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COMMUNICATION FOR TECHNOLOGY TRANSFER IN AGRICULTURE
(CTTA)

Integrated Action Plan

AID/S&T Project 936-5826

- U.S. Agency for International Development (USAID)
- Academy for Educational Development (AED)
- National Institute for Agricultural Research and Development (INIPA)

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TABLE OF CONTENTS

- I. Location
 - II. Time period of the plan
 - III. Institutions involved
 - IV. Background
 - V. Project authorization
 - VI. Activity Plan
 - VI.A. Research
 - VI.A.1 Identified technologies
 - VI.A.2 Researching the (potential) User
 - VI.A.3 Agricultural infra-structure and policy
 - VI.A.4 Communication infra-structure
 - VI.B. Strategy and development of the plan
 - VI.B.1 Testing the concept
 - VI.C. Methods and materials
 - VI.D. Production of the materials
 - VI.E. Information diffusion
 - VI.F. Monitoring and feedback
 - VI.G. Formative evaluation
 - VI.H. Inter-institutional coordination
 - VI.I. Training of personnel
 - VI.J. Administration and management
 - VI.K. Institutionalization
 - VII. Technical assistance
 - VIII. Activity calendar
 - IX. Circumstances that could affect the development of the plan
- APPENDIX - Marcara Agricultural Calendar

COMMUNICATION FOR TECHNOLOGY TRANSFER IN AGRICULTURE

INTEGRATED ACTION PLAN

I. Location

This plan refers to CTTA Project activities in Perú. The site selected for development and testing of the communication strategy to be used in the rest of the country through INIPA is the area that corresponds to CIPA V. INIPA's sphere of influence covers the region of Ancash. The agency of Carhuaz was selected from within this region (in the Callejon de Huaylas).

CIPA V has offices located in the center of the city of Huaraz and its sphere of influence includes thirteen implemented extension agencies, which are, in turn, subdivided into sixty-eight sectors. This does not include the Experimental Station because it was invaded by the peasants in 1982. This occurred because most of the research was done in lands taken from these peasants. However, there is a sub-station in Tingua where some programs in cultivation and breeding have been developed. The research program has initiated an investigation into traditional technologies and has already obtained some results. The action of generating technologies is as much a part of office work as it is field work and both are integrated with agricultural technology transfer through agricultural extension and propaganda. The actions pointed out earlier are supported by agencies such as the Office of Agro-Economy and Rural Commercialization.

1.1 General Description of the Ancash District

Generalizations:

The District of Ancash is located in the central region of Peru, between 8 00' 20" and 10 45' 10" latitude South and between 76 44'12" and 77 38'13" longitude West of the Greenwich Meridian. The District of La Libertad is on its northern border, Huanuco is on its eastern side and the Pacific Ocean is on its west.

The terrain of Ancash is uneven and hilly owing to the presence of the Cordilleras Negra y Blanca (White and Black Mountain Range). These run parallel to each other and form the Callejon de Huaylas which divides the district into two geographically well-defined areas, the coastlands and the mountain ranges.

The Andean Mountain Range is rough territory consisting of a chain of mountains with snow-covered peaks that reach the highest altitudes in Peru. Deep valleys, such as the Marañón are interspersed among these mountains as are shallower ones such as the Callejón de Huaylas and the Callejón de Conchucos. The first is a typical Andean valley that is responsible for the highs and lows of the Rio Santa flow, ranging from 2,180 qsnm. up to 3,700.

I.2 Description of the Callejon de Huaylas

Generalizations:

The Callejón de Huaylas, located about 400 km. from Lima, belongs to the Ancash district and extends to 6,422 km². This area has the Cátac district to its South and the Huaylas district to its North. It is bordered by the Cordillera Blanca on the East and the Cordillera Negra on the West.

Politically, it includes the provinces of Huaraz, Carhuaz, Yungay and Huaylas.

The Río Santa constitutes the principal hydrographic element and runs from South to North. This river begins at 4,100 msnm and has a longitude of 331 km; its annual median flow is 0.890 m³, with the heaviest flow occurring during the months of December and April.

Agriculture:

According to the data from the Agricultural Census in 1972, in the Callejón de Huaylas, 29,778 agricultural units exist in an area of 152,231 Has. The land is distributed in the following manner:

Cultivated land	22%
Irrigated land	12%
Dry land	10%
Natural pastures	53%
Mountains and forests	1%
Other Areas	24%
	100%

The crop distribution varies in each ecological step, but the

basic unit of cultivation consists fundamentally of maize, sweet or grain corn (choclo or grano), barley, wheat and potato.

The surface area and production of the potato, corn, grain, sweet corn, wheat and barley was distributed in the following manner in 1982:

<u>CROP</u>	<u>AREA</u> (Ha)	<u>YIELD</u> (Kg)	<u>PRODUCTION</u> (TM)
Potato	7,700	3,700	28,490
Grain Corn	1,700	1,900	3,230
Sweet Corn	1,400	19,800 (+)	27,720 (++)
Wheat	5,350	900	4,814
Barley	2,100	1,230	2,583

(+) expressed in units

(++) expressed in miles of units

At the level of the provinces of Callejón de Huaylas, production, in terms of percentages, was distributed as following:

<u>Province</u>	<u>Potato</u>	<u>Grain Corn</u>	<u>Sweet Corn</u>	<u>Wheat</u>	<u>Barley</u>
Recuay	9	-	-	23	30
Huaraz	16	5	41	11	8
Carhuaz	50	23	43	24	16
Yungay	14	13	52	5	13
Huaylas	11	59	1	37	33
TOTAL	100	100	100	100	100

The main production of potato is located in Carhuaz, seed corn and wheat in Huaylas, and sweet corn in both Huaylas and Yungay, and barley in Recuay and Huaylas.

Livestock in the Callejón de Huaylas consists of sheep, guinea pigs, cows, pigs, rabbits and (caprinos ??). On both shores of the Río Santa, cattle raising has been developed with the objective of producing meat and milk. At higher altitudes, sheep

and **caprinos** are dominant; the guinea pig is a native animal of this entire region.

I.3 Description of the Carhuaz Agency in the Marcará Sector

It was not possible to find specific data about this agency and sector among the sources of information we consulted, because most studies are conducted on the Callejón de Huaylas in general. The socio-economic, climatic, etc. characteristics are similar to those of other provinces in the Callejón, according to written observations. This information can be used in examining the agency.

The region covered by the extension agency of Carhuaz is the largest potato producer in the Callejón and the second largest corn producer (both grain and sweet). An approximate total of 2,000 Has. is reserved for the potato crop (1600 in irrigated land and 400 in dry land) and 4,800 Has. of irrigated land is used to grow corn. Approximately 2,260 farmers grow potatoes and 5,500 farmers cultivate corn. 1,500 Has. of dry land is used for wheat, which is grown by 1,500 farmers.

The Carhuaz Agency is divided into six sectors, each being assigned to an agricultural specialist: Yungay, Mancos, Amashca, Marcará, and Carhuaz. The Agency covers the province of Carhuaz (population of 71,700) and part of Yungay.

The town of Carhuaz is located 32 km. from the district capital (Huaraz) and 8 km. from Marcará. The road between Carhuaz and Huaraz is a paved one. Marcará is where the Agency headquarters has been established and where the Project will work.

II. Time-span of the Present Plan

The present plan will be in effect in the time between June, 1987 and June, 1988. This period corresponds with the first and second approximations. Afterwards, a new plan to cover the extension activities of all the CIPAs in the country will be created.

III. The people in charge of the plan

This plan is presented by the long-term project advisor of AED, Mr. José Ignacio Mata and the evaluator, Sra. Marta Cruz.

IV. Background

Representatives from the CTTA Project visited Peru during the months of January and October of 1985, as a result of telephone conversations between the AID/Science and Technology Office and USAID/Peru. These conversations led to an interest on the part of the local USAID Mission and the Peruvian government agency of INIPA in the CTTA Project.

AED prepared a proposal in November, 1985 for consideration by USAID/Peru that included the tentative separation (desglose??) of the USAID/Peru and AID/Washington pronouncements. One month later, a new group from AED traveled to Peru to choose a pilot site and, with help from INIPA personnel, chose Huancayo. This selection was later changed in December 1986 and CIPA V-Ancash became the new pilot site.

In February, 1986 the AED team came to Peru to prepare the Implementation Plan and Letter of Understanding No. 41, which had been written in May of the same year. The long-term Resident Advisor arrived in November.

The objective of the CTTA Project, in working with INIPA, is to create a tested methodology that would be used in the technology transfer programs. The actual extension system has various barriers to an optimistic outlook, one of them being limited coverage due to a lack of enough personnel to work with a greater number of farmers. Another problem is that the shortage of communication mediums and poor education have an impact on the extent of adoption of the technology transfer on the part of the farmers.

The methodology will be prepared and tested in action as it applies to the CIPA V-Ancash and the programs it has already established. It is hoped that in the development and testing stage, more adoption and application ratings of CIPA's transferred technologies (on the part of the farmers) will be obtained.

On the other hand, the CTTA Project will reinforce the institutional capability of CIPA-Ancash and those with whom the project will work during its development. This will occur as a result of the training of personnel and implementation of the Offices of Technical Communication at the central level as well as at the regional.

V. Authorization of the Project and Participating Institutions

The CTTA Project is a project of the Office of Science and Technology of the Agency for International Development of the

United States (USAID). The Project number is AID/ST Project 936-5826.

The CTTA Project is authorized by Contract No. DPE 5826-00-5054-00 between the Agency for International Development of the United States (USAID) and the Academy for Educational Development (AED). The National Institute for Agricultural Research and Advancement (INIPA), an agency of the government of Peru, and the local Mission of USAID signed Letter of Understanding No. 41 with the framework of AID Project No. 527-0192, Project of Agricultural Research, Extension and Education in May 1986. The Activity Plan of the Project and the Implementation Plan were prepared by a team from AED and from INIPA, with the technical assistance of AID, in March 1986.

Participating Institutions

The Project will be implemented through the Office of Technical Communication (OCT) of INIPA, where the national headquarters of the Project will be located. The pilot site activities will be included in the activities of the OCT of CIPA V, which is directly responsible for their execution.

The Project's training program will include representatives from other CIPAs, as well as other development institutions in the region such as the Development Corporation, the Regional Office of the Ministry of Agriculture and the National University of Santiago Antunez de Mayolo (UNASAM) of Huaraz.

As part of its sources of technical information and validation, the Project will coordinate communication channels with the International Center of the Potato (CIP).

Coordination mechanisms will be established with the Agricultural Research, Extension and Education Project (IEE) and its various programs with the goal of integrating mutual technology transfer objectives with CTTA strategies.

On the International Level

In addition to the Academy for Educational Development, Cornell University and Applied Communication Technology (ACT) will also be working on the project. They will be subcontracting agencies and will be in charge of the summative evaluation.

VI. Activity Plan

VI.A. Investigation

VI.A.1. Actual Behavior and the Technology Offered

CIPA V- Ancash is not included with the Experimental Station because its research is basically carried out in the fields of certain farmers who agree to it. The farmer lends his land and uses his labor, and CIPA provides the seeds, tools and technological assistance. At the end, the crops produced are split according to pre-set percentages between CIPA and the farmer. This system has the advantage that the technology is researched and tested in the farmers' fields -- the technologies that come from this procedure have already been tested and their results are known.

Nevertheless, we have to take into account that the results were achieved with technical assistance and the necessary tools from the researchers, and may not have been possible for the farmers to achieve alone. This is not researching the actual capabilities of the farmers' adoption and application of the technologies.

