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Technical Events  
No. A2/SR-86-001  
ISSN 0253-4746

## A SHORT COURSE IN AGRICULTURAL TECHNOLOGY TRANSFER

August 19 to 30, 1985. Paramaribo, Suriname

Sponsored by:

MINISTRY OF AGRICULTURE, ANIMAL HUSBANDRY AND FISHERIES (LVV)  
and  
INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE (IICA)

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INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE

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OFFICE IN SURINAME

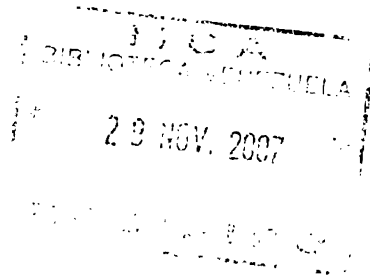


Centro Interamericano de  
Documentación e  
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A SHORT COURSE  
IN  
AGRICULTURAL TECHNOLOGY TRANSFER

August 19 to 30, 1985. Paramaribo, Suriname

Edited by:

Guillermo Villanueva\*

Horacio H. Stagno\*\*

August, 1986

PARAMARIBO, SURINAME

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## INTRODUCTION

The Ministry of Agriculture, Animal Husbandry and Fisheries requested the technical assistance of IICA in designing and implementing a training course in agricultural transfer of technology to improve the capabilities of the Agricultural Extension Service and also to help the coordination and integration of both the agricultural research and the extension.

The course was developed using lectures with visual aids, and complemented by discussion groups. Through the discussion groups the participants were able to analyze the situation of generation and transfer of technology in Suriname and suggest ways for improving it.

The initial part of the course was concerned with providing the participants with conceptual framework and information necessary for understanding the process and structures of the generation and transfer of technology knowledge within Suriname, while the later stages were oriented to furthering recommendations towards improving it.

The final activities of the course were the compiling of suggested ways of restructuring the extension and research systems and making eleven specific recommendations to the Ministry of Agriculture (L.V.V.).

R. Huiswoud  
Course Coordinator (IUV)

Guillermo E. Villanueva  
Director IICA/Suriname



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PROGRAM

MONDAY AUGUST 19

8:30 - 9:15

OPENING CEREMONY

- Opening Remarks: R. Huiswoud, Course Coordinator
- Welcome Address: G. Villanueva, Director IOCA Office in Suriname
- Opening Address: R. Randjietsingh, Minister of Agriculture, Animal Husbandry and Fisheries

9:15 - 10:00

COFFEE BREAK

10:00 - 12:00

The Agricultural Sector: General Framework; National Development Plan - H. Lionarons, Planning Specialist, IWV, Suriname

13:00 - 15:00

Definition of Goals and problems related to the Seminar topic. (Work groups and plenary session).

15:00 - 15:30

Coffee Break

15:30 - 17:30

"The generation of technology" G. Villanueva, Agricultural Research Specialist, IICA/Suriname

TUESDAY AUGUST 20

8:30 - 10:00

Work groups and plenary session (generation of technology in Suriname)

10:00 - 10:30

Coffee Break

10:30 - 12:00

"The evolution of the extension process"  
K. Le Morvan, IICA Consultant, Venezuela

12:00 - 13:00

Lunch

13:00 - 15:00

Extension approaches in Suriname - Work groups

15:00 - 15:30

Coffee Break

15:30 - 17:30

Continuation of work groups and plenary session.

WEDNESDAY AUGUST 21

8:30 - 9:30 "The process of technological transfer"  
K. Le Morvan, IICA Consultant, Venezuela

9:30 - 10:00 Coffee Break

10:00 - 12:00 Continuation of presentation

12:00 - 13:00 Lunch

13:00 - 15:00 The process of technological transfer in Suriname.  
Work groups

15:00 - 15:30 Coffee Break

15:30 - 18:00 Continuation of work groups and plenary session.

THURSDAY AUGUST 22

8:30 - 9:30 "Technological transfer viewed as a social system"  
K. Le Morvan, IICA Consultant, Venezuela

9:30 - 10:00 Coffee Break

10:00 - 12:00 Continuation of the presentation

12:00 - 13:00 Lunch

13:00 - 15:00 The system of technological transfer in Suriname  
Work groups

15:30 - 18:00 Continuation of work groups and plenary session

FRIDAY AUGUST 23

8:00 - 9:30 "The communication process and its relationship  
with technological transfer" R. Pineda,  
Agricultural Communication specialist, IICA  
Dominican Republic

9:30 - 10:00 Coffee Break

10:00 - 12:00 Continuation of presentation

12:00 - 13:00 Lunch

13:00 - 14:30 "The hollow square" a game in planning and  
communications. K. Le Morvan, IICA Consultant  
Venezuela

14:30 - 15:00 Coffee Break

15:00 - 17:30 "Extension methodology and techniques" R. Pineda  
Agricultural Communication Specialist, IICA  
Dominican Republic



MONDAY AUGUST 26

8:00 - 9:30 "Planning of agricultural research" G. Villanueva  
Agricultural Research Specialist, IICA/Suriname

9:30 - 10:00 Coffee Break

10:00 - 12:00 Work groups on research planning plenary session

12:00 - 13:00 Lunch

13:00 - 15:30 "Program planning and evaluation" K. Le Morvan,  
IICA Consultant, Venezuela

15:30 - 16:00 Coffee Break

16:00 - 17:30 "Structuring the Extension Service" R. Pineda  
Agricultural Communication Specialist, IICA  
Dominican Republic

TUESDAY AUGUST 27

8:00 - 9:30 "Agricultural credit" B. Narsingh, Deputy  
Director of Agricultural Bank of Suriname.

9:30 - 10:00 Coffee Break

10:00 - 12:00 Continuation presentation

12:00 - 13:00 Lunch

13:00 - 15:15 "Marketing - inputs and agricultural products"  
K. Raghoebarsingh, Planning Specialist IWV;  
Suriname

WEDNESDAY AUGUST 28

8:00 - 9:30 Orientation to group work on recommendations  
for recognizing the extension service. K. Le Morvan  
IICA Consultant, Venezuela

9:30 - 10:00 Coffee Break

10:00 - 12:00 Work Group discussions

12:00 - 13:00 Lunch

13:00 - 15:00 Continuation of work group discussions

15:00 - 15:30 Coffee Break

15:30 - 17:30 Continuation of work group discussions

THURSDAY AUGUST 29

8:00	-	9:00	Continuation of work group discussions
9:00	-	9:30	Coffee Break
9:30	-	12:00	Reports of groups on Extension Service recommendations
12:00	-	13:00	Lunch
13:00	-	15:00	Continuation of work group presentations
15:00	-	15:30	Coffee Break
15:30	-	17:00	Formulation of general recommendations

FRIDAY AUGUST 30

8:00	-	8:30	Simulation game "forming squares" K. Le Morvan, IICA Consultant, Venezuela
8:30	-	9:00	Finish recommendations
9:00	-	9:30	Coffee Break
9:30	-	11:00	"What concrete actions can we take to improve our work?" Work groups
11:00	-	11:30	Plenary session
11:30	-	12:00	Evaluation of course (use of questionnaire).
12:30	-	14:30	OFFICIAL CLOSING CEREMONY
			- Summary of the program: R. Huiswoud, Course Coordinator, LWV, Suriname
			- Closing Remarks: G. Villanueva, Director IICA Office in Suriname
			- Closing address and presentation of diplomas: R. Randjietsingh, Minister of Agriculture, Animal Husbandry and Fisheries of Suriname

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## INSTRUCTORS

The instructors who participated in the course were the following:

a. For the Government of Suriname

Mr. H. Lionarons: Director of Planning Division LWV

Mr. B. Narsingh: Agricultural Bank

Mr. K. Raghoebarsingh: Planning Division LWV

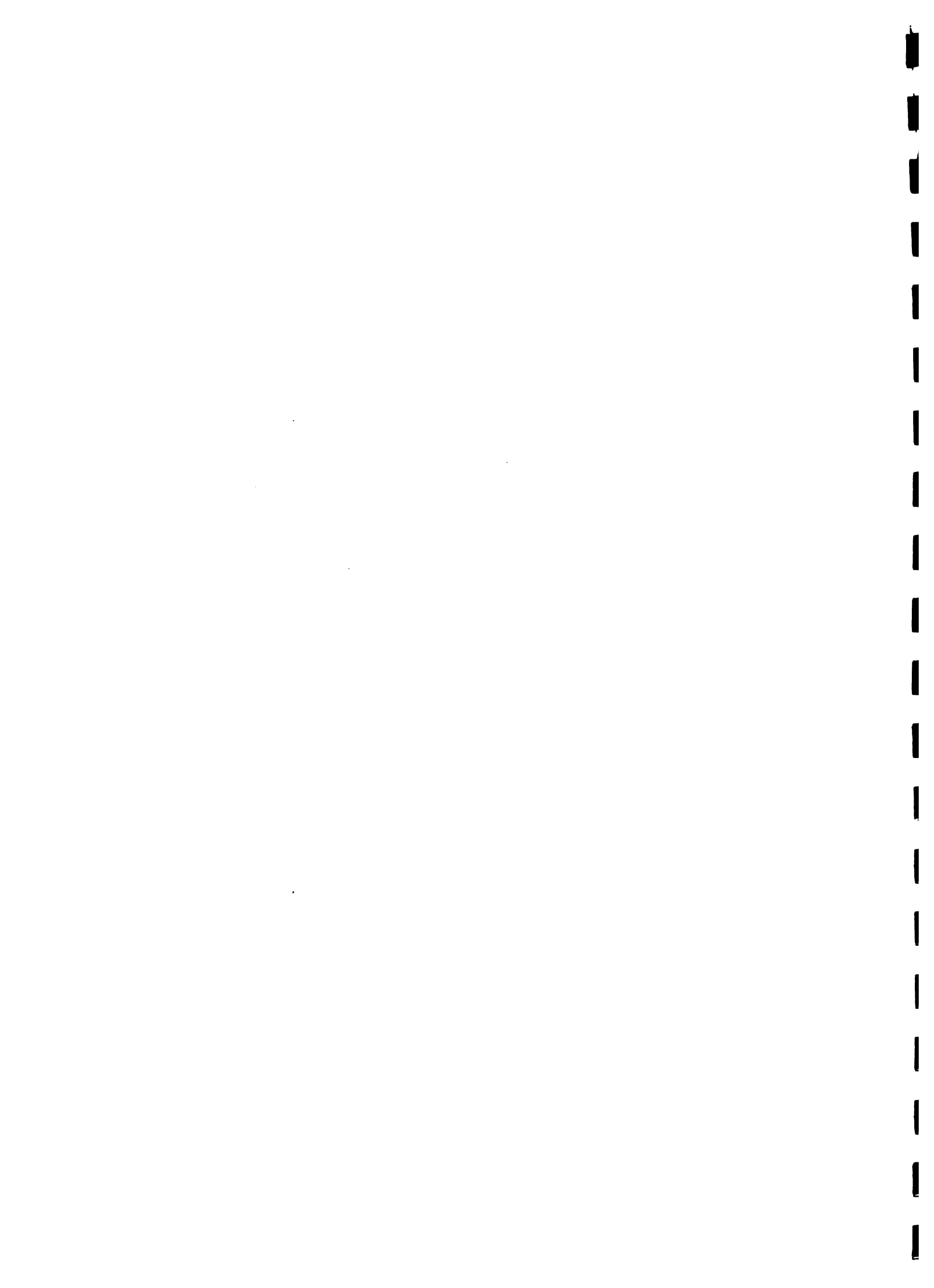
Mr. R. Sewpersad: Office of Sociology, Education and Cooperatives LWV

b. For the Inter-American Institute for Cooperation on Agriculture

Mr. G. Villanueva: Director of IICA in Suriname

Mr. R. Pineda: Specialist in Communications, IICA Dominican Republic

Mr. K. Le Morvan: Consultant, Venezuela



INAUGURATION CEREMONY

SPEECHES



## OPENING REMARKS

R. Huiswoud  
Course Coordinator LWV

Speaking of extension one can engage in the philosophy, the principles, methods and techniques of extension. It seems appropriate this morning to touch upon a few philosophical points, while leaving the principle methods and techniques to the participants to discuss in a feed back manner.

In an effort to build a strong extension service or rather boost its activities, this in-service training seems appropriate for the less hypocritical.

If the goal of this training of extension workers is in new attitudes and new modes of behaviour with rural people, the people centeredness of extension or more, the spirit and philosophy of extension work is greatly enhanced.

One of the core questions to be projected is:  
Is it possible to have a new breed or corn of breed of extension workers by this in-service training?

In rephrasing, extension operates for the benefits of rural people. It involves developing the confidence of rural people in a cooperative effort. This leads to knowing of the situation in the district or region and the needs reflected by the situation. The importance of understanding local customs or culture in our diverse rural society need not be emphasized. This is where awareness of mental, emotional and physical behaviour of cultural sub-cultural elements is important.

Extension seeks to introduce change. This change is impeded by social conditions where agriculture is a way of life, a social heritage handed down from generations to generations, and, where joint or extended families still function as social and economic units, individuals sttach a strong sense of loyalty to the joint families.

Customs or traditions constrain individuals to change. As each culture is unique, and as each particular situation, within which a change to occurring or is to be made, is unique, it is not possible to lay down prescriptions for what is to be done in a particular case. Furthermore, sometimes the tradition is so highly valued, that no change is accepted as an improvement; in other cultures it might be difficult to motivate people in terms of future benefits or move them exclusively by the profit idea. It is in these cases that the transfer of technology technique is most needed to realize maximum benefits in extension.

In this context the role of extension in the transformation of an illiterate society (illiterate in Dutch) or partly illiterate society, should be briefly discussed and the questions put forward if we should go into a new type of extension method and incorporate agricultural facts into the literacy program in joining Alpha 84 or confine ourselves to visual extension techniques with a message in pictures with simple captions.

Where interests of the extension service are looked after by a section also in charge of other duties not directly related to the advisory work as such, one is not able to spend full and undivided attention to the transfer of technology. This was clearly illustrated by Dr. G. Kalshoven in his report on the organization of the extension service in Suriname.

The relation of extension to agricultural research or reverse in the sense that integrating is of utmost importance if we ever want to have specialists ready to be consulted by advisory workers. The national extension office should be strengthened by more liaison-officers to work in the interest of extension as well as research. Here the core question is: how to bring about an integration of research and extension.

One should be aware of budgetary problems, continuity drawback, and other handicaps in the organizational set up of the agriculture advisory service as panel discussion points. Also the phenomenon of "part-time farming" needs evaluating in terms of farming system development.

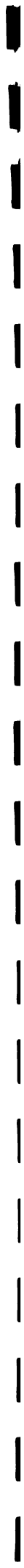


Is it possible to integrate or incorporate the real extension work in the sense crop specialistic work in the Agriculture Experiment Station, leaving the regional offices to tackle the development work and other duties.

It is my opinion that an integration will work, but I would like to subject this statement to a discussion in the workshop or panel discussion during this course.

It is our wish that in analyzing the problems of the transfer of technology process, the practical work will result in proposals for a better front line extension in Suriname.

With these opening remarks as the course coordinator, I would like to extend the welcome address to the Director of IICA.



WELCOME ADDRESS

G. Villanueva  
Director IICA Office  
Suriname

The Honourable Mr. Randjietsingh, Minister of Agriculture, Animal Husbandry and Fisheries, Director, Deputy Directors and Coordinators of the Ministry, distinguished heads of International Organizations, participants in this training course, ladies and gentlemen.

I wish to extend a very warm welcome to all of you who are kindly giving us some of your very busy time, to support and encourage our actions in benefit of the improvement of Suriname's Agricultural sector.

The purpose of gathering here this morning is as you might know, to open a training course aimed to improve the Agricultural Transfer of Technology System in Suriname. Transfer of Technology is very significant in supporting and promoting innovations so necessary for increasing the output of food by the most economical means at our disposal, but let me stress that transfer of technology should include the improvement of social and economical conditions of the farmers or, better, the overall improvement of human welfare, especially of the low income small farmer and his family.

This training course is addressed to the Technical staff of the Ministry of Agriculture and other Institutions which deal with the Transfer of Technology activities to increase their capabilities in the execution and management projects.

This event is being carried out as a joint activity of our organization, the Inter-American Institute for Cooperation on Agriculture, (IICA) and the Ministry of Agriculture, Animal Husbandry and Fisheries (LWV).

We would like to use this opportunity to thank those who have been working very intensively in the organization of this short course,

in the person of the LWV Course Coordinator Mr. R. Huiswoud, and to all the participants for their presence. We encourage them to make this event a positive and successful one with their active participation and the implementation of the concepts they are about to learn and or update, in benefit of their institutions in particular of their country, Suriname, in general.

Once again, I welcome you on behalf of our General Director as well as on my own behalf.

OPENING ADDRESS

R. Randjietsingh

Minister of Agriculture, Animal Husbandry and Fisheries  
Suriname

Honourable Director of the Inter-American Institute for Cooperation  
on Agriculture, the IICA,  
Honourable Representatives of the International Organizations and Institutions,  
Honourable Guests from abroad,  
Honourable Lecturers,  
Honourable participants,  
Ladies and Gentlemen,

I consider it an honour to welcome you on behalf of the Government of  
Suriname for attending the opening ceremony of a very special Training Course  
regarding the Transfer of Modern Technology in the Agricultural Field.

This course is another fine example of fruitful cooperation between  
the IICA and our Ministry.

It is still fresh in our memory how successful some ten months ago an inter-  
national training course had been organized in the field of "Project Appraisal  
and Planning".

I may cherish the hope that in the same way this Training Course will be rewarded  
by success.

It might have been noticed that I characterized this Course as "very  
special"; this is true indeed. For quite some time we have felt at our  
Ministry the lack of an effective research system and extension service as an  
integral part to increase the agricultural production and productivity. As  
result of this, there was in our opinion insufficient interaction between  
the agricultural research, our extension service and the farmers.

It is true that quite some important research work is being done within  
and outside the Ministry, but the results, its conclusions and recommendations,  
have never been properly canalized to the extension officers, still less the  
farmers in the field can have profit by these research activities.

On the other hand it is true as well, that the specific cultivation problems of the farmers are not systematically brought to the attention of the research authorities, for which the extension officers, being in close contact with the field producers, ought to be responsible.

In short, each section concentrated on its own topic or subject without systematic and structural possibilities of transfer of new experiences.

It is a well-known fact that the future of our national economy will depend to a large extent on the agricultural sector. You may also know that according to the policy of our Government the farmers - both small- scale as well as large scale- will play a central role in the agriculture development. Therefore we consider it of vital importance that our farmers must be supplied with the newest and most up to date information in the field of technological achievements. Only by means of this systematic transfer of technological knowledge we will enable the farmers to participate and contribute effectively in the national economy both quantitatively as well as qualitatively. For sure we will have to concentrate on these two requirements of volume and quality through means of modern technology, in order to compete soundly at the world market. For sure our extension officers and research specialists will have to accept this challenge for proper transfer of modern technological knowledge.

I avail myself of this opportunity to express my gratitude towards the IICA and its Director in Suriname, Senor Guillermo Villanueva, for his sponsorship, which enabled us to organize this Training Course. The implementation of this project will prove once again that the IICA is truly and successfully willing to stimulate, promote and support the efforts of the member States to achieve agricultural development and well-being for the rural population.

I also like to thank the officers of our Ministry who have prepared and helped organizing this Course.

May the experience gained by the trainees during this Course be fully used to support our farmers in the several regions of our Country for their well-being and for the improvement of agriculture as a whole.

May the Course achieve its target!

With this welcome-address I declare the Course OPEN!

I thank you!!



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Faculty of ...

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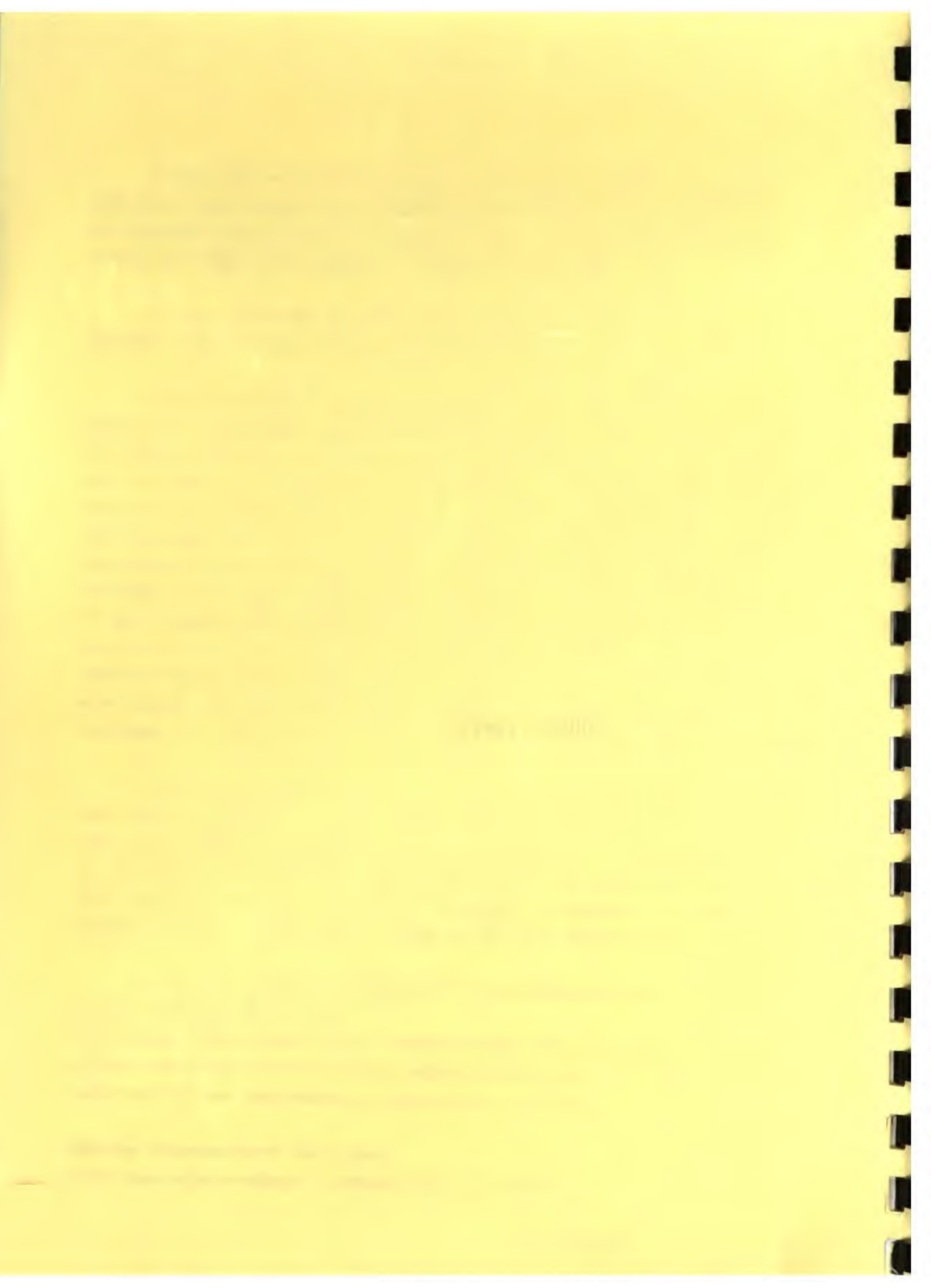
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COURSE PAPERS

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The Agricultural Sector. General framework.  
National Development Plan.

by

Harold Lionarons  
Ministry of Agriculture, Animal Husbandry and  
Fisheries,  
Paramaribo, Suriname

Ladies and Gentlemen,

As I have been introduced by Mr. Huiswoud, I am supposed to be the first speaker this morning to present an introduction on the subject of a "General framework of the Agricultural Sector Policy and the national, and I put between brackets, agricultural development plan," since I am not in a position to tell you everything about the total national plan, but only about the agricultural sector plan, which should be of interest to you here present today.

I am certainly very honoured and I do hope to be able to give you an insight in our planning activities and especially in relation to the subject matter under discussion: that is "the transfer of technology in agricultural extension." I hope that at the end of these ten day course you may have collected enough knowledge and techniques, in order to be in a position to execute your work with more motivation, interest and more convinced.

Now, looking at the subject under discussion, a couple of words should be watched at and kept in mind as much as possible. I refer to the word development, I refer to the word "plan", I refer to the word "policy" which very often go hand in hand and are most of the time used in combination with each other. Talking about policy, talking about developing plans and you go ahead.

At the same time I think it is only fair to state that this presentation of Suriname agriculture can for more than one reason bring up more questions that I am possible able to answer at present. Of course there is a general framework as mentioned in the agenda of an agricultural sector policy of some time ago, which at present is however under discussion in order to arrive at adjustments and corrections, based on our experience and based on the new policy principles.

These adjustments in terms of what type of strategies, what type of plans, what type of projects and programs are not according to schedule, but more based on present necessity and desirability.

Given the present policy points of departure, given the present pressing financial economic problems of about all developing countries, basically as the consequence of the world financial economic problems these adjustments of the sector plans not seldom are a matter of frequent exercise.

Within the Agriculture Planning division we are very frequently confronted with changes in policy guidelines, in changes in new insights not only within the country not only those you can control in the country, but which are important just as well.

The agricultural sector policy is only one of the elements contributing towards the making, the completion of a national development policy.

Unnecessary to say that the agricultural sector is of very great importance due to the relative complex character of the sector and secondly because of the many tangent planes with other ministeries.

I may mention the following few:

- For import and export aspects we have to go to the Ministry of Trade.
- If you are talking about developing a project in the interior where you need schools, hospitals, a doctor, you have to go to the Ministry of Education and the Ministry of Health.
- If you are talking about land you have to go to the Ministry of National Resources, and last but not least
- Most of the activities require money that can only be allocated by the Ministry of Finance, when you can arrive in a position where the whole exercise seems to be less rewarding since your budgetting a certain project can amount to an investment that cannot be supplied by the Ministry of Finance given our present financial problems.

The most important point of departure of policy principles we use at present to conceive or to calculate a project is of course, given the world wide problems, the export earning capacity of the crop we are going to grow. At the same time you want to know how little import inputs you need to realize that project, since the basic point at stake is, to increase our foreign exchange earnings.

At the same time it is important to know how much permanent employment such a project can generate, because you are familiar with the fact that unemployment is one of the big problems we have at the moment. The third point which actually can be seen in connection with the need for increased export earnings is the matter of production increase and at the same time you should increase the productivity.

Given these points of departure, the planning division and this refers mostly to the economic planning division starts exercises in calculating investment-costs and then based on two or three parameters such as employment, foreign earning capacity, low import component a kind of priority schedule is concluded. Given the scarce resources, we end up with a set of priority projects which the economists regard on purely technical criteria as projects carrying the highest priority. Apart from these purely technical criteria, there are other, I would say, more politically oriented criteria, more social criteria which we also must bear in mind. One of those criteria which I think you are familiar with is the point of the regional distribution of economic activities. We do not want all the agriculture and all the industries to be executed in Paramaribo, because people from Nickerie also have a right to earn their own living and people from New-Amsterdam just as well.

So, in overiewing these criteria we see that apart from a set of criteria which are purely economically, there are some political arguments, some socio-political policy points of departure in which indeed you may run into a position whereby the project you calculated on a purely technical level is not necessarily the one gaining the highest priority in evaluation.

Then when you have calculated such a project it appears that a parameter which is important is investment. But, since you have a project, you have a programme, you have a plan, you need the money to invest. I don't think it is relevant at present to mention the criteria which are part and parcel of evaluating or looking at investment-criteria. I mean in terms of what financing modalities you can get, low rates of interest, grace period, no grace period.

What is the pay-back capacity of such a project?

What are the exploitation costs of such a project, and finally what are the effects to be generated by that project?

It is, as I already told you, not relevant to mention these points at present, but it is clear that given this situation, given the serious foreign exchange problems we envisage today, it is necessary to set a number of priorities in evaluating and in implementing the project.

The principal point of departure of policy principle for the coming period is in a general sense, the optimum use of our national living and non-living resources:

On the one side in view of guaranteeing and save-guarding our food position in the country. The second point which is just as important is: What is the foreign exchange generating capacity of those activities, we are going to undertake. As I told you just now, additionally these activities should create a substantial number of permanent labour, employment.

It should be clear that this set of policy guidelines, this set of policy principles is a task that cannot be carried out only by the Agricultural Department, as the agricultural planning unit is, if there is a national plan in which parameters as employment, national product are mentioned, exactly for what part the agricultural sector should take care of. By way of speaking, if you say in a national plan, you want to create a certain number of employment places, the first question might be to the National Planning Office how much is expected to be contributed by the agricultural sector, because it is not the only one contributing to the realization of the national plan. There are also sectors like mining etc. and others you are familiar with.

Since seldom a clear answer is received, most of the time we do the exercises and pass the results to the relevant divisions and departments. This contribution should be the basis for discussion with the National Planning Office.

In general I must say that the export-earning capacity of commodities to be produced here and to be exported should be better than the value of the import components we need to produce that crop. A point to mention is the following. Agriculture as you understand it is kind of an adding up of a summing up of a number of crops being produced.

But apart from these general principles, which we threw out for the agricultural sector as a whole. I think it is important to focus some of the attention to those sub-sectors which contribute already for a tremendous amount to our export earnings.

The first crop in this respect is rice. The second, and this is no order of priority or order of foreign exchange earnings, is bananas, the third is the shrimp industry. The fourth which is not in the export line as yet is oilpalm at Victoria, Phedra and Patamacca. Oil-palm is of relatively recent time and is added, based on the crop-diversification principle because we should not plant rice all the time but should spread the risks of losses you may encounter in the rice-subsector. The rest of the exportable crops is so much that we will run in time problems if we are going to discuss all of them.

Let me present some basic information of the rice-subsector. First I am going to present some policy guidelines we use for the rice sector:

We hope by the end of 1986 to have over 50,000 ha. in rice, which is standing area not planted area, because we grow rice more or less twice a year. Then we must realize that in the rice sub-sector two or even three big scale projects are being executed right now, and we may mention the following projects and areas going from west to east:

The first is the MCP (Multipurpose Corantijnkanaal Project) which has a potential of roughly 12,500 ha., but as a first phase, we hope that by the end of 1987/88 about 4,800 ha. will be in production. This is apart from the 50,000 ha I mentioned earlier for the end of 1986.

Quite recently and then we move from Nickerie eastwards, we started a rice project in the Coronie area which is being financed by the European Community and basically includes improving the technical conditions and expanding the agricultural conditions, and in a general sense save-guarding the second crop. The execution of this project will take about 2 years, the costs are estimated included drying and storage facilities, at roughly 12 million Suriname guilders. Moving more eastward we arrive at the Saramacca area, in the Lareco area and the Jarikaba area.

In the district of Suriname there are only a few small scale rice activities. Eastward of Suriname, we arrive at the Commewijne area.

So given this total acreage of rice to be planted, given the point that rice is being regarded or even must be regarded as being an export crop, given the situation that we as a supplier don't determine the world market price, which is basically a matter of supply and demand in the world market, we regard it as a necessary point of policy principle to arrive at methods and techniques, to lower down the exploitation costs in the rice culture.

Where our prices are too high, because there is room in the import markets it is necessary to look for room to lower down our exploitation costs.

The second point of departure is to stimulate the organization of farmers, interest groups, cooperatives and other forms, which can operate on the scale of benefits in buying their inputs collectively and marketing their products collectively, hereby profiting from the scale of economics benefits.

A third policy point relating to the rice sector is also based upon the lowering of the import component refers to the present experiments to use rice husks and local fossile fuel in the drying of paddy, which indeed means a much lower import component as far as the rice subsector is concerned.

I am going to present some figures to demonstrate the importance of the rice sector. In this respect the following figures may be of interest. At the end of 1984 there was a planted area of about 75,000 ha. planted area, not standing area, producing a total of roughly 250,000 tons cargo, of which 78,000 tons were exported at a value of roughly 37 million dollars. I was trying to look at Mr. Grauwde and was wondering, because I could not find the right figure, what was the import component in the rice sector, which is, I think, over 50 percent. Therefore of the 37 million dollars you can see that roughly half is going back, in terms of fuel, in terms of machines, spareparts, herbicides, fertilizer and other inputs.

