-45	4 997	2 316	4 076	1 210	2 866	3.37
Level of fertilization giving highest Net Return: 90-45-0							
Level of fertilization giving highest V/C ratio: 90-45-0							
CHIMBORAZO (6 demonstrations)				IRRIGATED MAIZE (1969)			
T	0- 0- 0	414	-	-	-	-	-
2	45- 0- 0	437	23	55	425	-	0.13
3	45-45- 0	513	99	235	670	-	0.35
4	45-45-45	596	182	431	850	-	0.35

* $ = Sucres

Plot No.	Treatment $N-P_2O_5-K_2O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
TUMBACO (15 demonstrations) IRRIGATED MAIZE, SOFT (1969)							
T	0- 0- 0	6 465	-	-	-	-	-
2	90- 0- 0	9 106	2 641	1 743	400	1 343	4.36
3	90-45- 0	10 458	3 993	2 635	1 060	1 575	2.49
4	90-45-45	9 871	3 406	2 248	1 210	1 038	1.87
Level of fertilization giving highest Net Return: 90-45-0 Level of fertilization giving highest V/C ratio: 90- 0-0							
PISQUE, PIFO (43 demonstrations) IRRIGATED MAIZE (1970)							
T	0- 0- 0	613	-	-	-	-	-
2	45- 0- 0	927	314	728	390	338	1.87
3	45-45- 0	1 079	466	1 081	680	401	1.59
4	45-45-45	1 133	520	1 206	827	379	1.46
Level of fertilization giving highest Net Return: 45-45-0 Level of fertilization giving highest V/C ratio: 45- 0-0							

Plot No.	Treatment $N-P_2O_5-K_2O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
PISQUE, PIFO (7 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	810	-	-	-	-	-
2	45-45-45	1 643	833	1 833	827	1 006	2.22
3	45-90-45	1 928	1 118	2 460	1 117	1 343	2.20
4	90-90-45	1 989	1 179	2 594	1 507	1 087	1.72
Level of fertilization giving highest Net Return: 45-90-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
PISQUE (3 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	872	-	-	-	-	-
2	45- 0- 0	1 031	159	239	260	-	0.92
3	45-90- 0	1 637	765	1 148	860	288	1.33
4	45-90- 0	1 850	978	1 467	1 000	467	1.47
Level of fertilization giving highest Net Return: 45-90-45							
Level of fertilization giving highest V/C ratio: 45-90-45							
PISQUE MONTESERIN (7 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	1 128	-	-	-	-	-
2	45-45-45	1 581	453	997	827	170	1.21
3	45-45-45	1 899	771	1 696	1 117	579	1.52
4	90-90-45	2 158	1 030	2 266	1 507	757	1.50
Level of fertilization giving highest Net Return: 90-90-45							
Level of fertilization giving highest V/C ratio: 45-90-45							
TUMBACO (10 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	1 660	-	-	-	-	-
2	45-45-45	2 608	948	2 086	870	1 216	2.40
3	45-90-45	3 774	2 114	4 651	1 314	3 337	3.54
4	90-90-45	3 343	1 683	3 703	1 574	2 129	2.35
Level of fertilization giving highest Net Return: 45-90-45							
Level of fertilization giving highest V/C ratio: 45-90-45							
MILAGRO (5 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	1 079	-	-	-	-	-
2	45- 0- 0	1 742	663	597	425	172	1.40
3	45-45- 0	1 987	908	817	660	157	1.24
4	45-45-45	2 232	1 153	1 038	835	203	1.24
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45- 0-0							

Plot No.	Treatment $N-P_2O_5-K_2O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
MILAGRO (2 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	862	-	-	-	-	-
2	45-45-45	1 906	1 044	1 608	914	694	1.76
3	45-90-45	1 860	998	1 537	1 203	334	1.28
4	90-90-45	2 268	1 406	2 165	1 666	499	1.30
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
MANUEL J. CALLE (4 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	1 350	-	-	-	-	-
2	45-45-45	1 644	294	488	792	-	-
3	45-90-45	1 769	419	695	1 067	-	-
4	90-90-45	2 143	1 212	2 011	1 442	569	1.39
Level of fertilization giving highest Net Return: 90-90-45							
Level of fertilization giving highest V/C ratio: 90-90-45							
MANUEL J. CALLE (3 demonstrations)			IRRIGATED MAIZE (1970)				
T	0- 0- 0	892	-	-	-	-	-
2	45-45-45	1 663	771	1 187	914	273	1.30
3	45-90-45	1 754	862	1 327	1 203	124	1.10
4	90-90-45	2 038	1 146	1 765	1 666	99	1.06
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
TUMBACO (9 demonstrations)			IRRIGATED MAIZE (SOFT) (1970)				
T	0- 0- 0	6 003	-	-	-	-	-
2	45-45-45	8 457	2 454	1 080	914	166	1.18
3	45-90-45	9 223	3 220	1 417	1 203	214	1.18
4	90-90-45	10 846	4 843	2 131	1 666	465	1.28
Level of fertilization giving highest Net Return: 90-90-45							
Level of fertilization giving highest V/C ratio: 90-90-45							

Plot No.	Treatment $N-P_2O_5-O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
PISQUE, PIFO (16 demonstrations) IRRIGATED MAIZE (1971)							
T	0- 0- 0	1 112	-	-	-	-	-
2	45-45-45	1 928	816	1 795	896	899	2.00
3	45-90-45	1 921	809	1 780	1 247	533	
4	90-90-45	2 072	960	2 112	1 619	493	1.30
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C ratio: 45-45-45							
MANUEL J. CALLE (3 demonstrations) IRRIGATED MAIZE (1971)							
T	0- 0- 0	1 030	-	-	-	-	-
2	45-45-45	1 773	743	1 010	865	145	1.17
3	45-90-45	2 100	1 070	1 647	1 211	436	1.36
4	90-90-45	2 373	1 343	2 145	1 577	568	1.36
Level of fertilization giving highest Net Return: 90-90-45 Level of fertilization giving highest V/C ratio: 90-90-45 and 45-90-45							
PISQUE, MONTESERIN (5 demonstrations) IRRIGATED MAIZE (1972)							
T	0- 0- 0	1 216	-	-	-	-	-
2	45-45-45	1 724	508	1 570	1 028	542	1.53
3	45-90-45	2 114	898	2 775	1 428	1 347	1.94
4	90-90-45	2 223	1 007	3 112	1 886	1 226	1.65
Level of fertilization giving highest Net Return: 45-90-45 Level of fertilization giving highest V/C Ratio: 45-90-45							