In the same way, research into the adaptation of the technologies to the capabilities of farmers who do not have access to agricultural tools does not exist.

Nevertheless, some basic behavior patterns, which have not been affected by tools or monetary contributions, have been identified and can noticeably increase crop production.

The agricultural technologies that have been proposed by the researchers of CIPA do not indicate revolutionary changes in the farmers' activities or behavior with respect to how they act now.

The aspects which have been researched are the preparation of the soil, fertilization, and the control of pests and diseases. The proposed methods require more work on the farmer's part in preparing the soil, and require the acquisition of tools that the farmer realizes are a necessity but cannot buy because of a lack of funds. Even if these tools are purchased, often they are not used in a correct and efficient manner. The most important crops of the region, which are CIPA's focus, are corn, potato, and on a smaller scale, wheat.

In this chapter, it is important to point out how the technologies are selected. The first step was to meet with the head of the Technical Unit and the crop specialists to decide which would be the prioritized crops. Corn, potato and wheat were chosen because they were planted over the greatest land area. Later on, a second meeting took place with the specialists of each of the selected crops.

In the second meeting, each specialist was indicating the technical aspects of those who, according to experience and zonal

characteristics, needed technological improvement. This gave us an idea of the technologies that were going to be transferred.

Finally, a meeting was held with each specialist for the separation (desglose??) of the technologies and to visit farms. The results of these successive meetings have been systematized and are presented in the following pages.

1.1 Potato

The aspects prioritized in the potato cultivation are:

- o Preparation of the soil
- o Density
- o Seed
- o Fertilization
- o Control of pests and diseases

1.1.1. Preparation of the soil

Actual problems and behavior

The farmers are accustomed to making only three crossings (cruzadas??) with the oxen in the soil, that is: first plowing, crossing (?), and furrow (?).

Technical recommendation

The recommendation is to make 5 crossings: first plowing, three crossings and one furrow; this is especially true in the fields where there is corn. However, if there are clumps of sod (champal??), (for example, where there is alfalfa) it is necessary to make at least ten crossings.

1.1.2 Density

Problems and actual behavior

The farmers do not know exactly how many square meters they have in cultivated land. They calculate it according to the amount of seed that they use. The farmers know that each sack of seed, which they call "cargas", weighs between 70 - 72 kg. or 6 arrobas (measure of weight -- each arroba is 12 kg.) In the region, the farmers normally plant between 12 -16 "cargas" per Ha., that is, 864 kg. per Ha., using third (tercera??) seed.

Technical recommendation

Ancash has determined that the average amount of seed is 1200 kg. per Ha., but the recommended amount is 2,000 kg. or 30 "cargas" per Ha.

1.1.3 Seed

Problems and actual behavior

The problems with the seed are in relation to quality. The farmers do not take into account the characteristics that a seed of good quality should have.

Technical recommendation

A seed of good quality should have the following characteristics:

- a. With respect to the size: the ideal is the size of a chicken's egg, which is the "papa de tercera" (in order that farmers use the papa de tercera, they have to be told to use the papa de segunda).
- b. With respect to shape: it should be typical of the type of seed, if it is "Revolucion", it should be well-rounded, without any deformations; the "Mariva" type should be flat.
- c. With respect to color: the "Revolucion" should be white with red or reddish eyes, without red or streaks of red (machas??), which would mean it could have "Rizoctonia Sp." or another disease that would be affecting it. "Mariva" should be a brilliant purple.
- d. With respect to appearance: the potato seed should be whole, with a firm shell. It should not be "pelona" (immature potato) that has been harvested before it is ready.
- e. With respect to the buds: they should be numerous, robust or thick, but if they are potatoes without shoots, they should be stored with diffused light. The potatoes with few sprouts or stunted, weak shoots similar to thin strands of hair should be eliminated because they could contain microplasm and/or a virus.

1.1.4 Fertilization

Problem and actual behavior

The farmers do not manage the sources of fertilization well, do not know the adequate quantities of fertilizer nor the proper time and proportions for their application.

Technical recommendation

The ideal would be to recommend a fertilization formula according to the results of the soil analysis.

In general terms, if there is no soil analysis, the technological recommendation would be:

- o A minimum formula of N-P-K of 100-90-60
- o A maximum formula of N-P-K of 120-100-90

If we take the minimum formula of 100-90-60 into account and we translate it into bags of fertilizer, the alternatives would be:

- o 5 bags of Urea
 - o 4 bags of triple Superphosphate
 - o 2 bags of Potassium Chloride
-

- o 6 bags of Ammonium Nitrate
- o 9 bags of simple Superphosphate
- o 2 bags of Potassium Chloride

For the maximum formula of 120-100-90, the alternatives are:

- o 6 bags of Urea
 - o 5 bags of simple Superphosphate
 - o 3 bags of Potassium Chloride
-

- o 8 bags of Ammonium Nitrate
- o 10 bags of triple Superphosphate
- o 3 bags of Potassium Chloride

1.1.5 Controlling pests and diseases

Problems and actual behavior

The farmers do not know which are the best products to use in combatting pests. They also do not know when is the right time to begin their application in order to achieve the most effectiveness and to economize on the amount of product used.

The farmers do not use adequate methods of applying the product and do not mix them well within the "bombs". It has also been observed that the products are not applied in a correct manner.

In the area, the most common problems are:

- o Plagues:
 - o Earthworms (cortadoras, Rakee or Wisoc)

Epitrix (pulgilla, pulga saltoma, piqui, piqui)
Grubs, weevils of the Andes (white worms, papa
kuru or Shaclla)
Moth/grub/destructive larva (Inacco)

o Diseases:

Marchitez bacteriana or pseudomonas (Tocto, Pokia)
Rancha (black rancha)

Technical Recommendation

The recommendation in reference to pesticides would be GUSATHION and the proportion would be: 2 - 3 measures of Bayer or 3 - 4 spoonfuls per pack of bombs; or one liter per cylinder of water for 1 ha. of land or 30 "cargas" of seed. But the following warning is necessary: the application should be to the neck/root (cuello) of the plant and to the wet plants; it should be done two days after irrigation and it should be done early in the morning. If it is applied too soon after the rain, the insecticide will be lost; however, if it is applied two to three hours before the rain, that will give it enough time to penetrate the plant.

Alternatives for the control of pests are: Furadan 4F, Ripcord, Ambush or Belmark.

The most effective is Ripcord, although it is somewhat expensive; 2 liters per ha. or one liter per cylinder or 3 spoonfuls per pack of bombs are used. Belmark can also be used and is similar to Ripcord in its manner of use and efficacy.

If we take into account that during a short season, there are more pests and less diseases and the opposite is true during the long season, applications would have to be increased during long seasons. This would not be achieved by prolonging insecticides, but by adding fungicides.

The recommendations as far as the time of application would be:

For all pests, at the time of emergency (that is, when all the plants have appeared in the furrow), the first application is made.

The second application is made at the first "aporque" or "ureada" after forty days.

The third application is twenty days after the first one or at the second aporque ("to earth up -- aporcar?) and the fourth application is at the blooming. But the most important ones are the first three while the last one is optional.

After the first application, the Epitrix finishes off the earthworm and some adult "gorgojos". After the second application, the "gorgojos" larvae and the moths/grubs will be gone.

For the control of diseases:

- o Marchitez bacteriana: more than a cure, it has to be prevented and the recommendation would be to use seed produced on the slopes where there is no infestation. But if it does appear, there will have to be a crop rotation for a minimum of three years. Corn, cereal or "col" (cabbage, kale, sprouts) may be used as rotation.
- o Rancho: in this case there are two possibilities, one is preventative and the other is curative:

Preventative: Dithane M 45, 2 kg. per Ha or 1 kg. per cylinder or 3 spoonfuls per pack of bombs of 15 liters. It would have to be applied one day before the first and second aporques.

Curative: Ridomil MZ or Fitoraz PS, 2 - 3 kg. per Ha. or 1 kg. per cylinder or 4 - 5 spoonfuls per 15 liter pack of bombs. This must be applied when a black stain appears on the leaves of the plants.

- o Virus: to control the virus, the most efficient alternative is natural selection and better storage in diffused light.

In general, and this was confirmed by the research, the potato crop is the one farmers know most about and manage best. Regarding the density of the sowing, the differences between the "cargas" of seed used and that recommended does not have anything to do with the quantity of tubers to be planted. It is the inadequate size of these tubers that affects the weight (in "cargas") of the seed utilized for a determined plot of land.

The farmers are informed as to the best distances between plants and between furrows and are encouraged to act accordingly. Also, cultural workings such as the aporque and weeding are known and used, but it is pest control and diseases which cause the most problems because of a lack of or inadequate use of agricultural tools/supplies. Alternative technologies researched by CIPA as possible substitutes for chemical products used to control pests and diseases do not exist. This excludes the use of the certified seed, which is not always attainable or within reach of what the farmer can afford.

1.2 Corn

The prioritized aspects of the corn crop are the following:

- o Soil analysis
- o Sowing density
- o Variety and quality of the seed
- o Fertilization
- o Pests and diseases

1.2.1 Soil Analysis

This technology is a priority in all crops for the use of efficient formulas of fertilization.

Problem and Actual Behavior

Farmers do not know the characteristics of their soil, as is apparent from their arbitrary estimations regarding the type and the quantity of fertilizer to use.

Technical recommendation

The soil analysis is necessary to plan fertilization. CIPA V has the capability to respond to a high demand for soil analyses.

1.2.2 Sowing Density

Problem and Actual Behavior

The type of sowing most widely-used in this area is the "cola de buey" (siembra loca/crazy seed). This system implies less manual labor for the farmers because only one person is needed to walk behind the oxen to disperse seed. The seed is approximately 10-15 cm., that is "al ojo"; sometimes one and sometimes two seeds are used. The process is repeated as the oxen turn around and begin another furrow.

Technical recommendation

The alternative technology proposed is the sowing in furrows. For a system of furrows, first, the furrows must be dug, then a hoe/spade is used to dig a hole. Three or four seeds are placed in the hole and it is covered up again. This assures an even depth in the sowing process.

The advantages of this system are the following:

- o control of the density to know the number of plants there are per Ha.

- o uniformity in the depth of sowing and in the germination
- o better efficiency in the use of water
- o better control of pests and diseases
- o better ability to do the "aporque"
- o better ability to use fertilizers
- o better ability to control weeds

These advantages are the disadvantages in the "cola de buey" system.

The recommended density depends upon the variety/type:

Early variety (precoces???): Should use between 40 - 50 kg. of seed per Ha. with a separation between furrows of 80 cm. and plants should have 50 cm. between them, with two plants at each spot. Sowing three seeds per hole is necessary so that later on, with natural selection, there will be a total of 50,000 plants per Ha.

Late variety: Should use 70 kg. of seed per Ha. with a separation between furrows of 80 cm. and plants should have 60 cm. between them, with three plants per hole. In this case, four seeds are required at each hole in order to achieve a total of 62,000 plants per Ha.

Some considerations with respect to technology:

- o Farmers that sow "cola de buey" do not fertilize and do not consider corn a commercial crop. On the other hand, fertilizers are not easily available to the farmer.
- o The majority of the crops cultivated "cola de buey" are grown in only one season -- the rainy season, although they are completed with irrigation. (riego??)
- o With adequate management of sowing in furrows, 30% more output is assured if it is complemented with a minimum amount of technology such as using two bags of fertilizer.
- o The system of sowing in furrows allows for a more efficient use of water management. The furrows should be made with a minimum amount of incline to avoid erosion, but with enough of a slope so that water can run.