The second important crop, which I mentioned to you was, the bananas, that in contradiction to rice is actually been planted by Surland, which is a Government-owned company.



Some figures in this respect are: in 1984 about 35,000 tons of bananas, were exported and valued at about 9 million dollars. Based on the policy principle to increase the export earnings Suriland has plans to expand its area. At present it runs about 1,500 ha., which in the long run will be increased to 3,000 ha.

At the same time Suriland is experimenting with the culture of fresh water shrimps, based again on the principle of diversifying its risks. Gathering from the results of the pilot experiments, there really is good hope that fresh water shrimp culture, which is, let me put it this way, less difficult than brackish water shrimp culture also can generate, when in full commercial production adequate amounts of foreign exchange.

The last, because I told you that the fourth "crop" which was oil palm is not as yet in the phase of commercial production for export, what is produced as palm oil is being used locally, but I talk about the last one which at present generates, foreign exchange, which is the commercial shrimp fisheries. The story is that these commercial shrimp fisheries are in the hands of foreigners as far as the catching operations are concerned. The processing operations are practically, I must say, in Surinamese hands.

Given the situation that the shrimp fishery is in foreign hands, you can imagine what the policy principles of the government should be:

- 1) train nationals so they can today or tomorrow become shrimp fishermen.
- 2) create the conditions whereby Surinamers can apply for credit to buy their own boats and
- 3) the very important point is for the government to guarantee the buying up of all the catches landed.

All the catches landed should be bought up by the government, so the fisherman should not have a problem when he is coming in and then wants to sell his catch and nobody wants to buy. The Government is in favour of or even committed to guarantee that all the fish landed should be bought up.

This part of the presentation has come to a preliminary end.

The second part of the title regarding the national agricultural sector plan causes more problems to me. But allow me to make the following remarks.

The general principles outlined just now in terms of producing in order to substitute the imports, producing in order to export, producing in order to create employment, resulted in the composition of an indicative programme. In this indicative programme the introduction of new crops and the increase of production have high priority.

In this respect I must call to your attention that we want to increase for instance the citrus acreage. We also think there is a good market for passion fruit. But the last culture is still under evaluation. I do understand that shortly ago there were some problems. One was basically the virus and the second was how you could arrive at financing. You could use concrete poles which are very expensive, or you could use normal wooden poles. The evaluation should on short notice give results.

We have in the experimental phase, again in terms of import substitution, onions, brown beans, potatoes and some more crops. These crops are in the process of being evaluated technically and economically.

There is an indicative programme, we have plans, but because of the discussions still going on as yet not fully implemented. The point is we feel that if a crop is a new crop, you should not burden the farmer with the risks of growing that crop. What I mean to say is that, you got the guarantee in some way or the other that if the crop fails you should pay the farmer his costs made back. You should teach him the techniques with which he is not familiar.

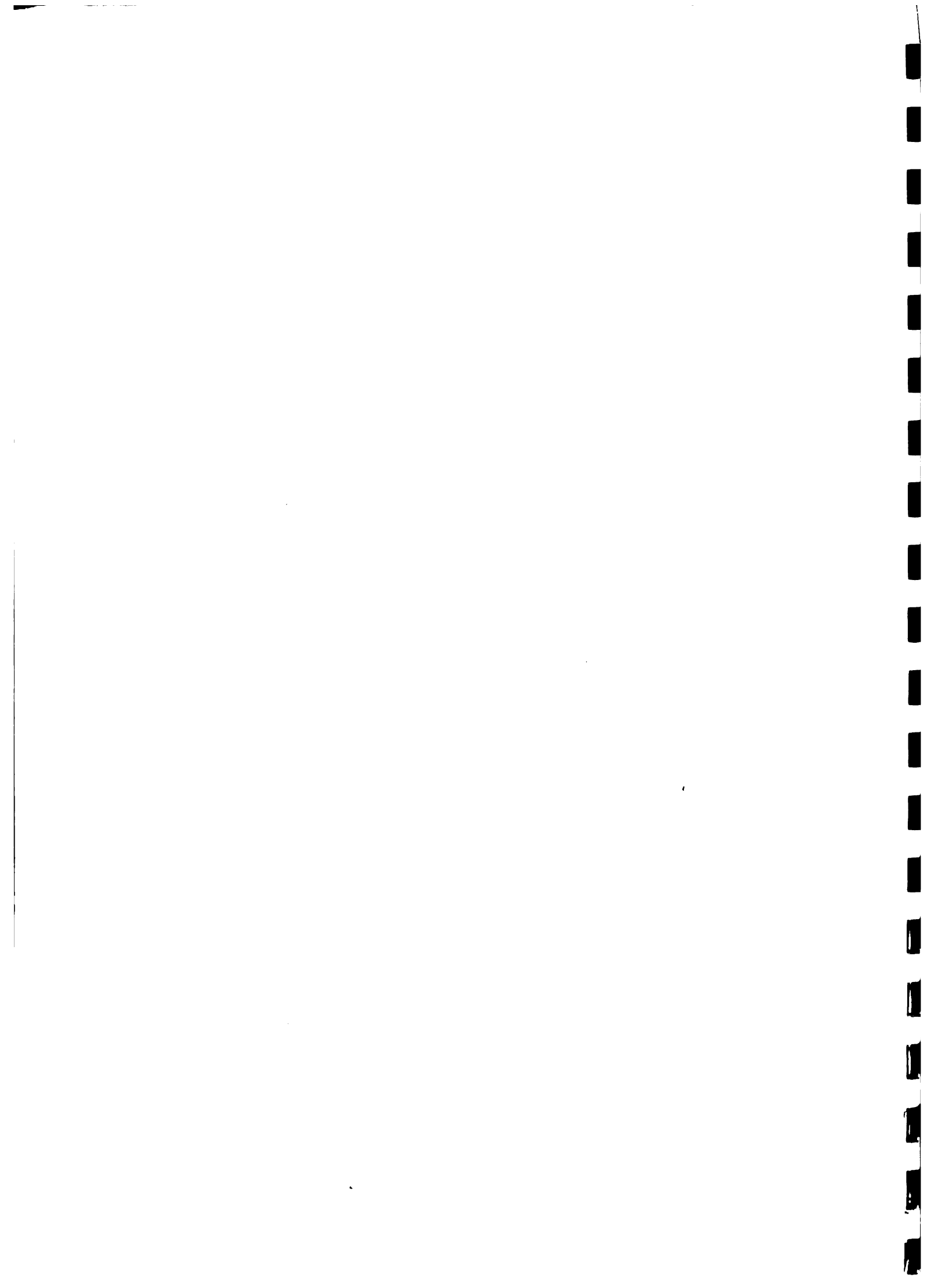
Apart from the productive projects, of course we have additional conditions which are important to be able to grow the crops. In this respect there is need, I must say, for the establishment of a guarantee price. The law should be there that if people come and they offer you as a Government the new product, you should be in a position to pay them a guarantee price.

Another point in this respect is the evaluation, I shall say, of the existing agricultural laws, which are very old and date back from long ago. There is a definite need to adjust these laws to modern times.

A very important point indeed at present at stake is the point of how do we regulate financing, through one of the instruments Government has to provide credit to the serious farmers and farmers who are in position to grow new crops. You know that Mr. Bundel or one of the staff members of the Agricultural Credit Bank will hold their lecture one of these days, but let me anticipate and explain to you as a general principle that we feel that if the Government is indeed going to stimulate certain crops which the farmers as a whole are not familiar with, there is a definite need for a kind of preferential rate to stimulate the development of that crop. What I mean is that if the normal rate is 8 or 9 percent interest, if it is a new crop, I can see that the Government will create a preferential rate, taking up the difference of the tab and reasons that since in our country nobody knows the crop, let's charge the farmers less and let the Government be charged for the difference. This is one thing we feel is necessary.

We also feel it is necessary that if you want to stimulate dairy farming for instance, we know that not as rice when you have a crop the first year, but it takes three to four years before you really get returns back. In this case we feel that a preferential treatment of the dairy farming is justified.

Another point which is equally important is, if we are promoting the organization of farmers in interest groups or in cooperatives or whatever form of cooperation we feel that there should be some kind of preferential treatment for these groups. But mentioning these points I am afraid we enter in a discussion again, because we should be responsible for the pay back; the individual farmer or the organization. These are only a few points I thought were important to mention as far as the second part of the title of this presentation was concerned.



## THE TECHNOLOGY GENERATION

by

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### 1. INTRODUCTION

Agricultural policy will be dominated by the concern with increasing the agricultural surplus for supplying internal needs and for export. It's principal support will be an increase in the productivity of land and labor and a stabilization of production. Policies designed to expand the agriculture frontier will loose their importance. As a result, the institutions which develop knowledge-research and rural extension- must be strongly supported. The product of their work is the necessary condition for the self-sustained growth of agricultural productivity.

Agricultural research concerns the application of the principles of the basic sciences to the solution of problems of immediate or potential usefulness in agricultural production. To do this it draws on wide range of scientific diciplines in the biological, physical and social sciences. It, therefore, involves people (executors and beneficiaries), finance (budget, allocation and control), physical infrastructure (buildings, laboratory and field equipment, field facilities) and materials of various kinds (fertilizers, chemicals, pesticides).

### 2. THE TECHNOLOGY DEVELOPMENT PROCESS

The process of creating knowledge is continuum that starts with identification of a problem, and terminates only when the producer, incorporates into his production system, the technology resulting from the research aimed at the solution of his problem. There are various functions during this process.

It is common to differentiate two of them:

research and extension. The first creates a body of knowledge, while the record adds to the research results the information needed to make them adaptable by producers. "The former creates the product, the latter sells it". These two functions can be located in the same institutions or can be seperated.

In both cases the problems of integration are present, due to the fact that the work of researchers and extension workers do not coincide, even though they may have the same objective, i.e., to increase the productivity of agriculture and the well-being of producers. The integration between extension and research lies, in the first place, in showing that the interests of the two groups coincide, and that one can not survive without the other. Secondly, a way must be found by which each group participates actively in the work of the other, both at the producer contact level and in the initial or continuous training programs.

### 3. THE CHOICE AND STATEMENT OF A RESEARCH PROBLEM

Many scientists owe their greatness not to their skill in solving problems but to their wisdom in choosing them. It is therefore worth considering the points on which this choice can be based.

#### 3.1. KINDS OF RESEARCH

A problem often faced by research administrators is the question of balance between what is known as basic research and applied or adaptive research. Basic research is here described as investigations that extend scientific knowledge by the search for new principles and the understanding of underlying process, whereas applied or adaptive research is adapting of these new principles and techniques to specific environments and problems. The two are complementary. It is very important for the investigators who are to carry out the actual research to know as much as possible about the background of the problem, how it arose, why it is important and what will be done with the results.

The kind of research to be chosen in relation to a specific problem should be dictated by what will achieve the best results both qualitatively and quantitatively, in relation to the available time and the effort and money applied to it.

#### 4. SOME CHARACTERISTICS OF AGRICULTURAL RESEARCH

Agriculture, the art and science of crop and livestock production, is a very complex subject and it is reasonable to expect agricultural research also to be complex. In agricultural research, one strives to apply all possible sources of scientific discovery to the solution of the technical and practical problems of agriculture. But there are some peculiar characteristics of agricultural research which may impede progress.

- Agricultural research is dependent on a wide range of scientific disciplines. Practically every scientific discipline impinges on it in one way or another. The biological sciences predominate (Breeding, Physiology, Microbiology, Entomology, Virology, etc.) but the physical sciences (Soil chemistry, Soil physics, Meteorology, Engineering etc.) and social sciences (Economics, Human Behaviour) are very much involved. The interdependence of the various fields is a source of organizational difficulty which can be only partially overcome by team work.
- Agricultural research is susceptible to the environment which is very variable (soil, climate) and some aspects are beyond predictability with a high degree of accuracy (rainfall). This makes it necessary to carry out both basic and adaptive research in order to resolve problems in specific locations. These lead to fragmentation and dispersal of resources into small units (experiment stations and sub-stations) and the attendant managerial difficulties.
- Agricultural research is international in character and it virtually thrives on exchange of ideas, information, expertise, germplasm etc. Attendance at conferences, workshops, seminars etc. is a necessary adjunct to implementing agricultural research.

- Although agricultural research results are freely available to the farming community unlike say industrial research, one often is faced with the problem of farmer acceptance. Since research findings are useless if not utilised in the productive process, an agricultural research administrator should be aware of the need for transfer of technology and the relatively recent concept of farmer participation in development of research programmes.

#### 5. Organizational Structure

A logical and effective organizational structure is essential if one is to assign specific duties to individual units and maintain a coordinated effort. The organizational structure should be as simple and as flexible as is compatible with the fulfillment of its functions and should ensure the following:

- Good communication flow along clearly defined lines
- Efficient use of manpower and resources
- Minimum of routine work by researchers
- Minimum overlapping between different fields
- An environment that is conducive to research

Research organizations can be divided and sub-divided either on the basis of scientific disciplines or into inter-disciplinary groups which may or may not be commodity oriented. Before deciding on an organizational structure, consideration should be given to the characteristics and comparative advantages and disadvantages of each form, based on:

- Effectiveness in solving research problems and achieving goals
- Efficiency in administration
- Effect on research workers

Regardless of the structure there is generally need for some form of adjustment. Often this is due to personality problems. A good research administrator should not adhere tenaciously to rigid patterns but instead should be sufficiently flexible and should attempt to find individual solutions when necessary.



Because of the complexity and quantity of decisions involved in the administration of agricultural research it is essential that administrative functions be divided and a certain amount of authority and responsibility be delegated, in a large research organization; this often is divided into Administrative and Technical Divisions with a Research Director at the head.

The Administrative Division generally has responsibility for routine administration - personnel, discipline, finance, physical plant maintenance and development, procurement etc. whereas the Technical Division generally is concerned with scientific matters.

The area of finance sometimes is a source of conflict between administration and scientist because of the ability of the former to exert some measure of control over the activities of the latter through budget allocations. This can be obviated to a large extent if the scientists have responsibility for planned budgets with the administration ensuring that the expenditures are in keeping with existing rules and regulations. In short, administration should be used to facilitate rather than control research.

## 6. ORGANIZATIONAL FACTORS

A research institution is projected to have a rather long lifespan. Many people confuse this with the idea that research institutions need a long timespan to obtain valuable results.

The long life of a research institution creates special needs for a continuous renovation process to avoid becoming obsolete. To avoid atrophy, research institutions should be allowed the following:

Location - The research station should be located in a region that either commercially produces the commodities of interest or has resources required by the research. This will assure that research workers will be in continuous contact with producers.

These contacts will inspire research workers to concentrate their efforts on relevant problems and encourage them to continuously strive for professional achievement based on solving farmer's problems.

Problem Solving - The traditional organization of research institutions is in the form of specialized departments set up by disciplines. The main function of these departments is to gather a group of scientists, create pressure on the budgeting process so as to benefit the discipline and allow scientific development and growth of a given field of specialization. This organization may create difficulties for problem-solving research aimed at producers and demanding formation of interdisciplinary groups. These difficulties can be solved with a certain ability and patience, so as not to compromise the professional interests involved. On the positive side, this organization has the advantage of being able to prevent the research institutions from dedicating themselves exclusively to the solution of short-term problems that, as experience has shown, do not produce the highest returns in the long run.

The other form of organization is to create multidisciplinary teams for solution of specific production oriented problems. This organization guarantees a better performance in terms of the solution of given problems, and facilitates collaboration among, and administration of, research workers. It is also more responsive and relevant, as far as farm interests are concerned. Still, it may have the disadvantage of reducing creativity of scientists who have different interests than those of the dominant group, and may result in superficial research work if certain precautions are not taken. The organization tends to benefit from group action to the detriment of individual actions that are necessary to obtain the research results. It is, however, an appropriate model for applied research, as long as the individual work of each scientist is protected. The definition of the problem is made by the whole group. After that, each member formulates his own project.

Frequent meetings should be held for the purpose of following the development of the projects, avoiding major deviations from established objectives, making proper changes when needed and evaluating the results. Here, the most important factor is the capability of the team leader.

It is possible to combine the two forms of organization, i.e., the traditional disciplinary departmental organization with the multidisciplinary team organization. The departments will be restricted to basic disciplines or to the service areas such as: laboratories, administration and others.

Maximizing time devoted to research - The resources allocated to research are usually limited. As a result, programming aimed at optimum efficiency becomes very important. Still, experience shows that a strong programming-planning system of research has a high cost, in practice. A rigidly programmed research institution does not attract private initiative or participation of university systems. It does not follow basic procedures of scientific methodology, but tends to be general rather than specific and over-demanding in terms of time dedicated to paper work by individual research workers, who constitute the most valuable resource of any research institution. It tends to be more bureaucratic and centralized, is an excellent producer of "reports", but inhibits good ideas. Thus, all programming functions should be permanently subject to critique by research workers, so they can be adapted and improved continuously for the convenience of the research workers concerned. In other words, the programming system must be as dynamic as possible.

Short-Term vs. Long-Term Projects - There can be a conflict between the short-term interest of farmers (or of local governments) and the long-term future interest of the nation. In other words, short-term political objectives may clash with long-term scientific considerations.

To avoid these potential conflicts, the research program must be well balanced in terms of short-term and long-term projects. Giving needed priority to producing immediate results, that are easily adopted by farmers, is indispensable for survival and growth of the institution. At the same time, the projects of greater impact or productivity, that need longer time for execution, cannot be sacrificed. The program must also include those projects which have high risk since these give much higher returns once successful. The program should take into consideration actual production practices of various farmer groups, the interest and potential of small and low income producers, export crops and other special interests. Finally, it is very important to avoid dispersion of efforts, through establishment of a set of research priorities.

#### 7. RESEARCH INSTITUTIONS AND THE DISSEMINATION OF TECHNOLOGY

From the research viewpoint, the production of a new technology cycle can be characterized in the following way:

Difficulties encountered by farmers, and considered by them as serious problems, without appropriate solutions or on-going work at the research level, are identified and analyzed by the researchers in the light of learned theories. In this way, research projects are born. These lead to the formation of hypotheses and to formulation and implementation of experiments whose outcome comprises fragmented research results. One part of these results, such as new crop varieties, animal breeds and superior insecticides, have physical existence, while the other part constitutes a set recommendations on how to better use existing or newly developed inputs.

The partial, or what are often referred to as fragmented research results, are brought together in the form of "technological packages", and form the new technologies which will be offered to the farmer for adoption. Thus, research is an industry which produces technology, while extension adds an information content to newly developed technologies, making them accessible to farmers.

New technologies are the aggregate products of research, while the contribution of extension institutions is the information which is added to the new technology to create a message comprehensible to the farmer.

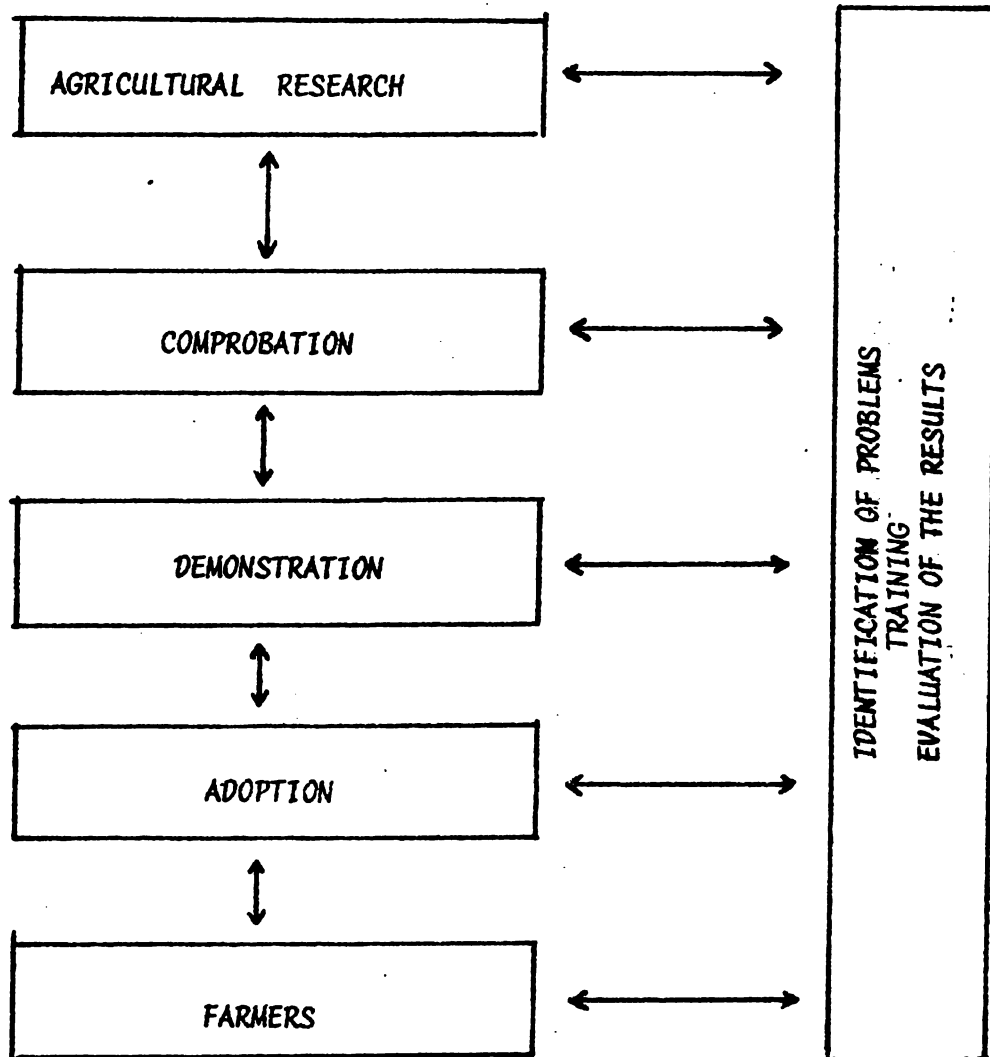
Just as various industries do, both research and extension consume inputs and produce outputs. Their efficiency must be measured in terms of inputs consumed and outputs produced. It should be pointed out that the output of a research system cannot be separated from the contribution made by extension. When the technology reaches the farmer, at which time its economic and social efficiency can be measured, the work of the two institutions is complementary. For this reason, it is often said that the development of agricultural technology is a "continuum" which begins with a problem of the farmer and ends when he adopts at least part of the technology developed. (see fig. no. 1, 2)

#### 8. FACTORS AFFECTING DISSEMINATION OF NEW TECHNOLOGY

Dissemination of technology depends on various factors, some of which are mentioned below:

1. The existence of a substantial number of alternative production systems to those in use by the farmers, that are more efficient from the economic point of view. In many agricultural operations the biggest limiting factor is the small number of alternatives and which above all, require heavy investments and expose the farmers to big risks. They are not accessible to small farmers and, in many cases, the large landholder only puts them into practice after receiving heavy subsidies;

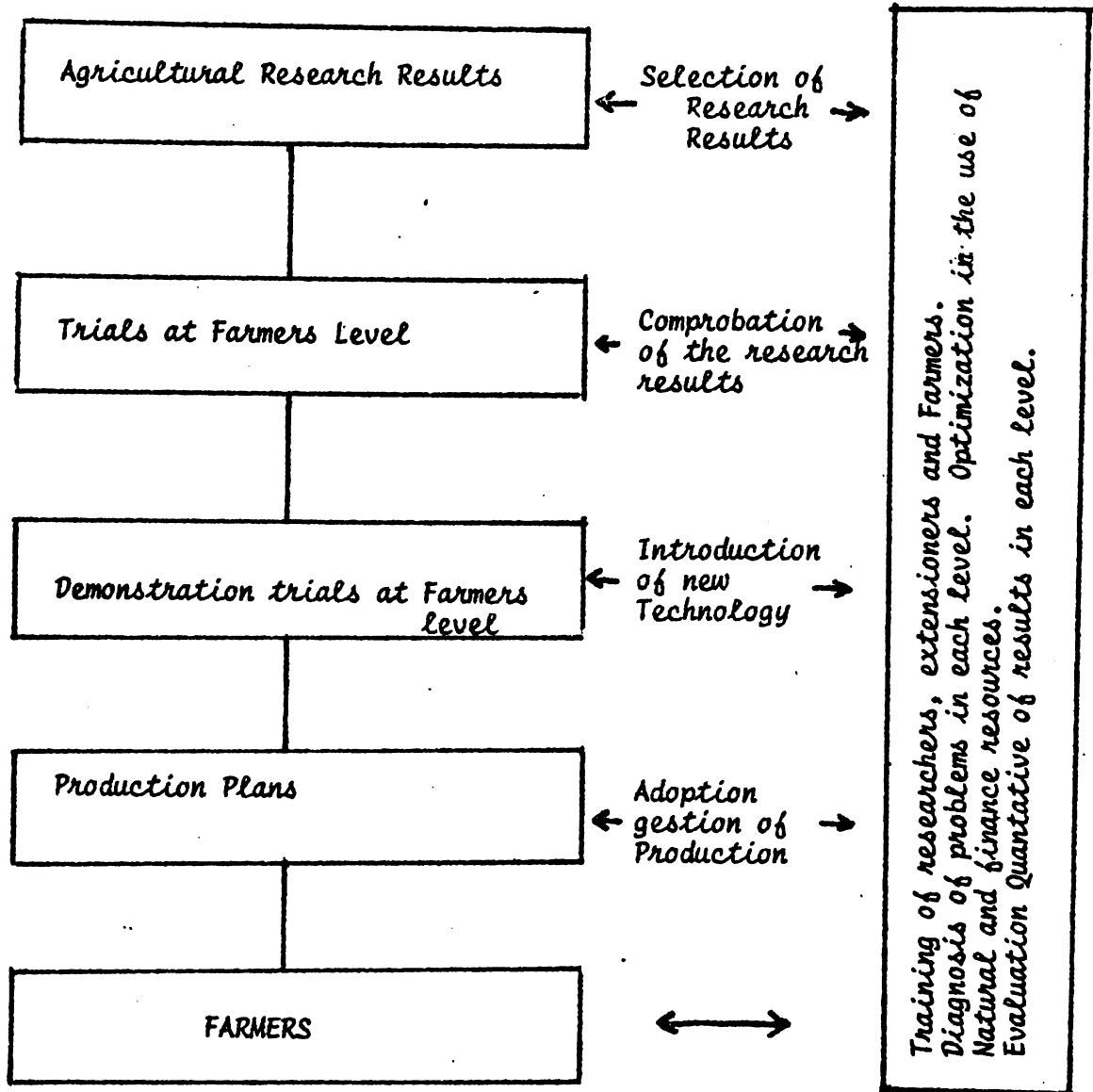
Fig. 1. Stages for the Projection of Research results in the Generation and Transfer of Technology Process



Source: Adapted from Edgar Zapata (8)

(\*) : Participation of the extension specialists

Fig. 2. Actions for the Projection of Research



Source: Adapted from Edgar Zapata (8)

2. The economic policy to the extent that it raises the price of inputs, reduces the prices of products and increases price fluctuation, make inviable technologies which require larger investments and which offer greater risks in the implantation phase. In a very uncertain situation, the farmer prefers the technology which requires a minimum expenditure of money. He even attempts to divide the risk with the hired labor through a sharing arrangement, etc. Since modern technology involves the purchase of costly modern inputs, it is rejected in this circumstance.

3. Production systems which require close and costly supervision and with which great risks of loss are associated if the recommendations are not strictly followed, are also not likely to be adopted by farmers;

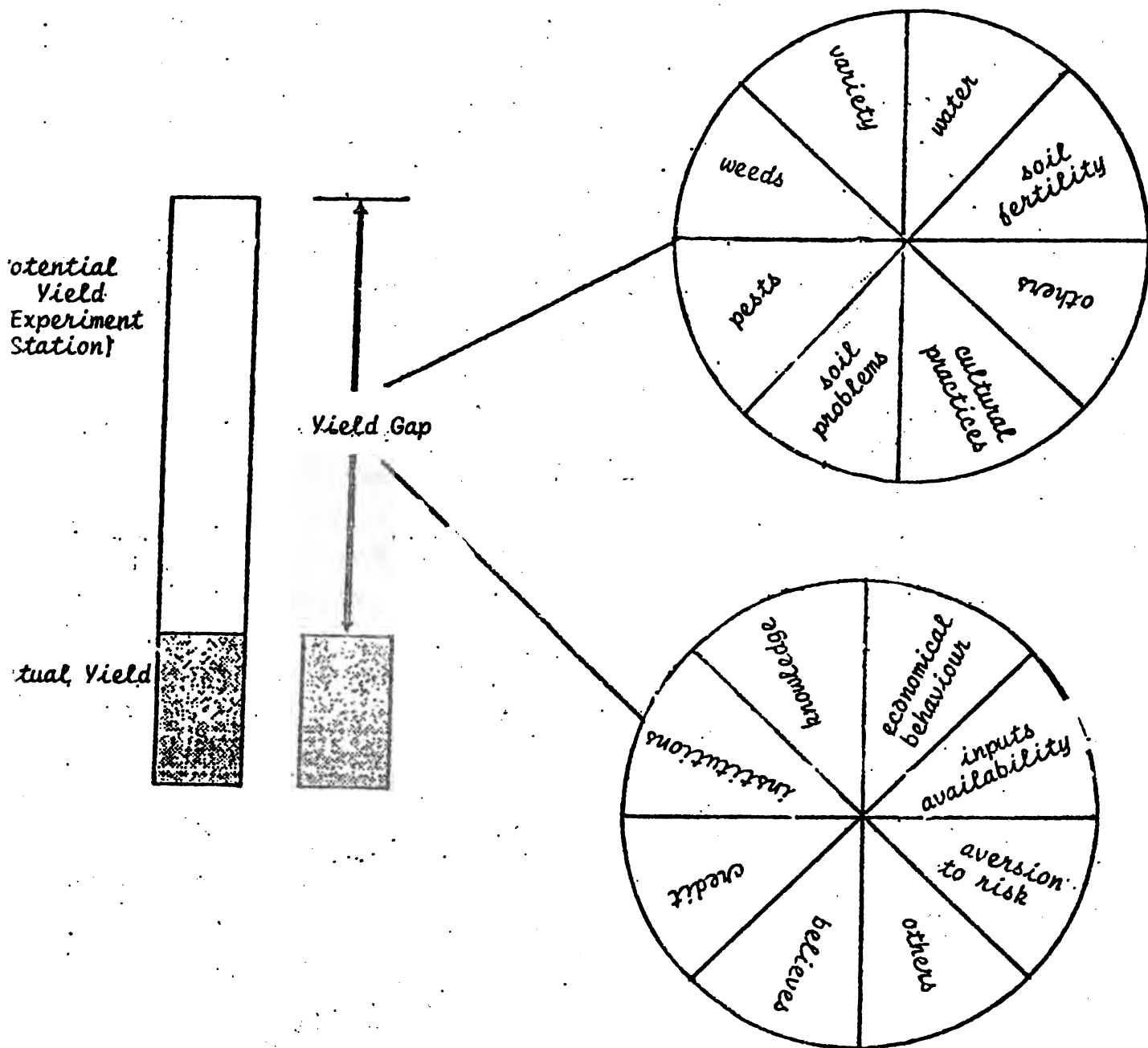
4. The farmer certainly needs to be informed about new technology. This requires that the extension workers know thoroughly what they hope to teach. The biggest problem facing Extension and Technical Assistance is to prepare its workers who are almost always very young. The production systems elaborated also need to facilitate the training job; the problem of diffusion of technology is today much more related to the technical knowledge of the extension workers than to their ability to communicate.

5. There are also factors which involve the education of the farmer, land ownership, rent laws, etc., which in some cases sharply retard the diffusion of technology. The rural credit system does not always favor long-term investments and discriminates against small and medium farmers. The lack of companies which acquire expensive machinery and rent it to farmers tends to make inviable technologies which depend on this machinery.