Plot No.	Treatment $N-P_2O_5-K_2O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
TUMBACO (2 demonstrations)			IRRIGATED BARLEY (1970)				
T	0- 0- 0	408	-	-	-	-	-
2	45- 0- 0	1 701	1 293	1 422	400	1 022	3.56
3	45-67.5-0	1 611	1 203	1 323	790	533	1.67
4	45-67.5-22.5	1 225	817	899	865	34	1.04
Level of fertilization giving highest Net Return: 45-0-0 Level of fertilization giving highest V/C ratio: 45-0-0							
PISQUE (2 demonstrations)			IRRIGATED WHEAT (1970)				
T	0- 0- 0	1 843	-	-	-	-	-
2	45- 0- 0	2 198	355	710	420	290	1.69
3	45-90- 0	2 977	1 134	2 268	890	1 378	2.55
4	45-90-45	2 906	1 063	2 126	1 050	1 076	2.02
Level of fertilization giving highest Net Return: 45-90-0 Level of fertilization giving highest V/C ratio: 45-90-0							
TUMBACO (2 demonstrations)			IRRIGATED WHEAT (1970)				
T	0- 0- 0	438	-	-	-	-	-
2	45- 0- 0	692	254	447	400	47	1.11
3	45-67.5-0	849	411	723	790	-	0.92
4	45-67.5-22.5	908	470	1 598	865	733	1.85
Level of fertilization giving highest Net Return: 45-67.5-22.5 Level of fertilization giving highest V/C ratio: 45-67.5-22.5							
CHIMBORAZO (2 demonstrations)			IRRIGATED POTATOES (1969)				
T	0- 0- 0	10 253	-	-	-	-	-
2	45- 0- 0	10 501	248	394	425	-	0.93
3	45-45- 0	11 408	1 155	1 836	670	1 166	2.74
4	45-45-45	13 382	3 129	4 975	850	4 125	5.85
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C ratio: 45-45-45							

Plot No.	Treatment $N-P_2O_5-0$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
PISQUE, MONTESERIN (11 demonstrations) IRRIGATED POTATOES (1971)							
T	0- 0- 0	6 618	-	-	-	-	-
2	45-90-45	9 476	2 858	2 515	1 257	1 258	2.00
3	90-90-45	10 932	4 314	3 796	1 639	2 157	2.32
4	90-135-45	14 230	7 612	6 699	2 000	4 699	3.35
Level of fertilization giving highest Net Return: 90-135-45 Level of fertilization giving highest V/C ratio: 90-135-45							
PISQUE (2 demonstrations) IRRIGATED POTATOES (1970)							
T	0- 0- 0	9 662	-	-	-	-	-
2	45- 0- 0	11 159	1 497	1 347	420	927	3.21
3	45-45- 0	14 098	4 436	3 992	655	3 337	6.09
4	45-45-22.5	13 608	3 946	3 551	735	2 816	4.83
Level of fertilization giving highest Net Return: 45-45-0 Level of fertilization giving highest V/C Ratio: 45-45-0							
PISQUE (8 demonstrations) IRRIGATED POTATOES (1970)							
T	0- 0- 0	6 107	-	-	-	-	-
2	90- 0- 0	6 929	822	904	520	384	1.74
3	90-135-0	10 019	3 912	4 303	1 420	2 883	3.03
4	90-135-45	11 737	5 630	6 193	1 560	4 633	3.97
Level of fertilization giving highest Net Return: 90-135-45 Level of fertilization giving highest V/C Ratio: 90-135-45							

Plot No.	Treatment $N-P_2O_5-K_2O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
CHIMBORAZO (2 demonstrations)			IRRIGATED POTATOES (1970)				
T	0- 0- 0	12 089	-	-	-	-	-
2	45- 0- 0	12 587	498	657	425	232	1.55
3	45-45- 0	12 928	839	1 107	670	437	1.65
4	45-45-45	14 062	1 973	2 604	850	1 754	3.06
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C ratio: 45-45-45							
TUMBACO (8 demonstrations)			IRRIGATED POTATOES (1970)				
T	0- 0- 0	4 139	-	-	-	-	-
2	45-90-45	6 294	2 155	2 845	1 314	1 531	2.17
3	90-90-45	5 330	1 191	1 572	1 574	-	1.00
4	90-135-45	7 020	2 881	3 803	1 758	2 045	2.16
Level of fertilization giving highest Net Return: 45-90-45 Level of fertilization giving highest V/C ratio: 90-135-45							
PISQUE (9 demonstrations)			IRRIGATED POTATOES (1971)				
T	0- 0- 0	12 040	-	-	-	-	-
2	45-45- 0	16 297	4 257	4 683	560	4 123	8.36
3	45- 0-45	14 107	2 067	2 274	400	1 874	5.69
4	45-45-45	17 588	5 548	6 103	700	5 403	8.72
5	90-45-45	17 747	5 707	6 278	960	5 318	6.54
6	45-90-45	16 518	4 478	4 926	1 000	3 926	4.93
7	90-90-45	18 419	6 379	7 017	1 260	5 757	5.57
8	135-90-45	1 Plot lost					
	(8 demonstrations)						
8	135-90-45	17 064	5 663	6 229	1 560	4 669	3.99
Level of fertilization giving highest Net Return: 90-90-45 Level of fertilization giving highest V/C Radio: 45-45-45							
PISQUE, PIFO (15 demonstrations)			IRRIGATED POTATOES (1971)				
T	0- 0- 0	4 016	-	-	-	-	-
2	45-90-45	6 275	2 259	1 062	1 257	-	-
3	90-90-45	6 911	2 895	1 361	1 639	-	-
4	90-135-45	6 839	2 923	1 374	2 000	-	-
POOR RESULTS DUE TO UNFAVOURABLE CLIMATIC CONDITIONS							