In the "cola de buey" system, there are no furrows and in order to irrigate, the land must be flooded, which causes the waste of a great deal of water. This could make the seed rot and not germinate. Since there is no uniformity with respect to the

depth of the seed, the seed that is buried very deep will stay there and will not emerge.

1.2.3 Weeding

Problem and Actual Behavior

Farmers allow weeds to compete with plants and make the first aporque soon after forty days; this results in the weeds not allowing the plants to develop and accounts for a 50% reduction in output. The farmer does this to use the weeds as fodder for animals.

Technical Recommendation

If the farmer sows in furrows and uses 3 - 4 seeds of good quality, they will all germinate and can be "selected" (seleccionar?) later. Then there will be sufficient fodder for the animals -- the plants that are pulled out. The first weeding is recommended before twenty days, so that when twenty days have passed, the cleared field can be fertilized without fertilizing the weeds.

1.2.4 Variety and Quality of the Seed

Problem and Actual Behavior

The farmers in the area keep their seed from the harvest and that is what they use. The negative aspect of this practice is that the purity of each variety/strain is not kept intact. The seed degenerates, which results in a reduction of output. The farmer is very unwilling to change his seed.

Technical Recommendation

It is suggested to give the farmer a similar variety/strain of seed, but one that has 50% more output.

The recommended varieties/strains would be:

Early Varieties (precoces?):

Morocho	501	(yellow hard serrano)
Canchero	301	
Choclero	101	
PMS	635	(canchero)

Late Varieties:

Blanco Urumbamba
PMC 561 (choclero)

The Experimental Station has seeds of these varieties in enough quantity to provide all that is required.

- o It is important to maintain the purity of the strain because, for example, if the corn "Pacchu de Caraz" mixes and toughens, it loses its commercial value.
- o The farmer, sowing the same corn, can increase production by improving the crop management.

1.2.5 Fertilization

In this aspect, the season, the method of fertilization and the sources or types of fertilizers all constitute a problem.

Problem and Actual Behavior

The majority of the farmers only use nitrogenized fertilization and almost always mix Urea and Ammonium Nitrate. Since Urea is (nigroscopica??) when mixed with Ammonium Nitrate, it turns into water.

Technical Recommendation

The recommendation is to fertilize with Nitrogen and Triple Superphosphate of Calcium; the Potassium depends upon the soil analysis, since most of the soil in the Callejon de Huaylas region are rich in Potassium.

Problem and Actual Behavior

Most farmers only fertilize once at the aporque (?) of about 40-50 days after sowing; this method causes the loss of fertilizers.

Technical Recommendation

The recommendation would be to first do the weeding and then the first fertilization 20 days after sowing. When the plant has sprouted is when the entire dosage of the Superphosphate, all of the Potassium and half of the Nitrogen should be applied. The second fertilization - the other half of the Nitrogen -- should be applied at the aporque.

Problem and Actual Behavior

Farmers fertilize by the fistful (por "puñadas") but, since they have not seeded in furrows, there is no way to measure out the

fertilizer.

Recommended Technology

The recommendation is that the first fertilization is done by "puyadas" (??) (jabbed in the ground), about 10 cm. from the plant, according to the slope or the direction in which the water runs. This way the fertilizer is diluted before reaching the plant because if it were too close, the plant would burn. The fertilizer should be a mixture of Urea, Superphosphate, and Potassium.

In the second fertilization, the Nitrogen will be applied at the same distance of 10 cm. from the plant but in fistfuls (golpes de mano??).

Problem and Actual Behavior

Farmers are not knowledgeable as to the percentages of fertilizer necessary for their crops of corn.

Technical Recommendation

Even though the formula should depend on the soil analysis, in case this is not done, the recommendation would be:

Early Varieties (precoces):	N-P-K = 80-80-30
Late Varieties :	N-P-K = 120-60-30

1.2.6 Pests

Problem and Actual Behavior

The most serious problem is the white worm of the corn or Heliothis. The "choclero" farmers generally apply some insecticide once, some do not even do that. A problem with the insecticides is that many farmers use Parathion, Tamaron, Metasystox, which are all phosphorized systematically and have a residual period of 15 days. There are residues that remain and are eaten later by humans. The accumulation of the residues in a human could be toxic.

The farmers also do not apply the products in an adequate manner and with the correct dosage.

Technical Recommendation

The insecticides that are recommended are not toxic and do not pose any danger in case of human consumption. These insecticides would be:

- o SEVIN 85 PM (a powder that can be mixed with water) in

a dosage of 1.5 kg. per Ha. or 60 g. per pack of 15 liters, with the application directed towards the chin (barba??) of the choclo. The time to apply it is when 10 - 15 % of the eggs (???) (postura o huevos -p. 14) appear. Generally, three applications have to be made with 10 day intervals between each of them.

- o AMBUSH, (liquid), is apparently the most expensive--one liter costs 1,600 Intis -- but it is used in lesser quantities. The dosage is 50 cc. per Ha. or 10 cc per pack of 15 liters. It is enough to make two applications with ten days in between each one.

1.3 Wheat

The prioritized aspects of the wheat crop are:

Preparing the soil
Fertilization
Controlling pests and diseases

1.3.1 Preparing the soil

Problem and Actual Behavior

The farmers only make one crossing (cruzada???) to prepare the soil for wheat. This does not grind the soil as finely as it should be and it causes less plant germination than should be possible according to the amount of seed used.

Technical Recommendation

The farmers should make a minimum of two crossings so that the soil is well-prepared.

1.3.2 Fertilization

Problem and Actual Behavior

The farmers are not inclined to fertilize wheat crops which reduces the possibilities of achieving a better output.

Technical Recommendation

Fertilization should take place. The recommended formula is the following:

Maximum formula: when the soil conditions are good, it would be 80-80-0 of N-P-K.

Minimum formula: when the soil conditions are medium-poor to poor, such as on a hillside, the formula of N-P-K would be 40-40-0.

In case wheat is planted after potato, the formula would be 40-0-0 of N-P-K.

In the case of fertilization during sowing, the basic condition is that the soil be moist; then the formula would be:

Prepare the soil
Volley (Volear (??) the Uruca and Phosphorus
Volley the seed
Use the plow

1.3.4 Control of Weeds and Pests

Problem and Actual Behavior

The wheat producers do not control weeds and do not know how to combat pests that attack the wheat.

Technical Recommendation

There are two types of weeds and there is a method of controlling each one.

- o Weeds with wide leaves are generally controlled by: Hedonal 2.4-D. The preparation is: two liters per Ha. or 75 cc. per 15 liter pack of bombs or 5 spoonfuls per bomb. The ideal is to apply it when the plant's first bud (nudo (???) appears or when it is between the macollaje (??) and the encañado, that is between 30-45 days when the wheat has 4 - 5 small leaves.
- o Weeds with narrow leaves, "cebradilla" or "avena loca" and some "gramineas" (???) are controlled with FINAVEN or CYAVEN, 3 liters per Ha. 7 soup-spoonfuls per 15 liter bomb, plus the adherent. The adherent is especially necessary during the rainy season.

Weeds are fumigated directly. The herbicides can be mixed together if there are weeds with wide and narrow leaves in the same field. It should be taken into account that some herbicides used for corn contain TRACINA which is fatal for the wheat.

- o As far as pests, the problem is mainly the plant louse. To control it, Metasystox must be used, 1 liter per Ha., or the equivalent of 2% spoonfuls (??doesn't make sense) per 15 liter bomb.

Wheat cultivation requires the least amount of dedication from farmers and this is demonstrated by a low index in the use of fertilizers, pesticides and cultural workings on the part of the producers. Nevertheless, it appears that the plant louse is an increasing problem in the region and perhaps the Project should make a dedicated effort to research and diffuse information on methods of controlling it.

VI.A.2. ANALYSIS OF THE TARGET AUDIENCE DEVELOPMENT RESEARCH

According to the results of the development research, farmers in the region selected to initiate CTA activities have the following characteristics:

Land tenancy and size of the plots

Most of the farmers of the region are "comuneros", that is, they are members of "comunidades campesinas" (farming communities) and as such, have certain rights and duties within these organizations.

The land they own has been inherited from their ancestors or has been given up by the community so that it will be farmed. No one has paid a great deal of money for these holdings -- in legal terms, they have the right of ownership of these lands, but not of property. (This doesn't make sense; Span. p. 17) Nevertheless, the farmer considers it his own.

A smaller number of farmers are individual owners, that is they possess their own land, acquired through the system of buy-and-sell either by their ancestors or themselves. In most cases, these lands are located within the property of a farming community.

Both categories, that of communal and individual ownership, are not exclusive. Although in terms of land tenancy, there is a difference between the farmers, in reality the difference does not exist. This is because both groups relate to the land in the same manner, that is, as individual proprietors, with the same practices, attitudes, behaviors and limitations in confronting problems.

Most farmers in the region are small landowners of less than one Ha. of land, fragmented in disperse parcels, in which they practice subsistence farming that puts a strong pressure on the land.

Because of the small size of the farms, the majority of these farmers are not in debt to the Banco Agrario (Is there a special

word in English for this?? Agricultural Bank? Agrarian Bank??) because they do not meet the bank's requirements. This means they do not dispose of enough resources to agree to the agricultural tools or aids that would allow them to improve their level of technology and as a result, their productivity.

Educational Level

The percentage of illiterates in the region is approximately 50% with close to 36% pertaining to the head of the family. Nevertheless, as far as the objectives of information dissemination by graphic and written materials are concerned, the researchers found that in 88% of the families, there is at least one person who is able to read.

Main crops and related common problems

The main crops of the region are corn (85% of the farmers grow corn), potato (80% cultivate the potato) and wheat (77%). For 99% of those who produce potatoes, 93% that produce corn, and 94% who grow wheat, the attack of pests and diseases are the problems considered most important. These farmers believe this is the area in which they would benefit most from expert assistance. Nevertheless, when the researchers increased the depth of their study into the systems of production, they discovered a series of behavior which is incorrect and affects production. The farmers do not consider this incorrect behavior a factor in limiting their production.

Use of Agricultural Technology

o Crop Rotation:

Researchers found that in a majority of the cases (70%), the decision about which crop to sow is taken by the head of the family. Results of the research show that the farmer in the pilot site (an irrigated area), rotates his crops according to their vegetative cycles since the harvest seasons of some coincide with the planting seasons of others.

o Selecting the seed:

63% of the farmers interviewed do not use a chosen and/or certified seed. 51% of them do not use it because they do not have the money to buy it. The ones who do use this type of seed do so because they know their output will be greater. The majority use their own seed from previous harvests; those that do not, buy them in the markets from merchants who do not guarantee their products as being free from diseases. The selection of their own seed is not made according to any technical criteria.

o Preparing the soil and sowing:

The farmer in the region generally prepares the soil and the sowing on the same day and this preparation is not done correctly. Not enough soil is removed nor is it left to sit for a long enough time so that natural pest control can act upon it.

The seed for the potato is handled correctly in most cases as far as density is concerned (distance between furrows and among plants). This is not true for corn in that the method of sowing named "cola de buey" places the seed in rows behind the plowed land. When this is combined with the deficient soil preparation, it results in an irregular density of germination.