6. Rural extension always faced the problem of reaching the mass of farmers. From this point of view, the conclusion is obvious: there are a lot of farmers and few extension workers. But there are also other factors: the geographical dispersal of properties; the poor quality of country roads; the low educational level of the small and medium farmers who require a direct contact with the technician either through individual or group meetings. (see fig. no. 3)



Fig. 3. The gap between Research Centers and Farmer's yield.  
Limitations and Constraints



Source: Adapted from A. Violic et al. (6)

Within the perspective of increasing production surplus, the problem would be greatly simplified since a small percentage of farmers hold the greatest portion of agricultural land. It is therefore necessary to reach this small fraction of farmers. This can be done with help from private technical assistance firms, while drastically reducing government investments.

The implication in a decision of this kind is that the small and medium farmers would be left marginalized from modernization. Such a decision would help aggravate the internal market supply problems both in regard to the food basket of the poor consumer and in income distribution in rural areas. It would certainly increase the rural-urban migratory flux.

Rural extension will have to increase its staff in order to improve service to the small farmers. As already mentioned, a possible alternative would be to give public extension the responsibility for this type of work while large farmers would be taken care of by private assistance.

Even so, government investments will still have to grow very sharply if outlook and work methods are not changed.

The Primary school program will have to be revised to include courses on agricultural practices. The Extension Service could collaborate in this task.

Extension work with groups rather than with individual farmers will have to be revised and considerably increased.

There is a need to prepare special publications that can be read by people with a minimum amount of education. The same approach should be followed by radio and television which today constitute a powerful means of communication in farm communities.

## 9. FINAL OBSERVATIONS

Applied agricultural research may be understood as a search for the new technologies within the boundaries of existing scientific knowledge. The role of research is to increase the number of alternative production systems. This will give the farmers more opportunities and permit each one of them to make the best choice considering the existing markets, characteristics of their assets, knowledge, personality and other factors.

The development of knowledge is a continuum process which starts with a research project seeking an answer to an agricultural problem, which has originated with a farmer, when he puts into practice the results of that research in order to increase his productivity and his income. The broad objective is to benefit mankind by the advancement and utilization of agricultural and related sciences through technological innovation, and creation of new technology for agricultural producers. The participation of extension and technical assistance in all stages of this process is of major importance.

Research results must be disseminated and adopted by farmers to affect agricultural productivity. Extension activity helps speed up the adoption process and increase the percentage of adoption. Thus, the effect of a given technology on agricultural productivity depends on the level of extension activity. On the other hand, the effectiveness of extension depends on the effectiveness of research. Without research, no new knowledge can be extended by extension agents.

Therefore, research and extension are interrelated and complementary.

In general, the public research and extension efforts are done as "service". The role of public research and extension initiative theoretically should concentrate on matters closely linked with the public well-being, emphasizing social benefits.

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# THE PROCESS OF TECHNOLOGICAL TRANSFER

by

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IICA, Consultant

## 1. INTRODUCTION

Research and extension are two components of a matrix which includes marketing, supply, production, credit and other elements necessary for the development of agriculture.

These elements constitute an interrelated system constituted by elements and their connecting relationships or processes and can only be fully understood and analysed in this context.

The purpose of the system is the attainment of specific goals which can and do vary from one country to the next dependent on the interests and aims of the policy makers, and the constraints imposed on them by their reality.

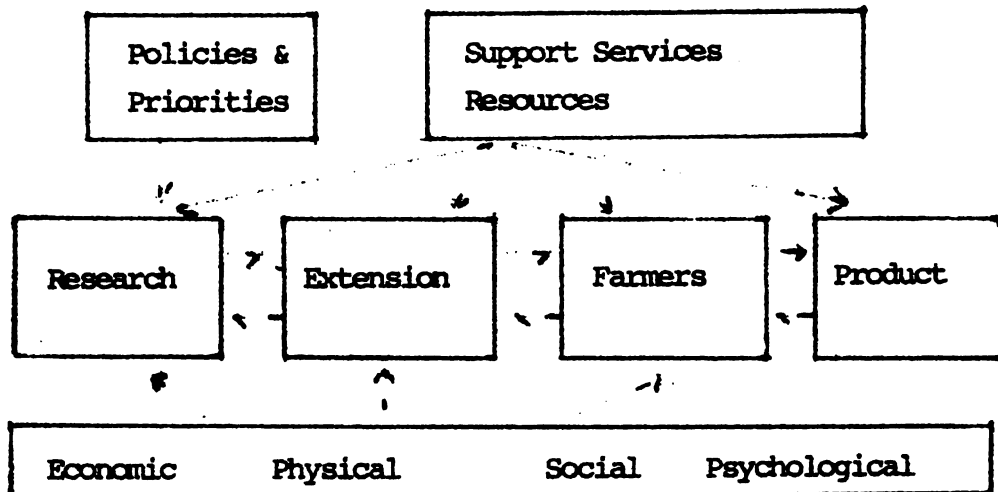
In this paper we will look at and analyze the functioning of the technological transfer system, trying to indicate the principle forces which influence its functioning. The attempt is not to describe the operation of any one system in particular but delineate elements and processes common to all, and which in each case conduct themselves in accordance with the specific conditions which exist.

In the system there are three sub-systems which we want to emphasize, and which constitute the principal elements of our model: the research subsystem. the extension sub-system and the client or farmer sub-system.

Apart from these three elements there are important conditioning factors, such as the policies and priorities established by the policy decision-makers; the availability and quality of the resources, and the character of the support services all of which serve as limitations or constraints on the functioning of the process.

## 2. GENERAL MODEL

Figure 1 presents the tentative model of the technology transfer system.



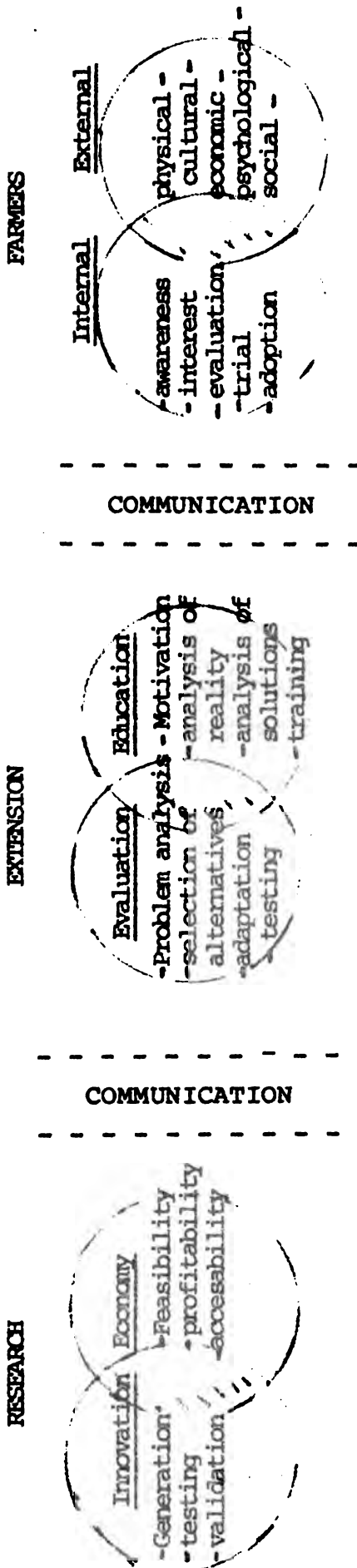
### 2.1. CHARACTERISTICS OF THE MODEL

- Each of the elements are inter-related and interact among themselves.
- While the generally considered direction of the relationships is that originating from policies through research to extension and the farmer, this is not necessarily so. In some systems the flow may be reversed, initiated by farmer's demands and channelled through the extension process to the research and policy making elements. In practice both situations should exist permitting a truly dynamic and interactive system.
- Environmental factors and support services affect all these sub-systems and should be object of concern to each of them. Research for example if it is to be realistic must consider the constraints which exist in the implementation of its innovations.

## 3. PROCESS OF TECHNOLOGICAL TRANSFER

In figure 2. we indicate the process of technological transfer looking this time at the relationships and activities related to it. Each of the subsystems have a set of activities to perform, which are related to the activities of the other sub-systems.

PROCESS OF TECHNOLOGICAL TRANSFER



\* Communication process includes

- \* Source
  - Formulation of the message
  - Codification
  - Treatment
  - Channel selection
  - Reception
  - Decodification
- \* Transmission
  - Interpretation
  - Response
  - Noise

Adopted from model of Ing. Ignacio Ansorena

In the process model we can see that there are a number of inter-related activities which constitute the technological transference from the researchers to the farmers. We shall now analyze each of these activities.

### 3.1. RESEARCH

3.1.1 Research is a process by means of which variables and their relationships in the fields of physics, chemistry, biology and sociology are identified with respect to their activity for determined ends.

Note that in this instance we include sociological factors because agriculture is a process which involves human intervention.

The researchers carry out two types of research:

- pure research: where the goal is production of new knowledge as a result of new combinations of variables and the generation of new theories.
- applied research: which is the application in pre-established situations of known variables and relationships to test their behaviour.

The scientific process involves the generating and testing of these two types of knowledge in order to establish their validity and reliability .

The research process covers a wide range of problems varying from specific production problems such as the control of a weed or plant disease to areas as general as the effects of cultural practices on the environment.

3.1.2 ECONOMY: One area which should be the concern of research are the social and economic affects of new practices and discoveries on the communities and soccial groups involved. This is especially important if we consider that the effective implementation of the new knowledge is in the hands of the farmers.



A second dimension of research then is the analysis of the new discovery in terms of its economic and social effects: its feasibility: its adjustability to the productive systems and its profitability. A new practice may increase the yield of the plant, but may not be profitable to the farmer, or may require conditions which are beyond his situation.

### 3.2 COMMUNICATION

It is not enough to develop and test a new discovery. It is also necessary that this should be communicated to the extension agency, responsible for its diffusion and implementation.

This requires the structure of mechanisms and the adequate formulation of the messages between the research sub-system and the extension sub-system. In general this communication tends to be deficient with the result that the extension workers often are unaware of the innovations available in their field. Types of mechanisms that can be implemented are:

- periodic meetings between extension and research staff.
- planned visits of extension workers to experimental stations.
- subject matter specialists who work both with the extension staff and the research stations.
- liaison officers: who are responsible for regular communications of new ideas to the extension workers.
- regular courses for extension workers.

Apart from the established mechanisms, lack of communication may derive from problems in the use of technical language or insufficient specification of the conditions necessary for the effective use of the new practice.

### 3.3 EXTENSION

The extension sub-system has two basic functions evaluation and education.

### 3.3.1 EVALUATION

The first function is that of "adaptations" and evaluation of the new practice or innovation in terms of the specific production conditions of the farmers that it serves.

These production conditions may be physical (problems of soil, rainfall, altitude, access roads etc.) economic (requires the use of high cost inputs, infrastructure modifications etc.) or social (requires a level of training or administrative skill that is beyond the capacity of the farmers).

The extension service should also ensure that this technique is adequately tested in the area where it is to be applied, before recommending it to its clientele.

In this way the extension service acts as a filter selecting the most appropriate techniques available and rejecting those which are not applicable. Preferably this activity should be carried out jointly together with the research station.

### 3.3.2 EDUCATION

This is the principal function of the extensive service: namely capacitating the farmers so that they are capable of understanding and managing their production systems, and taking the measures necessary for their improvement. Extension should not limit itself to providing information or getting the farmer to accept new ideas mechanically and uncritically. On the contrary it should enable him to think critically. Learning to understand his problems and situation, understanding their causes, evaluating the positive and negative aspects of new ideas and making well-thought-out conscious decisions. This enables the farmer to act on his own initiative as a self-directed responsible person.

### 3.4 COMMUNICATION

The extension service should therefore seek to provide the farmer with the knowledge, skills and attitudes necessary for self-directed action.

This can only be done through a systematically planned and executed process of education, which involves the active participation of the farmers. This latter aspect then is the communication process between the extension service and the farmers.

Mechanisms which can facilitate this communication are:

- creation of local farmer's committees which can meet regularly with the extensive agent to plan, implement and evaluate activities.
- short courses, field days, demonstrations;
- radioprograms, bulletins, studygroups;
- regular visits to the farmer and his family. *etc.*

### 3.5 FARMERS

The farmers are the principal element of the process, because it is they who must assume the responsibility for implementing the new discoveries and manage them effectively.

In this model we can identify two dimensions an internal one related to the stages in the process of adoption and an external one which deals with facilities that condition this process.

#### 3.5.1 INTERNAL

Adoption studies have identified 5 stages in the process of adoption:

- \* the farmer becomes aware that there are new techniques or ideas but he has only a general information about them.
- \* his interest is aroused and he begins to search out information from his friends, neighbours, the extensions agent etc. about these new ideas.
- \* He evaluates the information weighing its pros and cons and may decide that he would like to try it out.
- \* He tries out the new idea, possibly on a small plot, on a limited scale, or he goes to see demonstrations in other areas. On the bases of this trial he will then decide whether or not to adopt.
- \* The final stage is where he adopts the new practice incorporating it into his farming behaviour.

### 3.5.2 EXTERNAL

Studies on adoption-diffusions have identified and analyzed some of the more important variables that affect the adoption process among farmers. Among these we mention the following:

3.5.2.1 THE PHYSICAL ENVIRONMENT: here we include such factors as the land and its tenancy, farmsize, soil-quality, availability of water, topography, climate, access roads, drainage, irrigation, etc. all of which influence the possibility of the farmer to use the new available technology.

3.5.2.2 THE CULTURAL ENVIRONMENT: As is well known, agricultural practices are closely related to the cultural environment of the group with its traditional beliefs and practices. These are products of a long process of the communities' adaptation to its environment and often might present forms of conduct, beliefs and practices which are in conflict with the new technology. One area of conflict may be a subsistence rather than profit orientation to agriculture which typifies the new science-based technology.

Because of the unconscious nature of many cultural behaviours it may be difficult to induce changes without an adequate educational process. Similarly cultural beliefs often have strong emotional elements which defy rational analysis.

On the other hand traditional cultural values, beliefs and behaviours may provide supportive underpinnings for new behaviour, which if taken advantage of can dynamize the adoption process.

3.5.2.3 ECONOMIC SITUATION:

Both the economic resources and their form of management are essential elements in a process of agricultural modernization.

Scientific agriculture requires a productive rationality which seeks efficiency and productivity in the use of resources. Studies have shown that the capacity to risk is often involved in the adoption of new practices, especially where the outcome is uncertain and the farmer lacks the experience to calculate his chances of success. Unless the farmer is amply endowed with funds he will be reluctant to undertake the risks involved. Similarly new techniques often require substantial capital investment in seed, inputs and equipment and unless he has access to credit on favourable terms, the farmers may be unable to introduce the new technique. Thus it is important that there should be adequate support services [credit, supplies, machinery and marketing] to facilitate the adoption process.

A factor often cited particularly in small farmers is their tendency to diversify their production, as they produce not only for the market but also to provide food for their families.

The tendency in research has been towards single cropping, which while permitting higher yields in the particular crop, may be anti-economic for the farmer compared with his previous cropping patterns.

#### 5.2.4. PSYCHOLOGICAL VARIABLES

The way a person sees the world [his cosmovision] is a product of multiple factors: his cultural beliefs and values, his personal experiences, his social and economic position, etc.

This vision of reality colours and orientates his perception of new ideas and conduces to a personal interpretation of the situation.

Similarly the motivation which a person feels towards an object or activity is a product of his needs, aspirations fears and hopes. Unless the extension worker understands this, and attempts to comprehend these motivations and perceptions it is possible that his communication efforts will fail.

#### 5.2.5. SOCIAL ENVIRONMENT

People are not isolated, they form part of social groups, with which they interact and from which they receive satisfactions and rewards (esteem, status, approval). Similarly the group may sanction their behaviour by withdrawing recognition or approval. Each group has its accepted norms of behaviour, expectations and beliefs, which become part of the individual's own belief system.

Studies have shown that the group plays an important role in shaping a persons behaviour, and the disposition to adopt new techniques or ideas is influenced by the group's attitudes to these innovations. The dynamic of the community social system is affected by other structural factors such as leadership, power distribution, factionalism religious and political institutions, all of which may play a role in the adoption process.

The social system will be analyzed in more detail in the next session, when the adoption diffusion process will be viewed in terms of social system dynamics.

The extension agent to be successful must not only know his community and its dynamics, but be continually aware of the changes that are occurring in it.

#### 4. INTEGRATION OF THE PROCESS

The process of technological transfer must be looked at as a whole, in which each of the parts or elements has a contribution to make, and where we can only understand each part in relation to the whole. Thus while we have seperated analytically the process of research from the process of adoption by the farmer, it becomes apparent that the new technologies devised by the research station must take into account the conditions and characteristics of the farmers who will benefit from them. This has practical implications for the researcher both in determining what research problems are important and also evaluating them in the field conditions of the farmers who will use them.

This therefore helps to reduce the gap between the innovation and its application and helps to make the role of extension more efficient.

Among the ways that have been tried to achieve this closer contact between the farmer and the researcher are:

- Including the farmers, together with extension agents and research staff on a planning and coordinating committee.
- Visits by farmers to the research centers.
- Field work by researchers on the farms and testing new ideas in demonstration plots on selected farms.
- Including the farmers as participants in on-farm experiments and demonstration plots.
- Evaluation by researchers of effectivity of implementation by the farmer.

#### 5. TECHNOLOGICAL TRANSFER AS A TWO WAY PROCESS

The process of generation and transference of technology should in practice be a two-way process, where research not merely initiates the process by generating new ideas on its own initiative, but also responds to queries from farmers. In this way extension becomes a two-way process both transferring ideas from the research center to the farming community, and bringing problems and queries from the farmers to the researchers.

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# TECHNOLOGICAL TRANSFER VIEWED AS A SOCIAL SYSTEM

by

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## INTRODUCTION:

In this paper, we shall analyze the relations between the researcher, the extension agent and the farmer in terms of the social systems to which they belong, and analyze the process of technological transfer as a process of relations both within and between systems.

This is a more realistic form of analysis because in practice the behaviour and relations of individuals in the process of technological transfer is determined not by their individual characteristics alone, but by the behaviours and relationships defined by the organizations or groups to which they belong.

Thus the behaviour of an extension agent is conditioned by the rules, procedures, job definitions, selected methods, etc. which the extension service has established.

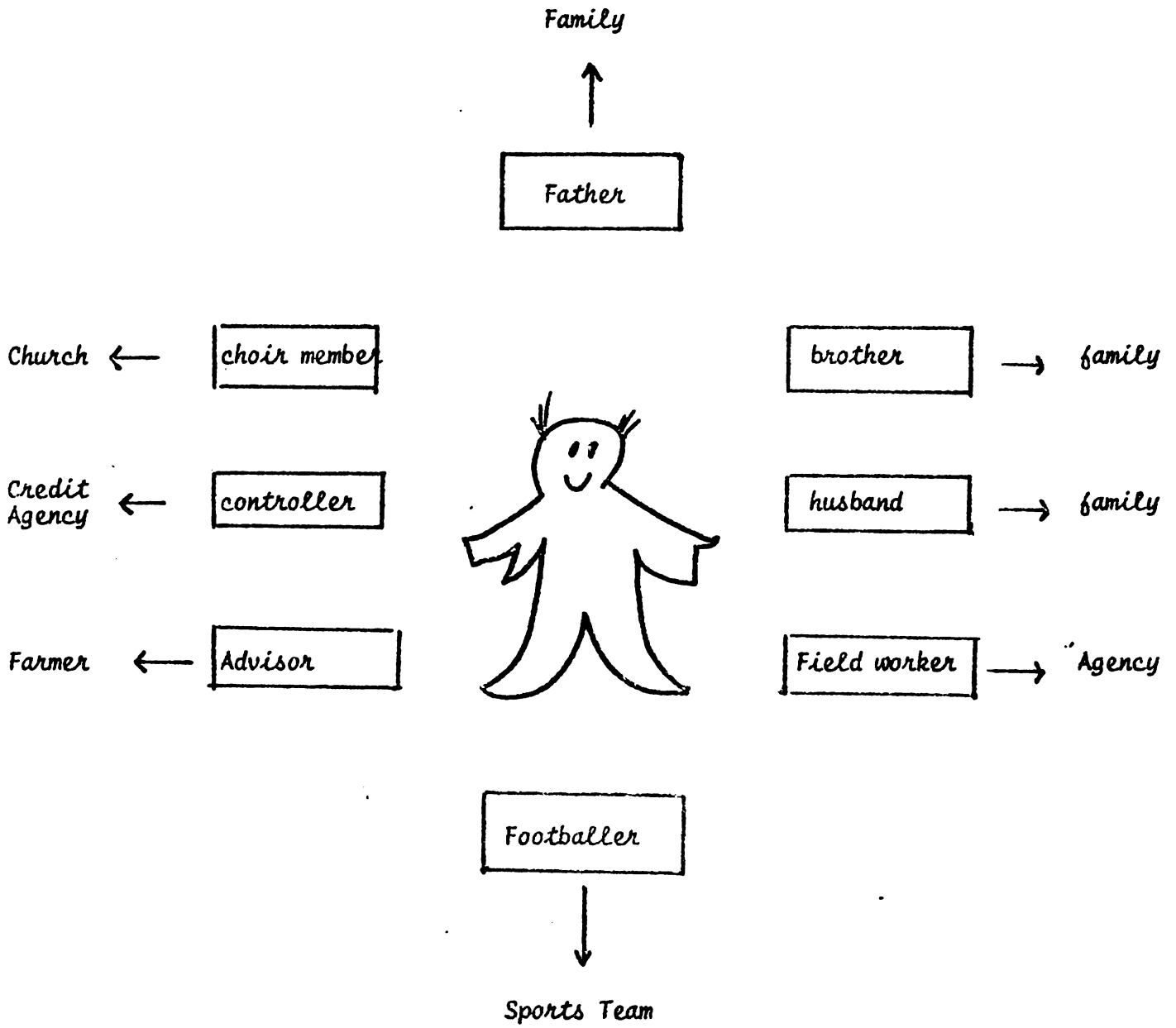
Social systems are constituted by elements which are interrelated by processes. The basic element of a social system is the "role" [father, mother, son, extension worker, researcher, farmer] or position of the person in the system, and the basic process is the relationship between roles.

This relationship or interaction between roles is the fundamental structural unit of the social system.

We can thus consider a social system as the set of roles and their relations of all the the system members taken as a whole.

## I ELEMENTS AND PROCESSES OF THE SOCIAL SYSTEM

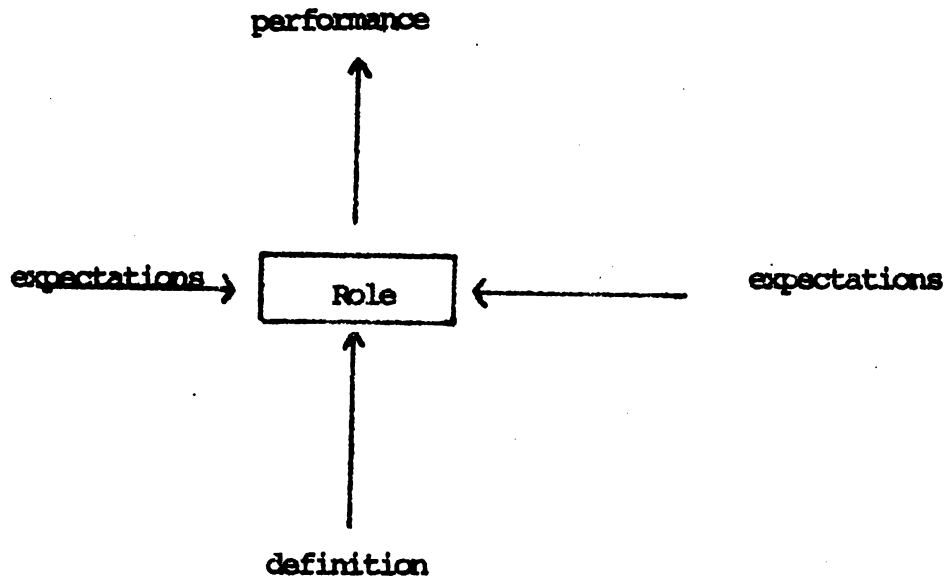
Loomis<sup>1</sup> has developed a social system model, which identifies the principal elements and their processes, as well as certain master processes and conditions which characterize the system as a whole. We shall use the major parts of Loomis' model for our analysis.



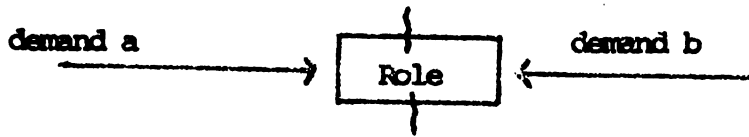
*Different role demands of a person.  
Some of which may be conflictive  
e.g. between being advisor and controller  
between work and family*

ELEMENTS AND PROCESSES OF THE SOCIAL SYSTEM

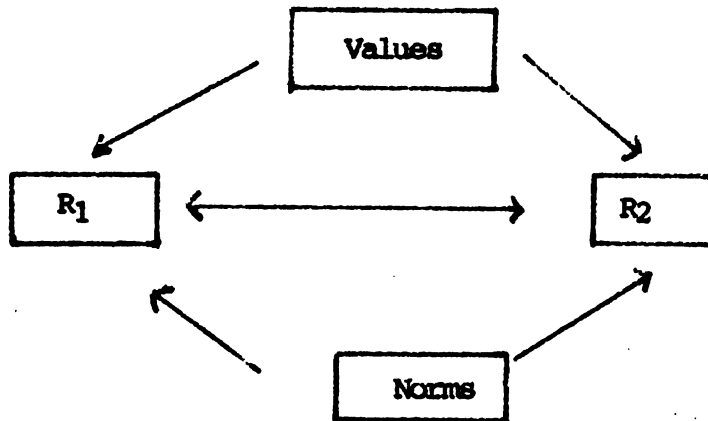
1. Status-role            The position of a person within the system and his standing or status. Each person performs multiple roles within a social system, each of which has its demands or expectations, prestige, reward, etc. [father, brother, field worker, choir member, club president ....]  
  
The process related to this is the performance of the role.
2. Rank                    The hierarchial location of the role within a specific subsystem and the system as a whole. The process is ranking or allocation of positions.
3. Power                    The capacity to control the behaviour of others. The process is controlling or decision making.
4. Sanction                The reward or punishment a person receives for his behaviour. The process is sanctioning.
5. Goals or Objectives      Established for the social system. The process is achieving or attaining goals.
6. Knowledge and belief      The type of knowledge existing in the system: the beliefs shared by the members and their form of validation: [scientific, empirical, magical etc.] The process is that of knowing or believing.
7. Norms & values          What the system establishes as forms of acceptable behaviour. How the system members should act. What the system considers to be valuable. [order, liberty, compliance, creativity ....] The corresponding process is that of norming and standardizing, and evaluating.



Role : definition, expectations  
performance



Role : conflict



Role relationship

8. Sentiment The feelings that system members have towards each other or towards things. The process is that of feeling, management of tension or communicating sentiment.

Master Processes:

There are certain basic processes which affect the social system as a whole, and its relations with other social systems. These are:

Communication: This is the process whereby information decisions and directives pass through the system and by which knowledge is transmitted and sentiment formed or modified.

In a social system the relations between members form interpersonal networks of an informal nature, which permit communication flows. At the formal level the system sets up communication channels: meetings, bulletins, notice-boards, memorandum, for the same purpose.

These formal and informal networks may be quite differently composed. Where formal communications are deficient, informal ones will take their place (rumours, gossip, etc.).

2. Boundary Maintenance

Each social system attempts to establish its boundaries, which separate it from other social systems. In this way the system can maintain its internal solidarity, identity and interaction patterns. The system maintains its boundaries in multiple ways: (Limiting recruitment, developing its own language (jargon), reserved behaviour towards outsiders, differentiated beliefs and behaviours, tradition, etc. Some organizations have more permeable boundaries than others, but all have some degree of restrictions which retains their identity.

### 3. Systematic Linkage

The ways in which one social links itself with others: for example the extension service must have linkages with the research station if it is to have effective performance. Similarly it must link in with the local community system thus allowing an adequate flow of technical knowledge and dynamic interaction. These linkages may be formal: meetings, agreements, liaison people, integrated activities, secondment, etc. or informal: family-friendship relations between system members.

#### Socialization:

The process whereby the social and cultural heritage of the system (norms, beliefs, values, goals, sentiments, knowledge ....) are transmitted to the newly recruited members.

In a societal system the process is carried out by different institutions, the family, the school system, the judicial system, the neighbourhood, etc. in both formal and informal ways.

In organizations this is done formally through the training system, enforcement of rules and procedures, supervision, and informally through colleague relations.

Both acceptable and deviant behaviour is transmitted. [for example the group's work rate, as opposed to the organizations].

Where bureaucratic procedures are cumbersome, informal more agile procedures may be developed informally.

#### Institutionalization:

Refers to the process whereby interaction patterns become stabilized into systems of behaviour. This is more clearly seen at the level of the community where behaviour becomes institutionalized around specialized functions as for example: education, religion, politics, judicial systems, health etc.

Each of these functions or institutions have their own beliefs, norms, goals, specialized roles, sanctions etc.. and become in time easily identified social sub-systems. The same can happen within a sub-system such as extension or research, where specific activities become institutionalized. In practice both research and extension are institutionalized sub-systems of the agricultural production system. It is this institutionalization which helps to create difficulties in communication between the two systems.

Conditions of Social interaction:

The social system exists within time and space and functions in terms of specific ecological conditions which influence and shape its development. Among the conditions of social interaction we can include the following:

Territorial location: determines the space or location of the different members and structures of the system. For example a decentralized system with sub-systems located in different geographical locations is quite different in character to a centralized system.

Size: The larger the system the more complex and differentiated it tends to become and therefore more complex the control, coordination and decision making processes.

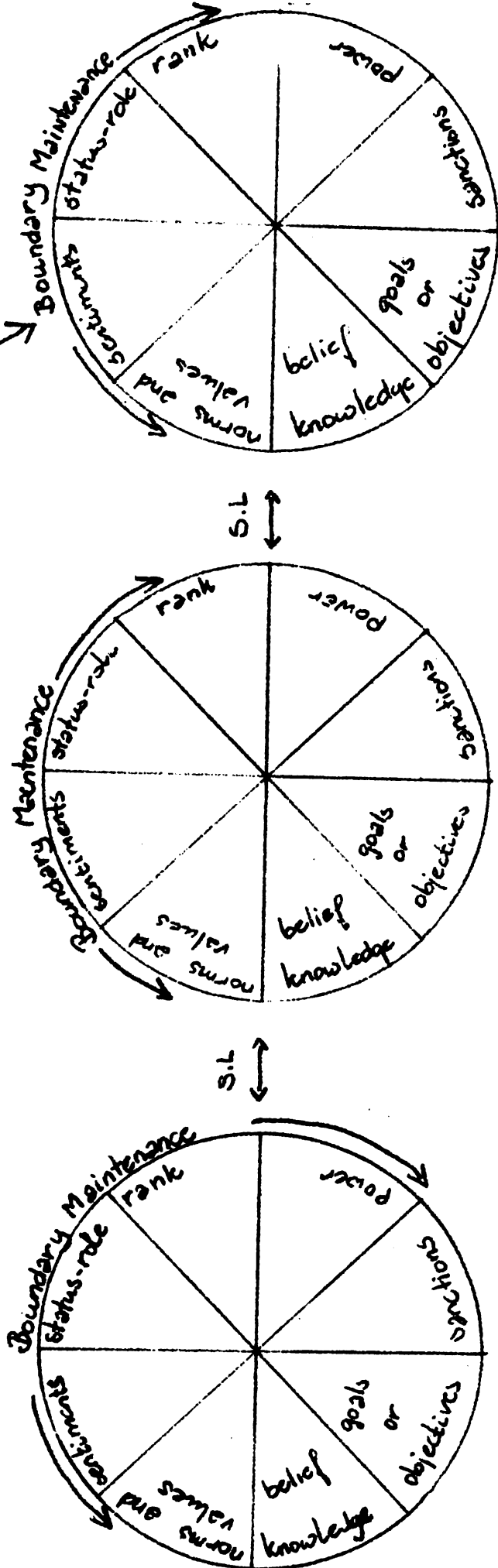
Cultural-Historical: Social systems are conditioned by their cultural and historical development processes, each one reflecting its own experience and perception of reality. This is clearly seen when we analyze the development of individual societies (e.g. U.S.A., U.S.S.R., Suriname) but it also occurs within specific societies (indian, negro, european,...) and even within institutions. The historical tradition of a program, the character of its founders, its early experiences tend to shape the way a system develops.