Plot No.	Treatment N-P_2O_5-0 kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
MILAGRO (2 demonstrations)		IRRIGATED COTTON (1970)					
T	0- 0- 0	1 089	-	-	-	-	-
2	45- 0- 0	1 338	249	872	425	447	2.05
3	45-45- 0	1 679	590	2 065	660	1 405	3.12
4	45-45-45	1 860	771	2 699	835	1 864	3.23
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
MILAGRO (3 demonstrations)		IRRIGATED COTTON (1970)					
T	0- 0- 0	862	-	-	-	-	-
2	45-45-45	1 527	665	2 347	914	1 433	2.57
3	45-90-45	1 557	695	2 453	1 203	1 250	2.04
4	90-90-45	1 709	847	2 990	1 666	1 324	1.79
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
MANUEL J. CALLE (12 demonstrations)		IRRIGATED BANANA (1970)					
T	0- 0- 0	2 277	-	-	-	-	-
2	45- 0- 0	7 579	5 302	3 287	375	2 912	8.77
3	45-45- 0	10 044	7 767	4 815	650	4 165	4.41
4	45-45-45	13 889	11 612	7 199	792	6 407	9.09
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
TUMBACO (2 demonstrations)		IRRIGATED GREEN BEANS (1970)					
T	0- 0- 0	4 797	-	-	-	-	-
2	22.5- 45-45	13 306	8 509	18 720	740	17 980	24.69
3	22.5-67.5-45	13 540	8 743	19 235	962	17 273	19.99
4	22.5-67.5-45	12 203	7 406	16 293	1 045	15 248	15.59
Level of fertilization giving highest Net Return: 22.5-45-45							
Level of fertilization giving highest V/C ratio: 22.5-45-45							
MILAGRO (4 demonstrations)		IRRIGATED RICE (1971)					
T	0- 0-0	712	-	-	-	-	-
2	45-45-0	1 304	592	1 302	752	550	1.73
3	45- 0-45	1 259	547	1 203	625	578	1.92
4	45-45-45	1 905	1 193	2 625	914	1 711	2.87
5	90-45-45	2 359	1 647	3 623	1 377	2 246	2.63
6	45-90-45	2 234	1 522	3 348	1 203	2 145	2.78
7	90-90-45	2 495	1 783	3 923	1 666	2 257	2.35
8	135-90-45	2 823	2 111	4 644	2 129	2 515	2.18
Level of fertilization giving highest Net Return: 135-90-45							
Level of Fertilization giving highest V/C ratio: 45-45-45							

Plot No.	Treatment N-P_2O_5-0 kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
MILAGRO (24 demonstrations)		IRRIGATED RICE (1971)					
T	0- 0- 0	968	-	-	-	-	-
2	45- 0- 0	1 673	705	1 833	425	1 408	4.31
3	45-45- 0	1 850	882	2 293	660	1 633	3.47
4	45-45-45	2 361	1 393	3 622	835	2 787	4.34
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C ratio: 45-45-45							
MILAGRO (7 demonstrations)		IRRIGATED RICE (1971)					
T	0- 0- 0	908	-	-	-	-	-
2	45-45-45	2 054	1 146	2 521	914	1 607	2.76
3	45-90-45	2 554	1 646	3 621	1 203	2 418	3.01
4	90-90-45	2 917	2 009	4 420	1 666	2 754	2.65
Level of fertilization giving highest Net Return: 90-90-45 Level of fertilization giving highest V/C ratio: 45-90-45							
MILAGRO (8 demonstrations)		IRRIGATED RICE (1971)					
T	0- 0- 0	2 257	-	-	-	-	-
2	45-45-45	4 349	2 092	6 464	-	-	-
3	90-45-45	5 488	3 231	9 983	1 231	8 752	8.11
4	90-90-45	5 880	3 623	11 195	1 577	9 618	7.10
Level of fertilization giving highest Net Return: 90-90-45 Level of fertilization giving highest V/C ratio: 90-45-45							
MANUEL J. CALLE (6 demonstrations)		IRRIGATED RICE (1971)					
T	0- 0- 0	1 336	-	-	-	-	-
2	45- 0- 0	1 944	608	1 581	425	1 156	3.72
3	45-45- 0	1 886	550	1 430	660	770	2.17
4	45-45-45	2 296	960	2 496	835	1 661	2.99
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C ratio: 45- 0-0							
MANUEL J. CALLE (2 demonstrations)		IRRIGATED RICE (1971)					
T	0- 0- 0	920	-	-	-	-	-
2	45-45-45	1 885	965	1 959	865	1 094	2.26
3	90-45-45	2 065	1 145	2 324	1 231	1 093	1.89
4	90-90-45	2 210	1 290	2 619	1 577	1 042	1.66
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C Ratio: 45-45-45							

Plot No.	Treatment N-P_2O_5-0 kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
CHIMBORAZO (2 demonstrations)			IRRIGATED ONION (1969)				
T	0- 0- 0	10 841	-	-	-	-	-
2	45- 0- 0	11 431	590	944	425	519	2.22
3	45-45- 0	12 451	1 610	2 576	670	1 906	3.84
4	45-45-45	13 880	3 039	4 862	850	4 012	5.72
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C Ratio: 45-45-45							
TUMBACO (6 demonstrations)			IRRIGATED CABBAGE (1969)				
T	0- 0- 0	42 692	-	-	-	-	-
2	45- 0- 0	60 601	17 909	1 970	400	1 570	4.93
3	45-22.5-0	63 793	21 101	2 321	530	1 791	4.38
4	45-22.5-45	35 010	35 010	3 851	680	3 171	5.66
Level of fertilization giving highest Net Return: 45-22.5-45							
Level of fertilization giving highest V/C Ratio: 45-22.5-45							
MILAGRO (2 demonstrations)			IRRIGATED SESAME (1970)				
T	0- 0- 0	397	-	-	-	-	-
2	45- 0- 0	567	170	629	425	204	1.48
3	45-45- 0	781	284	1 051	660	391	1.59
4	45-45-45	953	556	2 057	835	1 222	2.46
Level of fertilization giving highest Net Return: 45-45-45							
Level of fertilization giving highest V/C ratio: 45-45-45							
MILAGRO (3 demonstrations)			IRRIGATED SESAME (1970)				
T	0- 0- 0	360	-	-	-	-	-
2	45-45-45	647	287	1 581	914	667	1.73
3	90-45-45	737	377	2 077	1 377	700	1.51
4	45-90-45	805	445	2 452	1 203	1 249	2.04
Level of fertilization giving highest Net Return: 45-90-45							
Level of fertilization giving highest V/C ratio: 45-90-45							
TUMBACO (2 demonstrations)			IRRIGATED ALFALFA (1970)				
T2	0- 0- 0	14 470	-	-	-	-	-
2	0-90- 0	21 546	7 076	1 274	888	386	1.43
3	0-90-45	24 336	9 866	1 776	1 054	722	1.69
4	0-135-90	28 487	14 017	2 523	1 664	859	1.52
Level of fertilization giving highest Net Return: 0-135-90							
Level of fertilization giving highest V/C ratio: 0-90-45							