Most farmers use less seed than is recommended for the amount of land being cultivated. This fact, combined with the problems mentioned above, results in negative repercussions for the production level of the farms.

o Fertilization:

There is a relatively high number of farmers in the area (65%) who use some type of fertilizer, generally from a nitrogenated source. This does indicate an effort on the farmers' part given the low economic conditions of the area. The problem is that the best combination of fertilizers (Nitrogen, Phosphorus and Potassium) are not used -- neither in recommended percentages nor in adequate quantities.

o Cultural workings:

In the potato cultivation, the farmers generally handle the cultural workings well (aporque, weeding, irrigation, etc.). This is not true for the production of corn and wheat, in which the weeding is not done effectively nor at the correct time. The end result is that the weed growth competes with crop development at the expense of the crops.

o Controlling pests and diseases:

55% of the potato producers, 87% of corn producers, and 96% of wheat farmers, do not use pesticides or any other type of pest and disease control. The most obvious causes for this behavior are a lack of economic resources in order to acquire the tools or means to apply pest and disease control. In addition to this, there is a decreasing level of confidence in the effectiveness of the products based on personal or second-hand experience. This lack of effectiveness is generally due to the fact that the right product was not used for the particular problem, the

necessary quantity was not applied, the recommended form and correct time to use it were not taken into consideration, all of which account for diminished or completely negated effectiveness.

Technical Assistance and Sources of Information

26% of the farmers surveyed do not ask advice from anyone about their problems with crops. Of those who do request advice, 28% ask the experts at CIPA, 29% ask relatives, 17% consult the vendors of agricultural equipment and 16% ask advice from friends and neighbors.

77% claimed not to have received any kind of technical assistance. Among those that did, 43% received it from CIPA, 27% from the (Banco Agrario????), 6% from the Ministry of Agriculture and 24% from other development institutions (CIPA and specific projects).

80% of the technical assistance received has been in the form of visits, depending upon the availability of an expert. Of those who said they did not receive technical assistance (77%), the majority (70%) revealed that it is because no expert comes to their farms, and 15% said it was because they did not know where to look for this type of assistance.

93% of those interviewed were convinced that if they did receive expert assistance, their crops would improve. There does not appear to be a credibility barrier against technical assistance, however, the problem lies with the large amount of farmers that need it. The coverage provided by the experts is low because of the limited availability of institutional resources.

When farmers were asked who they believed could offer them the best advice on their agricultural problems, 90% stated that it was the expert at CIPA who was the preferred source of information. Only 24% of those interviewed receive credit from the (Banco Agrario??). Of those that do not use credit at this bank, 51% do not ask for it because they are concerned about not being able to afford it. 24% cannot be given credit because they do not meet the criteria necessary with respect to the size of the farms. 9% do not know the official channels to go through, 7% have difficulties resolving the official documents and 7% do not have any interest in attempting to get credit.

Use of the Communication Mediums

85% of those surveyed listen to the radio. Out of these, 99% prefer Radio Ancash mainly for their news and music. The

preferred listening hours are:

In the morning -- 93% listen to Radio Ancash as a first choice (between 4 and 8 a.m.)
In the afternoon -- 50% listen to it as a second choice (between 4 and 7 p.m.)

Among the farmers' favorite programs, they emphasize the news (83% made this their first choice), musical shows (70% of the second choice), and "Amanecer Campesino" ("Good Morning, Farmer") (a program of CIPA) which has 50% of the third choice.

Those interviewed selected Andean folkloric music as their favorite (86%). The actual program of CIPA "Amanecer Campesino" (Good Morning, Farmer) is listened to by 70% of the people surveyed. 72% suggested it be extended and that quechua be used more often.

As far as preferences in graphic materials, 23% were said to prefer those with drawings and 15% preferred photographs as illustrations. 35% liked the graphics in both types of illustrations while the rest said they did not like any type of graphic material at all.

Mobility between locations

92% of farmers interviewed leave their communities at least once to go to larger, more populous centers for various reasons. Among these reasons are, to buy food (74%), to purchase agricultural supplies (10%), to sell products (7%), visit relatives (9%) and to work (9%). This high index of mobility does not (seems like the opposite should be true) permit (preveer???) a high access to promotional materials placed in markets, shops and key points on travel routes.

Expectations of improvement

61% of those surveyed said that if they had good harvests and benefitted economically from them, they would use this profit to buy agricultural equipment and continue, in this manner, to increase their production. This indicates a certain predisposition towards investment which could be adequately motivated and channeled to achieve gradual progress.

For a more detailed analysis of the research results please refer to the document, "Informe Técnico No. 2: Resultados de la Investigación de Desarrollo en el Sector Marcará."

Advice from the Farmers

- o Train a farmer from the community to be an agricultural promoter so he can permanently give expert advice.
- o Disperse information about the use and benefits of fertilizers and pesticides through various communication mediums such as radio, brochures, etc.
- o Establish land plots as demonstrations according to crop so that the farmers can learn from the practice.
- o Given the deficiency of experts, advice should be given over the radio at the proper time and in quechua. The information should be timed according to the sowing, aporque, weeding, etc., indicating if and when fertilizers and pesticides should be used.
- o Brochures should be available and these should be explained in theory and in practice.
- o More advice on technical knowledge regarding agriculture is needed.
- o Expand the "Amanecer Campesino" program with more information on agricultural problems.

Advice from the agricultural equipment salesmen

The salesmen agreed that it is necessary to diffuse information about insecticides, pesticides and fertilizers because most farmers are ignorant as to their proper use. They are especially unaware of the benefits and effects of pesticides and insecticides. Also, for economic reasons, they often choose a product according to its price rather than its quality, and will then proceed to use less than the recommended minimum. Later on, they will not achieve the results they expected and attribute this to the product used. They also do not know the right combination of fertilizer required to achieve the best results.

The proposed strategy tries to combine all this advice to attain the proper focus according to the research. This strategy will use mass mediums which will integrate the available knowledge on problems with the crops. It will be presented at opportune moments according to the agricultural cycles of the crops and will be complemented by parallel sources of information. In addition to this, it will be verified by selected farmers and extension activities taking place in the field.

The agricultural supply salesmen will be a source of diffusion for the instructions on how to use their products. Pertinent educational materials will be given to them for this purpose.

VI.A.3. Agricultural Infrastructure and Politics

INIPA

The National Institute of Agricultural Research and Promotion (INIPA) is represented at a regional level through the Centers of Agricultural Research and Promotion (CIPA). They are responsible for researching agricultural technologies to be transferred to the farmers through programs such as the Extension and Promotion of the Farmer Community (Extension, Fomento y Promocion de la Familia Campesina).

CIPA V-Ancash information comes from an experimental substation with research programs in the field. They take place in plots of land that belong to farmers in the region who agree to collaborate with CIPA. CIPA provides seed, tools and technical assistance and the farmer contributes the land and the labor; later on, the harvest is shared. The part of the harvest that belongs to CIPA is used as seed for other farmers.

CIPA V is divided into extension agencies under the responsibility of an agricultural engineer. Each agency is divided in turn, into sectors (68 as a total for CIPA) which are run by an agricultural expert (sectorist).

CIPA also promotes Junior Agricultural Clubs in schools which develop agricultural projects -- CIPA provides the seed and technical assistance.

The Ministry of Agriculture

The Ministry of Agriculture works at the regional level through the regional offices of agriculture. Its actions are focussed primarily on the implementation of government agricultural policy, summaries and statistics of production, and marketing in the region. The Ministry is interested in these aspects as they pertain to the Law of Agricultural Policy Reform (Ley de Reforma Agraria) and animal health programs such as livestock vaccination campaigns.

National Office of Nutritional Support (ONAA) (Oficina Nacional de Apoyo Alimentario)

ONAA develops production projects with the communities and organized agricultural groups in the region. They work with the system by supplying the agricultural tools, seed and food staples such as oil, sugar, flour and milk. The farmers provide the land and labor. The harvest is divided into previously agreed upon percentages.

Rational Use of Slopes/Hills Project (Proyecto Uso Racional de Laderas)

This project searches for land that has possibilities of becoming suitable for farming with the help of terraces to stop erosion. The project works with communities and organizations by providing supplies for the construction of the terraces. Once these are finished, seed and agricultural tools are given to the communities which are allowed to keep the entire harvest.

Reforestation Project (PRA) (Proyecto de Reforestacion y Arborizacion)

The PRA Project of the Reforestation Center (CENFOR) relies upon National Institute of Reforestation (INFOR). Its objective is to promote reforestation in the communities to control erosion and maintain the climatic equilibrium, as well as supply combustible sources which were rationally exploited in order to prevent massive and indiscriminate deforestation. CENFOR hands out seed to the communities which, after promotion and motivation campaigns, have begun asking for them. The communities create nurseries with this seed. CENFOR supplies them with food, fuel, and other necessities while they are tending the nurseries. Once they have seedlings/cuttings of trees, these are distributed among the farmers in the community or organization. When a community directly solicits seedlings, CENFOR sends an expert who makes a diagnosis of the selected area to be reforested and the necessary number of seedlings. Seedlings of trees are also sold for a token price (precio simbolico) to individual farmers who are also given technical assistance as to their planting and care.

Caritas Huaraz

Caritas develops small projects of family and communal gardens. They supply farmers with seed and work supplies. They work primarily with the Mothers' Clubs which rely upon the Development Corporation (CORDE).

Agricultural Tool Marketing Enterprise (ENCI) (Empresa de Comercializacion de Insumos)

ENCI is a semi-autonomous government enterprise responsible for marketing agricultural tools/aids (mainly fertilizers) at low prices. They are also in charge of buying the farmers' produce at guaranteed prices in accordance with government policy which regulates agricultural production.

University of Santiago Antunez de Mayolo

UNASAM offers superior training in agriculture in courses of study for Agricultural Engineering and Nutrition Industry.

Institute of Higher Technological Learning of Huaraz

This institution offers a course of study, at the mid-level, in Farming Expertise.

VI.A.4. Communication Infrastructure

Communication Routes

The Callejon de Huaylas is connected to the PanAmerican Highway through a bypass from Pativilca to Huaraz. This highway is completely paved and is 200 km long. It is used for transporting heavy cargo and passengers. This is a principal route for the Callejon de Huaylas and ties together the capitals of the provinces of Recuay, Huaraz, Carhuaz, Yungay and Caraz. The final point of its route is in the city of Caraz; along this route, there exists a series of secondary road networks.

RADIO DIFFUSION

There are eight radio stations in the Department of Ancash, three come from Huaraz, two from Santa and the rest from Huarney, Casma and Caraz.

The radio stations from Santa are: Radio Bahía and Radio El Mundo. The stations from Huarney, Casma and Caraz have the names of the places where they are located (Huaraz, Radio Ancash, Huaraz and Huascarán).

The most important is the Radio Ancash with the potential of 3 kw. of medium wavelengths, 5 kw of short wavelengths and 500 w in FM; which allows regional coverage of medium waves and almost national in shortwave. To the North, in the city of Chimbote, Radio Bahía covers the province of Santa and the coastal zone of the Department.

PERIODICALS

All the daily newspapers published in Lima arrive in Ancash and have a special section "for the provinces" whose content varies

from those which are sold in the capital in that they carry more news about the provinces and less international information. We could not say that these newspapers have a wide coverage among the farmers given the illiteracy rate in the mountains, but any newspaper that arrives at the market is accessible to them.

In addition to the daily newspapers, two weekly publications which are not of great importance nor have much coverage are published in Huaraz (and printed in Lima).

OFFICE OF TECHNICAL COMMUNICATION OF CIPA V - HUARAZ

The OCT of CIPA V has twelve employees -- nine technical workers, two secretaries, and one chauffeur. Of the twelve employees (I DO NOT UNDERSTAND THE REST OF THIS SENTENCE...six are appointed?? nombrados...three are temporary (eventuales)...two are contracted and one is a freelancer?? destacado...) (Span. p. 24, bottom section)

In order to fully develop its work, the OCT believes that in addition to relying on the people who are actually contracted or are temporary, the staff would need to be reinforced by eight more people in the areas of radio transmission and printing.