Systemic Linkage (SL)

Research

Extension

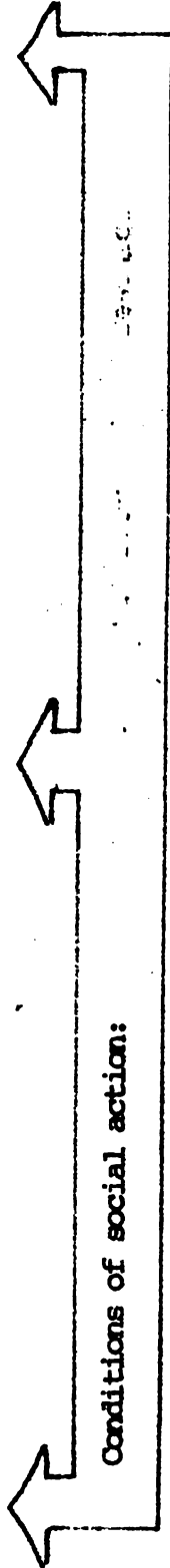
Community



Communication  
Institutionalization

Communication  
Institutionalization

Communication  
Institutionalization





Resources:

The access to resources that a system has affects its behaviour and performance, view of the world and internal structuring. For example an organization that has few resources compared with its objectives will seek ways to exercise strong internal control, will develop attitudes of thrift, will encourage sacrifice and effort and will seek ways to maximize its efficiency. The behaviour of an organization with an abundance of resources will probably be very different.

Summary:

To conclude we may say that a social system is a: set of interrelated roles and behaviour patterns, directed to achieve different goals, while seeking to maintain itself as a coherent social unit. As such it acts dynamically responding to and attempting to influence changes in its environment, and establish relations with other social systems to permit it to achieve these goals.

Two basic functions of all social systems are goal attainment and system maintenance.

II APPLICATION OF THE SOCIAL SYSTEMS MODEL TO THE PROCESS OF TECHNOLOGICAL TRANSFERENCE

We shall now analyze some of the implications for the extension process derived from the systems model. Two sets of relations will be studied: The relationship of extension and research, and the relation between extension and the community.

RESEARCH-EXTENSION - COMMUNITY

Each of the sub-systems have as components the elements and processes of the system model as described above.

SOCIAL SYSTEM MODEL

ELEMENTS

Status-role  
Rank  
Power  
Sanction  
Goals or objectives  
Knowledge and belief  
Norms and values  
Sentiment

Master Processes

Communication

Socialization

Conditions for social action

Territoriality:

PROCESSES

Role performance  
ranking  
controlling, decision-making  
Sanctioning  
Achieving, attaining  
knowing or believing  
norming, standardizing, evaluating  
feeling

boundary maintenance, systemic  
linkage

Institutionalization

Size, cultural historical: resources

Taken from: Loomis C.P. "Social System"

To study the systems we can analyze them in terms of certain key variables as follows: taking into account the relation of these elements between the three systems.

1. WHERE CAN DIFFERENCES ARISE BETWEEN MEMBERS OF DIFFERENT SOCIAL SYSTEMS WHICH AFFECT THEIR INTERACTION.

Goals:

What are the goals of each of the systems, are they the same ? Do the researchers have the same goals as the farmers and the extension workers ?

The extension worker as a link between research and the farmer may find that:

- the research and farmer goals are incompatible
- the goals of extension per-se are also incompatible

Researchers are often oriented by the demands of the scientific community, seeking to further knowledge in general and primarily concerned with problems unrelated to the specific needs of the farmer. Often the scientist seeks basic research rather than applied research. The farmer on the other hand is more interested in solving immediate day to day problems.

The extension worker finds that he has demands from the farmer which conflict with the kind of information he can get from the researchers. Thus he finds that he may lose credibility with both groups.

Roles and Role demands:

The fieldworker often finds that the demands on him by his ministry create conflict with his work in the field. As an extensionworker his principal role is that of a researchers to find ways of improving agriculture.

In practice he may find that much of his time has to be dedicated to other activities, such as surveys, campaigns etc. that his ministry requires of him.

This means that his major role is undermined again helping to produce lack of credibility among both the researcher and the farmer.

Status:

There are different levels of social prestige involved among the three major roles. The researcher is usually university professional, often with post-graduate studies working in a position which has relatively high status. The extension worker is often a person of lower academic formation and correspondingly lower social prestige. These prestige differences can lead to negative perceptions among the role occupants, thus weakening the possibilities of true teamwork and communication.

A similar status difference exists among the farmers—many of whom have only a low status a factor which can affect negatively their communication with the extension agent and much more with the research worker.

Sanctions:

Related to status levels are the rewards and incentive systems necessary for motivating the social system members. The differences in status between the members of the different social systems may also be reflected in their levels of income, possibilities of production and thus on their motivation and job-satisfaction.

In some countries today for example one of the problems in attracting good high-quality researchers is the level of salaries that the research agency can afford. This has led to a brain drain away from research centers in the third world to private sector firms or universities and to first world countries.

Similarly studies have shown that extension services often suffer from low morale because the fieldworkers are relatively poorly paid compared to colleagues in other fields, and have little opportunity for promotion as the civil service hierarchy is open only to higher qualified persons in the top administrative parts. This is particularly acute where there is little opportunity for further professional training and upgrading. These conflicts lead to a loss of motivation and creativity among the workers and an unwillingness to confront problems in their work.

Knowledge and beliefs :

Here again differences arise between the three sub-systems. On the one hand the researcher tends to be a specialist in his material, while the extension worker is a generalist with a somewhat lower level of academic training.

The researcher is concerned with a narrow range of problems many of them abstract, while the extension worker seeks concrete, specific solutions to a variety of production problems.

These differences can produce discrepancy between the groups: the researcher claiming that the extension worker doesn't understand the problem, while the extension agent considers that the researcher is in an "ivory tower". The communications difficulty can also be great unless there is a way of translating the scientists solutions into the language and procedures that the extension worker and the farmer can understand.

The difficulty is enhanced for the extension worker who often has to bridge the gap between the traditional-empirical knowledge of the farmer and the science-based technology of the researcher.

Here the difficulty is not merely the knowledge gap but may also be one of different views of reality. The farmer having a totally different theoretical background for explaining agricultural phenomena.

Communications and Systemic linkage:

One of the more serious limitations in the transference of technology system is the lack of adequate communication between the parts. This is in part due to the separation physically and administratively of the research stations from the extension service, thus reducing the possibility of a continual communication flow. The failure to establish specific formal mechanisms of systemic linkage between the sub-systems leads to this deficiency. Other factors which limit the communication are those already referred to above: namely role and status separation.

The extension program needs to have very extensive linkages and communications not only with the researchers but also with the community and with other specialized agencies that can provide supporting services to the process of agricultural production.

The lack of institutional coordination is a major obstacle to the effectiveness of the extension services.

The linkages and communication of the extension agency with the farming community are perhaps its most important ones.

Here considerable care must be taken to establish close dynamic interactive linkages which permit a continual processing of information and an almost complete integration and identification.

### EXTENSION AS A SUPPORTIVE SERVICE AGENCY

Unfortunately the normal bureaucratic patterns of government ministries and agencies tend to be vertical, with centralized authority.

Policies and programs tend to be formulated at the top with the central authorities and then passed down the chain of command as a series of orders to be carried out.

This puts the extension worker in a difficult position, for as the lowest level in the hierarchy he has very little say in the formulating of plans or policies but is merely an implementer of already made decisions.

Thus he finds himself in the position of sandwich filling. On the one hand he faces the vertical demands of the system and on the other the demands of the farming communities to satisfy their needs, which may be quite different.

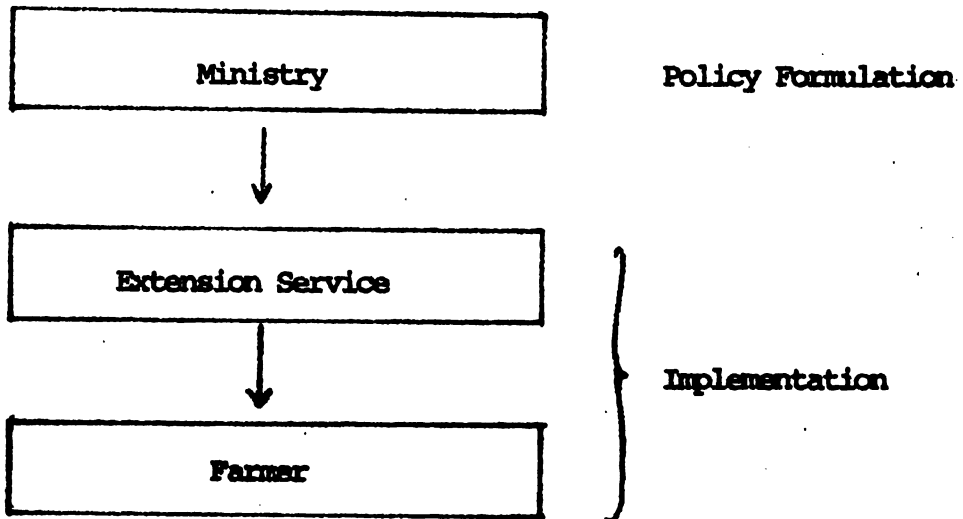
In order to resolve this problem it is necessary to reconsider the structure and functioning of the extension sub-system and permit the of the extensionists role allowing him a certain area of initiative and a greater degree of participation in the formulating of extension programs.

It implies laying the extension system on its side, converting it into a service system responsive to the needs of its clients as well as to the demands of national planning and policy. These two structures are shown in fig. 2 on the next page.

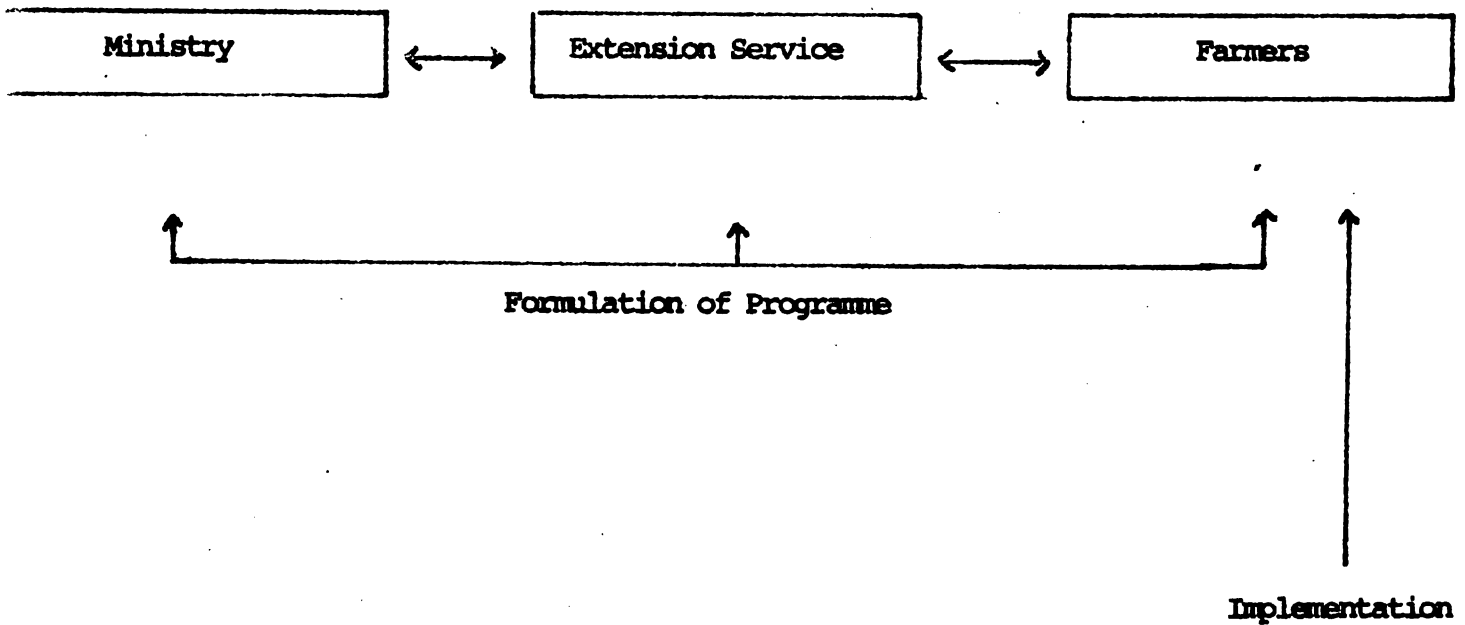
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2a) Traditional Extension Structures



2b) Suggested Extension Structure





# COMMUNICATION PROCESS AND ITS RELATIONSHIPS WITH TECHNOLOGY TRANSFER

by

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## 1. INTRODUCTION

This page is addressed to those agriculture and livestock extension workers who are interested in trying out new participatory ways of working at the community level.

As we already know, community involvement in its deepest sense often requires fundamental changes in people's attitudes. This is particularly true where people have been apathetic, dependent on outside directives, or resistant to new ideas.

Cultural beliefs and also taboos may keep people from adopting new technics that could greatly improve their production and productivity levels as well as their income and their way of life.

Experience shows that in such situations, merely imparting information about better agricultural and livestock production practices does not solve the farmers problems neither the national needs.

Therefore, many programs in our developing countries are trying other means, like the Extension Services, whose projects and activities gives great importance to the communication process, as well as to the teaching and learning process. We are using different types of media to carry out such activities dealing with non-formal education, results and methods demonstrations, and so forth, to increase people's understanding and to develop in them a genuine sense of commitment to find solutions. It is a challenge to all of us. "But even the best of methods will not work unless field staff, coordinators and supervisors are suitably trained. If staff are expected to conduct participatory learning for adults, then they themselves need to experience participatory learning".

## 2. AGRICULTURAL AND LIVESTOCK INSTITUTIONS (UPPER CASE LETTERS)

Any society needs, requires that resources available been used adequately to satisfy its needs and development goals. That is the main reason why we do have governments.

Governments usually establish or adopt strategies and instruments trying to fulfill their responsibilities. Strategies are presented like policies, while instruments include all formal institutions involved.

As one of the main economic sectors of our countries, agriculture has its own institutions. Through them, "Governments" try to establish some kind of synchronization between agricultural production and the social and economical needs. At the Western Hemisphere these institutions operate as a complement to a free market economy. This implies that government efforts and resources must be devoted to satisfy population requirements regarding social priorities and areas which have not been taken into account for a long time.

Figure 1, shows how some agricultural institutions try to synchronize the farmer's food production and social needs.

### 3. WHAT DO WE UNDERSTAND BY TECHNOLOGICAL TRANSFERENCE ?

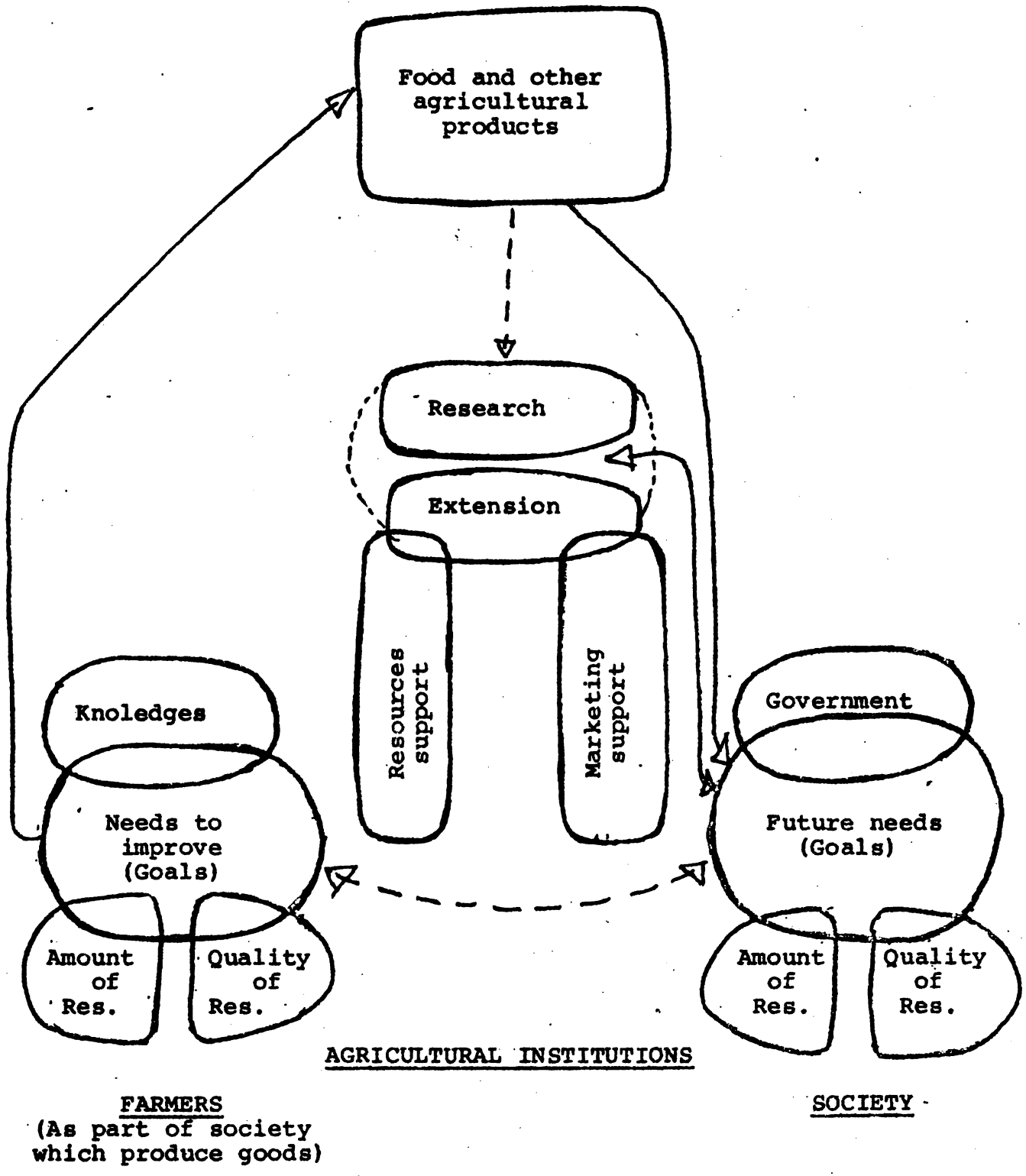
Among human being activities, the development of new technologies is the one which must have affected the relationship between business, government actions and the work and activities accried out by individuals, no matter if we are talking about developed or developing countries.

Most of the time, a great deal of agricultural research is done, by the government, in order to release new technologies to improve food production and other agricultural and livestock commodities.

Technological transfer is known as a process thru which research findings, it means better technologies, validated and with great possibilities to be adopted, are taken to the farmer taking into account all social and economic factors which affect the environment (internal and external) as well as the farmers or producers.

Regarding the agricultural field, technology has its roots based on experience; in the trial an error method (stochastic approach), or according to the more logical criteria dealing with research conducted to reach determined purposes and following the scientific method. This kind of research can be done locally, according to the needs of the country and the agrarian politics, or policies, given by the government.

Figure 1. POSITION AND THREE FUNCTIONS OF AGRICULTURAL INSTITUTIONS



Source: Adapted from L.A. Navarro. IDIAP/CATIE

It is time to start performing research essays whose results will be of benefit to the farmer. Also, we have to look for accumulated reserve of knowledges that remain filed at Research Centers and experiment stations. They had been pretty good exercises for academics and scientifics, but they also show that we have been working without coordination, mainly due to the divorce that exists between researchers, extension personnel and farmers. The process of technology generation and the mechanisms of supply and demand, are schematically presented in figure 2.

### 3.1 EDUCATION VS. TRANSFER OF TECHNOLOGY

What we have pointed out about what we do understand when talking about Transfer of Technology is very important, since we will be acting as a function of the concept that we have about any specific type of work, responsibilities, actions or processes. We can not dissociate proceedings from the conception, goals and objectives that we are looking for.

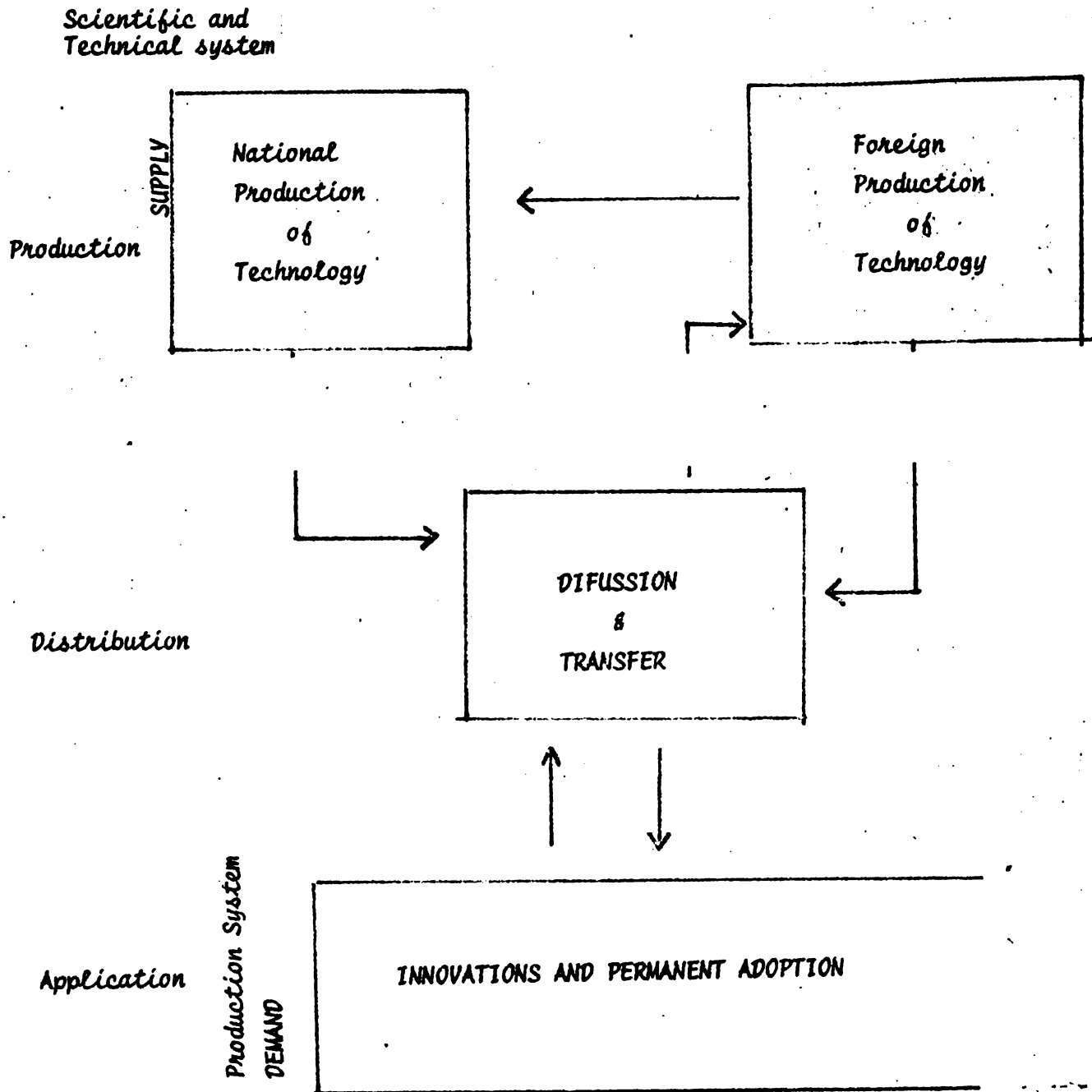
The process of technological change has to be an educational process, mainly if we are dealing with people who live at rural areas.

We understand education as a process which enables people to act, with criticism, upon a reality in order to change it; to educate or to adapt such a reality to their own social and human needs. We are thinking in education for human development and consequently, as an activity to promote economic, social, technological and political development.

From the premise established, we have that the technological change is only valid, from an educational point of view, when it is inserted into a wide complex or when it becomes part of the set of knowledges owned by a particular social group. In other words, it is integrated to the scales of values, beliefs, ways of thinking and actions. This way, the new technology should be assimilated by people, through a reflective - active process, putting together theory and practice, of the best knowledges with the best skills and abilities.

The old conception of vertical communication in which a professor just gives a lecture or explains something must be avoided.

Figure 2. TECHNOLOGY GENERATION AND MECANISMS OF SUPPLY AND DEMAND



Source: adapted from Carlos Molestina IICA/CATIE (3)

Instead, we have to carry out a participatory process on an equal-to-equal base. The farmer has to have an active role. He has to have the opportunity to express his own ideas, to discuss, to present his considerations about biophysical and socio-economic aspects and the risks implied in the new technology. The farmer will be the final adopter of any given technology and due to that he participated most. If he does not feel that he is the father of the creature, he will not apply any new technology, no matter how good it could be.

#### 4. THE COMMUNICATION PROCESS

##### 4.1 THEORETICAL FRAMEWORK

A communication's axiom postulate that any kind of behaviour (digital or analogical) is communication. This means that every human activity has a communicational value. If we take this for sure, transfer of technology, as a consequence of it, should have a basic nucleus, central point, of investigation about different ways of communication.

The objectives of research and the transfer of technology are oriented toward the farmer's improvement, his family and society as a whole, since mankind is the subject and object of development. We should consider that when we are involved in the teaching and learning process, which means, transfer of technology, the communication situation is given by the kinds of relationships between farmer/environment, farmer/family, farmer/farmers, farmer/social context, farmer/technician, farmer/government, and farmer/society.

Each one of these relationships suppose ways of behaviour and they show us guides of interaction.

Sound research regarding communication, at different levels, will allow us more precise ideas to take decisions, and also to promote the adoption of new technology and changes to improve agriculture and livestock. In this way, we will be trying to solve those problems faced by producers, "which have not found coherent and complete answers through the research done up to this moment".

The adoption of technology, as well as its transfer, implies behavioural changes within the extensionist system as well as the objective-system to be changed. The extensionist should be called "change agent" because he always tries to introduce new practices or technologies, while the objective of the change is the human group or individuals. In order to get this, we have to develop, as extension men, the phenomenon of empathy, that is the capacity of a person to understand another by playing the role of that person. This way, we will have enough knowledge to improve performance of our own role.

All of this should be reached only through a permanent interaction and a feedback which will allow us to predict behaviour. As Skinner said "in the measure that relevant conditions can be predicted or controlled". As far as we go deepest in the different communication aspects, we will be able to know how behavioural changes come through and that it is basic for any technology transfer process.

#### 4.2. THE PROCESS

Communication is nothing new. It is as old as the human being. For many centuries, man has been trying to communicate their own experiences using different ways or means. A good example is the fantastic amount of information written upon the walls of the great Greek pyramid. Signs and symbols standing for subjects and objects; earth planet information, distances between a planet and another in our galaxy is included on that pyramid is one example of man wanting to transfer all their knowledges to future generations. The amount of information was of such magnitude and of such high quality that today's better scientists are using it, are testing it and are also trying to understand great parts of it.

About 25 centuries ago, a Greek philosopher, Aristothl or Aristoteles, developed a model of vertical communication in which man presented a speech to another person or group of them called audience. But that so called "Audience" had no part in the communication at all. The person or the members of the group were just listeners. It was a one way address and that is not communication. We rather like to call it information.

Later on, men started to look for a participation approach. Many men all over the world started to put more attention to human communication, trying to understand how people learn and after they realized that communication was a process, they were capable of developing new models.

Wilbur, Schram, Eco, Berlo, McLuhan, Lasswell, Nixon, Beltran and Diaz Bordenave are just some names of the scientist who have devoted many years to understand what communication is and also to establish relationships between the human beings minds and objects, signs, symbols and the nature of everything that is part of the environment which surrounds men and that, in one way or another affects or identifies human behaviour.

The ancient concept that communication was just information or the answer to any stimulus is not right. It is more up to date.

As a definition of communication we think that one of the best is that from David Berlo, a former University professor, that stands: Communication is a process through which two or more persons interact with the named purpose to produce meaning.

We can observe, if we compare them, the great difference between the Aristotelian concept and Berlo's one.

Now we do have to consider communication as a process, we have to have interaction, we have to share meanings and our messages must be within a context. In other words, we must develop a participatory scheme in a holistic way. If we want to be understood we have to understand the other people and give participation to them.

We need to remember that human beings are constantly engaged in making adjustments to the presence and activities of other human beings. We must also recognize individual's drives, motivations, and frustrations. Since man can think, he can also deal with abstractions and these give him certain desires, wants or wishes which must be satisfied.

Man has certain motivations which move him to act: security, response, recognition and new experiences.



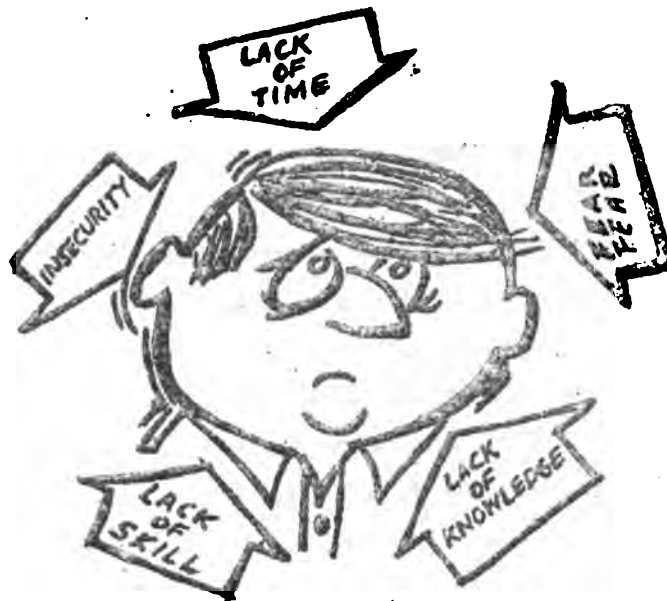


Figure 3. "BLOCKS" THAT KEEP FROM PARTICIPATING

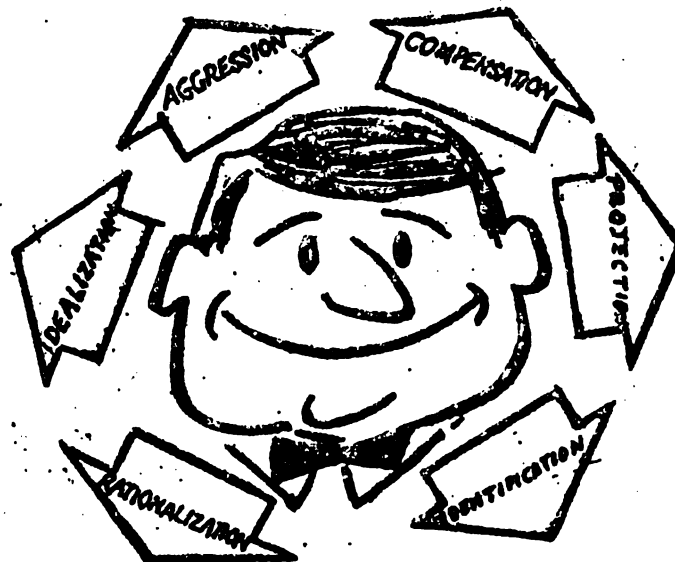


Figure 4. ADJUSTING FROM FRUSTRATIONS

Although these are simple enough terms, not everyone responds to them in the same way. (Explanations in class room).

As communications, we have the task of determining which motivating force is strongest among the people of our audience.