Plot No.	Treatment N-P_2O_5-0 kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of fertilizer $/ha	Net Return $/ha	V/C
CHIMBORAZO (5 demonstrations)			IRRIGATED CARROTS (1971)				
T	0- 0- 0	14 334	-	-	-	-	-
2	45- 0- 0	14 860	526	526	425	101	1.24
3	0-45- 0	15 713	1 379	1 379	245	1 134	5.63
4	0- 0-45	14 488	114	114	180	-	0.63
5	45-45- 0	16 193	1 859	1 859	670	1 189	2.77
6	45- 0-45	16 720	2 386	2 386	605	1 781	3.94
7	0-45-45	17 572	3 238	3 238	425	2 813	7.62
8	45-45-45	18 852	4 518	4 518	850	3 668	5.32
Level of fertilization giving highest Net Return: 45-45-45 Level of fertilization giving highest V/C ratio: 0-45-45							
MILAGRO (6 demonstrations)			IRRIGATED COTTON (1971)				
T	0- 0- 0	968	-	-	-	-	-
2	45-45-45	1 671	703	4 338	865	3 473	5.02
3	90-45-45	1 862	894	5 516	1 231	4 285	4.48
4	90-90-45	1 905	937	5 781	1 577	4 204	3.67
Level of fertilization giving highest Net Return: 90-45-45 Level of fertilization giving highest V/C ratio: 45-45-45							
T	0- 0- 0	499	-	-	-	-	-
2	45- 0- 0	567	68	95	425	-	0.22
3	45-45- 0	2 041	1 542	2 159	808	1 351	2.67
4	45-67.5-22.5	3 062	2 563	3 574	906	2 668	3.94
Level of fertilization giving highest Net Return: 45-67.5-22.5 Level of fertilization giving highest V/C ratio: 45-67.5-22.5							

Plot No.	Treatment N-P_2O_5-0 kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
CHIMBORAZO N., SAN JUAN-SAN ANDRES (2 demonstrations) BARLEY (1971)							
T	0- 0- 0	499	-	-	-	-	-
2	45- 0- 0	567	68	95	425	-	0.22
3	45-67.5-0	2 041	1 542	2 159	808	1 351	2.67
4	45-67.5-22.5	3 062	2 563	3 574	906	2 668	3.94
Level of fertilization giving highest Net Return: 45-67.5-22.5							
Level of fertilization giving highest V/C ratio: 45-67.5-22.5							
IMBABURA, IBARRA (5 demonstrations) BARLEY (1971)							
T	0- 0- 0	986	-	-	-	-	-
2	45- 0- 0	1 151	165	218	420	-	0.45
3	45-67.5-0	2 465	1 479	1 952	773	1 179	2.53
4	45-67.5-22.5	2 097	1 111	1 467	853	614	1.72
Level of fertilization giving highest Net Return: 45-67.5-0							
Level of fertilization giving highest V/C ratio: 45-67.5-0							
IMBABURA, COTACACHI (5 demonstrations) MAIZE (1971)							
T	0- 0- 0	554	-	-	-	-	-
2	45- 0- 0	798	244	322	420	-	0.77
3	45-45- 0	1 451	897	1 184	655	529	1.81
4	45-45-22.5	2 069	1 515	2 000	735	1 265	2.72
Level of fertilization giving highest Net Returns: 45-45-22.5							
Level of fertilization giving highest V/C ratio: 45-45-22.5							
IMBABURA, OTAVALO (10 demonstrations) MAIZE (1971)							
T	0- 0- 0	449	-	-	-	-	-
2	45- 0- 0	723	274	362	420	-	0.86
3	45-45- 0	1 259	810	1 069	655	414	1.63
4	45-45-22.5	998	549	725	735	-	0.99
Level of fertilization giving highest Net Return: 45-45-0							
Level of fertilization giving highest V/C ratio: 45-45-0							
TUNGURAHUA, AMBATO (4 demonstrations) MAIZE (1971)							
T	0- 0- 0	757	-	-	-	-	-
2	45- 0- 0	1 463	706	988	425	563	2.32
3	45-45- 0	2 032	1 275	1 785	670	1 115	2.66
4	45-45-22.5	2 642	1 885	2 639	760	1 879	3.47
Level of fertilization giving highest Net Return: 45-45-22.5							
Level of fertilization giving highest V/C ratio: 45-45-22.5							