OCT has adequate office space when compared with other branches of the government and has been supplied with some basic printing and radio equipment from the World Bank.

In actuality, with the new focus on technical communication, this office is not in charge of training, documentation or information. It is responsible only for the functions related to the diffusion and support for technology transfer.

In order to achieve this goal, the OCT publishes different publications such as: "Advances in Research", brochures, leaflets, teaching guides, informative notes and press supplements, in addition to an informational series such as "CIPA Informs" and "Press Notes". These are expected to reach a diversified audience of extensionists, farmers and the general public.

OCT has a daily radio program on Radio Ancash (the radio station with the largest audience in the region) in Quechua and Spanish which is 15 minutes long and is called "Good Morning, Farmer" (Amanecer, Campesino). The local extension agency of Chimbote, which is a city on the north coast of the region and has agricultural problems specific to the area, also produces a daily radio program on Radio Bahía titled "The Voice of CIPA". The Radio Ancash program is taped beforehand at the radio station. The one on Radio Bahía is transmitted directly because it does not have the facilities to prepare it before transmission.

**CUADRO DE RADIOEMISORAS MAS IMPORTANTES DEL DEPARTAMENTO --CHART
ON SPAN P. 26 AND 27.**

VI.B. Development of the Plan and the Strategy

General Description of the Strategy

VI.B.1

The actual methods of transference in INIPA through the extension program has limited coverage because of the small number of extensionists compared to the larger number of farmers. This makes other methods of extension necessary to extend coverage without losing, as much as possible, the impact of individualized face-to-face training.

The mass media has the advantage of a wide reach and of credibility in the field, especially when its transmissions are about public interest and focus upon specific sections of the population. Its limitation in education is that in radio and graphic materials (except for TV which is not applicable to our case), only the one sense (either the visual or audial) is being appealed to. This limitation is determined by the level of illiteracy in the audience.

A transference strategy that utilizes the mass media should do so with the idea of integrating its many aspects so that they act in a complementary manner to decrease individual limitations. This strategy would integrate the three main components of the mass media: radio and the graphic materials which complement it, and face-to-face training to reinforce the message of the first two communication forms.

All these mediums should cover, in an integrated form, the necessary information, motivation and training of the farmers as to technologies to be transferred. In this manner, not only will farmers be aware of the technology's existence and feel motivated to test and adopt it, but they will also be capable of using the technology correctly to obtain the desired results.

The strategy proposed by CTTA in Peru would integrate the use of radio with graphic materials and face-to-face training as elements of an educational program for farmers on the selected technology to be transferred.

This integration of mediums will be made progressively through

two approximations to eventually become a long-distance educational program:

In the first approximation, the technology will be promoted and its adoption will be encouraged through the mass media as a complement to the extension activities and programs. The objective is to inform as many farmers as possible about the technologies that can be used to increase production and resolve some of the actual crop problems. At the same time, the services

offered by the institutions of technical assistance and the activities of extension programs will be promoted.

During this first approximation, research into the farmers' behavior associated with each technology will be developed in order to study their actions and compare them with the suggested ones. The feasibility of applying the proposed technology will also be studied and a profile of the expected behavior will be formed.

At the same time, educational materials will be prepared, designed and produced for the second intervention (radio programs for long-distance education and teaching guides on each of the technologies).

The second approximation will consist of the implementation of educational activities through the methodology of long-distance education. This will complement the communication activities developed in the first intervention with programs such as long-distance radio education, teaching guides, and face-to-face training through extension activities.

1.1 Users

The strategy is to divide the program's users into two big blocks: those who already use agricultural tools/aids in some manner, and those who, basically because of economic barriers, do not have access to them. The fundamental problem among those who already use some agricultural tools/aids is that they do not use them correctly (with respect to time, dosage, manner in which they are applied, etc.), and as a result, do not obtain the expected results which would compensate their investment. Among those who do not use agricultural tools or aids, the main barrier is the economic inability to obtain them.

In a way, each crop receives a different treatment: The potato, for example, is a crop that the farmer in the zone considers more commercial or marketable than corn or wheat, which are, in most cases, products consumed by those who grew them. As a result, these crops do not receive as much attention from the farmer. However, it is true that the potato is a crop that requires more agricultural aids in its production.

1.2 General Objectives

- o To increase the farmers' knowledge to a certain level of technological use of the best and most convenient way to use agricultural tools.
- o To promote alternative technologies that are available to those farmers that do not use agricultural tools and do not have access to them because of economic barriers.

Objectives of the First Approximation

Communication Objectives

- o That the producers of potato, corn and wheat in the pilot region become familiar with the agricultural technologies they can put into practice to resolve some of the problems they face in their crops. In this way, their actual level of production would rise.
- o That the farmers become motivated to adapt these suggested technologies.
- o That the farmers know about and use the expert assistance and extension activities available at the regional institutions.
- o To present the farmers with orientation on the adequate usage for applying the suggested technologies and agricultural tools.
- o To supply the farmers with useful information for better decision-making on aspects related to farming (commercialization or marketing, prices of agricultural supplies, planting seasons and the correct use of technology, government agricultural products, etc.)
- o To promote organizations and communal work among the farmers, in order to take better advantage of the extension activities and to increase their capacity for accepting agricultural tools and expert assistance.

Strategy Objectives

- o To deepen the analysis of the workings and feasibility of the proposed technologies through research of their application by the farmers. Also, to compare this with traditional behavior of the farmers at different moments in the agricultural cycle of each crop.

- o To test the feasibility of the proposed strategy and the validity of the diffusion messages with the goal of not only getting feedback from their contents, but also of readapting the messages to be included in the second approximation.
- o To prepare the educational material to be used in the second approximation (radio course and teaching guides for each technology).
- o To organize and train the technical communication team in charge of the project in the future, after institutionalization.
- o To identify those farmers that can be radio announcers (irradiadores??) in the second approximation.

Objectives of the Second Approximation

Communication Objectives

In addition to maintaining the objectives of the first approximation, our goal is:

- o That the producers of potato, corn and wheat in the pilot region learn the correct usage of the available agricultural technologies and that they become capable of putting them into practice with their crops.
- o To promote the liasion farmers as sources of information and consultation for the others.

Strategy Objective

- o To develop the activities of the long-distance educational radio course by integrating the use of the radio, teaching guides and face-to-face training.
- o To extend the Project's coverage to cover the whole CIPA V Ancash area.

Behavioral Objectives

Potato:

For farmers who use agricultural tools/aids --

Adequate use of fertilizers:

- o When they should fertilize
- o How they should mix the fertilizers

- o How they should apply the fertilizers

Adequate use of insecticides and fungicides:

- o Which products to use
- o How to mix and prepare the product
- o How to apply and when

For farmers who do not use agricultural aids --

Adequate selection of seeds (shape, size, appearance and quality)
When and how to correctly use aporque (??)
Good preparation of the soil for seeding number of crossings
(cruzadas?) necessary

For both types of farmers --

To promote the correct form of storage using diffused light.
To provide information related to commercialization or marketing.
Promotion of sources of expert assistance.

Corn:

Correct way to plant the seeds: density of the seeding and depth
of the seeds' position.
Use of a better seed.
Promotion of a minimum level of fertilization.
Pest control: promotion of a sampling as a way of knowing when
to apply the insecticide to control the Ellyiothis.

Wheat:

Promote correct soil preparation until the right consistency is
achieved.
Minimum level of wheat fertilization .

1.3 Educational Contents

Potato:

For farmers who already use agricultural tools/aids --

Correct use of fertilizers

- o How much fertilizer to use:

If using third potato (de tercera???) as seed, the
recommendation is the following for one Ha. of land, or 30
"cargas" of seed:

6 bags of Urea (or 8 bags of Ammonium Nitrate)
10 bags of Simple Superphosphate of Calcium (or 5 bags of
Triple Superphosphate)
3 bags of Potassium Chloride

o When to fertilize:

Two applications should be made -- the first at the time of seeding and the second at the first aporque, forty days after seeding.

In the first fertilization, half of the Urea or Ammonium Nitrate should be applied, all of the Phosphorus and all of the Potassium. In the second application, the rest of the Nitrogen must be applied.

o How to apply fertilizer:

At the moment of seeding -- mix the different products uniformly in the field and apply.

When doing the first aporque, apply a fistful of the Nitrogen 20 cm. below the plant in the direction in which the water runs. In this way, the fertilizer will reach the plant already diluted. Earth it up (aporcar??) around the plant afterwards.

Correct usage of insecticides and fungicides

o Which product to use:

"Gusation" as a preventitive product.
"Ridomil", "Fitoraz", "Ripcord" as curatives.

Three measures per 15 liter pack (mochila) (3 or 4 spoonfuls), or one liter per water cilinder for one ha. of land (30 "cargas" of seed).

To prevent the "ranca" -- use Dithane M45; three spoonfuls per 15 liter pack of bombs. To cure: use 4 -5 spoonfuls of Ridomil MZ or Fitoraz PS per pack of bombs.

o How to mix and prepare the products:

The product should be mixed first in a bucket of water and stirred well with a stick. Then the contents should be added to the bomb and water added until it is filled.

o When and how to apply the products:

Preventatives (Gusation):

When the plant emerges, the first insecticide application should be made to attack the "Epitrix", the earthworm and some adult grubs.

One day before doing the first aporque, Dithane must be applied to prevent the "rancho".

The second application of insecticide will be made at the first "aporque". This should complete the task to kill the grub and moth larvae.

One day before the second aporque, the second application of Dithane M45 must be made.

At the day of the second aporque, the third application of insecticide will be made.

Curatives:

Ridomil MZ or Fitoraz PS is recommended to cure the "rancho". It has to be applied when black stains are visible on the leaves of the plants.

The products mentioned for pest control and diseases should be applied to the neck of the plant when it is wet. This should be early in the morning two days after irrigation--this is the best time because it allows the product to penetrate the plant before the rainy season eliminates it and decreases its effectiveness.

The messages referring to pest control and diseases will insist upon the necessity of using the recommended quantities, correct mixtures and manner of applying the product. If this is not done, there will be no results and the money invested in this agricultural tool/aid will be wasted.

For farmers who do not use agricultural tools/aids --

Selecting seed

o Characteristics of a good potato seed

Size: the size of a hen's egg (potato of the tercera)

Shape: typical of each variety, with no deformities

Color: the "Revolution" is white with red or reddish eyes, without stains

Appearance: should be whole and with a firm shell;

should not be cracked or peeled.
Shoots: should be numerous and robust.

The seed should be stored with diffused light and they should have shoots before they are planted.

Aporques

When to dig up the earth (aporcar??): At least two aporques should be made because it protects the plant from pests and helps it absorb fertilizer and water better. The first aporque should be done forty days after seeding. The second should be done twenty days after the first, that is, sixty days after seeding.

How to dig up the earth (aporcar): First the neck of the plant should be covered to protect it and prevent any harm to the most common roots of the plants. At this time, fertilizer is applied. The way to do it is by placing a fistful of fertilizer about 20 cms. from the plant in the opposite direction of the water flow from irrigation. Later on, the soil is dug up so that the fertilizer will mix well with the soil and reach the plant in the best condition.

Preparing the soil

To prepare the soil, the message will be to make three crossings (cruzadas) after ploughing. It is best to let a few days go by so that the sun, birds and other animals will eliminate the larvae and pests which may remain from the previous crop. Once the ploughing and the three crossings are done, and the field has rested for a few days, the furrows for the seed should be made.