There is no doubt in our work, or in our leisure time, that we spend much of our time with groups of people. No matter why we become a group member, we still become a part of that group's structure. And we are still individuals who may have one or more block that keep from participating in a group. At least, eight blocks have been identified: Fear, insecurity, lack of knowledge about the group, lack of time, lack of skill, vested interests, group values and group demands. (expectations in class room). (see figure 3)

Nevertheless, even when we are not aware of our blocks, we frequently adjust by means of: aggression, compensation, nationalization, identification, idealization, projection, displacement, conversion and regression (see fig. 4)

In order to adopt any new practice, we generally go through a mental process that may cover a considerable period of time. This process is a five-step one: 1) awareness, 2) interest, 3) evaluation, 4) trial, 5) evaluation, and 6) adoption.

Several primary sources and channels of communication are at work during each stage of the process. For purposes of analysis, they are grouped into mass-media, group media and individual or face-to-face communication. (Explanations in class room).

Most people become aware of a new idea or Technology through one or more of the mass media (newspaper, radio, television, etc.) At the interest stage are again placed first followed by groups and individual media.

In the evaluation and trial stages, group media come in first place.

At the adoption stage, self-communication is the most important factor. The individual has tried the idea, likes the results and decides to go ahead with it.

#### 4.3. DIFFUSION RATE

We have to keep in mind that the more complex and expensive the practice, the longer the required diffusion process. (Remember that at any extension audience we do have: innovations, early adopters, informal leaders, majority and non-adopters or Laissez-faire).

It is not the same thing if we are dealing with a simple change in materials (one kind of fertilizer to another), than if we are trying to introduce an improved practice, trying to go ahead with an innovation or introducing a change in enterprises (switching from dairying to swine).

#### 4.4 EFFECTIVE COMMUNICATION

Planning a communication message (see figure 5) is something like taking a trip. We have to decide whether the trip is necessary, where we are going and we have to decide routes or the kind of vehicle we might use to get there.

Asking the following questions will help

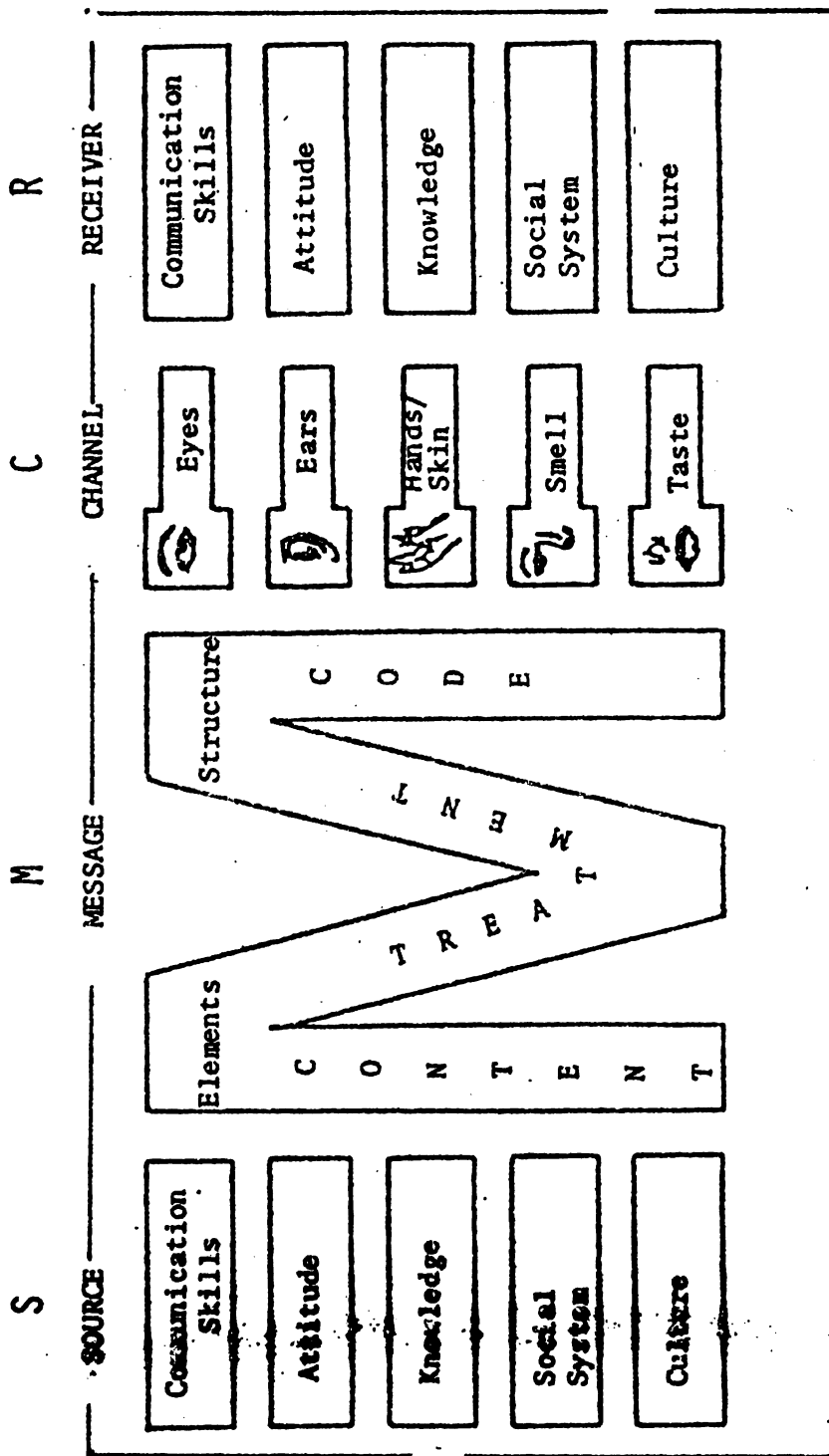
- 1) What is the need to be met by the message we are going to make and release ?
- 2) What types of communication goals are we trying to reach ? (Teach skills, inform or persuade).
- 3) What obstacles must we overcome ?
- 4) What specific outcomes do we have to reach to get to the general goal we have in mind ?

The effectiveness of the message we finally transmit will depend largely upon how well we answer those questions.

Practice looking at situation and analyzing them in some detail, using those four questions. The experience will help us to react more quickly when we have an off-the-cuff requirement. If our time is short, we will have a ready-made shortcut.

As communicators, there is nothing better said than "Start where people are".

Figure 5. THE COMMUNICATION PROCESS



Feedback

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# SOCIOECONOMIC AND BIOPHYSICAL ASPECTS IN TECHNOLOGY TRANSFERENCE

by

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The aim of ex-ante technology design is to formulate new technology that: (1) will be viewed by small farmers as attractive improvements over existing methods and hence be used them, and (2) will be of more positive net benefit to the nation than existing small-farmer technology. In Part, the first of these aims is explored in terms of methodological considerations in applying economic analysis to ex-ante technology design and appraisal.

The design of technology demands an interaction, sometimes extended over a period excessively long for the preference of those involved between biologists, economists, and administrators. The economists should participate from the start, the first stage being to identify the target groups (i.e., regions and type of farms). and the resource and institutional constraints the farmers face. In this respect the assumptions about which constraints are to be taken as irremovable become critical. At the second stage this process will allow an initial screening of the potential technologies to be designed in the third interaction stage.

The apparent improvement of aversion to risk by small farmers has been widely stressed. Technologies that satisfy only the criterion of higher net profits may be unacceptable if they involve outlays threatening the subsistence level of small-farmer income. The recognition and quantification of multiple constraints at the farm level then becomes an important phase in the adaptation and validation of new technology.

A variety of problems were also recognized. Chief among them were questions of research priority, the role of policy, the need for institutional change and our inadequate knowledge of the resource and psychological attributes of small farmers. These may be posed as a series of open interrelated questions needing substantial further research:

1. To what extent, from a global and/or national view, should research priority be given specifically to small-farmer technology? Might not general welfare gains to consumers (including small farmers) be more readily achieved by concentrating on technology for commercial agriculture?

2. Even if we were successful in developing new technology for small farmers, is there any guarantee that they would capture any of the benefits of this enhanced productivity? To what extent and under what circumstances are changes in agriculture policy needed within the existing institutional structures themselves before improved technology can be of any significant benefit to small farmers?

3. What generality is there in the ways in which small farmers make decisions? How are they influenced by tradition, culture and socio-economist circumstance, and what do these factors imply for the design of technology?

4. What is the resource base of small farmer? What are the dynamics of their land resources from an ecological point of view?. To what extent are they progressively forced to farm on poorer deteriorating land (as appears to be the case in Latin America), or is their situation more stable (as appears to be the case in Asia)? If small farmers possess limited, poor-quality land resources, does this impose a technical ceiling on the productivity gains that new technology, generated by a given quantity of research, could hope to achieve? Would the total supply of food therefore be smaller if research resources were directed more toward developing small-farmer technologies?



The characteristic small farm is tropical, situated in a less development country (LDC), and operated by a family producing largely for subsistence consumption. Often several crops are grown, multiple cropping and intercropping are widely practiced, and some animals are kept. Excluding the few systems based on monocultures - notably tree crop production - all this adds up to a recognition that each small farm is a complex system. Further, because of the diversity of resource endowments, methods, skills, beliefs, and preferences, small farming in a general or cross-sectional sense is also very complex.

Modeling of small farms or theorizing about them thus confronts some fundamental difficulties. The essence of the small farm cannot be captured adequately in simple soluble models. Many equations must be used to specify satisfactory models of small-farm system, and these may run aground on the Square Law of Computation (Weinberg, 1975). This states that, unless some simplifications can be made, the amount of computations increase at least as fast as the square of the number of equations, and this in turn may deny solution on even the fanciest of computers. However, the nature of individual small-farm systems (specially farmers risk attitudes) does not permit adequate (simplifying) statistical summary in mere averages through appeal to the Law of Large Numbers.

We take "new technology" to be a euphonic expression for a different way of doing things down on the farm". Many so called new technologies consist of changed sowing rates and dates, changed rates and forms of fertilizers, etc., so that there is little intrinsically "new" about them. The case for newness is better when genes or machines foreign to the farm are embodied in the changed technology.

Our purpose here is to emphasize that the name of the game really is evaluation of changes in small-farm technology. But what sort of changes? We find it instructive to categorize new

technologies in three ways: national (quarter-baked), preliminary (half-baked), and developed (full-baked).

National new technologies are, because of their hypothetical nature cheap to invent and bounded only by the imagination of the inventor. Since more fully baked technologies usually have their genesis as notions, attention to generating notional new technologies should not be disregarded. Evaluation of this category can range from intuition to analysis, but analytical appraisal is essentially confined to work on models rather than on real systems. Thus work on formal model may reveal useful insights about a notional change in the physiology of a crop (ensuant perhaps on a notional change in plant architecture), which in turn may aid the orientation of breeding programs and the identification of fruitful avenues of research.

Preliminary new technologies are the unrefined real (as opposed to notional) products of research. Neither testing (perhaps for disease susceptibilities in some target areas) nor evaluation have been adequately completed. Herein lies the main thrust of evaluation work, which is also the thrust of most later discussion here.

Developed new technologies are rare ones that have successfully survived careful and through evaluation and await only successful communication to and adoption by the farming community. Once adopted, they are no longer classifiable as new technologies.

Basically, there are two extreme modes of human problem solving analytical and intuitive. The analytical extreme has explicit, sequential, and recoverable attributes, while the intuitive extreme as implicit, nonsequential, and nonrecoverable attribute. In contrast with the logical, reductionist, and vertical reasoning of analysis, intuitive thinking relies on holistic impressions, impulsive synthesis, and lateral reasoning (Zeleny, 1975).

As our evaluative aspirations advance from simple, well-structured, static, and deterministic problems toward the complex, fuzzy, dynamic, and stochastic problems epitomized in small farming, the best approach changes from logical, reductionist, and quantitative toward perceptive, simultaneous, and qualitative (i.e. toward an intuitive approach)

Generalizing, we can say that an activity is efficient if it produces an output and if production of the same quantity of that output by some other activity (or combination of activities) involves either a reduction in the production of at least one other output or an increase in the use of at least one input (or both). Such a definition may allow some poor technologies to be identified, although it tells nothing about the best mix of activities in the efficient subset. Nevertheless, the relevance of the concept of activity efficiency in the evaluation of technology is obvious. Many new technologies are designed to be output increasing. If a higher output can be achieved without a more than proportionate increase in input levels, the new technology will dominate the old in an activity efficiency sense.

INTUITION. At the other end of the spectrum of modes for evaluating changes in technology rest intuition. With intuition even more transparently so than with analysis, it is most important to know whose is being discussed. The village idiot may be able to apply linear programming methods in tolerable fashion, impulsive synthesis, and the other stuff and substance of his intuition.

Apart from the aforementioned general preconditions for good intuition, there seem to be at least two special addition considerations in the context of evaluating new technologies for small farms. First, there is the obvious necessity to know the existing farm scene intimately. This becomes a more difficult and challenging task to the extent that the evaluator does

not adopt the stance of a social antropologist, does live and work close to existing farming practice, and may not even visit the target community.

Second, and closely related to the first condition, there is the necessity to know the technology very completely. We can easily comprehend a technologist's enthusiasm for getting hopeful innovations "going" among the audience of small farmers as rapidly as possible. This will probably be before even the technologist has been able to discover the full impact of the new methods in the changed farming environment, perhaps under unfortunate and unanticipated conditions. By the diverse nature of small farming, mistake are bound to be made, but a good base of knowledge for intuitive evaluation would minimize the chance of error.

We have sough to show that many analytical and methodological issues in the evaluation of small-farm technologies remains unsolved. Moreover, we have argued that the complexity of small-farm systems implies that these unresolved issues are unlikely to yield readily to attempts to find solutions.

First, farmers who are risk averse in the sense of having high disaster levels will not necessarily a greater inclination to choose a low-mean, low-variance technique. Indeed farmers with high disaster levels who are following the safety principle will tend to "gramble" on the high-mean, high-variance technique (Roumasset, 1971; Masson, 1974).

The second misleading assumption is that risk necessarily increases as we move from traditional to modern techniques, thus increasing the cash intensity of inputs.

Notice that the more cash-intensive technique is less risky than the "traditional" technique except for a very small range of disaster level at the left side of the diagram. Moreover, the cash-intensive technique is only more risky at precisely those disaster level where the risk constraint is not likely to be binding.

## PLANNING OF AGRICULTURAL RESEARCH

by

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### INTRODUCTION

In the developing countries there exists a tendency to interpret the problems of rural poverty as a problem peculiar to agriculture. Whether this judgement is valid or not it is of little consequence in view of the fact that rural poverty does exist and is associated with a broad complex of problems. Precisely because it concerns a complex of problems the solution is not simple. From the point of view of agricultural research, the professional obligation of researchers is to analyse in what manner technology may be transformed into an effective instrument for changing this state of affairs.

The interrelationships of research being developed in different countries, and the ever-increasing variety of problems to be analysed, made evident the advantage of avoiding duplication of effort by ordering innovative activities. Consequently, the planning and programming of innovative activity took on greater institutional importance.

### GENERATION, TRANSFER AND ADOPTION OF TECHNOLOGY

Although it is customary to speak of the process of technology generation, transfer, and adoption, many people think of this process as if it were composed of isolated stages or phases. In fact, rather than stages these are aspects of the process whose differentiation is merely heuristic, emanating from the need to assign functions to the Government services between which, by their nature, resources and direct beneficiaries, it is useful to distinguish. In practice what is aimed at, by this differentiation of a continuous process into phases, is improvement of separate decision taking in research, extension, and input provision, with the objective of raising the technological level of agriculture and, as a consequence,

fostering rural development.

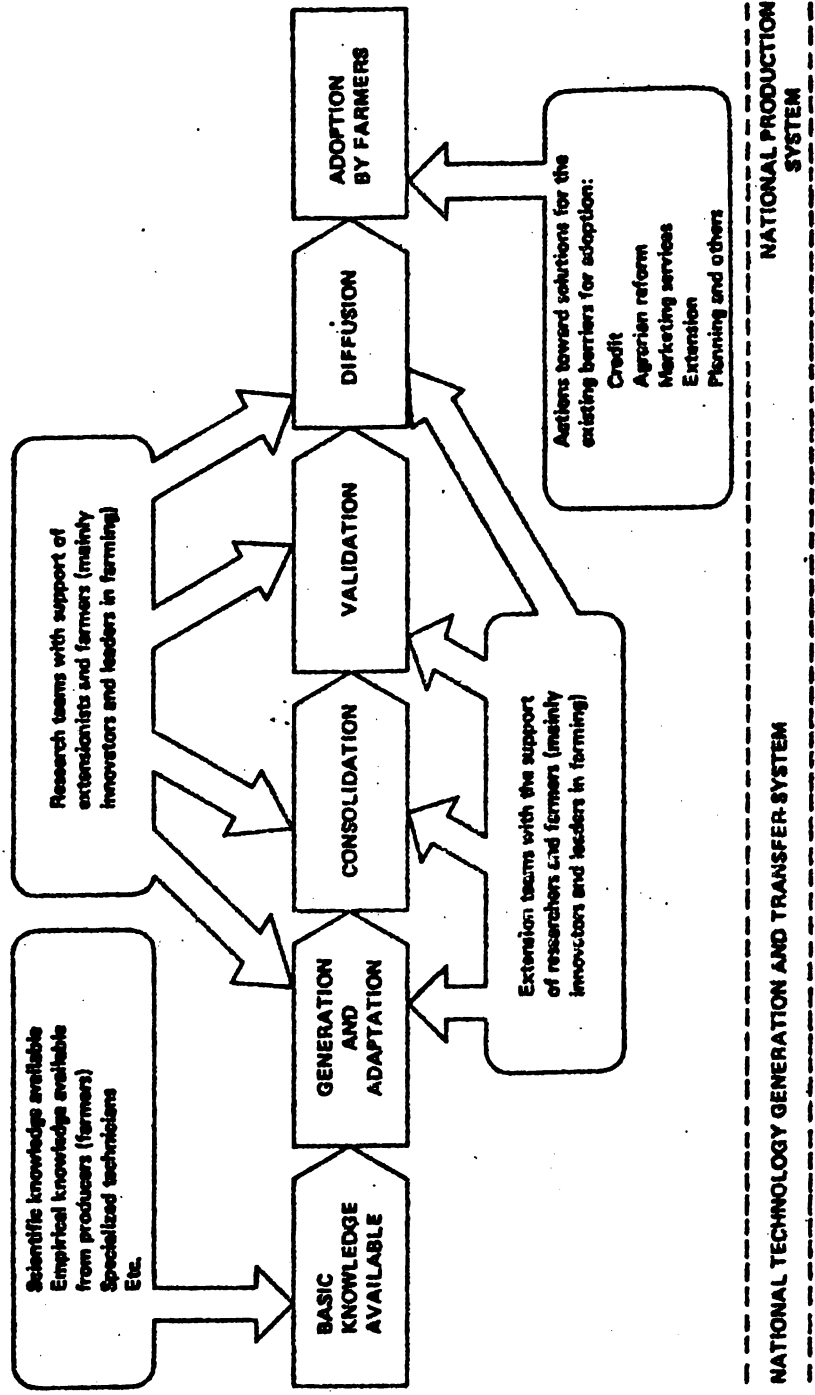
In the schematic representation of the generation and transfer process, the starting point is the potential to obtain technological innovation, and the terminal point is its adoption by farmers. This process occurs as a continuum. In this process (see Fig.1) the stages of technology generation and adaptation, consolidation, validation and diffusion are distinguished.

From the viewpoint of institutional functions, specialisation tends to isolate the organisations devoted to research, extension, etc. emphasizing the differences among these stages, and this is oftentimes the main cause of technological transfer failure. On the other hand, of the existing barriers to adoption and the ways technological innovations could overcome them are not analysed beforehand, adoption could not be expected to occur. Sometimes the barriers are not removable within a reasonable margin of available time and resources. If this is the case, it is useless to produce the technological innovation which will not be adopted anyway. The art of good programming is then to determine - before it is produced - the technology that will have real possibilities of being adopted. In this way, sterile results can be avoided and resources may be assigned instead to the production of that technology that will be effectively utilised.

Very often agricultural research does not go further than the obtaining of a new plant variety or the publication of the results produced for the benefit of a given public.

In a few cases actions are considered to facilitate transfer, but the researcher almost never takes the time to formulate concrete plans to overcome barriers that may hinder permanent adoption. This failure in most cases has its cause in the narrow range of analysis that impedes the recognition of the factors acting on the three aspects mentioned (generation, transfer and adoption) which are equally important. In this paper we shall attempt to illustrate how those factors affecting each one of these aspects in the technological change process have been taken into account.

FIGURE 1. TECHNOLOGY GENERATION AND TRANSFER PROCESS



Source: Adapted from H. Stagno (6)

CURRENT APPROACHES ON PLANNING AND PROGRAMMING OF AGRICULTURAL RESEARCH

Establishing a certain degree of planning in research implies a clear definition of options revolving around two central issues:

- (a) The relationship of the probable results of the alternative research activities to selected development objectives, making it possible to select priority research areas and subjects (objectives) for the research activities. This process will be defined in this paper as planning.
- (b) The organisational mechanisms through which co-ordination of research activities and the most efficient use of resources is obtained. This activity refers to research strategy and methodology and will be called programming.

In general, it can be said that the National Agricultural Research Institutes, created in Latin America during the 1950s and 1960s, as well as the International Centres established in the 1960s, adopted a type of organisation that allowed them to programme their research activities on the assumption that other public sector institutions would do the planning. Research was organised around definite programmes dealing with the quantitatively most important products. (Most of these institutions have some disciplinary type programmes and a partially disciplinary administrative organisation.) However, as a consequence of the weakness of the planning systems that should have assigned research priorities, the Institutes were obliged to perform a task for which they were not appropriately prepared. Planning was developed within the existing structure; that is, in programmes by product-line and without sufficient allocation of human and financial resources.

The mechanism for allocating resources is, in some cases, extremely informal and is in effect, superimposed on a system through which the operative units (centres and institutes) compete for scarce resources. The resultant resource distribution thus reflects regional and social power relationships or the prestige and influence of those responsible for the technical-administrative management of the said units.



A brief analysis of the productive performance in developing countries indicates that successes in increasing agricultural productivity have been limited to specific situations. This contrasts markedly with the generalised increases in productivity that have taken place in the developed countries. It would not be fair to blame agricultural research alone, because, in many cases, sufficient technological knowledge has existed which provided the potential for significant increases in production and productivity. The reasons why these increases have not taken place are related more to barriers to the adoption of new technology stemming from the socio-economic conditions within which production is performed, rather than from the lack of technology. It is also important to note that the organisation of research into independent programmes by product-line and the prevailing forms of organisation at the disciplinary level, have created a series of problems for designing efficient operative mechanisms to select research priorities that are consonant with the real production conditions of numerous heterogeneous agricultural units.

This has resulted in an inefficient use of resources and the failure to implement significant contributions towards the resolution of problems of the agricultural sector in general, and of small-scale farm production in particular.

The following section provides a brief description of the research planning-programming process and presents some of its principal problems, reflecting particular characteristics evidenced in Latin America and the Caribbean.

#### AGRICULTURAL RESEARCH BASED ON PROGRAMS BY PRODUCT-LINE

When agricultural research is programmed having in mind the importance of the value of the products as a means to relate the goals of socio-economic development to the establishment of research priorities, the impression is given that an effective contribution is being made to the achievement of the goals of national programs of product promotion and development, as well as of rural development.

In underdeveloped market economies, however, research planned with this approach fails to take into account that:

- The structural rigidities and the irrelevance of market prices offset usefulness of product value to establish priorities. Frequently in these countries other factors must also be considered, such as the ability of the new technology to generate or replace employment to improve income distribution, or simply the new potential agricultural products whose market value is not yet known.
- Technology is not neutral, which means that it produces important impact according to the social group to which it is related, insofar as it not only increases the productivity of one factor (mainly land), but at the same time it affects the productive structure and the distribution of income.
- Regional dualities in the economy of these countries determine specific needs for regional development with the support of technology adequate to each region.
- The diversity of types of farming enterprises does not permit in all cases the proper use of the factors required by technological innovation.

This approach to research programming generally results in the generation of what is usually called technological packages. In theory, these packages, developed either separately or globally, supply the technical innovations for production in such a manner as to make various combinations possible. This would allow one, also in theory, to put together the pieces of the puzzle of the technological package, adequate to each zone and each group. In practice, however, the model followed is that of temperate zone monoculture on large farms endowed with an abundance of production factors.

Researchers in developing countries have had to confront the fact of non-adoption of new technology when they realise that their results have not reached the farmers. Faced with this situation, they have begun to think of the production systems approach to orient the generation of technical innovations within a more realistic context.

THE CONCEPT OF PRODUCTION SYSTEMS AS AN ALTERNATIVE FOR PLANNING  
AGRICULTURAL RESEARCH

The previous section pointed out the limitations of assigning priorities and resources to research based on programmes by product-line, without taking into account the contextual elements of the agricultural production process.

The growing, although disorderly, perception of these difficulties has awakened the interest and increased the use of agronomic and socio-economic diagnosis of agricultural production as a framework for selecting research priorities. These diagnoses aim to define and identify more precisely the restrictions within which production develops, and the manner in which technological innovations can contribute to the productive process.

This new perception means an expansion of the system to be studied. In the previously described method, the relevant system was a specific product, while, in the method currently being proposed, it is the whole production system, including socio-economic, as well as agro-climatic, elements. Expanding the system under study will necessarily produce more specific results. This does not, however, preclude the possibility that research results derived in one area may be fully or partially transferable to other areas. One can say that, in general, the more generic (broad) the system that is used as a point of reference for the research, the more encompassing will be the results in terms of their use under different production conditions.

It is also important to point out, however, that from the point of view of selecting research priorities, the use of the systems concept applied to the productive unit could result in a series of additional difficulties, especially from the point of view of macroeconomic efficiency in allocating resources. There follows a discussion of the main difficulties.

### Need to set priorities for specific systems

The incorporation of the concept of production systems to substitute product-lines as the basic unit for assigning research priorities requires the eventual use of criteria for setting priorities among the different systems that have been identified. Examples of such criteria include, among others, the size of the target population and importance in terms of geographical coverage. The designation of acceptable criteria would make it possible to select systems to be given priority, and the research could generate appropriate technological alternatives. However, none of these criteria guarantee a socially optimal allocation of resources. Thus, the systems approach would allow for a better micro-level allocation of resources, since it emphasises the internal interrelationships of the production unit within the context of available resources and the limitations of the market in which it operates. However, macro-level problems mentioned in criticism to the traditional approach would remain. Setting priorities and allocating resources by production systems does not necessarily imply a move closer to the social optimum than planning and priority setting based on programmes by product-line.

### Production systems and the role of technological research as elements of agricultural policy

The use of systems concepts begins with a description of existing systems. At any point in time, these are influenced by prevailing historical conditions in terms of the management of certain policies (prices, inputs, etc.) and, as such, are points of reference within a dynamic process. In this respect, the subordination of research priorities to conditions prevailing at a given moment would limit the transforming capability of technology, perhaps even to the point of converting it into a factor which reinforces prevailing structural conditions.

This means that technological development, which is essentially a long-term proposition, may be subordinated to short-term economic situations. In addition, adoption of a systems approach implies acknowledgement that the impact of policy variables is negligible on the behaviour of production units.

Conceptually, these limitations can be reduced by incorporating dynamic elements into the analysis of the production systems that would facilitate choosing higher impact technological alternatives. This would entail, however, significant methodological complexities and informational requirements which would impede its use on the scale necessary to serve as a basis for selecting research priorities.

The concept of production systems and the specific nature of the resulting technology: Some institutional aspects

The systems approach make possible the generation of more specific technology and thus facilitates the transfer process. At the same time, it has significant consequences on the cost of generating technology and on the limitations it imposes on the research entities' range of clients. The move from criteria by product-line to those based on production systems implies that the technology developed will be specific for high priority systems. The move is from technology for corn production at the most specified in terms of general ecological conditions to technology for producing corn, in production system A or B. This implies that, for a given level of resources available for agricultural research, the number of potential users would likely be reduced. Therefore, it is probable that the political support necessary for keeping and adequate flow of resources to the research entities available would be similarly reduced. This is particularly important in cases where funding for research is provided by the State through the national budget, and is thus highly dependent on the political process and the support of different interest groups that make up the agricultural sector.

Also, when the use of the systems concept is accompanied by greater resources for research, increases in the specific nature of the technology may imply a multiplication of logistical problems arising from having to deal with a large number of clients.

Finally, it is necessary to mention that the incorporation of the systems concept with the introduction of the analysis of existing interrelationships between the different components of the productive process, whether this be taken at the farm level or at the level of the subprocesses that occur within it (crop production, animal production, etc.), no doubt makes it possible to perform better technical and economic analysis of the factors and relationships involved. At the same time, however, it suggests the need for differentiated methodologies which are primarily derived from the essentially interdisciplinary nature of investigation. Furthermore, the requirements for information necessary to carry out analysis will be increased in quantity, as well as quality, as compared with those of the product-line approach.

#### A case of programming model

The situation faced in the present case required adapting the system of decision-taking on research programming and also introducing changes in the organisational structure, if institutional effectiveness and efficiency were to be raised. The problem then consisted in passing from a programming system almost entirely product-focused to one centered on production systems. Nevertheless, during the transition period both approaches were to overlap temporarily for two main reasons:

- a. the need to avoid interrupting the already ongoing development of technological packages and, at the same time, the wish to integrate them into production structures specifically defined in terms of type of farmers.

- b. the need to experiment to find out whether the change of focus would really give good results.

It was assumed that the progressive transition between the approaches would result in a better equilibrium between the research activities and the use of resources. Insofar as the experiment is still in process, it is not possible to assert that the change will prove to be beneficial, although this is expected.

The instruments employed are: The National Plan, the Programs, the Projects and the Activities of Research (Fig. 2) in the order they are listed.

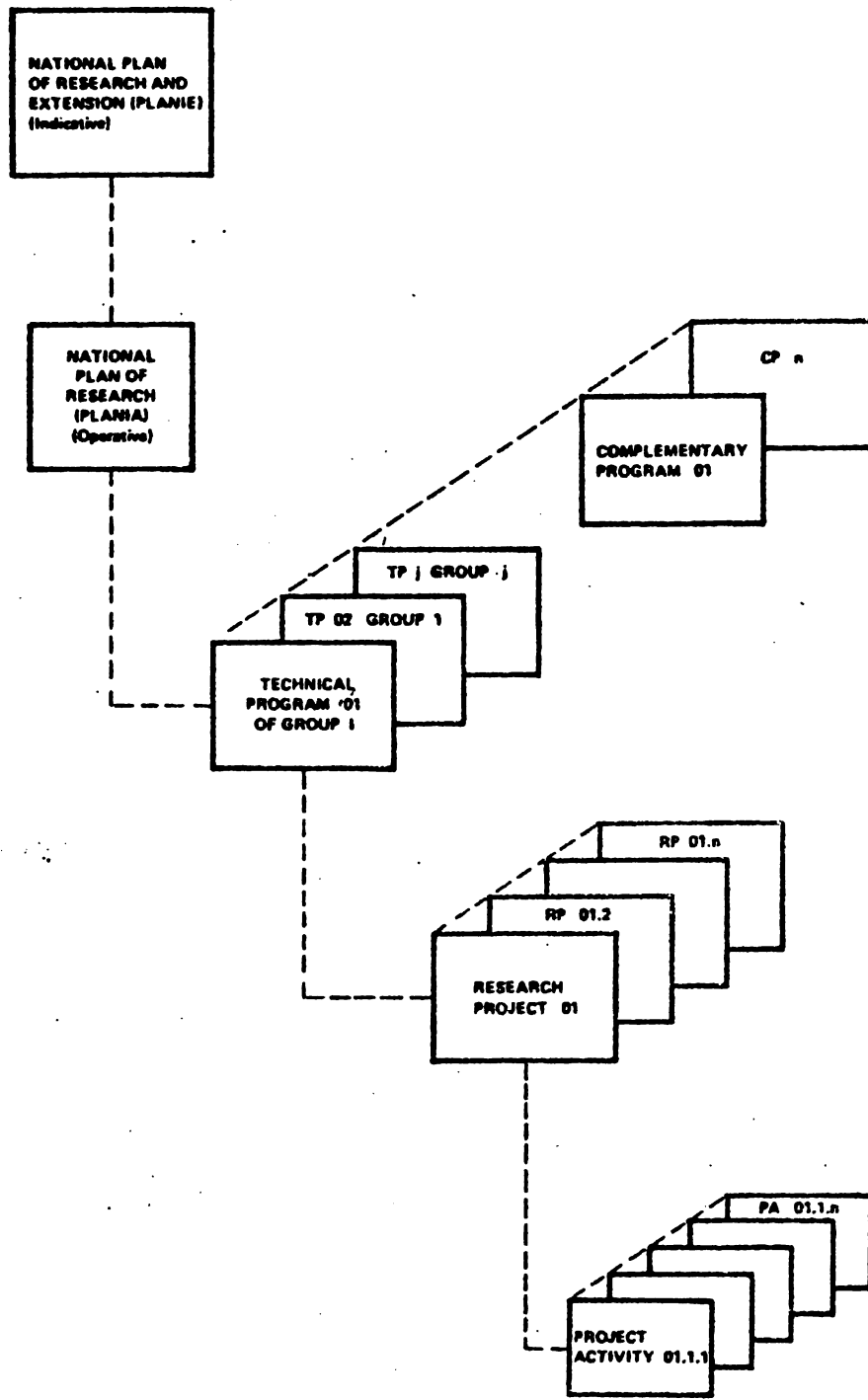
In order to facilitate the allocation of resources, Programs were classified in two types: Technical Programs and Complementary Programs.