Plot No.	Treatment N-P_2O_5-0 kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
TUNGURAHUA; PELILEO (2 demonstrations) MAIZE (1971)							
T	0- 0- 0	449	-	-	-	-	-
2	45-45-45	862	363	508	850	-	0.60
3	45-90-45	1 134	635	889	1 095	-	0.81
4	90-90-45	1 475	976	1 366	1 520	-	0.90
CHIMBORAZO N., CAJAMARCA (11 demonstrations) MAIZE (1971)							
T	0- 0- 0	857	-	-	-	-	-
2	45- 0- 0	912	55	83	425	-	0.20
3	45-45- 0	1 256	399	599	670	-	0.89
4	45-45-22.5	1 542	685	1 028	760	268	1.35
Level of fertilization giving highest Net Return: 45-45-22.5 Level of fertilization giving highest V/C ratio: 45-45-22.5							
CHIMBORAZO N., GUANO (3 demonstrations) MAIZE (1971)							
T	0- 0- 0	4 367	-	-	-	-	-
2	45- 0- 0	4 971	604	846	425	421	1.99
3	45-67.5-0	7 862	3 495	4 893	670	4 223	7.30
4	45-67.5-22.5	8 600	4 233	5 926	760	5 166	7.67
Level of fertilization giving the highest Net Return: 45-67.5-22.5 Level of fertilization giving the highest V/C ratio: 45-67.5-22.5							
CHIMBORAZO N., GUANO (2 demonstrations) MAIZE (1971)							
T	0- 0- 0	3 738	-	-	-	-	-
2	45- 0- 0	6 151	2 413	3 378	425	2 953	7.95
3	45-45- 0	7 929	4 191	5 867	670	5 197	8.76
4	45-45-22.5	8 691	4 953	6 934	760	6 174	9.12
Level of fertilization giving highest Net Return: 45-45-22.5 Level of fertilisation giving highest V/C ratio: 45-45-22.5							
CHIMBORAZO N., SAN JUAN-SAN ANDRES (2 demonstrations) WHEAT (1971)							
T	0- 0- 0	680	-	-	-	-	-
2	45- 0- 0	1 361	681	1 362	425	936	3.20
3	45-67.5- 0	2 495	1 815	3 630	808	2 822	4.49
4	45-67.5-22.5	3 629	2 949	5 898	906	4 992	6.51
Level of fertilization giving highest Net Return: 45-67.5-22.5 Level of fertilization giving highest V/C ratio: 45-67.5-22.5							

Plot No.	Treatment $N-P_2O_5-0$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
CHIMBORAZO N., SAN JUAN-SAN ANDRES (2 demonstrations) WHEAT (1971)							
T	0- 0- 0	567	-	-	-	-	-
2	45- 0- 0	907	340	680	425	255	1.60
3	45-67.5- 0	2 948	2 381	4 762	808	3 954	5.89
4	45-67.5-22.5	3 175	2 608	5 216	906	4 310	5.76
Level of fertilization giving highest Net Return: 45-67.5-22.5 Level of fertilization giving highest V/C ratio: 45-67.5-0							
CHIMBORAZO N., CAJABAMBA (9 demonstrations) WHEAT (1971)							
T	0- 0- 0	887	-	-	-	-	-
2	45- 0- 0	1 089	202	404	425	-	0.95
3	45-90- 0	1 369	482	964	915	49	1.05
4	45-90-22.5	1 534	647	1 294	1 005	289	1.29
Level of fertilization giving highest Net Return: 45-90-22.5 Level of fertilization giving highest V/C ratio: 45-90-22.5							
IMBABURA, IBARRA (10 demonstrations) WHEAT (1971)							
T	0- 0- 0	415	-	-	-	-	-
2	45- 0- 0	670	255	528	420	108	1.26
3	45-90- 0	1 577	1 162	2 405	890	1 515	2.70
4	45-90-22.5	1 338	923	1 911	970	941	1.97
Level of fertilization giving highest Net Return: 45-90-0 Level of fertilization giving highest V/C ratio: 45-90-0							
IMBABURA, COTACHI (14 demonstrations) POTATOES (1971)							
T	0- 0- 0	5 990	-	-	-	-	-
2	45- 0- 0	8 226	2 236	2 280	420	1 860	-
3	45-67.5-0	13 809	7 819	7 975	773	1 702	10.32
4	45-67.5-22.5	20 527	14 537	14 828	853	13 975	17.38
Level of fertilization giving highest Net Return: 45-67.5-22.5 Level of fertilization giving highest V/C ratio: 45-67.5-22.5							
IMBABURA, IBARRA (5 demonstrations) POTATOES (1971)							
T	0- 0- 0	4 730	-	-	-	-	-
2	45-90-45	16 470	11 740	5 870	850	5 020	6.91
3	90-90-45	18 054	13 324	6 662	1 270	5 392	5.25
4	90-135-45	21 428	16 698	8 349	1 405	6 944	5.94
Level of fertilization giving highest Net Return: 45-90-45 Level of fertilization giving highest V/C ratio: 90-135-45							

Plot No.	Treatment $N-P_2O_5-O$ kg/ha	Yield kg/ha	Yield increase over control kg/ha	Value of Yield increase $/ha	Cost of Fertilizer $/ha	Net Return $/ha	V/C
TUNGURAHUA, AMBATO (4 demonstrations) POTATOES (1971)							
T	0- 0- 0	11 317	-	-	-	-	-
2	45- 0- 0	15 105	3 788	5 114	425	4 689	12.03
3	45-67.5-0	17 192	5 875	7 931	793	7 138	10.00
4	45-67.5-22.5	18 666	7 349	9 921	883	9 038	11.24
Level of fertilization giving highest Net Return: 45-67.5-22.5							
Level of fertilization giving highest V/C ratio: 45-0-0							
TUNGURAHUA, AMBATO (6 demonstrations) POTATOES (1971)							
T	0- 0- 0	6 842	-	-	-	-	-
2	90- 0- 0	9 110	2 268	3 062	850	2 212	3.60
3	90-135-0	10 584	3 742	5 052	1 585	3 467	3.19
4	90-135-45	11 680	4 838	6 531	1 765	4 766	3.70
Level of fertilization giving highest Net Return: 90-135-45							
Level of fertilization giving highest V/C ratio: 90-135-45							
TUNGURAHUA, PELILEO (5 demonstrations) POTATOES (1971)							
T	0- 0- 0	12 882	-	-	-	-	-
2	45- 0- 0	16 093	3 211	6 422	425	5 997	15.11
3	45-67.5- 0	16 584	3 702	7 404	793	6 611	9.34
4	45-67.5-22.5	14 806	1 924	3 848	883	2 965	4.35
Level of fertilization giving highest Net Return: 45-67.5-0							
Level of fertilization giving highest V/C ratio: 45-0-0							
TUNGURAHUA, PELILEO (3 demonstrations) POTATOES (1971)							
T	0- 0- 0	2 843	-	-	-	-	-
2	45-90-45	4 503	1 660	2 241	1 095	1 146	2.05
3	90-90-45	5 037	2 194	2 962	1 520	1 442	1.95
4	90-135-45	9 979	7 136	9 634	1 765	7 869	5.46
Level of fertilization giving highest Net Return: 90-135-45							
Level of fertilization giving highest V/C ratio: 90-135-45							
CHIMBORAZO S., GONZOL (2 demonstrations) BROADBEANS (1971)							
T	0- 0- 0	3 288	-	-	-	-	-
2	45- 0- 0	3 624	336	840	425	415	1.98
3	45-90- 0	4 332	1 044	2 610	915	1 595	2.85
4	45-90-22.5	4 786	1 498	3 745	1 005	2 740	3.73
Level of fertilization giving highest Net Return: 45-90-22.5							
Level of fertilization giving highest V/C ratio: 45-90-22.5							