Good soil preparation results in the following benefits:

- o clumps of soil are eliminated which facilitates the emergence of the plants
- o there is better ventilation of the soil which keeps it loose enough for the sprouts
- o more larvae and pests are eliminated
- o the potato estolones (???) can develop normally, whereas they would have broken if the soil had not been well-prepared
- o there is better absorption of fertilizers
- o irrigation is more effective because the water flow does not get clogged with clumps of soil

Storage

The message here refers to the technique of diffused light to store potatoes, keeping them in a certain location and adding traditional products such as the "muña" to combat pests such as the grub. The seeds should be laid out in layers rather than in piles.

Corn:

For farmers with a low level of technology --

Correct seeding density

The goal is to promote seeding by hits (golpes??) instead of seeding "a cola de buey". The suggestion made to the farmers is that, instead of throwing the seed into furrows behind the plough, they should make holes every 50 cms. and place three seeds into each one.

This results in:

- o control of the density, in order to know how many plants there are per ha.
- o uniformity in the depth of the seed and in germination
- o increased efficiency in water usage
- o better pest control
- o greater ease in using aporque
- o greater ease in fertilizing
- o better weed control

These advantages are, in turn, the disadvantages of using the "cola de buey" system.

When placing three seeds in the manner indicated above, three plants will be obtained in each hole -- later on, one of them can be pulled and used as livestock feed.

Depth of the seed

The seed should be placed at a depth of 5 cm. to even out the emergence of the plants and to assure as great a number of plants as possible. If the seed is deeper than that, it cannot emerge; if it is at a shallower level, it will be eaten by birds or will rot rather than sprout. The only system that assures the correct depth of the seed is the "por golpes" system.

Weeding and aporques

The first weeding should be done in the first twenty days after seeding so that weeds will not compete with the corn and so the fertilizer will be used exclusively for the corn.

The farmer will allow weeds to grow in order to use them to feed his livestock; with the "por golpe" seeding system, by placing three seeds in a hole, he can later pull one out for fodder. This way, he can still provide his livestock with fodder without depending upon weeds.

The aporque is done 40 - 50 days after seeding.

Improvement of the seed

The farmer at a low technological level does not spend money to buy improved seed and instead, uses his own. Going on this assumption, the following must be promoted:

- o selection of only one variety of seed
- o seed with a uniform color, which has a higher market value
- o utilization of at least in one out of every three seasons a type of improved seed; this will improve their own seed without a great cost increase

For farmers with some level of technology --

Use of improved varieties of seed

The recommended varieties would be:

Early (??precoces) varieties:

Morocho 501 (hard, yellow, coarse)
Canchero 301
Choclero 101
PMS 635 (canchero)

Late varieties:

Blanco Urubamba
PMC 561 (choclero)

The recommended density depends on the type of seed:

Early varieties: Use between 40 and 50 kg. of seed per ha. with a separation of 80 cm. between furrows and a separation of 50 cm. between plants, with two plants in each "golpe" (hole??). Three seeds must be planted in each hole so that some plants can be removed later leave a final total of 50,000 per ha.

Late varieties: Use 70 kg. of seed per ha., with a separation of 80 cm. between furrows and between plants (per golpe, per hole) which means 4 seeds must be planted in each hole resulting in a total of 62,000 plants per ha.

Minimum level of fertilization

Although this formula should depend upon the soil analysis, in case this is not done, the recommendation is :

- o Early varieties: N-P-K = 80-80-30
- o Late varieties: N-P-K = 120-60-30

Potassium, however, depends upon the soil analysis because the soil of the Callejón de Huaylas is in general, rich in Potassium.

It is recommended to use Nitrogen (in the form of Urea or Ammonium Nitrate but without mixing them) and Triple Superphosphate of Calcium.

As far as the best time to fertilize:

It is recommended to do the first fertilization twenty days after seeding, after the field has been weeded. In this first process, all the Triple Superphosphate of Calcium will be used and half of the Nitrogen (if Potassium is to be used, then all of it should be applied). The second fertilization should be done when the soil is turned up (aporque) or about 40 - 50 days after seeding, applying the remaining dosage of Nitrogen.

The recommended form of application:

It is recommended that the first fertilization will take place when sprouts have appeared. It must be placed 10 cm. from the plant in the direction in which the water plows so that the fertilizer will reach the plant in a diluted form. If it is placed too close to the plant, it will not be diluted and will burn the plant. The fertilizer will be a mixture of Urea, Superphosphate and Potassium. Nitrogen will be applied in the second fertilization, also placed 10 cm. from the plant but in the form of "golpes de mano".

Pest Control

The most serious problem with pests is the white corn worm or Heliothis. The choclero corn farmers generally apply some insecticide, although some of them do nothing. Farmers commonly use the insecticides Parathion, Tamaron, and Metasystox which are systematically phosphorized and have a residual period of 15 days. A problem with this are the residues that remain which, upon accumulation, are toxic to humans. The insecticides which are recommended are not toxic and do not pose any danger to human consumption.

These insecticides would be:

- o SEVIN 85 PM (powder that can be wet) 1.5 kg. of it to be used per ha. when mixed as 60 g. per 15-liter pack. Applications should be directed towards the neck of the corncob. These applications can be made with a pack or

with a brush, wetting each cob in the correct place. Three applications with an interval of ten days between each must be made.

- o AMBUSH (liquid) is apparently more expensive -- each liter costs 1,600 Intis -- but less is needed. The dosage is 50cc. per ha. or 10 cc. per 15-liter pack. Two applications with a ten day interval in between is all that is needed. It is applied in the same way as the previous one.

When to apply insecticide:

One determining factor in the positive results of insecticide is the moment when it is applied. The practice of taking field samples is to be encouraged in the farmers so that the insecticide will be applied when 10% of the plants are infected.

Wheat:

For farmers with a low level of technology --

Correct soil preparation

- o At least two crossings (cruzadas??) must be made.
- o The soil should be loose and without clumps to facilitate the emergence of the plants and to have as many plants as possible.

Correct Depth of the Seed

The seed should be planted at a depth of 5 cm. because it will not emerge if it is deeper than that.

For farmers with some level of technological use --

Minimum levels of fertilization

The fertilization formula would be 40-40-0, that is: 2 bags of Urea and 2 bags of Triple Superphosphate of Calcium per ha. of land (or 100 kg. of seed).

Half of the Nitrogen and all of the Phosphorus is applied at the planting. After 30 - 45 days after seeding, after weeding, the other half of the Nitrogen is applied. The fertilizer is applied by boleo (??).

The educational matter described above will be developed in the form of messages to be transmitted through different mediums and communication instruments. The format used will be in accordance with the characteristics of these mediums and the selected

formats. This is explained in the following chapters.

VI.B.2 Testing the Concept and the Product

Given that the strategy divides the intervention into two consecutive approximations, it is during the first one that the evaluation of the content takes place. The success of the messages is evaluated in a comparison with actual behavior patterns of the farmers when faced with the new proposals regarding farming practices.

On the other hand, before the preparation of educational material, the contents will be explained to the farmers in order to analyze with them the best way to present it and to observe their reactions, doubts and difficulties. In this way, possible doubts and questions can be answered in the material itself.

To contrast the proposed contents with the point of view of the farmers and to familiarize them with the correct terminology, techniques such as focal groups and individual field interviews would be used. These would take place at different times during the agricultural cycle of each crop and would refer to the contents that are to be evaluated. Only in this way will the farmers, (inmediatistas??) for nature, explain their behavior and discuss the advantages, disadvantages, doubts and difficulties of the proposed behavioral strategy.

The entire period that corresponds with the first approximation will be converted into a testing and strategic evaluation period. When the message and the technology are tested and evaluated at this time, it is more likely they will be successful in the second approximation.

On the other hand, during the first approximation, the messages diffused through certain mediums (demonstration days, field days, model land plots, group work) will also be put into practice through extension activities. As these activities take place, a process to analyze the knowledge, abilities and behavior required for the proper use of the proposed technologies will be developed. Specific behavioral objectives will be defined and an exact outline of the activities and steps that the user should take to correctly follow the proposed educational materials will be created. At the same time, the technologies to be used can be evaluated and analyzed as to their applicability to the conditions and capabilities of the farmers.

VI.C. Materials and Mediums used in the Strategy

The radio announcements/spots

Radio spots in Spanish and Quechua will be used fundamentally to:

- o promote the use of technologies
- o give information on institutional services
- o promote the listening and follow-up of the radio programs

The radio programs

The radio program "Good Morning, Farmer" will be reinforced in the first intervention according to the farmers' suggestions when surveyed. Its contents will be systematized according to the different stages in the agricultural cycle of each crop.

A new format of a radio program will be produced in the second intervention with a length of 45 minutes split into three 15-minute blocks which are perfectly differentiated.

- o The first block will have a news format and will be used to transmit useful information to the farmers. This will include news on agricultural policies, commercialization techniques, activities of the agricultural sector, and extension activities taking place in the region.
- o The second block will be educational and will consist of a radio course about the technologies; this should be accompanied by the parallel reading in the corresponding educational guide.
- o The third block, with the format of a dramatic novel, will develop a story line with consecutive chapters in which different characters (farmers, sectorists, salespeople, etc.) will act out aspects of the production, its problems and difficulties in a social (entorno???) which will include other development factors (such as health, education, etc.).

This third block, a mixture of drama and fact, is expected to complete the function of identifying with the farmer and of reinforcing the content and focus of the previous blocks. For this purpose, people on the radio program were created with characteristics of the region so that the farmers can identify with them.

Posters

Posters will be complements of the radio spots and their function is to reinforce the messages by making them more memorable. They will be distributed in strategic locations in the community, such as schools, municipal buildings, stores, meeting houses and other

popular, crowded places.

Technical manuals

The technical manuals are to train the sectorists in the technology to be transferred. This training was done in the terminology that will be used with the farmers, but on a more expert level. The manual format will be the same as the technical pamphlets and will be distributed to all the agricultural experts and extensionists in the area.

Leaflets and (Desplegables???)

In the first approximation, the desplegables will be used to complement the radio programs in explaining the proposed technologies in the first stage. Its size will be double that of official letter-size. The leaflets will deal with specific issues such as formulas for missing insecticides and fertilizers and will be handed out with these agricultural aids. The desplegables as well as the leaflets will be distributed through institutional personnel, agricultural supply salespeople, community leaders, schools and key people in each community.

Teaching guides

The teaching guides will complement the teaching block of the radio programs in the second approximation. It will be the same size as the desplegables and technical manuals in order to create a uniformity so the farmer will identify it as an agricultural teaching tool. This helps in the integration of mediums and establishes an element of identification so that the farmer knows the materials come from the same source and have the same function. The teaching guide will have an educational format and will contain drawings and photographs to visually explain the same messages that are presented audially on the radio programs.

These guides will be placed in different distribution points and will be promoted on the radio and through other mediums so that a majority of farmers will be reached. Institutional personnel (such as sectorists, extensionists, etc.), agricultural aids salespeople, agencies of the Banco Agrario, training committees of farming communities and their presidents, as well as selected farmers in each community will also serve as guides because of their close connections with the sources of expert assistance.

The guides will also be handed out at schools with the double purpose of assisting to train students in social studies classes or agricultural activities and of reaching the farmers through an additional channel of communication (especially since the students are usually the only ones in the family who can read).

Other Mediums

Extension activities such as model farm plots, field days, method demonstrations, etc. will act as a demonstrative complement of the theoretical training that the farmers will receive through other mediums such as radio and graphic materials.

These actions, conveniently promoted, will be the time when farmers who are interested can test the results of the proposed technologies or can learn the correct application by watching how it is done in these demonstrations.

To reinforce these extension activities, some teaching materials will be produced for the sectorists such as (rotafolios??). In addition to this development, teaching guides will be used as points of reference and as a systematization of the training that is offered.