The technical Programs include 5 groups: Basic Crops, Animal Production, Intermediate Technology Transfer, Production Systems and Resources for the Future.

The Complementary Programs are aimed at the expansion and conservation of the physical inventory and human resources. They are concerned with the resources that to a certain extent are not totally programmable because they consist largely of fixed expenditure supporting the functioning of the whole research structure.

The above mentioned set of programs helps to distinguish the efforts being made to change the research approach, and at the same time serves the purpose of facilitating the analysis of the allocation of resources to those activities that should be strengthened in accordance with the demand for technological information and available resources. The established mechanism is of course more complex than the description hereby presented, but for the goals of this paper it is less important to enter into details than to describe the general pattern of programming.

**FIGURE 2: INSTRUMENTS OF THE ILLUSTRATED RESEARCH PLANNING SYSTEM**



Source: Adapted from Secretaria de Estado de Agricultura.  
Plan Nacional de Investigaciones Agropecuarias (4)



### The information required for programming

Besides the existing information on technology, two significant groups of informational material have been considered for the purpose of programming:

- a. the situation of agriculture and the rural sector
- b. the country level situation of each product

In order to provide coherence in the formulation of the (indicative) National Plan of Research and Extension, PLANIE, a procedure was developed that would ensure that the plan would serve as a basis for the elaboration of the National Research Plan, PLANIA, specifically directed to the orientation of research and intermediate transfer activities. Its purpose is especially operational, covering a three year period. The different research programs are adjusted according to its directives.

The information supplied by the planning instruments then cover two large areas separately identifiable: general information which orients the basic lines of research and the product-specific information which orients the programming activity.

The general information contained in the National Plan

The following basic information is contained in the various chapters of the plan for the elaboration of the component programs:

#### I. Introductory information

Explanation of the plan's content

Objectives, principal and secondary

Socio-economics and political justification

Relation of the plan to the government strategy for the development of the agricultural sector

## II. Synopsis of the country's agriculture

Description of the main problems

Characteristics of the resources devoted to agriculture

- Soils and eco-systems
- Enterprises and producers
- Production
- Technical inputs: machinery, agrochemicals, irrigation and others
- Agriculture as employment generator: supply and demand of farm labour

Role of agriculture in the satisfaction of national needs

- Satisfaction of the internal demand of goods
- Import substitution, present and potential
- Generation of exportable surplus
- Agriculture as income multiplier

Institutions having to do with agriculture and their operational capacity

## III. Diagnosis of the present situation of research and extension

Resources: human and material; physical and financial (including national and external resources):

## IV. Beneficiaries to the plan

Determination and quantification of beneficiaries

Justification of the exclusion of certain sectors and strategies to include them in the future

## V. Priorities by products and by subjects plus bases for program elaboration

Synthesis of problems

Objectives of the program

Profiles of programs and of their projects

Fig. 3

SEVERAL INFORMATION CONTAINED IN THE NATIONAL PLAN

- I. Introductory Information - Explanation of the plan's content - Objectives principal and secondary  
- Socio-economics and political justification - Relation of the plan to the government strategy for the development of the agricultural sector
- II. Synopsis of the countries - Description of the main problems - Characteristics of the resources devoted to agriculture  
agriculture  
- Soils and eco-systems, - Enterprises and producers, - Production, - Technical inputs: machinery, agrochemicals, irrigation, - Agriculture as employment generator: supply and demand of farm labour, - Role of Agriculture in the satisfaction of national needs, - Satisfaction of the international demand of goods, - Import substitution, present and potential, - Generation of exportable surplus, - Agriculture as income multiplier, - Institutions having to do with agriculture and their operational capacity.
- III. Diagnosis of the present - Resources: human and materials; physical and financial (including national and situation of research and external resources) extension
- IV. Beneficiaries to the plan - Determination and quantification of beneficiaries, - Justification of the exclusion of certain sectors and strategies to include them in the future.
- V. Priorities by products and by subjects - Plus bases for program elaboration, - Synthesis of problems, - Objectives of the program, - Profiles of programs and of their projects.
- VI. Recommendations about - Necessary institutional adjustments for plan implementation.

VI. Recommendations about necessary institutional adjustments for plan implementation

The function of the national plan is to orient the long range actions, subject to periodic updating to secure effectiveness.

The elaboration of programs by product

This paper will not detail the information required to formulate programs by subject (examples: soil management and conservation. bio-climatology) but only for programs by product, inasmuch as these are the ones that present the greatest difficulties in the determination of approach, when making the choice of research priorities. The formulation of programs by product can be made in two stages: the first one consists in gathering information on the principal problems (present and potential) and the second relates to the decision as to problems to be attacked.

First stage: As a basis for the formulation of programs by product, problems were considered from several viewpoints, taking into account the institutional possibilities to solve them. It is important, in our case, to clearly define the institutional responsibility for research and for extension in the process of technological change that is oriented to socio-economic development in the rural environment. This information is contained in the "basic document" of the program and includes the following aspects:

I. Problems related to production

- Areas of present and potential production (known)
- Comparative advantages among the production areas
- Varieties used and recommended
- Seed availability

Crop mechanisation  
Utilisation of labour  
Utilisation of irrigation  
Utilisation of fertilisers  
Pest and disease control

II. Problems related to the production system  
Dispersion of the cultivated area (homogenous zones)  
Types of enterprises

III. Marketing problems

The marketing system at the farmers' level

- Production and organisation scale
- Producers' dependency
- Product marketing norms
- Product losses at the farm level
- Losses due to the centralisation of the marketing system
- Consequences of the lack of State participation

The marketing system at the intermediary level

- Degree of concentration of the economic activity
- Problems of the marketing infrastructure

IV. Socio-economic importance of the product

Aggregate value

Contribution to the balance of balance of payment  
(export, import substitution)

Direct and indirect generation of employment

Quantity of production units

Input demand

Second stage: In regard to the decision on what research to undertake, an analysis is made of the problems on the basis of the information contained in the basic document, with consideration given to two principal aspects:

Whether the problem is related to productivity, to production or to the farmers' income

What institution has the responsibility and realistic possibility to solve the problem

The first analysis helps to recognise the factors causing the problem as well as of the means available to solve it; it allows a comparison of the alternative solutions from various angles (national, regional, type of enterprise, etc.) and finally, it permits the identification of those aspects in which the research will produce effective results. This analysis facilitates the evaluation and decision as to which institution has the greatest possibilities to solve the problem. In this way it will be possible to identify problems that can be solved by research, by extension, by input provision, by research extension with other agencies such as credit, agrarian reform, etc., and by organisations not related to research and extension. This will make it possible to decide whether the "barriers" to the adoption of technical innovation can be effectively overcome and even more importantly, whom the new technology will benefit.

The next step of program formulation consists in the establishment of principal profiles for the projects. Project elaboration has a more technical context, adjusted to the socio-political framework supplied by the program.

Evaluation and decisions as to the technological segment (ought the "package" to be elaborated?) rest now on the interdisciplinary teams which compare the possible innovations among themselves and adopt the decision that would have greatest probability of success in the shortest period, given the available resources.

Fig. 4

INFORMATION CONTAINED IN THE BASIC DOCUMENT OF A PROGRAM

- I. Problems related to production
  - Areas of present and potential production (known), - Comparative advantages among the production areas, - Varieties used and recommended, - Seed availability, - Crop mechanisation, - Utilisation of labour, - Utilisation of irrigation, - Utilisation of fertilizers, - Pest and disease control.
- II. Problems related to the production system
  - Dispersion of the cultivated area (homogeneous zones), - Types of enterprises
- III. Marketing problems
  - The Marketing system at the farmer's level: - production and organization scale, - producer's dependency, - product marketing norms, - product losses at the farm level, - losses due to the centralisation of the marketing system, - consequences of the lack of state participation.
  - The Marketing system at the intermediary level: - degree of concentration of the economic activity, - problems of the marketing infrastructure.
- IV. Socio-economic importance of the product
  - Aggregate value, - contribution to the balance of payment (export, import substitution), - Direct and indirect generation of employment, - Quantity of production units, - Input demand.

## CONCLUSIONS

In general, the approach by product-line is consistent with the scientific tradition and represents a tested and effective approach for certain types of agriculture, especially monocultures. The production systems approach seems best suited for situations where the characteristics of the production unit, the quantity and quality of available resources and adverse ecological conditions constitute primary limitations to the adoption of new technologies. Consequently, the consideration of the production unit's relationships with its environment - and the interrelationships between the different production alternatives within the same unit - are significant elements for defining and developing new technologies.

There is no doubt that maintenance of the tremendous transforming capability of science should be a prime objective of the process of organising a research infrastructure. Nevertheless, given the increasing problems of poverty and the world's need for food, research efforts will, in large measure, be judged by their capability to provide concrete answers to problems that confront broad sectors of farmers. This implies the need to develop technological alternatives adapted to production conditions generally characterised by severe ecological and economic restrictions and a large number of enterprises per production unit. The traditional approach no doubt complies with the needs of first objective; the approach by production systems represents a valid alternative for the second. It appears that the path to maximum benefits does not lie in selecting one approach over the other as alternatives, but rather in their complementary use within the research infrastructure.

Two alternatives appear reasonable at this level of conceptual and methodological development, in reference to the possible integration of the production systems and product-line approaches.



The choice of either alternative, and the lines along which the research network would subsequently be organised, will ultimately depend upon the institutional realities that confront each particular research centre and on the ability of scientists and research policy makers to reach a consensus on the issue of specialisation and division of activities.

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# PROGRAMMING AND EVALUATION IN THE EXTENSION SERVICE

by

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## INTRODUCTION

Just as there must exist a national sectional plan for agriculture and a plan for research and technological generation, so the extension service must plan and programme its activities if it is to function efficiently.

The more usual time lapse for planning may be annually but it is quite possible that other lapses may be more appropriate. For example where there are specific production projects of relatively short duration these may be the periods chosen be these three or six months or over a year. Whatever the time span chosen, however there should be plans established to serve as guidelines for the projects and activities to be carried out. Planning is important because it permits us to rationalize our work, seeking the most scientifically valid, economical and effective way of attaining our goals.

## THE PLANNING PROCESS

As has been mentioned in a previous lecture, planning can be considered as a process constituted by a series of ordered steps. The most common steps are shown in figure 1.

The process is continual and reiterative, the evaluation serving as a new diagnosis of the situation, triggering off a new round of selection of goals, programmes etc.

Similarly, the process is "nested" functioning at different levels as in a spiral, in terms of levels of implementation, from the more general and geographically embracing to the more specific and localised. This is shown in figure 2.

In this way we can see that the national plan, involves each time, more specific plans at the level of different administrative divisions (region, area, locality).

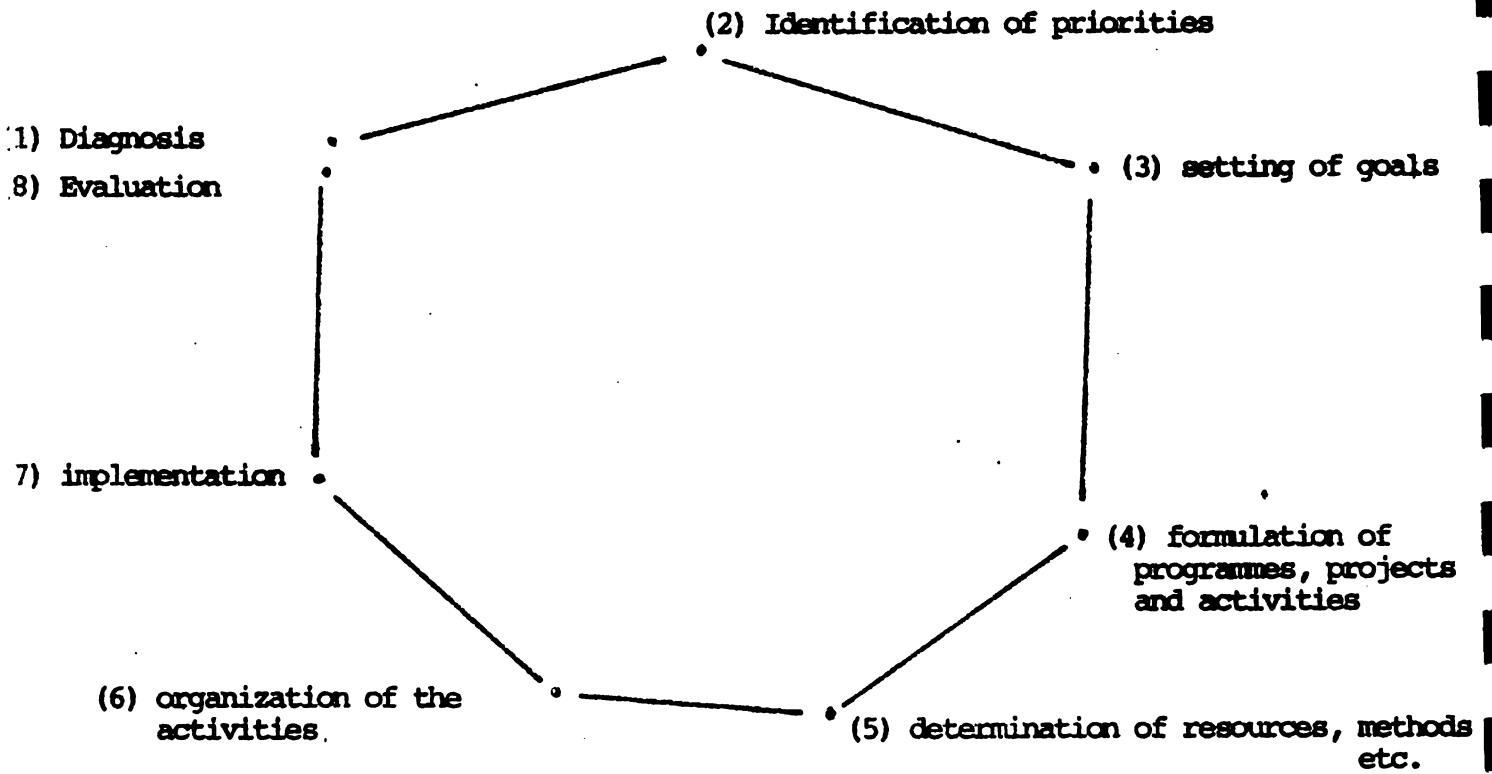


Figure 1. STEPS IN THE PLANNING PROCESS

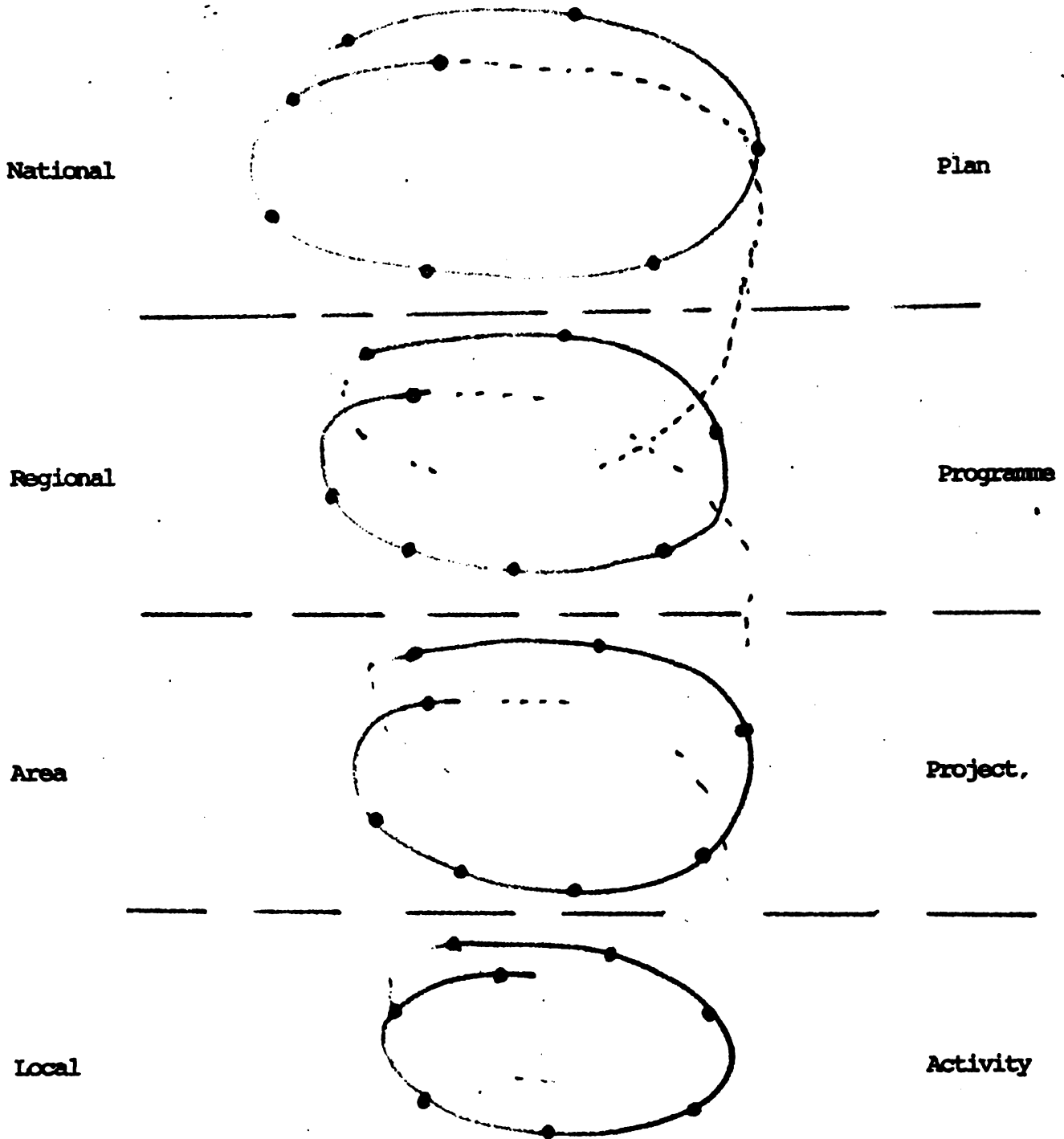


Figure 2. NESTING OF PLANNING, PROGRAMMING, ETC.  
BY GENERALITY

Similarly a plan is broken down into programmes, projects, and activities, all of which contain the same steps.

The extension service if it is to be effective, must have its plans, programmes and projects. At the national level there should be a general plan with its priorities and goals, while at the level of regions, areas and local communities there should be clearly defined programmes, projects and activities. We shall now consider this process in terms of extension. Figure 3 gives a more detailed model of the process, which we shall examine step by step.

#### ELEMENTS OF THE PROGRAMMING AND EVALUATION PROCESS

##### 1) DIAGNOSIS OF THE SITUATION

The diagnosis of the situation should be based on a systematic study of the needs of the farmer, and the national system, as a basis for establishing priorities.

Generally the needs of the national system will be expressed in the national plan and will define the national priorities regarding types of crops, quantities and other criteria. These should be considered as basic aspects into the planning model. However these in themselves are not enough. The production process is carried out in concrete situations which have opportunities, resources and constraints. In order for this process to be effective it has to take into account these local conditions which as we have seen can be:

physical [infrastructure, soil quality, water availability, etc.]

economic [resources at disposition of the farmers, local production costs, marketing and supply conditions etc.]

social-cultural-psychological [knowledge, attitudes, forms of organization, relationships with the system and among members, levels of technology, comprehension of farming etc.]



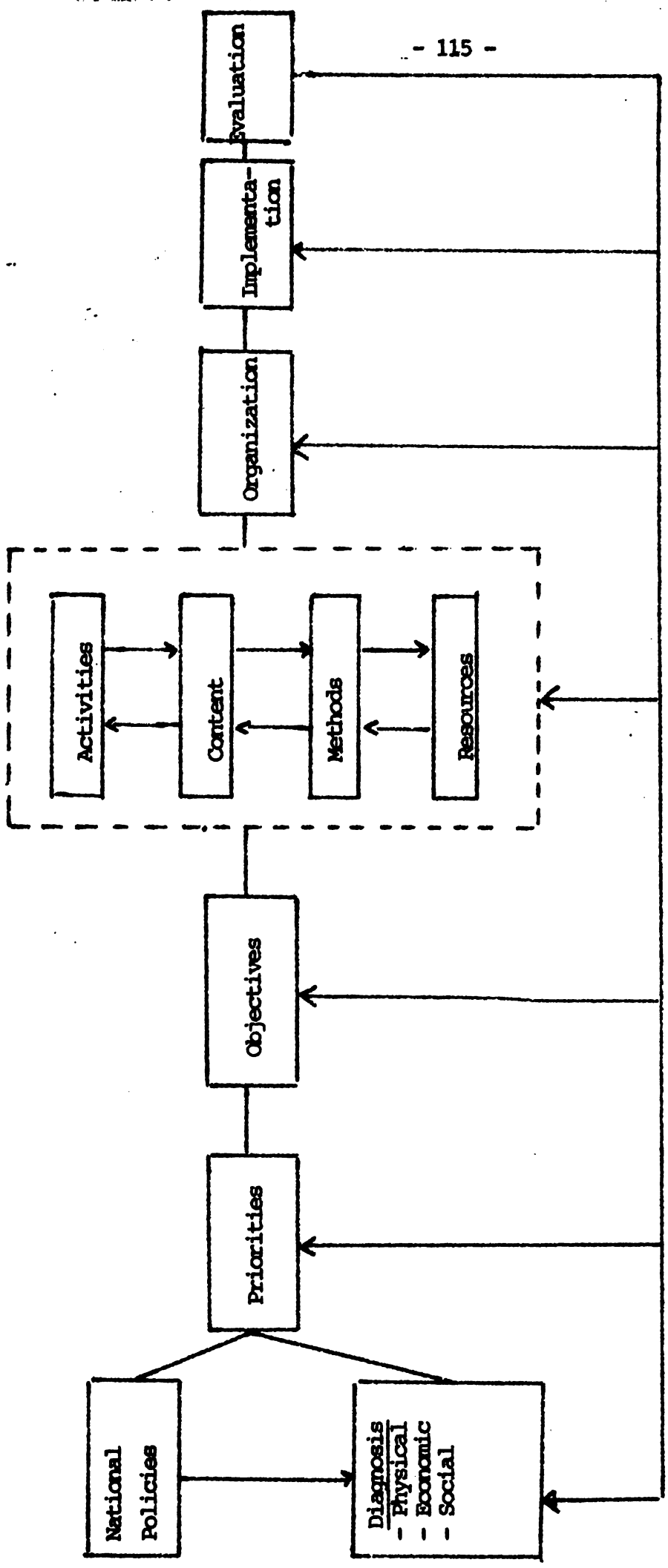


Figure 3. PROCESS OF PROGRAMMING AND EVALUATION

\*The diagnosis has to take into account all these aspects with a view to identifying the opportunities, resources and constraints that exist. These then become both conditioners and content areas of the programme.

The diagnosis usually requires a systematic study of the area in question. This may make use of many techniques and information sources.

- Previous reports, surveys, statistics, censuses etc.
- Studies carried out with and of the farmers. [surveys, study meetings, visits]
- Use of local key informants [religious, educational, administrative leaders, informal farmer leaders, etc.]
- Organizing the farmers, thus facilitating their inputs into the diagnosis process.

The degree of rigour of the study will vary from informal information to scientifically gathered data. The latter is usually costly to obtain, both in resources and time.

## 2. FORMULATION OF PRIORITIES

The extension service then has to make a list of its programme priorities. These will be based on:

- the needs of the country
- the needs of the particular area and farmers
- the constraints that can be overcome by extension education programs
- the resources that are available
- its theory of reality, value system and philosophy\*
- its own professional and administrative goals as a service

\* This point refers to the theory that extension has as to the causes and effects of particular phenomena. For example if extension believes that poor farming is essentially a result of low educational levels, the extension service will dedicate resources to training and educating farmers.

If it believes that it is a consequence of technical errors, then it may emphasise technical assistance. The value system of the service and its philosophy will also help to determine what it considers to be priorities for its programme.

### 3. FORMULATION OF OBJECTIVES

Objectives play a fundamental role in any programming activity as they signal the results and outcomes which the activity is to attain. The objectives should reflect the priorities that have been established and should show the relationship between the different activities that must be undertaken to achieve them.

Often we talk about objectives as if they were the final or general outcome of the programme. However every programme should consist of both specific and instrumental objectives as well as final and general ones. We often refer to the more specific and instrumental objectives as goals.

It is possible to consider objectives as forming a hierarchy or ladder, whereby the more specific objectives are subjected to the more general ones and can be considered as means to their attainment. This is shown in figure 4.

- \* In this case each of the lower objectives serves as a means towards attaining the immediately superior one.
- \* Each objective refers to activities which must be carried out if the higher more general objectives are to be attained.

In any extension programme there may be several priority areas that have to be dealt with, some of them successively whilst others can be carried out simultaneously. These different areas may be for example:

Improving Technology; Organizing the farmers; literacy and basic educational programmes; coordinating marketing and credit.

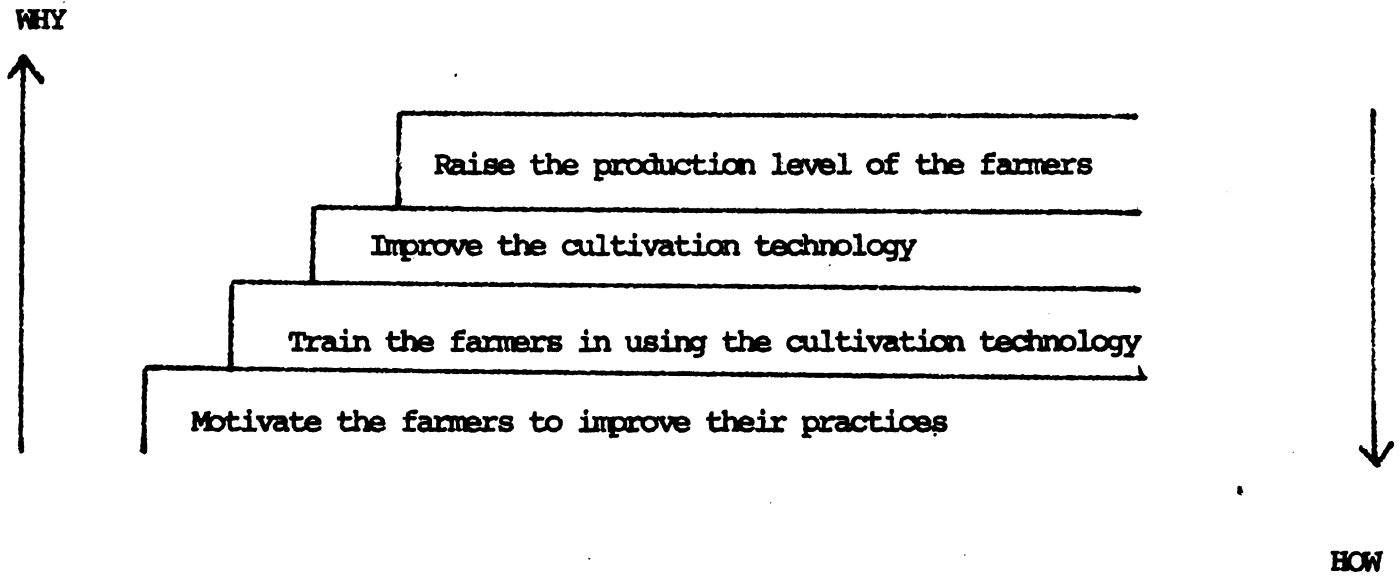


Figure 4. A HIERARCHY OF OBJECTIVES

Each of the areas should have their own planning and programming process, which should where possible be integrated.

Similarly, where there exists a cultural heterogeneity among the farmers similar activities may require different treatment in order to be successful, thus requiring a separate programming.

### STATING OPERATIONAL OBJECTIVES

In order for objectives to be useful programme tools, they should be stated operationally: that is in terms of the specific results or outcomes that are desired. These results may be in terms of: production output, behaviours, knowledge, etc.

For example: We desire a production of 4000 Kg per hectare minimum among 200 farmers.

We desire that the farmer is able to apply insecticide in the right dosis (specify) according to the recommended procedure (specify).

That the farmer knows and understands the importance of fertilizer for the soil and its effects on the growth of the plants.

By stating our objectives in these terms:

- we specify the results we want to attain.
- we specify the kinds of activities we must carry out in order to achieve them.
- we can evaluate if the programme has been successful or not

We can specify these objectives even further, by establishing the minimum standards that we wish to attain, detailing the performance outcomes, and defining the beneficiaries and the number or percentage to be reached.

To be effective objectives should be:

- Realistic [attainable under the circumstances and with the programme resources available]
- Measurable [so that we can evaluate their attainment or not]
- Operational [specifying outcomes, minimum standards, beneficiaries, etc.]
- Developed with the participation of those who will both implement the programme and benefit from it.

#### 4. Defining the Programme:

Basically the programme is a coordinated set of activities, each of which must be effectively performed for the programme to be implemented.

As far as it is possible these activities should be identified and specified previously, defining at the same time the content of each activity, the methodology or technique to be used in implementing it, and the resources necessary for its implementation. Figure 5 shows a scheme for defining and planning a programme.

Each programme will therefore consist of a listing of activities, ordered sequentially, with their different requirements in terms of inputs.

This listing is however tentative and will probably be modified as a result of implementation and evaluation.

#### 5. ORGANIZATION

An extension programme to be effective must be organized. This organization must be internal in the programme itself, with the assignment of appropriate human, economic and technical resources, the coordination of the activities in space and time, and the determining of responsibilities among the personnel.

ACTIVITIES	CONTENT	METHOD	RESOURCES
<p>1) Motivating the farmer to participate in the programme of rice improvement</p>	<p>Discussion of the farmer's needs. Analysis of possible solutions. Interest arousal by showing examples locally and in other areas.</p>	<ul style="list-style-type: none"> <li>- Study group of 8 farmers</li> <li>- Discussion</li> <li>- Use of slides of new techniques and results in other areas</li> <li>- visit to plots locally.</li> </ul>	<ul style="list-style-type: none"> <li>- Slide projector</li> <li>- Slides on rice planting and it's results.</li> </ul>

Figure 5. SCHEME FOR DEFINING AND PLANNING A PROGRAMME

It must also be external, establishing systematic linkages with the farmer, and other agencies (research, credit, marketing) and coordinating the activities which arise.

The internal coordination requires that there exist adequate procedures, job definitions, communication mechanisms, shared goals, norms and values, and technical skills so that the extension workers can function as a team and effectively perform their roles.