ANNEX 4

FECOAC - DISTRIBUTION OF FERTILIZERS AND DESCRIPTION OF REVOLVING FUND

NAME OF COOPERATIVE	CREDITS CONCEDED IN FERTILIZERS				MEMBERS		CREDIT SITUATION		
	Dates	No of qq	Formula	Value S/.	Total	Beneficiaries	Term Year	Balance S/.	In Arrears S/.
YARUQUI	Mar/67 Nov/69	400 100	10- 0-10 10-30-10	33 707.30 10 000.00	183	98	10	31 500	-
GUARANDA	Jan/68	400	10-30-10	46 800.00	774	350	10	23 400	-
CARCHI	Dec/68	499	10-30-10 10-40-10 6-24-24	57 000.00	800	379	5	40 000	-
ESCUELAS RADIOFONCS	Jan/69	400	10-30-10	40 000.00	260	180	5	24 000	16 000
SAN MIGUEL	Mar/69 Mar/71	400 400	10-30-10 10-30-10	40 000.00 40 000.00	186	54	5	24 000	16 000
CAICETA	Mar/69 Jan/70	100 300 193	10-30-10 Slf.Amon. 12-24-12	10 000.00 18 000.00 23 160.00	382	95	5	16 940	-
BABAHOYO	Feb/72	300	10-30-10	45 000.00	273	158	-	—	-
CENTRAL REG.SRV.AGR	Nov/70	600	12-24-12	72 000.00	—	—	5	23 000	-
CHEGA	Dec/71	80	10-30-10	10 320.00	201	160	2	—	-
DAULE	Dec/68	150	UREA	13 125.00	254	180	5	9 443.75	9 443.75
IRU	Aug/71	333	10-30-10	40 000.00	212	150	1	29 260.00	29 260.00

FECOAC - DISTRIBUTION OF FERTILIZERS AND DESCRIPTION OF REVOLVING FUND (Contd.)

NAME OF COOPERATIVE	CREDITS CONCEDED IN FERTILIZERS				MEMBERS		CREDIT SITUATION		
	Dates	No.of qq	Formula	Value	Total	Beneficiaries	Term Year	Balance S/.	In Arrears S/.
KENNEDY	May/70	50	10-40-10	5 700	500	454	2	—	—
LA LIBERTAD	Jul/71	150	12-24-12	18 000	156	156	2	18 000.00	—
LA MAGDALENA	Oct/69	500	10-30-10	50 000			5		
	Nov/70	200	12-24-12	24 000			2		
	Dec/71	200	10-30-10	24 000	204	75	1	26 000.00	—
MANANT.RIO VALDV.	Nov/70	100	12-24-12	12 000	60	60	1	12 000.00	12 000
ECHO DE SEPTBRE	May/70	167	SUP.FOS.SIMP	13 914	418	60	5	6 914.00	—
PAULO VI	Dec/69	100	10-30-10	10 000			5		
	Nov/70	100	12-24-12	12 000	460	85	1	20 000.00	20 000
PEDRO MONCAYO	Jan/71	100	10-30-10	12 400	433	210	1	—	—
PIMOCHA	Nov/69	48	UREA	4 200	50	30	1	—	—
PROGRESO	Nov/69	200	10-30-10	20 000			2		
	Oct/70	200	12-24-12	24 000			2	—	—
	Dec/71	200	10-30-10	25 000	515	498	1	12 500.00	
PUEBLOVIEJO	Jan/72	200	10-30-10	20 000	299	135	6mnths	12 500.00	—
PUELLARO	Sep/69	100	10-30-10	10 000			5		
	Nov/70	200	12-24-12	24 000			2		
	Dec/71	150	10-30-10	18 750	196	185	1	125.00	

FECOAC - DISTRIBUTION OF FERTILIZERS AND DESCRIPTION OF REVOLVING FUND (Contd.)

NAME OF COOPERATIVE	CREDITS CONCEDED IN FERTILIZERS				MEMBERS		CREDIT SITUATION		
	Dates	No.of qq	Formula	Value S/.	Total	Beneficiaries	Term Year	Balance S/.	In Arrears S/.
SAN GABRIEL	July/71	250	12-24-12	35 000					
	Dec/71	130	10-30-10	15 000	159	77	10	38 100.00	
SAN SIMON	Mar/71	550	10-30-10	6 500.00	37	35	1	500	500
SAN PEDRO GUANUJO	Nov/70	400	12-24-12	48 000.00					
	Dec/71	200	10-30-10	24 000.00	109	87	1	—	—
SAN PEDRO DE HUACA	Sep/69	500	10-30-10	50 000.00	340	160	5	40 000	20 000
SANTA ANA DE ALOASI	Dec/71	80	10-30-10	10 320.00	90	14	1	10 320	10 320
23 de JULIO	Aug/69	200	UREA	17 500.00	2 365	1 850	1	—	—
	Oct/70	574	10-30-10	72 400.00	—	—	5	40 000	—
T O T A L S		10 504		1 100 796.30	9 916	5 975		458 597.75	133 523.77
PERCENTAGES				100%				41%	12%