Other possible mediums will be exploited such as calendars which, besides containing informative and motivating messages, will include techniques to mark off dates for the correct application of agricultural aids or the dates for certain actions such as aporques, weeding, etc. (taking the seeding dates into account).

Communications Mediums for Sectorists and Institutional Personnel

Technical Manuals:

Technical manuals for each crop (potato, corn, wheat) will be created for the sectorists and will contain information and recommendations from specialists on the technology to be transferred. It is hoped that through the manuals, the knowledge that institutional personnel have on available technologies will be presented in a uniform manner. This way the farmer will receive the same expert advice from the institutional sources and from the project. These manuals will be re-edited and re-adapted according to the development of the research and to the feedback from the field work with the technologies.

Training:

Periodically, meetings will take place with the sectorists to inform them of the results of the research, formative evaluations and feedback. This will lead to a plan for monitoring and feedback on project activities through the sectorists.

VI.D. Production of the Materials

Steps to follow in the production of materials

1. The contents will be taken from the technical manuals

prepared by experts to train sectorists about the CTTA framework.

2. The contents will be adapted to the level of comprehension of the farmers and to the formats to be used with each medium. The adaptation will be made by the OCT team and the sectorist of the pilot site, at the same time that the concepts are tested with the farmers in the field.
3. Those at the OCT who are in charge of the production of radio and graphic materials will prepare the corresponding outlines for the materials which will be analyzed by the Director of the OCT of CIPA and the Surveyor. Experts at OCT Central can be counted on for their assistance.
4. The outlines will be given to the experts of the programs for their technical review and approval from the point of view of the technological message or contents. If it is not adequate, the whole process will begin again at point 2.
5. Once the technological content has been approved, the OCT team from CIPA will proceed to validate the outlines in the field with a sample of future users.
6. According to the results of validation in the field, changes and pertinent adjustments will be made by the group and will be passed along to those in charge of the final production.
7. The production of the materials that can be taped or printed at the OCT will be the responsibility of the OCT.

Using Validation, Formative Evaluation and Feedback

The development of the corresponding steps of the research, testing and production will provide information and direction for the development of adequate materials of communication. However, these materials must be validated with representative groups from the target audience in order to test the farmers' comprehension and adaptation to the desired objective before they are produced.

The volume of materials produced is such that it is practically impossible to validate each and every one of them. This is especially the case with radio programs which are impossible to evaluate individually because of their characteristics and frequent production. Nevertheless, certain materials which are prototypes will be cautiously evaluated, such as the teaching guides of the radio course because of its special characteristics and because of the high illiteracy rate in the region. The formative evaluations will permit evaluating the impact each of the materials has on the desired objectives. The materials will be adapted according to the evaluation results -- either by making the necessary adjustments in the contents or by

reinforcing the messages that may not have been conveniently assimilated. The same thing will happen with the permanent monitors that will develop as the program progresses.

These three activities: validation, formative evaluations, and permanent monitoring will allow feedback to create changes in the materials, strategy, contents, distribution systems and all the elements that come into play in the implementation plan.

Quality Control of the Materials Produced

The materials will go through several technical evaluations to guarantee their quality before they are produced. The content will be reviewed by experts of corresponding crops to assure their accuracy as far as scientific agricultural specifications.

The format should reflect the different types and elements that intervene in the production so that in the visits to the field a photographic history can be compiled as a reference for the artists and radio producers. This way it is not essential for them to actually go to the field to take notes or make observations on the popular vocabulary for the radio programs.

The realization of the desired objectives will be validated with groups representative of the target audience.

These steps will guarantee a high level of quality which will be progressively increased as the training of production personnel is strengthened.

Information diffusion

Radio:

The fifteen-minute daily program "Good Morning, Farmer" will be used in the first approximation; its contents will be in accordance with the previous calendar of messages (see diagram). To promote the different selected technologies, radio spots will be used in the first approximation and will be transmitted from Monday to Saturday on Radio Ancash, the most listened to station in the region (see chart). The program "Good Morning, Farmer" will be broadened by adding the corresponding part of the radio course and the "novel" in the second approximation. The same radio spots used in the first approximation will also be broadcast in the second one.

Graphic materials:

In the first approximation, posters (two for each crop) will be produced to promote the most important aspects of each crop (see diagram). (Plegables???) will also be created to explain the

aspects of application and use of the technologies. Leaflets will be used to teach the farmers how to mix and apply the fertilizers and pesticides; these flyers will be given to the farmers when they buy these agricultural aids.

In the second approximation, leaflets, posters and plegables will be maintained. The information in these will be completed in a more detailed manner by the guidebooks which complement the contents of the radio course using graphic materials.

Interpersonal communication

The sectorists will continue to be key people in the face-to-face training according to INIPA's structure. If any changes were made, it might be the specialists from the Experimental Station or those in charge of validating agricultural technologies in the farmers' fields who would be responsible for the training for CTTA. The activities developed would give the farmers the opportunity to test the contents of the messages they receive through the other communication mediums. These activities will help identify those farmers who would be promoted as liaisons and as sources of consultation for the rest of them.

Those farmers acting as liaisons will be promoted on the radio and will also be instruments in the distribution of graphic materials. Their main function will be to explain how they use the technologies and to answer any questions or resolve any doubts about it.

The salespeople of agricultural aids will be used to diffuse technologies referring to the correct usage of fertilizers and pesticides. The necessary graphic materials (leaflets) will be given to them and will be handed to the farmers when they buy any of the above-mentioned agricultural products.

VI.F. Monitoring and Feedback

Monitoring will take place through the institutional personnel in the field (sectorist, agents) who will be supplied with small evaluation formats with key questions to assure a continuous flow of information to the project staff. Also, periodic visits to the field will take place in order to analyze the workings of specific components such as a plentiful supply of agricultural products or the timely distribution of graphic materials. One important aspect of monitoring in the field would be the permanent evaluation of the diffused technologies and their application in the field. This would provide feedback for the radio as to the doubts and problems farmers encounter with the application of technologies.

The personnel responsible for radio diffusion in CIPA will be in charge of monitoring radio diffusion, making sure that the radio spots are diffused in the accorded quantities and intervals. Index cards will be prepared in order to record data for the monitoring.

VI.G. Formative Evaluation

The formative evaluation will be carried out periodically to determine how the different elements of the plan are working and to make any necessary changes.

Since the permanent monitoring provides feedback on how certain elements are working, formative evaluations are done to measure the impact at the end of each season's general diffusion of technology in the first approximation. This means that at least one formative evaluation is made at the end of preparing the soil, seeding and fertilization, and another one after finishing the next stage of pest and disease control.

For the second approximation, only one global formative evaluation is necessary at the end of the agricultural cycle of each crop.

The formative evaluations would evaluate:

- o if the messages have been understood
- o the roles that different mediums are playing in the diffusion of the messages and which medium is the best in transmitting them
- o how the farmers are using the messages
- o what effect new behavior patterns are having on production
- o the role of the farmer-liaisons
- o the development of the extension activities and of the trial fields (model land plots, etc.)

The results of the formative evaluations would be used to:

- o reinforce the least-assimilated messages
- o distribute more messages towards the most efficient mediums
- o analyze the validity of the proposed technologies
- o collect strategies for institutional possibilities

VI.H Interinstitutional Cooperation

INIPA

The Technical Unit (Unidad Tecnica) and the Central Office of INIPA will be informed on the development of project activities

through the National Director of the Project. On a parallel line, information and coordination mechanisms with those in charge of the INIPA extension program will be established. The objective is that the policies, methods and focal points of the communication-extension programs will mutually complement and reinforce each other.

Coordination will take place with the directors of national cultivation programs so that CTTA activities will be taken into account when they form their policies. In the same way, feedback as to the results can also assist these programs to enrich their decision-making.

At the CIPA level, channels of information will be established with the CIPAs that have shown an interest in the project and who could be the future actors in the Project's proposed methodology. In addition to keeping the Communication Offices informed on the progress of the activities, the personnel would become participants in the training days and seminars that the Project will carry out.

AID

A systematic program of informational meetings with the Project Official at AID will be established, in addition to the submission of written information as to the progress of the activities. Besides these established sessions in the agreement between AID and the Project, meetings will be held with the Office of Agriculture and Rural Development (OARD) personnel to unfold the present Integrated Action Plan. They will also be informed of the formative evaluation results and will be shown examples of the educational materials that are produced according to the strategy plan.

On the other hand, all the CTTA activities will be planned and implemented with AID approval.

North Carolina State University

Communication links are maintained with the University of North Carolina through the IEE Project and its Extension Surveyor. The university is sent technical reports on the progress the Project is making, just as they receive feedback on the progress of other projects such as extension activities, whose development and methodology affect the planning activities of CTTA.

CIP

Channels of communication are maintained with the Communication Office and the Social Sciences Department of the International

Center of the Potato. Meetings and seminars are held on the Project's progress and results through both of these offices. CTTA training will contain materials produced by the CIP.

Other Institutions

At the level of Ancash, mutual collaboration links will be established with the Rational Use of Slopes Project from the Development Corporation (CORDE-Ancash) according to the agreement signed between this institution and CIPA. In addition to joining together for CTTA staff to train CORDE personnel, ideas from the Rational Use of Slopes Project will be included in CTTA radio programs.

Ties will be initiated with the University of Santiago Antunez de Mayolo of Huaraz. A number of their teaching staff will be invited to participate in CTTA training days and several conferences on the Project and its methodology will be held at the university.

There will also be some collaboration with the project, "Diarrheal Disease Management" (AED/AID), to include some of its contents in the CTTA radio programs and to take advantage of mutual research that both projects do in the field.

VI.I Personnel Training

One of CTTA's objectives, which is also the basis of its institutionalization, is the creation of a national team capable of developing communication activities in the future -- when the advising period is finished -- which would follow the methodology proposed by the Project. The fundamental tool to achieving this objective is the training of local personnel in the skills necessary to manage the CTTA methodology and the specific strategy designed for communication intervention.

This training, in the case of CTTA-Peru, will have two general forms:

- o training in action, that is, training whose results are materials or specific actions planned by the Project in its program development

- o special training in certain specific aspects of the work that will require special abilities for those who are in charge of it

VI.I.1 Training Methodology

The methodology followed in personnel training will be a combination of theory and practice in the form of workshops whose teachings can be directly utilized by the project. For the training, the following workshops have been programmed:

- o Basic Social Research (???, Span. p. 54) Techniques
- o Educational Radio Diffusion Techniques
- o Techniques for the Production of Graphic Materials for Illiterates
- o Techniques for Validation of Educational Materials

All the workshops will be completed in the stage corresponding to the Project's first approximation. The goal is to have the team of people from the OCT of CIPA practice what they have learned in the activities of that stage and adequately carry out the activities in the second approximation.

The permanent training will be reinforced through a program of "Technical Meetings" every Friday afternoon to analyze the progress of the work on the part of the personnel and to analyze specific aspects of the methodology that they are developing. The Office of Technical Communication of the Central Office will supply advice permanently through its idea specialists or in other aspects that may be necessary.

The special training in particular aspects of the work will continue managing the necessities that are detected as the activities of the first approximation progress.

On the training days, personnel from other CIPAs will be invited to attend, those who will help direct the Project's strategy in the future, and those from other development organizations in the region with the goal of establishing mechanisms of coordination with them at the start of the same methodology of the Project.