Because the extension worker must often work alone, with little direct supervision it is necessary that there exist mechanisms which permit the evaluation of his performance and ensure his functioning as a self-directed responsible person. Among these we can mention.

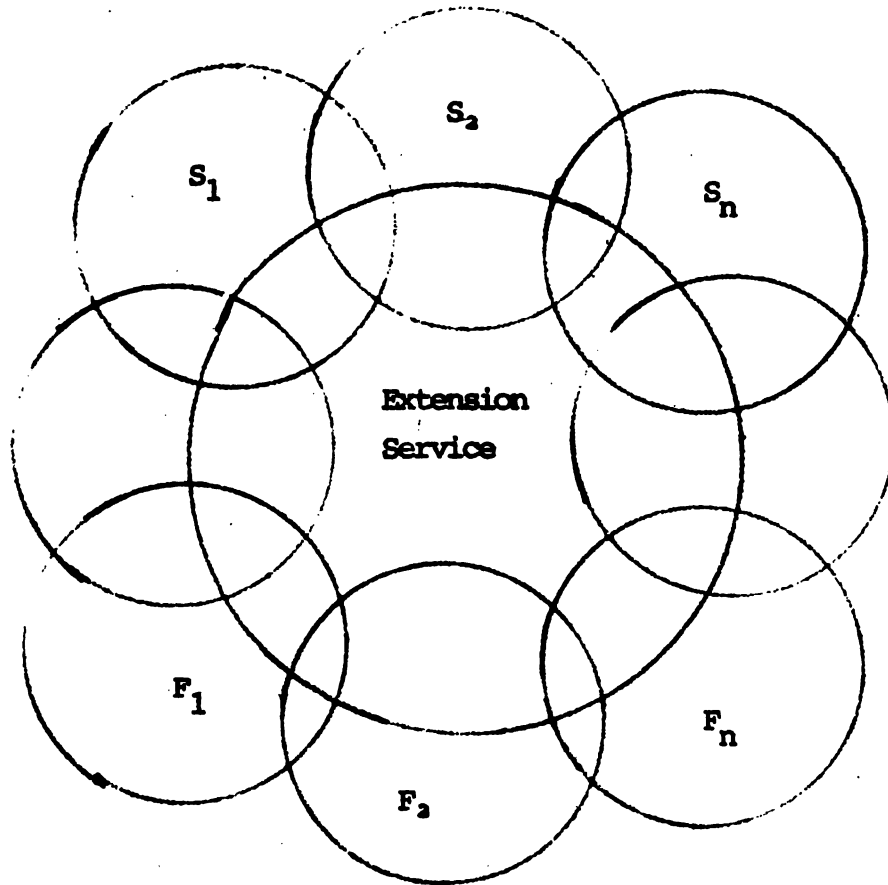
- adequate selection based on operating criteria
- induction training with emphasis on philosophy, goals, knowledge and communication skills required in the extension service.
- Planning by objectives, permitting the evaluation of the agents' work by the results achieved. These objectives should be fixed by the agent together with his supervisor.
- regular meetings of the extension personnel involved in the different programmes in order to plant problems seek solutions evaluate progress, acquire *new* insights and knowledge etc.
- systematic supervision and advisory support of the agent by his supervisor.
- regular systematic reports, based on objective factual information.
- participation of personnel in planning, implementation and evaluation of the programmes.

At the external level the extension agency has to set up formal mechanisms of communication, control and coordination with the other systems it works with (other agencies or services of the agricultural sector, and the farmers).

Among these mechanisms we can suggest:

- local committees of farmers
- area committees with representatives of the different agencies and the farmers
- liaison personnel with the agencies.





$F_1 \dots F_n$  = Farmers committees or organizations

$S_1 \dots S_n$  = Service agencies

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Figure 5. SYSTEMATIC LINKAGE OF EXTENSION WITH OTHER SERVICES AND WITH THE FARMERS

In the case of the farmers, the extension service may first of all have to promote their participation through programmes oriented to motivate, organize and train them, so that they can participate actively. The agents should try and involve the farmers as fully as possible in the planning, implementation and evaluation of the activities.

The external organization will therefore require that the extension service is located spatially within its work area, linking itself with each of the locality systems involved. At the area and regional level it will be linked to the other service agencies of the sector.

Thus the extension service becomes a link between the farmers and the specialized service agencies.

## 6. EVALUATION

Evaluation in its general sense means "judging the value or worth of something". In the programming process it means applying a value judgement as to the success or failure of an activity, project or programme.

Normally organizations tend to evaluate a programme when it has finished, to see whether it has achieved its purposes or not. That however is too late, because once finished it is impossible to change or improve the activity.

Evaluation if it is to serve a function of allowing programme improvement should therefore be a permanent and continuing process which allows readjustments and correction of different activities.

### WHAT CAN WE EVALUATE ?

We can evaluate outcomes, but we can also evaluate inputs, processes and the context in which our programme is situated.

We can also evaluate programmes, projects and activities. Rather than wait until our programmes have finished we can evaluate the effectiveness of each of the activities we perform. In this way we are continually checking and correcting our programmes.

In order to carry out evaluation processes in our programme it is necessary to:

- systematize and control our activities.
- specify operationally the objectives of each activity, with the minimum standards desired.
- specify our evaluation criteria and indicators.
- determine the type of information we require and the means of collecting it.
- set up control and data collecting systems.

Figure 6 presents a schematic model of the evaluation process.

In this process, we begin by operationally defining the objective.

This objective requires a criteria for success such as:

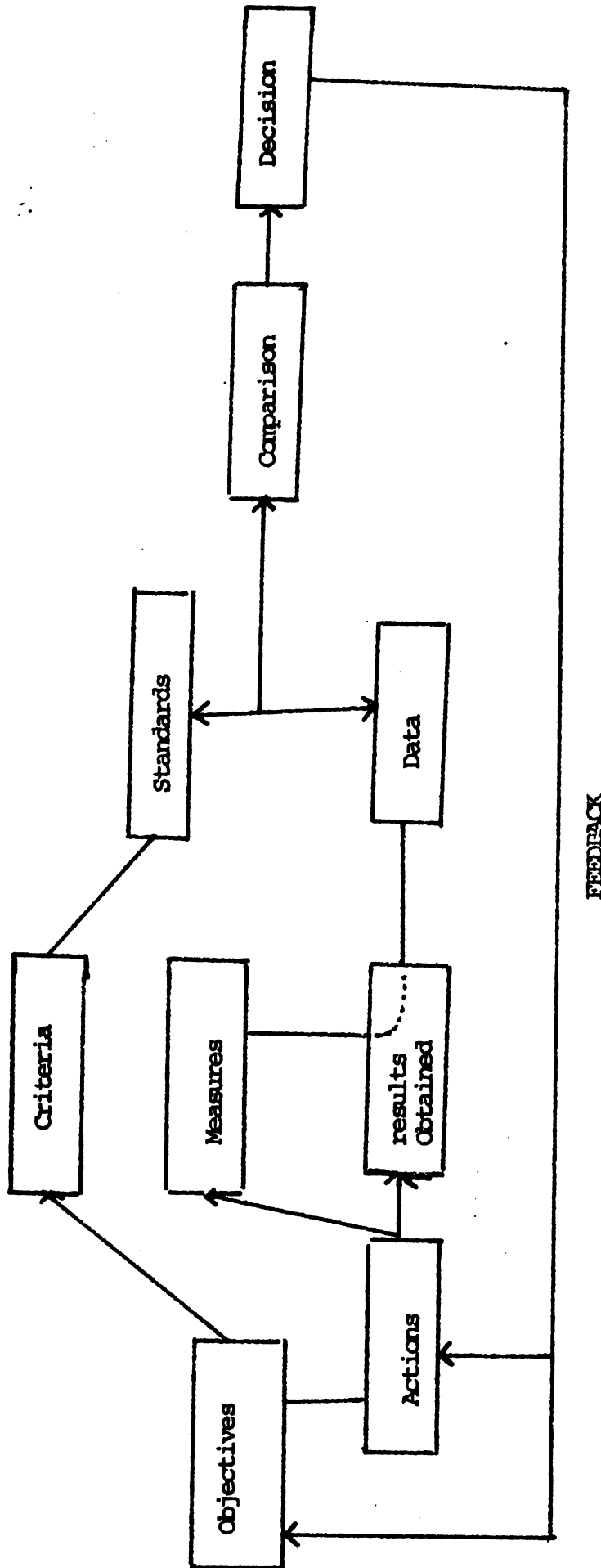
" 200 farmers will produce a minimum of 4,000 kg/ha in rice". This criteria in turn becomes the standard against which we will measure the production outcomes of the programme.

In order to measure the outcomes of our activity we must set up a mechanism for measuring the results, which will provide us with the information or data, which we will evaluate.

The evaluation process is the comparison between the data of actual production, against the standard of desired production. This comparison will tell us whether we have achieved our objective or not.

Whatever the result we will make a decision which will permit us to modify, continue or eliminate our programme.

The criteria of evaluation can be both quantitative, and qualitative. We should however try and establish indicators for what apparently is a purely qualitative and difficult to-measure behaviour for example: farmer's attitudes can be measured in terms of their behaviour, their opinions, or their response to a theoretical situation: "What would you feel if .....?".



This model is taken from  
Prof. R. Bruce, Cornell University

Figure 6. MODEL OF THE EVALUATION PROCESS

METHODS OF EVALUATION:

- 1) Day to day observations: using check-tests or other prearranged schedules.
- 2) Use of systematic data collection on activities that can be measured quantitatively.
- 3) Structured evaluation activity application of tests, use of demonstration plots, etc.
- 4) Scientifically structured research.

Effective evaluation is only possible if we systematically and consciously plan each one of our field activities, and we are aware of the objectives we pursue.

This requires that we make the effort to define the criteria, standards and indicators of performance and have the means of measuring them.



THE IMPORTANCE OF THE AGRICULTURAL BANK IN THE  
DEVELOPMENT OF THE AGRICULTURAL SECTOR IN SURINAME

by

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Agricultural Bank  
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Introduction

If we should examine all that the Agricultural Credit Bank (ACB) has done in favour of developing the agricultural sector in Suriname, during all the 13 years of its existence, we should be able to write a very thick book on this subject.

Seeing the objective of this training-course and the short available time (to handle the subject) I'll do my best however, to give you a clear picture of the importance of the ACB in the development of the agricultural sector. Up to now the Bank finances the agricultural sector in the main with means from development aid by the medium of the Government of Suriname.

For this I shall focus on the period 1979 up to and including 1984. I have taken 1979 as a basic year because of the fact that just in that period the financing from development aid funds via the ACB began to get more spurt.

I. Establishing of the Bank

The Bank was established on April 19, 1972. It is an Ltd-Company fully possessed by the Government of Suriname since 1977. The Bank has been established with the aim to help provide a substantial contribution to the development of the agricultural sector in Suriname.

Thus the function of the Bank is primary pointed at financing the farmers. In the years before establishment of the Bank, this group of national producers, had none or little entrance to the existing commercial banks in Suriname. Infact nowadays we have the same situation, in the sense that especially the small farmers do not have financing facilities on soft terms at the commercial banks.

Formerly the farmers got their agricultural credits with the help of the Government. In the fifties the Government has constructed many large polders in the coastal area of Suriname. This was possible with means of development aid from Holland. We can mention e.g. the large polders in the district Nickerie such as: Nanni-polder, Groot Henar, Prins Bernhardpolder and the rice-polder of Wageningen.

At that time the Government had reserved a special fund from the development aid to submit credits to farmers who had established their farms in these polders. This was done via the existing Government. Financial Institution named the Folks Credit Bank. Besides the possibility of having credit from the commercial banks on hard terms, the farmers could than have credits from the Folks Credit Bank on relatively short terms, e.g. they need not to have more securities than only the rented plot. The special fund at the Folks Credit Bank was named "the Agricultural & Fishery Credit Fund" and it was created in 1957. The farmers were financed in the form of supervised credit. Out of development aid an amount of Sf. 2,2 mln. (2 point 2 million Suriname guilders) was disposable to the Agricultural and Fishery Credit Fund. In 1964 and following years the Government executed more large agricultural projects. This was done in accordance with the first 5-year plan because of the development aid. Gradually more special financing was needed in favour of the agricultural sector. So the plan was conceived to establish a special financial institution for agricultural production activities. It was a rather long procedure, but at last, on April 19, 1972 this idea was a fact: the Agricultural Credit Bank was established, on basis of a Government ordinance (dated 1971 n° 93).

## II Investment Policy

In conformity with its Statutes the aim of the ACB is:

To execute the business in the widest sense of the word, in particular to promote the development of agriculture, fisheries and forestry in Suriname.

This aim is two jointed:

- Primary a development function
- Secondary a commercial banking function



The development function of the Bank finds expression in its investment policy. This is being attained by the following aspects:

A. Making the Bank more accessible to especially the small farmer in order to help him overcome his fear for visiting the Bank. For this the Bank has established branches in several districts, such as Nickerie (center New Nickerie), Coronie (center Totness), Suriname (Lelydorp and Kwatta), Saramacca (Groningen) and Commewijne (Taman-redjo). So the Bank has, apart from its headoffice in Parataribo, six other divisions in the country.

The policy is: Bring the Bank to the farmers in the form of simple; not imposing ones.

B. Financing on soft terms, such as:

- Relatively low interest rates:

small farmers 8%

medium sized and large farms: 8 - 9% for agricultural credits.

- Loans without sufficient securities: many farmers have rented plots from the Government; they also do not have own deposits.

- Grace period for reimbursement: 3 months, 6 months, one year dependant on misfortune in production activities.

- Assisting the farmer in making his loan-request with budget, for which he would have pay elsewhere.

C. In many cases financing is given in the form of "supervised credit".

- The credit-advisors of the Bank regularly pay visits to farms and give advice in the field. Further financing depends on progress in activities.

- In general they give instructions, in coordination with experts of the Department of Agriculture.

D. Quick decisions for submitting of loans:

- That's why the Bank doesn't have a big Board of Directors (5 or 7 persons).

- The acting Director himself has wider competence to submit loans than colleagues in other financing companies.

- Together with the Delegate Member of the Board of Directors the competence reaches SF. 50,000.

- E. Stimulating cooperation among farmers:
- Collective purchasing of means of production: machines and other farm implements, fertilizer, sowing-seed etc.
  - Collective selling of farm-pro-uce, namely helping the farmer to sell paddy.

- F. Financing the follow-up of agricultural projects initiated by the Government; e.g. Financing with means from I.D.F., is based on a financing-program of projects initiated by the Department of Agriculture in several regions.
- Financing of second infra-structure
  - Financing of pivotal production activities and the out-growers.

- G. Participation in share-capital of other companies with agricultural aims.

One of the policy-principles of the Suriname Government is to stimulate all companies which try to increase production especially for export in order to gain hard currencies. The Government also stimulates the establishment of companies which produce for import-substitution. In those cases, if it is needed, the Agricultural Bank participates in the share-capital of such companies, especially operating in the agricultural sector. (An example is the participation of 150,000 Surinam guilders in the Surinam Cardboard Factory).

### III Financial Means

The Bank operates with different financial means acquired under different terms. The Bank has:

A. Means on soft-term basis

- Netherlands Aid Funds (so called CONS)

In 1983 this fund has been ended.

From 1977 up to and including 1982 the Bank has received by installments in total Sf. 31,6 million on behalf of financing the agricultural sector.

Terms: grace-period of 3 years  
interestrate of 4% per year  
for each installment reimbursement in 5 years  
At the moment the balance of these loans is Sf. 16,4 million.

- Aid from the European Development Fund (EDF)

Up to now the Bank has received 2 creditlines from the EDF:  
First creditline in 1981: Sf. 4,2 million  
Second creditline in 1984: A total amount of about Sf. 12 million  
of which Sf. 2,6 million has already been received.

As I have already remarked both EDF-creditlines have been approved  
on basis of a fixed financial programme for the agricultural sector.  
Furthermore this fund can only be used for small and medium sized  
farmers.

Terms: grace-period of 1 year  
interestrate of 1% per year  
for each installment reimbursement in 30 years

- The third group of financial means on soft-term basis is formed by  
the loans from the Government.

These loans with an interest rate of 4% per year are approved on one  
year-basis. At the moment the balance of these loans is Sf. 5,9 million.

The total balance of loans on soft term basis is about Sf. 44,3 million.  
All the just mentioned loans have to be invested in favour of the agricultural  
sector, especially the small-farms.

Because of the facts that the Bank has to repay parts of these loans in  
the agreed space of time, the Bank runs the risk not having enough cheap  
money to provide the small-farmers in those poin of times. Therefore the  
Bank tries to generate own finances by means of revolving three funds in  
times it needs not to repay them. By doing so it is trying to provide as  
much as possible for the rapid growing financial needs of small farmers.

B. Means on hard-term basis

The second group of financial means the Bank operates with are the means on hard terms.

These are the savings and the time-deposits, received from the public. The Bank is bound to pass these means to clients, who can manage to pay the higher interest-rate. In this group you also find large farmers.

The principle of the Bank is:

Financial means received on soft terms are being used to invest in development projects where as received means on hard terms are being invested commercially.

#### IV Agrarian credits and the role of the agricultural Bank

In the introduction I have mentioned that we are going to give an outline of the agrarian credits during the period 1979 up to and including 1984. We have taken the year 1979 as a basis, because of the fact that just in that point of time financing from development aid funds via the Bank to agricultural production began to get more spurt.

Table I gives an outline of the number of submitted loans during the period 1979/84 as well as the total amount during that period. The average amount per loan is Sf. 6,798.-. During that period there were 10.348 loans in total, especially in favour of growing rice. Because of financing the agricultural sector, with means from the Agricultural Bank, the total production area in the different sub-sectors has been enlarged and improved. Thus the production area of rice has been considerably enlarged and improved.

As you know rice is the most important food-stuff of our country. It is said that rice is more nourishing than e.g. potatoes.

In the period 1978/79 when the Agricultural Bank disposed important amounts from development aid in favour of the agricultural sector, especially to grow rice, this sub-sector, such as Horticulture, Livestock, Mixed Enterprises, and Fisheries has also benefit by the development aid via the Agricultural Bank.

According to rice, as this is practically the most important sub-sector, we can notice as follows.

Out of the total amount in the table, namely Sf. 136,6 million, the Bank has financed only rice-growing for an amount of Sf. 65 million. This has been used for bringing the land under cultivation, establishing of enterprise, equipment, housing and other buildings et-. With this finance the farmers have been able to put ± 20,000 ha. new rice-area into production.

We may say that financing the rice-sector by the Agricultural Bank, in the period 1979/84, has created employment for ± 2,156 persons.

Among this: full-time employment for 1,464 persons and seasonal employment for 701 persons.

May I invite you to look at the table N° I.

TABLE N° 1: Agricultural Bank, Suriname. Financial Scheme.  
Suriname Guilders, 1979-1984

YEAR	NUMBER OF LOANS	TOTAL AMOUNTS
1979	4.538	Sf. 24,552,324
1980	4.023	" 23,157,171
1981	3.528	" 13,821,128
1982	3.027	" 20,132,945
1983	2.306	" 20,873,739
1984	2.674	" 24,074,591
TOTAL	20.096	Sf. 136,611,895

SOURCE: Agricultural Bank, Suriname. 1985.

In the credit-portfolio of the Bank, financing of the rice-sector plays a dominant role, as you can see on the diagram. (Figure # 1)

The situation is of that kind that we can speak about a mono-culture.

In accordance with the overall-policy of the Government, the Bank is trying to emphasize finance in favour of the other sub-sectors. By so-doing the Bank will make it possible to raise production considerably in these sub-sectors, so that our national economy needs not to be very dependant on the development of a mono-culture.

May I invite you to look at Table II

Seeing this picture we might say that from the first year of real operation on, the overall situation of the Bank is: growth.

This is in percentages:

(1984 in comparison with 1979)

Total balance sheet: 104,7%

Outstanding loans: 81 %

In the group "Time-deposits and Loans", we can explain that

in 1979: the Time-deposits were: Sf. 5,5 million;

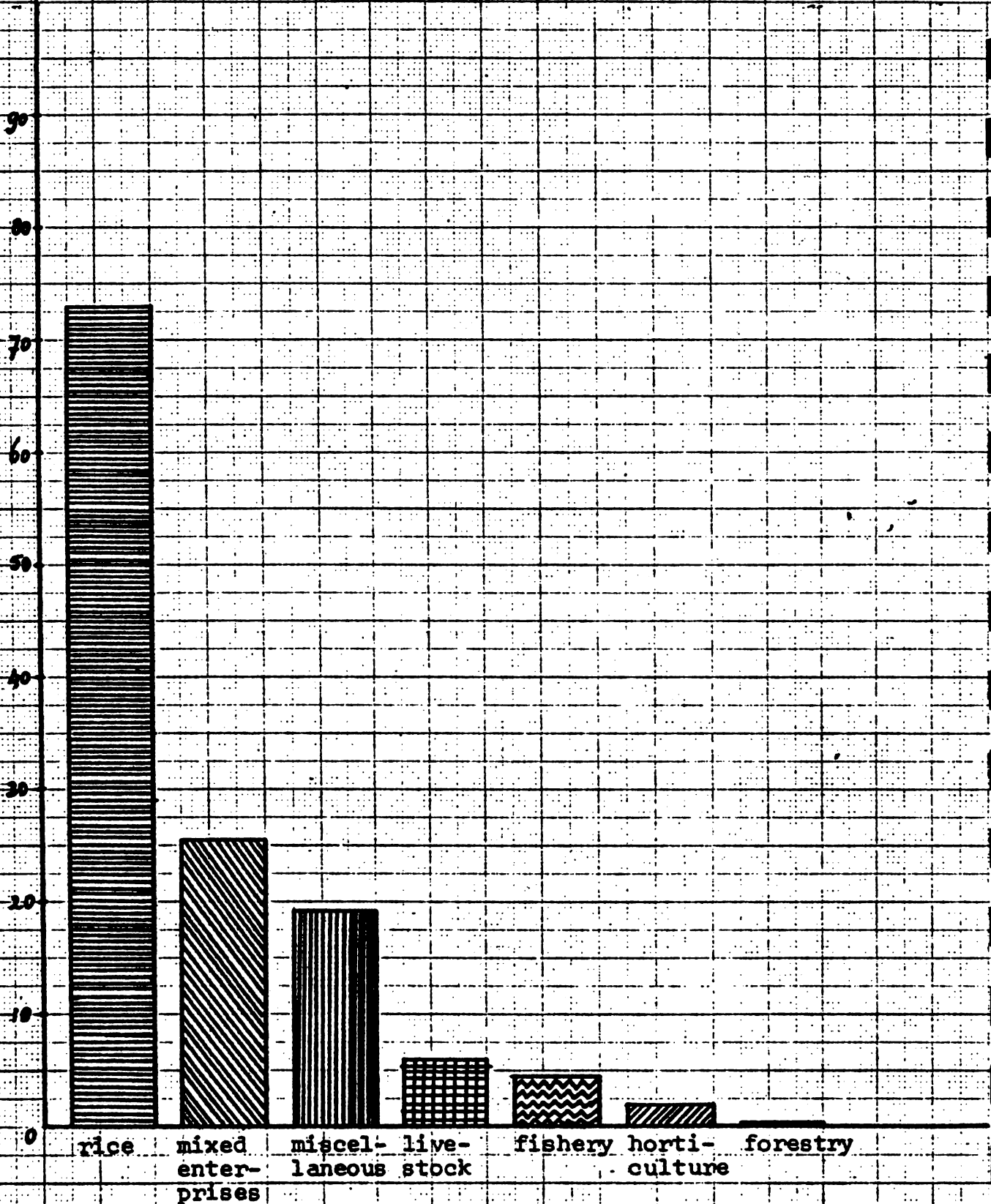
in 1984: Sf. 19,7 million; this denotes a growth of 25%

The Saving deposits have grown with 145,9%

Figure 1. CREDITS in favour of THE AGRICULTURAL SECTOR

Period 1979 up to and including 1984

x Sf million



SUB-SECTORS →



	1973	1979	1980	1981	1982	1983	1984
Total Balance Sheet	4497	46370	58276	71270	76544	84304	94921
Outstanding Loans	2243	25241	32429	40969	41447	40694	45688
Time deposits and loans	-	26587	34984	41816	46019	47036	52798
Saving deposits	348	6171	8639	10483	9950	10660	15177
<u>Numbers</u>							
Employees	14	49	60	69	72	74	84
Branches	2	5	6	6	7	7	7

Table 2. AGRICULTURAL BANK, SURINAME. SOME IMPORTANT DATA OF THE AGRICULTURAL BANK  
Amount (x Sf. 1,000) 1973-1984

Ladies and Gentlemen,

To end this lecture I may furthermore remark as follows. During the 13 years of its existence the Agricultural Bank has proved to be a necessity not only for the farmers in general but also for small citizens in our community.

Therefore, the Bank is trying to go on in this way, in order to render its useful service in favour of raising the national production. However the Bank has to get the support from the Government, as the only shareholder, and also from national as well as international financial institutions. Without the so-called passive financing on soft terms, it is nearly impossible for the Bank to help the small farmers, where as - according to its primarily function - the Bank is bound to intensify its credits to the agricultural sector.

Ladies and Gentlemen,

With this brief contribution to your training course I do hope I have complied with you wishes, for which I thank you.

LANDBOUWBANK N.V.

Paramaribo, August 1985

## SOME MARKETING ASPECTS IN AGRICULTURE

by

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### 1. DEVELOPMENT OF COMMERCIAL RELATIONS IN AGRICULTURE

The actual relations in agriculture, especially in the small scale farming systems, have been initiated in the period shortly before and shortly after the abolition of the slavery. As we know, production from the colonial estates was directed to European markets.

When costs of labour supplied by slaves and later by the labourers on contract increased relatively, the government supplied slaves and later labourers with small plots to grow products for their own consumption. This was done in an attempt to have the labour costs decreased, by having the labourers produced their own food.

It is interesting to know that the colonial government of that time itself stimulated the development of the small scale farming system, that became so important after the fall of the economic production structure based on colonial plantations. After the abolition of the slavery and after expiring of the contracts of imported labourers from China, India and Indonesia (after 1875) labourers abandoned the plantations and the whole economic structure collapsed. Instead, the free labourers became small farmers.

It is important to note that these new farmers built up another agricultural structure, with other priorities for products and use. This new agricultural structure, with other priorities for products and use. This new agricultural structure was developed on the basis of the needs of the farmers' families. For the second time in the history of this country the opportunity was there to develop the economy and especially the agricultural sector based on internal initiatives and used for the supply of own needs and own profits instead of that of a far and unknown market. This was the first interesting characteristic of this new production structure. Consequently production shifted from sugar, coffee, cocoa to rice, vegetables, fruit and cattle.

The second characteristic was that production was meant for self-supply and not at first for any local neither export market.

The third characteristic was, that production was realized on farms in a system of intercropping, on which inputs were delivered from the farm itself. (For example: after rice production, the cattle was let on the plot and fertilized it. at no costs: vegetables and pulses were grown in rotation with rice, so the soil was not exhausted).

A closed production system existed demanding minimal inputs from outside the farm, not commercial and not market oriented.

Some characteristics of the agricultural sector during several periods.

PERIOD	PRODUCTS	MARKETING
1. Pre colonial period (- 500)	Vegetables, plantain, cassave, fruits, meat	No market oriented production
2. Colonial period	Sugar, coffee, cocoa, cotton	Produced from European market. Extremely market oriented
3. Period after abolition of slavery 1875	Rice, vegetables, plantain, casave, fruit, cattle	Primarily for own use. Surplus is marketed.

In the century after 1875 this new agricultural structure evolved to a more commercial and market-oriented sector. This does not only apply for the large scale farms but also for the small scale farms. Internal as well as external factors were responsible for this shift. Internal factors were, increased production due to improved production techniques so that marketable surplus grew.

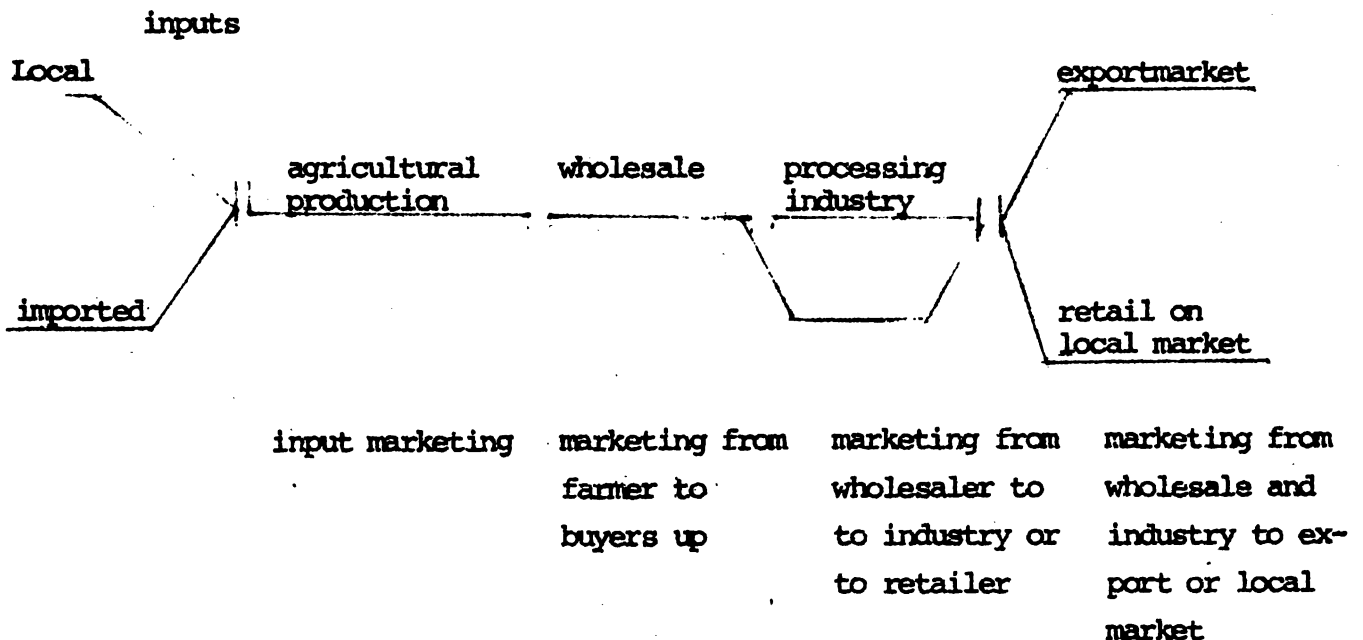
Secondly urbanisation led to increased demand for agricultural products.

International factors were:

- Renewed attention from colonial powers for colonies in the Caribbean after the loss of colonies in Asia.
- Influences of the "green revolution" through which western countries wanted to boost agricultural production by using h.y.v's, applying fertilizers and sophisticated machinery and equipment. These factors influenced strongly the agricultural sector and the actual structure.

The commercialized production, especially after 1945 was characterized by new production techniques, demanding a lot of inputs not available on the farm such as, seeds, fertilizers, fungicides, herbicides, tractors, combines, agricultural aircrafts etc. Monoculture in market oriented production became a must. Production increased, but so did also the costs.

Since the production commercialized, the whole attitude towards production had to be changed. While before the product mix was set by the farmers' needs, it was now the market which decided what had to be produced. Farming was not anymore that closed system of production/consumption, but began to look more alike this:



We can distinguish 4 essential marketing area's.

First, very often a forgotten part of the total marketing activities the input marketing. In this stage the farmer buys his inputs from importers and local suppliers to continue production. Farmers do not import themselves and they cannot control prices and qualities, so farmers are not able to influence prices of the inputs for their production.

Secondly, after the production process, farmers have to sell their production to buyers-up and to processors. As you know, agricultural products are perishable and have to be processed almost immediately after harvesting. Because farmers in general don't have access to processing facilities, they have to sell their products to processors. Farmers are in a very subordinated negotiating position, which is worsening as the harvesting time is getting closer.

Thirdly the marketing of products from the wholesaler to processors or to retailers or exportmarkets. Finally the outlet to local or export market don't start with soil preparation but before that with purchasing of inputs (input marketing). Since production is commercialized what means that production is realized on a clear market oriented basis, the production process does not end with harvesting either: the yield has to be processed and converted into cash, or foreign exchange.