INERHI IRRIGATION DISTRICTS
CHARACTERISTIC ASPECTS

District	Province	River	Volume m3/sec	System	Total Area ha	Irrigated Area 1972 ha	Altitude m	Temp. °C	Annual Rain mm	No. of Users	Population (Beneficiaries)
Montúfar	Carchi	Minas	3	Direct derivation	4 000	500	2 600	14	600	300	23 000
Salinas 1/	Imbabura	Ambi	3	"	4 500	2 000	1 700	20	350	250	13 000
Pisque 1/	Pichincha	Guachalá	7	"	10 000	3 500	2 700	15	600	1 110	37 000
Tumbaco 1/	Pichinacha	Pita	2	"	2 300	1 200	2 300	17	800	960	12 000
Chimborazo 1/	Chimborazo	Chambo	7	"	7 000	2 100	2 700	13	353	2 500	58 000
M.J. Calle 1/	Guayas	Cañar	12	"	15 000	6 000	140	22	800 2/	300	45 000
Milagro 1/	Guayas	Chimbo	10	"	10 000	3 000	15	25	1 500 2/	500	14 000
El Tablón 1/	El Oro	San Luis	13	"	1 200	200	800	18	800	80	2 000

District	Main Crops
Montúfar	Potatoes, vegetables, alfalfa, fruits, tomato and cereal
Salinas	Sugar cane, cotton, tomato, vegetables
Pisque	Potatoes, maize, alfalfa, fruits, vegetables, cereals
Tumbaco	Vegetables, potatoes, maize, alfalfa, fruits
Chimborazo	Vegetables, potatoes, maize, alfalfa, fruits
M.J. Calle	Rice, sugar cane, fruits, pasture, banana, cocoa, coffee
Milagro	Sugar cane, rice, fruits, pasture, banana, cocoa, coffee
El Tablón	Rice, fruits, pasture, sugar cane, coffee, groundnut

1/ ZONES WITH FFHC/AD-FP

2/ Distributed in three months

SOURCE: INERHI

QUANTITIES OF FERTILIZER AND DISTRIBUTION, REVOLVING FUND, INERHI

DISTRICT	ECU-522 PROJECT qq						FFHC qq			INERHI qq		qq.
	Urea	10-30-10	18-46-0	Muria.K.	Sulf.Amon.	Sup.Trip.	Urea	10-30-10	12-46-00	Urea	10-30-10	TOTAL
Salinas	200	179	138	—	305	50	70	50	30	100	—	1 122
Pisque	300	1 258	257	20	105	50	167	50	56	60	60	2 383
Tumbaco	—	324	119	20	35	100	68	40	49	40	540	1 335
Chimborazo	300	250	240	20	72	—	339	60	146	49	200	1 676
Milagro	400	200	100	20	83	—	410	100	219	520	50	2 102
M.J. Calle	600	200	100	20	—	—	—	—	—	1 110	50	2 080
TOTAL	1.800	2.411	954	100	600	200	1.054	300	500	1.879	900	10 698
	6 065						1 854			2 779		

SOURCE: INERHI

NOTE: Till 17 May 1973

THE REVOLVING FUND, INERHI

VALUES IN SUCRES

DISTRICT	ECU-522 PROJECT S/.						FFHC S/.			INERHI S/.		TOTAL S/.
	Urea	10-30-10	18-46-00	Muri.K.	Sulf.Amo.	Sup.Trip.	Urea	10-30-10	12-24-12	Urea	10-30-10	
Salinas	21 960	26 810.0	23.472	—	26 290	6 865	6.650	6 000	3 450	10 170.0	—	131 667.0
Pisque	32 940	184 692.0	43.448	1.798	10.290	6 285	15.865	6.000	5 635	6 426.0	7 221.0	320 600.6
Tumbaco	—	47 458.4	19.976	1 798	3 430	13 730	6.460	4.800	5 635	4 284.0	86 764.0	194 335.4
Chimborazo	32 940	36 300.0	40.320	1 798	7 056	—	32.205	7.200	16 790	5 772.2	29 040.0	209 421.2
Milagro	42 000	29 040.0	16.470	1 798	6 640	—	38.950	12.000	76 135	58 586.0	7 260.0	288 879.0
M.J. Calle	63 000	29 040.0	16.480	1 798	—	—	—	—	—	123 288.0	7 260.0	240 866.0
TOTAL	192 840	353 340.4	160.166	8 990	53 706	26 880	100.130	36.000	107 645	208 526.2	137 545.6	1 386 897.2
	796 510.40						244 775.0			344 611.80		