Training Calendar

Workshops

- | | |
|---|---------------|
| o Basic Social Research Techniques | April 1987 |
| o Educational Radio Diffusion Techniques | June 1987 |
| o Techniques for the Production of Graphic Materials for the Illiterate | January 1988 |
| o Techniques for Validating Graphic Materials | February 1988 |

VI.3. Administration and Leadership

The OCT of CIPA V, not counting those who are responsible for CTTA activities, does not have enough personnel who are up to date and sufficiently trained in the diverse aspects that make up the CTTA methodology (this is a problem the rest of the CIPAs

have, too). Also, the project is one of their responsibilities, not the only one, and they should respond to a plan of work in support of the different programs in accordance with the standard functions. It is not possible to actually structure an organized group to manage the Project.

However, once the proposed strategy demonstrates its effectiveness in the pilot site and is extended, it will be converted into the communication strategy of the institution. As such, it will be standardized and personnel who have been trained for this will be assigned to it.

The managerial structure of the Project will result from the experience of the first approximation, according to the strategy that was tested at this time. The creation of commissions, at the central as well as local level, was proposed to plan and orient the project activities but the proposal was not accepted by INIPA. It will be necessary for the Project to first demonstrate its effectiveness and be adopted before proceeding with the organization of a managerial framework.

Participation of National Personnel in the Project

The Director of the Office of Technical Communication of INIPA is the National Leadership of the Project. This position is now occupied by the engineer Luis Arguelles Palacio.

The Director of CIPA V Ancash is responsible for the execution of the project. This job now belongs to the engineer Jose Rios Sotero.

The Director of the Office of Technical Communication is the counterpart in CIPA V, a position filled by the engineer Ramon Espinoza Pantoja.

The personnel of the Office of Technical Communication are considered the executors of the activities. The national personnel, as part of their function and objectives within CIPA, are responsible for the execution of the CTTA Project activities.

In operative terms this means:

- o to execute research activities of the knowledge, attitudes and practices of the farmers in the coverage area of the Project in order to determine the most appropriate communication strategy to be employed.
- o to design and produce the communication materials to be used in different channels and mediums.
- o to validate the communication materials with the surveyors before their final production, to make sure

it conforms with the pre-set transfer objectives.

- o to supervise the execution of the activities.
- o to evaluate the impact that the activities have achieved.
- o to institutionalize the activity as a responsibility of the OCT and to progressively extend it to the rest of the CIPAs.

The OCT at the central level will supervise the pilot activities of the Project in CIPA V and will, through their specialists, support the development of the specific activities and actively participate in the training planning. In addition to this, OCT at the central level will provide support in the production of the communication materials, given that its greater capacity of production has been established.

It is expected that the OCT on the central level will be the principal organization responsible for the extension of CTTA methodology to other CIPAs. The function of these CIPAs is to frame a focus for policy and strategy for technical communication on the national level. It also supervises and advises on technical communication activities for the entire country.

Advisor participation in the Project

The Resident Advisor is Mr. Jose Ignacio Mata and his responsibilities are:

- o to advise on the design of the Activity Plan of the Project
- o to advise on the creation of the communication strategy and to suggest alternative methods
- o to advise on the adequate production of the communication materials that will be used to inform, motivate and instruct as to the correct adoption of new technologies.
- o to contribute, according to his specialty and experience, to the training of national personnel on topics related to the interests of the Project
- o to advise the administration and management of the Project, with the goal of establishing its institutional permanence, once the competitiveness (conurrencia??) is removed
- o to coordinate with the advisors of the donor Agency,

according to the work procedures it has established

- o to administrate the funds of AED for the operation of the consultancy and to ensure the good management of these funds

In addition to a long-term advisor, Mrs. Marta Cruz de Yanes will also serve as advisor in charge of evaluating CTTA in Peru as a representative of ACT.

Participation of different CIPA programs in the Project

The specialists in the cultivation of potato, corn and wheat from the Technical Center of CIPA V will be the sources of technology transfer through CTTA.

They will be in charge of preparing the technology offered and the technical materials for training the sectorists. The communication materials that will be prepared first go through analysis and testing based on technical content. They will receive feedback through the Project on the feasibility of applying the technology offered, as well as how it is working in the different circumstances of the public surveyor. The goal is that the materials will be altered according to the facts they receive.

The AgroEconomic Office of CIPA plays an important role in providing information for the decision-making about what is best to inform the producers, according to the variables in the markets of agricultural supplies and products.

Sequence of Direction of Project Activities

The OCT of CIPA has a reduced number of personnel, and in addition to CTTA Project activities, develops its own plan of annual work according to its responsibilities within CIPA's objectives. This makes it impossible to structure a team exclusively responsible for the activities of CTTA. It would only be possible to establish a system of work procedures to develop different CTTA activities.

Selection of Technologies

The selection of technologies to be transferred will be the responsibility of the crop and program specialists. This will be influenced by the feedback on research results and formative evaluations of the Project and will be presented and analyzed together.

Preparation of Technical Guides for Training Institutional

Personnel

The guides for sectorists, which contain guidelines to be followed in making technological recommendations, will be prepared by the specialists of each crop.

Publication, Testing, Production and Distribution of the Guides for Sectorists

The OCT of CIPA, through its publication personnel, will be responsible for preparing the design for the guides. They write them at the level of the sectorists and then pass them to the specialists who authored them for a technical revision and final approval. The OCT of CIPA will also be responsible for the final production of the guides and their distribution through the extension agencies.

Research and Formative Evaluations

The development research and formative evaluations will be planned by the OCT with the advice of AED and ACT personnel. Quechua speakers will be contracted as surveyors to carry out the research and will be trained by the advisory personnel.

The results of the research and evaluations will be analyzed by the crop specialists in order to use them as feedback for changes that may be necessary in the technologies, research or adaptation procedures.

Strategy Preparation for each Stage

This step will be made by all the OCT personnel so that each person will understand the integration of the contents in the different mediums under their responsibility.

Design of materials for radio and teaching guides

The OCT personnel responsible for each of the mediums will prepare the format designs. In the case of the teaching guides and the corresponding teaching format in the radio program, the content will come from the technical guides prepared for the sectorists. The content will be modified to the level of the farmers and the teaching format will be more conducive to easier assimilation on the farmers part.

Testing the materials

The communication materials will first be tested and approved for their technical content by the crop specialists. Once this revision has been done, they will be tested for comprehension by groups of representative farmers from the target audience. This test will be done by the OCT personnel responsible for the design

and production.

The final production of the materials will take place in the OCT with the support of the OCT of Lima, or in a private company that has been contracted for this purpose.

Distribution of Guides and Printed Matter

The guides and printed matter will be diffused to the farmers through sectorists, agricultural aids salespeople, community leaders and community training committees, schools, and farmers who have been identified as sources of information.

Monitoring

Monitoring the radio messages will be one of the functions of the radio personnel of the OCT. The distribution and use of graphic materials will be an activity of the sectorist and will be complemented by visits of the national and field advisory personnel.

Execution of Extension Activities and face-to-face Training

These activities will be the responsibility of the sectorists and will be coordinated with mass media broadcasting, not only to promote it but also to complement it with teaching programs in the radio courses.

Content Feedback for Different Mediums

This feedback will be channeled through the sectorists. A specific format will be prepared to be filled out when they are visiting farmers and doing group work. In addition to the sectorists, OCT personnel will make several continuous visits to the field to interview key farmers.

Training Institutional Personnel

The training of OCT personnel will be planned according to methodological aspects decided upon by the advisors that must then be reinforced. There also is the possibility of advice from a special consultant contracted for this purpose. The organization of events will be carried out by the OCT of CIPA and can count on support and reinforcement from the OCT at the central level.

Project Supervision

The National Directorate of the Project has placed Mr. Raul Graham in charge of the project supervision at the national

level. Through this supervision, not only will the progress of Project activities be observed, but also the activities that are showing results can be transferred to other CIPAs.

VI.K. Institutionalization

In the philosophy of the CTTA Project, as a pilot activity, it is of fundamental importance that the methodology and strategy be institutionalized in the institution in which the project is working. This should be done once it has been established that the effectiveness and correct focus apply to reality and to the objectives of this institution.

The institutionalization is a permanent process for CTTA which involves:

- o a methodology and effective strategy whose implementation is feasible for the resources of the institution
- o a staff trained to direct the methodology and strategy, which enriches and improves it to better meet ever-changing needs
- o a small production team to produce the necessary materials for strategy implementation
- o a system of work and some operative mechanisms to be integrated with the institutional mechanisms so that these work while still maintaining a balance

These mechanisms make the coordination ties extensive within as well as outside of the institution (with other related institutions).

The activities of the CTTA Project in CIPA-V have been incorporated into the activities of the Office of Technical Communication. The OCT personnel have demonstrated a great interest in CTTA's focus and are expecting to actively participate in the implementation. Various CIPA's such as the one from Huancayo, Chiclayo and Tarapoto have participated in the training workshops that have already been held and the OCT of the Chiclayo CIPA is trying to develop the aspects of CTTA's methodology for itself.

The training that has been planned will be a fundamental instrument in the institutionalization process. This training will be supervised by the OCT at the central level.

In the development of the activities, the rhythm most

accommodating to the capabilities of the personnel and the operative institutional mechanisms will be followed. The permanent advisors and the coordination at all levels of the institution would also have an effect on the development pace.

VII. Technical Assistance

VII.A Long-term Technical Assistance

The Project has a long-term advisor, Mr. Jose Ignacio Mata, anthropologist and educational communication expert, and an evaluation consultant, Ms. Martha Cruz de Yanes, sociologist and evaluation expert. They are both expected to remain for the duration of the project.

VII.B Short-term Technical Assistance

In November 1986, the Project received assistance from Mr. Jose Luis Monterroso, agricultural engineer, to determine the technology to be transferred. His work was originally to be used in the Project's development in Huancayo. When the site was changed to Huaraz, the technologies had to be determined once again and were done using the methodology proposed by this consultant.

It is expected that another short-term advisor will be contracted to run the technical workshop in Educational Radio Diffusion in the month of June 1987. Ms. Helena Pinilla, a Peruvian radio expert and social communication professional, has been selected for this position. The necessary steps to arrange for hiring her are being taken.

The national personnel in charge of the Project have determined a policy with respect to the hiring of short-term advisors, a policy that is shared with the INIPA authorities. When there is no possibility that the institution will resolve the needs of the Project through their own technical resources, the consulting needs will be determined by the national team according to the development of activities. In these cases, the need for assistance will be analyzed among those professionals or institutions outside of the INIPA that can offer it in a satisfactory manner.

The results of this analysis will be given to AID for their approval and decision on the corresponding procedure. If it is

not possible to find this type of technical assistance in the country, AED will be asked to find and suggest candidates from other countries.

It has not been possible to firmly establish which consultations will be necessary to the long-plan outlook of the work. It is expected that these will be used for the training of the national team responsible for the execution of the Project and for developing the communication activities for the technology transfer once this is finalized.

IX. Some Circumstances that might affect the Development of the Project's Activities

The government of Peru is considering the reorganization of the agricultural sector, which would affect INIPA's whole structure. The focus, policies and organization proposals of the new planning are still unknown to the Project because they will not be made public until next July.

The Project and its programming should be accommodated to the resulting new policies and institutional structures.

The flowing mechanism of the funds from the obligations of the national counterpart have been affected by these new policies. It has also been affected by other aspects of wage policies which oblige the financial source to reprogram the presuppositions and reorganize the distribution of funds. An inopportune flow of funds of the national counterpart could affect the normal development of the activities and their results according to established cronogramas (???)

The security conditions in the pilot region are changing, which could make it difficult to work there in accordance to AID policies. We hope to achieve a substantial advance of the Project before the situation gets worse, so that, if the permanent presence of the surveyors in the region is not possible, mechanisms can be established to maintain the level of technical assistance from the central office or other CIPA selected as an alternative.