SOURCE: INERHI

ANNEX 6

EVALUATION OF THE DISTRIBUTION OF FERTILIZERS THROUGH EX-MAE-FAO PROGRAMME

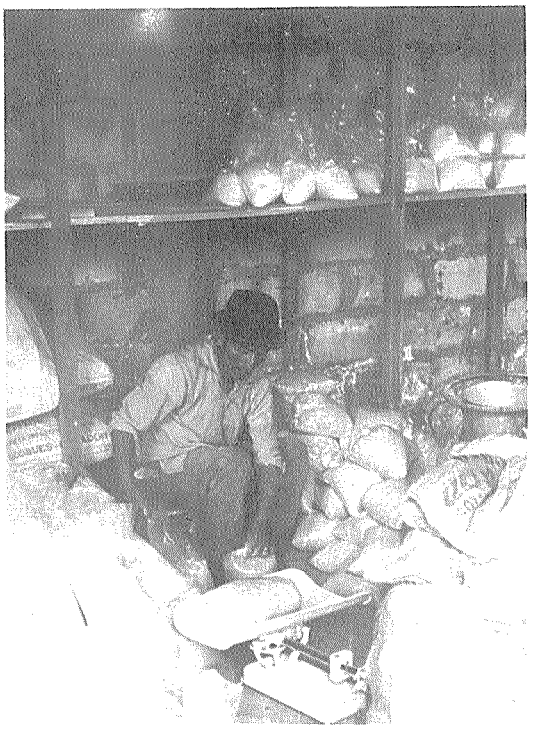
ZONES	Credit Obtained by Ex-MAE-FAO Programme		SALES		Credit Recovered	Used in Demonstrations	In-Arrears	Balance in Warehouse
	Balance	Value of Yearly Delivery S/.	Cash Value S/.	Credit Value S/.	Quantity S/.	Value S/.	Value S/.	Value S/.
1970								
Imbabura		36 679.50	19 101.98	8 353.40	8 353.40	—	—	9 224.12
Tungurahua		19 514.75	10 018.00	—	—	—	—	9 496.75
Chimborazo N.		6 146.50	1 212.50	—	—	—	—	4 934.00
T o t a l 1970		62 340.75	30 332.75	8 353.40	8 353.40	—	—	23 654.87
1971	Accumulated Balance 1970							
Imbabura	47 429.12	38 205.00	3 996.00	31 515.00	4 652.00	4 206.00	26 863.00	7 742.12
Cotopaxi	6 450.00	6 450.00	—	—	—	—	—	6 450.00
Tungurahua	21 401.75	11 905.00	1 774.37	18 877.00	4 615.00	375.00	14 261.73	374.00
Chimborazo N.	16 544.00	11 610.00	6 803.00	5 257.00	4 577.00	2 242.00	680.00	2 242.00
Chimborazo S.	6 450.00	6 450.00	246.00	270.00	—	—	270.00	5 934.00
Loja	12 900.00	12 900.00	448.00	—	—	292.00	—	12 160.00
T o t a l 1971	111 174.87	87 520.00	13 237.37	55 919.00	13 844.00	7 115.00	42 974.73	34 903.12
1972	Accumulated Balance 1971							
Imbabura	7 742.12	—	2 419.12	1 118.00	22 845.00	4 205.00	5 136.00	—
Cotopaxi	6 450.00	—	6 450.00	—	—	—	—	—
Tungurahua	375.00	—	—	—	9 724.08	375.00	4 537.65	—
Chimborazo N.	2 242.00	—	—	—	—	2 242.00	680.00	—
Chimborazo S.	5 934.00	—	4 773.00	—	—	—	270.00	1 161.00
Loja	12 160.00	—	9 011.60	2 598.40	—	292.00	2 598.40	258.00
T o t a l 1972	34 903.12	—	22 653.72	3 716.40	32 569.08	7 114.00	13 222.05	1 419.00
1973	Accumulated Balance 1972							
Imbabura	—	—	—	—	—	—	5 136.00	—
Cotopaxi	—	21 460.00	—	—	—	—	—	—
Tungurahua	—	27 305.70	—	—	200.00	—	4 337.65	—
Chimborazo N.	—	—	—	—	—	—	680.00	—
Chimborazo S.	—	—	—	—	—	—	270.00	1 161.00
Cañar	—	21 460.00	—	—	—	—	—	—
Loja	—	21 460.00	—	—	2 520.00	—	78.40	258.00
T o t a l 1973	—	91 685.70	—	—	2 720.00	—	10 502.05	1 419.00
T o t a l 70/73	—	241 546.45	66 223.57	67 988.48	57 486.48	14 229.00	10 502.05	1 419.00
Percentages	—	—	49%	51%	85%	—	15%	—

ANNEX 7

An Indian community. Minifundio.

Field day.

ANNEX 7

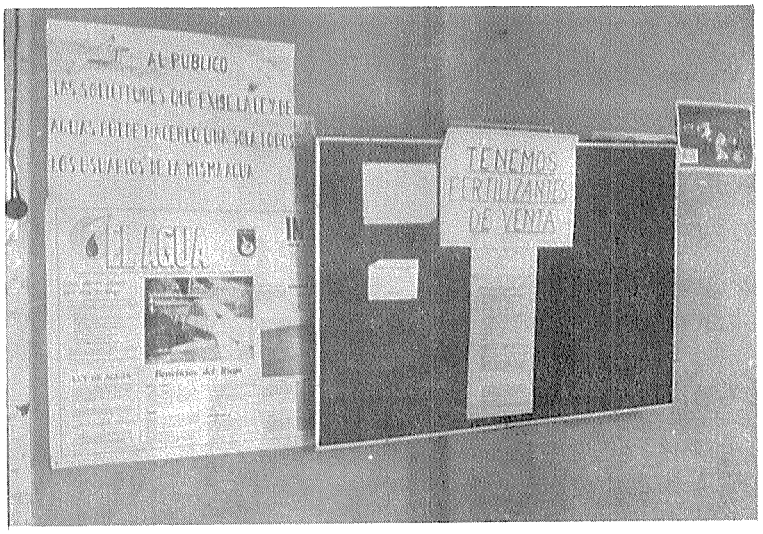


Preparing fertilizers for demonstrations.

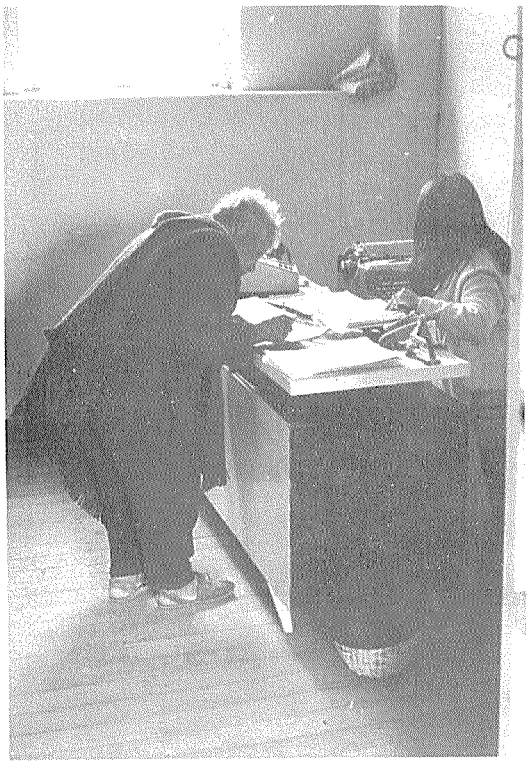
Fertilizer demonstration of maize.

ANNEX 7

Fertilizers being loaded on truck at the fertilizer factory "FERTISA".



"We have fertilizers for sale."
Note in an irrigation district office of INERHI.



Farmer signing contract for buying fertilizers on credit.

ANNEX 7

Small scale transport of fertilizer.

Harvest of barley.

Bringing home the straw.