In fact activities end when the product has finally reached the consumer: they are the market. So, if we commercialize production, first of all we should have a broad idea about where to sell the output, and at what terms. Furthermore, a lot of market elements such as price and quality are given. For example: prices on especially the international market are given, so from those international prices all trade and transport elements are subtracted even if they are inefficient (and they are), and the farmers' income is then what is left at last.

We also know that prices of food products on markets (also international markets) react sharply on fluctuations in quantities.

If production of rice increases with 1%, prices in general will decrease with more than 1%. So, if supply on any market increases, it leads to large fluctuations in price. Farmers' incomes are thus very unstable and uncertain.

Two marketing areas are of immediate importance to farmers. The area of input marketing, and the area of marketing the yield to the buyer-up/processor. Farmers have no influence on either of these marketing areas and their incomes are sandwiched between the incomes of the importers/suppliers and those of the buyers-up/processors. Because both come in at an essential point in agricultural production, while not controlled by farmers, they are able to have farmers paid also their inefficiencies. To improve agricultural incomes, farmers should be able to control these marketing areas.

## 2. MEASURES TO IMPROVE COMMERCIALIZED PRODUCTION AND MARKETING

At this moment we are dealing with an international crises in which prices of agricultural products are under pressure. On a national level we are dealing with serious foreign exchange problems, and problems in the aluminium industry. So all attention is focussed on the agricultural sector as the one which is locally controlled and able to generate or save foreign exchange.

But to make this sector as profitable as possible, some action has to be taken, both on the side of the government as well as on the side of the farmers. Measures should be taken to improve efficiency in production and make marketing effective.

What government should do is:

- Protect farmers by a policy of price control for guaranteed off farm prices.
- Organize activities of private entrepreneurs on export markets. Local exporters fighting on the same market with the same products, are only weakening the national marketing.

- Mobilize embassies to collect marketing information and promote national products.
- Supply inputs and know how to produce efficiently. Here is where the extension services come in.

The farmer can take measures to keep production commercially attractive for himself and on a national level. Farmers, especially small farmers can obtain the benefits of both, the small farm (efficient and steady control) and of large farms by producing in an organized and cooperative structure. Further farmers can try to increase own inputs in production as labour in stead of machinery. In some cases this has been proven to be cheaper on a farm level as well as on the national level.

Since production is market oriented, farmers will have to deal with interrelations and market factors influencing production activities. They should therefore be protected by policies of stabilized prices and adequate quantities of inputs.



THE DEVELOPMENT OF COOPERATIVES IN GENERAL  
AND, IN PARTICULAR IN SURINAME

by

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Suriname

1. GENERAL DEFINITION TER WOORST

A cooperative is a form of economic organization whereby economic subjects, who otherwise remain independent and who do not compete with one another, jointly carry out one or more similarly oriented economic function(s) or elements of these functions on a continuous basis, in order to improve the economic performance of the said economic subjects.

2. DEFINITION ACCORDING TO ARTICLE 1 OF THE 1944 LAW (SURINAME) /  
DUTCH LAW OF 1925

1. A cooperative society is a grouping of persons in which the joining and withdrawal of members is permitted and which has as its aim the furtherance of the material interests of its members, whether by means of the joint practice of their trade or craft, by supplying material needed by them or by extending advances or credit to them.
2. A cooperative society which satisfies these requirements does not lose its character if its statutes allow it to extend its sphere of actions to third parties or if it furthers other interests in addition to material ones.

3. DEFINITION ACCORDING TO ARTICLE 53, PARAGRAPH 2 (NEW DUTCH LAW)

By cooperative society is meant a society which sets out to provide for certain material needs of its members by concluding certain agreements with them in relation to the business which is transacted or has others transact to that end for the benefit of its members.

The statutes of the society can allow it to conclude similar agreements with third parties, but this may be done to such an extent that the agreements regarding the activities of the society which are concluded with the members thereof are merely of minor significance.

4. SIMPLE DEFINITION

A cooperative is an industrial organization created by persons who voluntarily join together in order to solve a common economic problem.

5. WORKING DEFINITION BASED ON THAT OF THE ILO

A cooperative is a socio-economic organization consisting of persons who have come together voluntarily to attain a common goal through the creation of a democratically led organization, whereby they make a reasonable contribution to the required capital and accept a fair share of the attendant risks and the benefits of the activities in which the organization's members take part, both in the material sense and in forming and training activities.

Before going on to deal with the principles of the cooperative movement, on the basis of this working definition, I should like to touch lightly on the background to the genesis of cooperatives.

6. THE SOCIAL SITUATION AT THE TIME OF THE CREATION OF THE ROCHDALE COOPERATIVE IN ENGLAND (1844)

The present cooperative societies originated as a reaction to the social situation in Europe around the years 1820 - 1870.

1. The coming into its own of factory-based production, in which new developments such as the steam engine, the division of labour, specialization and the conveyor belt were utilized (1st Industrial Revolution).
2. Work done by tradesmen declined and the working masses lost control of the sources of production, becoming dependent on factory wages.

3. As an individual the worker was powerless vis-a-vis the industrialists in the bargaining process. At that time there were long working hours, female and child labour, poor working conditions etc.
4. Owing to the fact that the tradesmen and workers were unorganized, they were in a poor bargaining position with regard to wages and were unable to wield any political influence.

In reaction to this situation, the labour unions came into being, while the small producers set up cooperatives societies.

Later, the stage was reached where labour-based political parties were formed.

Where the labour unions were concerned, the issue at stake was, in the first instance, the increasing of workers' incomes and the improving of working conditions.

When the cooperatives were set up it was a matter of securing the survival of the small producers.

The benefits obtained by the big enterprises can also be derived from working together in cooperatives.

Cooperatives can be a means of:

- a. increasing production and productivity;
- b. jointly acquiring inputs;
- c. setting up processing activities;
- d. arriving at the joint utilization of machines;
- e. taking care of the joint marketing of members' produce;
- f. encouraging saving, whereby funds become available for extending credit.

7. THE ROCHDALE COOPERATIVES PRINCIPLES

1. Open membership - If a person satisfies the membership requirements, that person is eligible for membership of the cooperative. One is also free to withdraw from the cooperative, but must first satisfy the conditions laid down in the statutes. A related tenet is neutrality with regard to race, creed and political conviction.
2. Equality - A cooperative is democratically led organization. The principle of equality plays a great role here - "One Man One Vote".
3. Deposits - A limited dividend on the deposits eg. a maximum of 6%. A maximum is to be imposed on the deposit per member (eg. 1/5th of the total deposits).
4. Proportionality - The surplus which remains after the dividend on the deposits is deducted, is distributed on the basis of business done (by each member) with the cooperative.
5. Permanent education - Permanent education and training of ordinary and executive members is necessary. In a big cooperative, instruction and information are indispensable.
6. Cash sales - In the case of purchasing and selling cooperatives it is recommended to conduct sales on a cash basis.
7. Prudence - Since a cooperative serves the interests of many persons, one has to be careful where taking risks is concerned.
8. Prudence in competition - Price wars with established commerce should be avoided.

## 8. THE DEVELOPMENT OF COOPERATIVES IN OUR COUNTRY

In contrast to the Western European countries, where the cooperative ideas were promoted by socially motivated people, in Suriname, it was the colonial government which wanted to develop cooperatives.

After the end of the 'Staatstoezicht' (the Apprenticeship period, which immediately followed the formal abolition of slavery) in 1873, small farming was started in our country. The indentured labourers who settled permanently in Suriname were the ones who, in the main, shaped small farming here.

In 1910 an attempt was made to stimulate small farming by setting up a farmers' credit bank, following the European model, to help farmers meet their credit needs. This was done under the direction of the District Commissioners. In Paramaribo, too, various cooperatives were set up, which functioned for a short or longer period.

Later, the 1944 Cooperative Societies Ordinance was promulgated. In 1953, yet another attempt was made to stimulate farmers to work together in cooperatives by assigning a quota to the Rice cooperative to enable it to export rice.

Because businessmen took advantage of the ignorance of the farmers, a large number of abuses occurred, with the result that the farmers had no trust in the institution of cooperatives - they came to distrust anyone who uttered the word "cooperative".

Following its establishment in 1954, the Ministry of Agriculture, Animal Husbandry and Fisheries was entrusted with the development of cooperative work and a Cooperatives Services, headed by Mr. Hiwitt, was set up.

This department was also manned by a bookkeeper and 2 information officials. In 1959 Mr. Tjin A Ten became head of a sub-department for cooperatives.

In the first instance efforts were made to develop all sorts of cooperatives and it is in that period that the Kwatta cooperative was established. When this also did not go quickly, credit cooperatives were set up.

In 10 to 12 years, some 30 credit cooperatives were created, first involving Agriculture Ministry workers and later, workers from other ministries and enterprises.

When funds became available the Agriculture Ministry set up the AVKC (General Association of Credit Cooperatives) and in 1969 - 1970 the AVKC was granted a greater degree of independence, through the appointment of professionals to the body.

It can be said that, after 1970, there have been two approaches in the process of the development of cooperatives, viz. development in the old agricultural areas and development in the new land development projects.

In the old agricultural areas the established interest groups have to be taken into account and the process is slower there than in the new projects since, in the latter, consideration can be given to technical facilities, funds and personnel for training and guiding farmers.

In this respect cooperative development in Nickerie, L.O.C. (Comme-wijne Agricultural Development Project), Pomona etc. comes to our minds.

What measures must be taken to adequately stimulate cooperative development?

1. Since 1976 the Ministry of Labour has gradually built up an independent department for cooperative affairs.

Owing to the fact that there are now 2 (two) ministries entrusted with the development of cooperatives, there are now more difficulties in the field than before.

This does not contribute to efficient work because the farmers become confused and the establishment of cooperatives, which should lead to increased power of action among the farmers, is frustrated.

This situation has also contributed to the Agriculture, Animal Husbandry and Fisheries Ministry's not being in a position to staff the department with the desired personnel.

Furthermore, it also means an inefficient use of government funds.

2. To be able to carry out the work of cooperatives properly and to ensure that there is optimal guidance, it is necessary for personnel to be taken on the areas of:
  1. Financial administration
  2. Information in the field
  3. Training for both executive and ordinary members of cooperatives.
  
3. The law will have to be adjusted so that the ministry which is in charge of the coordination of cooperatives:
  - a. can register the cooperatives which are created;
  - b. can have an overall view of the number of members per year per cooperative;
  - c. has the possibility of monitoring, whether asked to do so or not, the financial situation (in the cooperatives), not in the least in order to safeguard the interests of the members and executive boards as well as in the general interest.
  
4. The Government must take care to make available incentives or facilities aimed specifically at stimulating cooperatives, such as tax exemptions, the stimulation of vertical and horizontal integration of cooperatives, etc.

Given the time allotted to me, I, unfortunately, cannot deal with the other aspects related to the functioning of cooperatives.





# A BRIEF ANALYSIS OF THE EVOLUTION OF EXTENSION AND RESEARCH

by

K. Le Morvan  
IICA, Consultant

## 1. Introduction

Agricultural research from the 17th century onwards was linked to the pressure of more progressive farmers who sought ways of improving the productivity of their farms and estates.

In the United States, the development of the agricultural research and extension system similarly owed much to the efforts of more advanced farmers who pressured the local state legislatures to provide finance to the agricultural colleges. Farmers organizations such as the Grange and the Farm Bureau, were instrumental in setting up extension services for the farmers. These were later linked into the land grant colleges and the US department of agriculture through the mechanism of cooperative extension.

In areas colonised by European powers, research and extension tended to be limited to the farmers and companies producing export crops for benefit of the mother country, with little or no concern for improving the capacity of production of the small food crop producers who retained their traditional low productivity technology. The severe rigidities of colonised countries with their skewed patterns of land distribution, and sharply divided social class and ethnic system, produced a heterogeneous agricultural structure characterised by technological dualism.

Extension systems development in Europe and the United States under conditions of relative homogeneity of the farming system and inspired by the farmers themselves had great difficulty in adapting themselves to the conditions of third world countries where the institutional conditions were totally dissimilar.

After 1960 however considerable efforts were made to set up extension processes to attend the needs of the small and medium-sized farmers in the third world. This process has had a variable degree of success and different approaches have tended to evolve as a consequence of successive set backs.

## 2. Diffusion-adoption approach

The major emphasis initially was the application of the diffusion-adoption method, as had evolved in the United States. This was based on disseminating the more progressive practices as carried out by the best farmers. The concern of extension services was primarily the handling of information - both through direct contact and the use of mass-media, with the hope that farmers would progressively adopt the new practices as a consequence of their results.

Much effort was made to study the diffusion process, and apply findings from diffusion-adoption research in the USA and other countries. Emphasis was placed on identifying opinion leaders and innovators, who would initiate and then propagate the practice among the rest of the farmers. Major stress was placed on information on how to evaluate and apply innovation messages designed to make people more receptive to change.

The major limitations of this approach gradually became apparent:

- little attention was given to conditioning factors such as credit, marketing, supplies etc.
- too much attention was paid to innovators and opinion leaders, leaving out those most in need.
- over emphasis was given to the role of the mass media as opposed to interpersonal communication.
- the effects of village or group characteristics and their influence on decision making tended to be ignored.

-3. Package programs

To overcome the problems of inadequate conditions and support services, the package program was evolved, where a coordinated package of activities was applied ( credit, technical assistance, inputs, etc.).

While this permitted the extension programs to reach a wide range of farmers they required a strong national commitment to be successful, as they needed interagency coordination in order to ensure that the different elements of the program were supplied at the appropriate moment.

Another defect was that these programs tended to promote single cropping systems as opposed to multiple-cropping divorcing themselves from limited resource farmers, or even causing severe economic disruption for the farmers who used them.

The programs led to further centralization of the planning and policy making functions at the expense of a more decentralized, adaptive type of agricultural process.

4. Induced innovation

As a complement to, and to some degree in replacement of the packaged program approach, in the 1970's emphasis was placed on an induced approach.

This approach made use of marketing mechanisms particularly prices as a way of stimulating the adoption of new technologies. With increased opportunities, the farmers would respond by increasing production. To be successful however, this approach required that there exist a number of support services:

- information to the farmer about prices and opportunities.
- adequate supplies of credit and other inputs.
- adequate marketing opportunities.

Again the main beneficiaries tended to be the larger commercial farmers who had adequate factor endowment, linkages within the system and capacity to make rational economic decisions in terms of the market.

#### 5. Training and visit system

In the past few years the World Bank has introduced a new more intensive system of extension: the training and visit program. This system is based on:

- providing village extension workers with training every two weeks in specific activities which must be carried out.
- the village extension worker then trains a number of contact farmers, who will communicate with their neighbours.
- the activity at the grass roots is complemented by, research and extension committees which operate at the provincial, regional and national level. These evaluate and recommend specific practices.
- it is also foreseen that they will form local committees to tackle specific local problems.
- subject matter specialists serve as links between the extension workers and the research stations and participate in the committees, and collaborate in giving crop demonstrations at the local level.

However the system, though well conceived has not functioned as well as expected.

The subject matter specialists have not been able to dedicate themselves to their linkages with the research stations because of administrative tasks.

- There are insufficient specialists to handle the work load.
- The committees have not been set up at the local levels, and those at higher levels have dedicated themselves principally to administrative and not technical tasks.
- There is little adaptation of recommended practices to local soil and water conditions.

#### 6. Farming systems research

In an attempt to break away from highly centralised single-cropping programs and to link research and extension in a more coherent form, recent years have seen the growth of farming systems research.

- In this approach the local production systems are studied with a view to their characterization and to discover the dynamic interplay of biological, physical and social elements with a view to maximizing the energy use of the farm.
- This process requires the concurrence of specialists of different disciplines ( soil specialists, entymologists, plant specialists, agricultural economists and sociologists) together with the farmers themselves in a task of investigation, experimentation and verification.
- In this process the extension service has a key role to play as the extension field workers' permanent contact with farmers allows them to obtain, process and transmit information from the local area to the research centres, as well as helping to identify critical farming problems, useful techniques, and encourage farmers' participation.

## 7. Participative development

Together with farming systems research, recent efforts in rural development have expressed the need to involve the farmers actively within his process of development.

From a purely production oriented approach, extension has regained its educational focus, seeing its role as that of awaking in and developing the capacity of the farmer to participate actively and creatively in his own development. This approach requires that the farmers be organized, and have the opportunity to participate in the formulation of objectives, program planning, development and evaluation of the production and research processes.

This approach has reevaluated the importance of the farmers' knowledge and experience, and has permitted researchers to become aware of the efficiency of many of the traditional systems of production. Thus there is interest in analysing "native" knowledge and techniques as a basis for introducing new productive ideas.

This rebirth of extension is however still in its initial stages, and difficulties are found in inserting it into the highly centralised institutional systems which characterise most third world countries.

What is now clear however is that agricultural development is a complex process requiring adequate systems of support in terms of research, credit systems, marketing processes etc. as well as the education and organization of the farmers and their linkage into the planning and research phases of agricultural development.

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**RESULTS OF WORKING GROUPS**



CONCLUSIONS OF WORK GROUPS

I. PROBLEMS OF AGRICULTURAL RESEARCH

1. What is research at present carried out in different research stations?

Research station

Research topics

LWV Research station

- Agrohydrological research
- Mechanization
- Soils
- Mycology
- Virology
- Entomology
- Crop Management Research

Surland

- Banana
- Shrimp
- Pineapple

SEL

- Livestock research
- Citrus research

SML and LOC

- Rice cultivation technique

CELOS

- Crop management research

2. What kind of problems are there in agricultural research

While the group felt unable to give a meaningful answer because of lack of background information, the following problems were identified in plenary session:

- No participation of extension to develop research programs.
- No coordination at the national level, each institutions is independent.
- There is at present no established research plan nationally. There are long term ongoing programs, but in the short run there is no systematic program.
- There are at present budgetary limitations which limit the possibility of carrying out research, although facilities and personnel available.
- Many experienced personnel left the country - returning to Holland leaving a mainly junior staff behind.

3. How is the coordination with the extension services and other organizations

- At present there is virtually no systematic linkage between research station and the extension service. Where it occurs it is primarily at an interpersonal level.
- There is no systematic transfer of knowledge from the research to the extension service. Previously there existed an information liaison officer who prepared information for extension but this is not functioning at present.
- There is no way of feeding back information from the farmer to research.
- The extension worker rarely receives research information.
- There is no formal coordination mechanism for linking the research institutions at the national level.

II. WHAT TYPES OF EXTENSION APPROACHES ARE BEING USED AT PRESENT IN SURINAME, WHAT ARE THEIR POSITIVE AND NEGATIVE ASPECTS

1. Diffusion-adoption approach:

- Used primarily by extension workers in L.V.V.
- Used in the animal husbandry, in the vegetable sector, and to some extent in the rice and citrus programs.

Advantages:

- It has worked in areas where the preconditions exist within the area (infrastructure, inputs, resources).
- It tends to be a less expensive program, requires less organization than other approaches, and is time saving.

Disadvantages:

- The varying range of conditions of different farmers, and deficiencies in these, tend to produce specific demands of farmers that the system has difficulty in meeting.
- Not all information is useful to or used by farmers who often require specific responses.
- It is a relatively slow and hap-hazard method.  
Specific evaluation of results is difficult.
- It requires a great deal of instruction, training and supervision to be productive.

2. Use of package programs

- Is used extensively in the rice, oil palm, poultry programs.

Advantages:

- It is a more directed program, assuring complementation of farm practices and control.
- It is less risky, as it provides the conditions for the farmers to produce.

Disadvantages:

- There is minimal participation of the farmers in the planning, implementation and evaluation of the program.
- The direction and implementation of the program falls on the shoulders of the extension worker.
- The farmer becomes independent on the credit agency.
- When input supplies fail, the program tends to fail.

3. Training and visits

There are several areas where training and visits constitute components of the program, although a training and visit program per se has not been set up.

This has occurred in specific crop programs such as rice, pigs and beekeeping and with cooperative and individual farming.

In general the system does not seem to have been successful.

Training programs have made a positive contribution in LOC and specific products (beekeeping, pigs).

4. Participative development and farming systems research

Is in its initial stage, for the LOC area and appears to offer potential for the future.

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III. OBSTACLES TO COMMUNICATION BETWEEN THE EXTENSION PROCESS AND RESEARCH AND THE FARMER

1. What are the obstacles to communication between the research process and extension

- lack of initiative of the extension worker to contact the research worker and the Ministry of Agriculture and Livestock (LVV).
- Insufficient equipment available for the extension officer to present proper samples to the research station (ice boxes, etc).
- The research worker often doesn't take the problems presented by the extension worker seriously.
- New results from research doesn't reach the extension officer in the districts but stay in the center.

2. What are the obstacles to communication between the extension process and the farmers

- Infrastructure .
- Cultural and social factors: religion, customs, habits, language.
- Farmers low level of education.
- Lack of equipment for new technologies at the level of the farmer.

Solutions:

Restructuring of the extension department and research division, elaborating new procedures which allow a more analyse communication.

3. From where does the extension service derive its information and techniques? What happens to queris presented to the system by the extension worker? What should be the solution to the process?

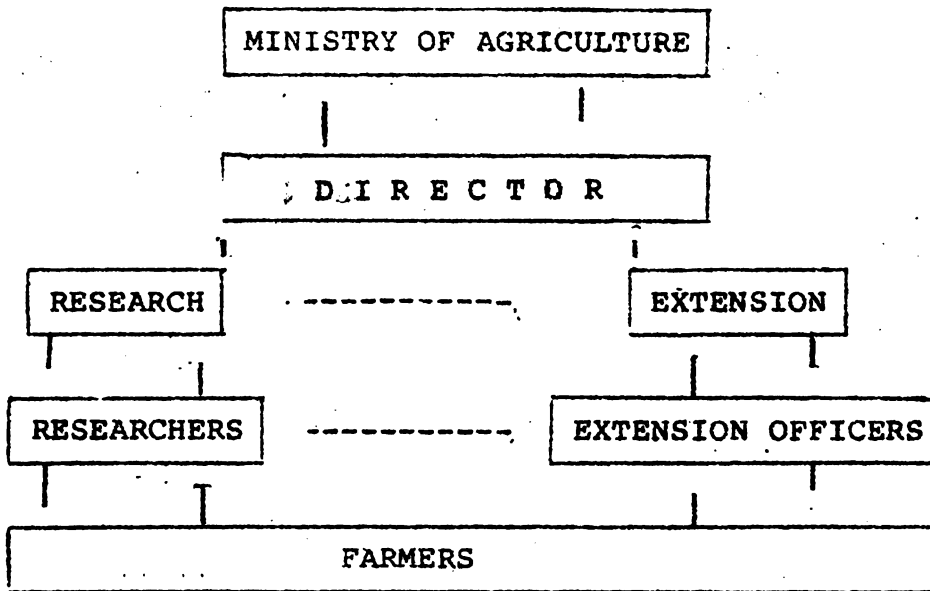
At present the extension service officers tend to receive little or no research information. This varies however with crops: there being more information available in rice but virtually none in greens and other crops.

The extension agents lack the imputs and resources to carry out field tests; although some areas do carry out tests with the help and collaboration of the farmers.

At present queris presented by the extension officer to his supervisor, and through him to the system often remain unanswered. The main concern with research tends to be crop management with little emphasis on agricultural economics or social studies.



A suggested new information system is:



4. What methods and techniques does extension to use to communicate with the farmers and how effective are they:

<u>Techniques</u>	<u>Effectiveness</u>	<u>Observation</u>
- <u>Personal contacts:</u> visits to and from the farmers	High *	Reach only a few
- <u>Group and individual demonstrations</u>	High	Reach only a few
- <u>Films</u>	Medium	Reaches more farmers
- <u>Exhibition</u>	High	Not easily measured

<u>Techniques</u>	<u>Effectiveness</u>	<u>Observation</u>
- <u>Meetings</u> and group extension	Low	Few farmers attend, low intervention, use as a social event.
- <u>Mass media</u> : radio T.V., newspaper	Low	Limited programs.
- <u>Publications</u> : posters, handbooks, etc.	Low	Low levels of literacy.
- <u>Youth groups</u> : home economics, 4H	High	Limited member of program.

Problems of communicating with farmers:

- Social : Large farmers : buy or hire the skills they need.  
Medium farmers : usually few communication problems.  
Small farmers : Limited because of lack of education and social isolation.
- Cultural : Language, customs and habits, political and religious affinity.
- Economic : Lack of capital.
- Physical : Distance, infrastructure, soil type.
- Psychological : Attitudes and mentality.

- SOLUTIONS:
- Structured education programs for the extension agent and the farmer.
  
  - More education facilities for future farmers.
  
  - Structured cooperation between research, extension and the farmer, better implementation of different communication channels.
  
  - Better programming, planning and evaluation of extension work.

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IV. THE EXTENSION SERVICE AS A SOCIAL SYSTEM?

1. The extension officers have many roles, both as agents and as members of their society. Some of them are also farmers, teachers, advisors, religious leaders, labourers as well as social workers.
2. The extension worker has limited power, because of the existing structures.  
He only has power derived from other roles in the society.
3. Among the basic goals of the extension worker are to help the farmer learn new techniques in order to manage their farms more effectively, and acquire the capacity to solve their problems as farmers, making them less dependent on the extension worker.
4. The extension agent has insufficient equipment to carry out his job effectively.
5. One of the problems is the slow rate of adoption of new techniques.
6. Because of the diversity of his roles the extension agent cannot always be objective.  
There is need to motivate the farmers to participate in the projects of the extension service.

RELATIONS OF EXTENSION AND RESEARCH AS SOCIAL SYSTEMS

1. There are differences in goals: Extension tends to be farmer oriented.

Researchers are often restricted by specific research goals, basic research, or problems of personal interest. Only incidentally in many areas the researchers relate to the farmers' problems.

2. There are status differences: extension workers tend to be lower paid and more open to criticism. They also work longer hours.
3. In general the extension agent has no power. He has a limited capacity to influence others, and has authority only when he is leader of a project.
4. The extension workers' knowledge tends to be general, while the researcher is specialized. The extensionist must be an all-rounder: educator, community developer, agricultural advisor.

In general the extension worker feels uncertain of his performance, and feels a lot of resistance to his efforts.

The extension agent works in a specific area, among a complex variety of cultural and language barriers. The researcher on the other hand has a larger target area, but a specified task, and fewer complications.

The extension service should be incorporated into the larger policy formulation system, involved in helping to formulate policies and programs.

The extension agent should have a higher status and rewards: higher pay, promotion opportunities, upgrading courses, higher participation possibilities, opportunity for further professionalization.

RELATIONS BETWEEN THE EXTENSION SERVICE AND THE FARMERS

The farmer has lost faith in the extension worker: because of:

- past political manipulation.
- the farmers think that agents pass information to the tax authorities.
- the farmers think that the extension agent doesn't care for their interests.
- the farmer feels the agent cannot put himself in the farmers' role because the extensionist has a secure income and social benefits, and doesn't confront risks.

Goals : There are diverging ideas about what is best for the farmer; and with regard to what is more profitable.

Role differences : Extension agent is an advisor, informant, messenger, communication media. The farmer is the recipient and implementer of the information.

Knowledge : The extension agent has mainly theoretical knowledge, the farmer practical knowledge.

Power : The extension agent has little control over the adoption of this information by the farmer.

Solution : There has to be consultation with the farmer and the extension agent over the formulation of extension and research programs.

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PROPOSALS FOR REORGANIZING THE EXTENSION RESEARCH SERVICES

I. GENERAL

1. Philosophy

The extension service should provide the farmer with the necessary tools, educate him so that he can improve his lifestandards and eventually those of the community he lives in.

2. Principles

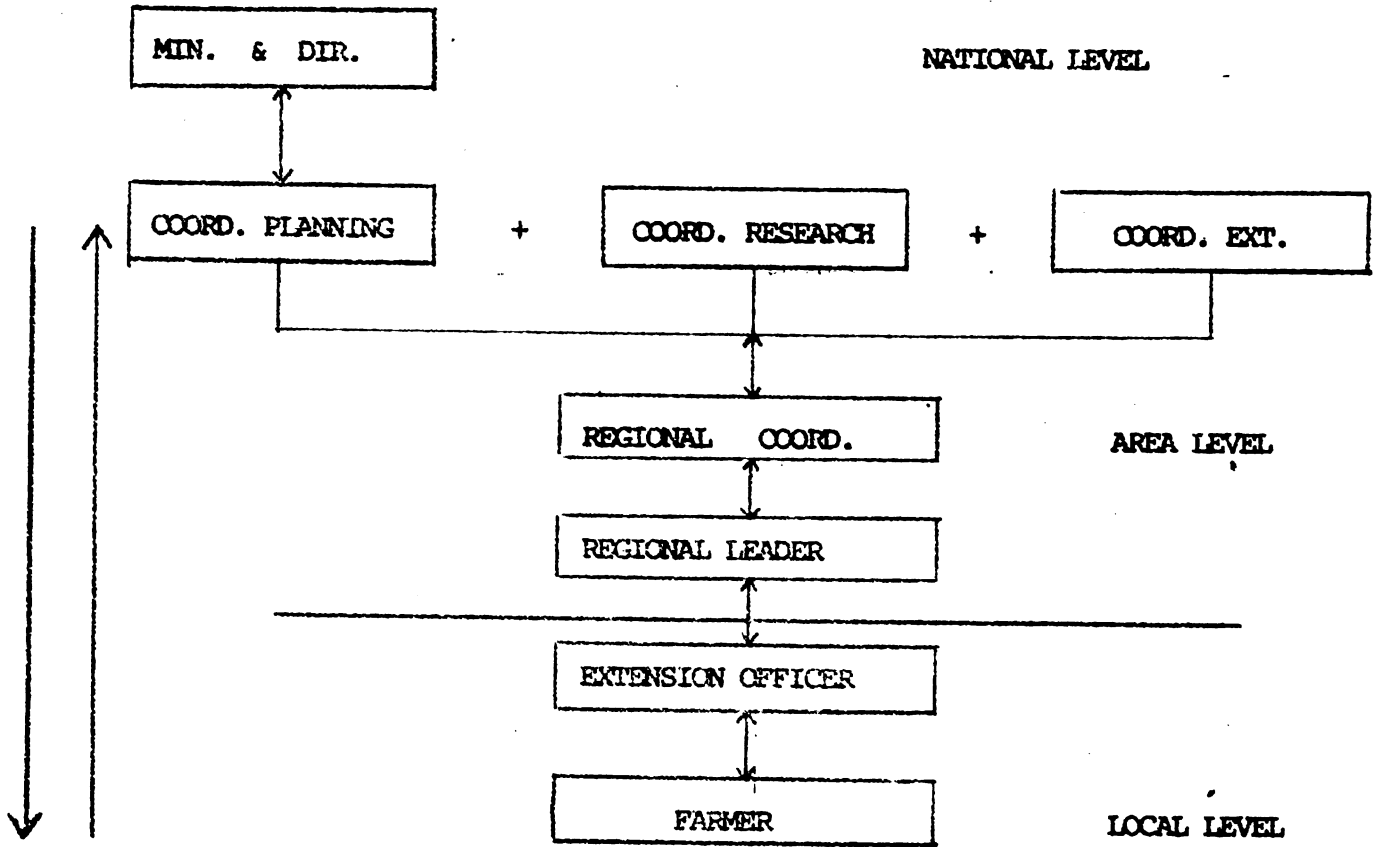
- Good communication and cooperation between extension-research-farmers.
- The extension service should work specifically towards the objectives it has.
- Respect the farmers norms, culture customs, beliefs, religion.

3. Goals

Help the farmer learn new techniques in order to manage their farms more efficiently and acquire the capacity to solve their problems as farmers, making them less dependent on the extension worker.

II. PROCESS

1. Planning, programming, evaluation



LEVELS

Nat. level

ACTIVITIES

Planning  
Programming  
Evaluation

PROCEDURES

Meetings  
Conversations  
Reports

Area level

Planning  
Programming  
Evaluation

Meetings  
Conversations  
Reports

Local level

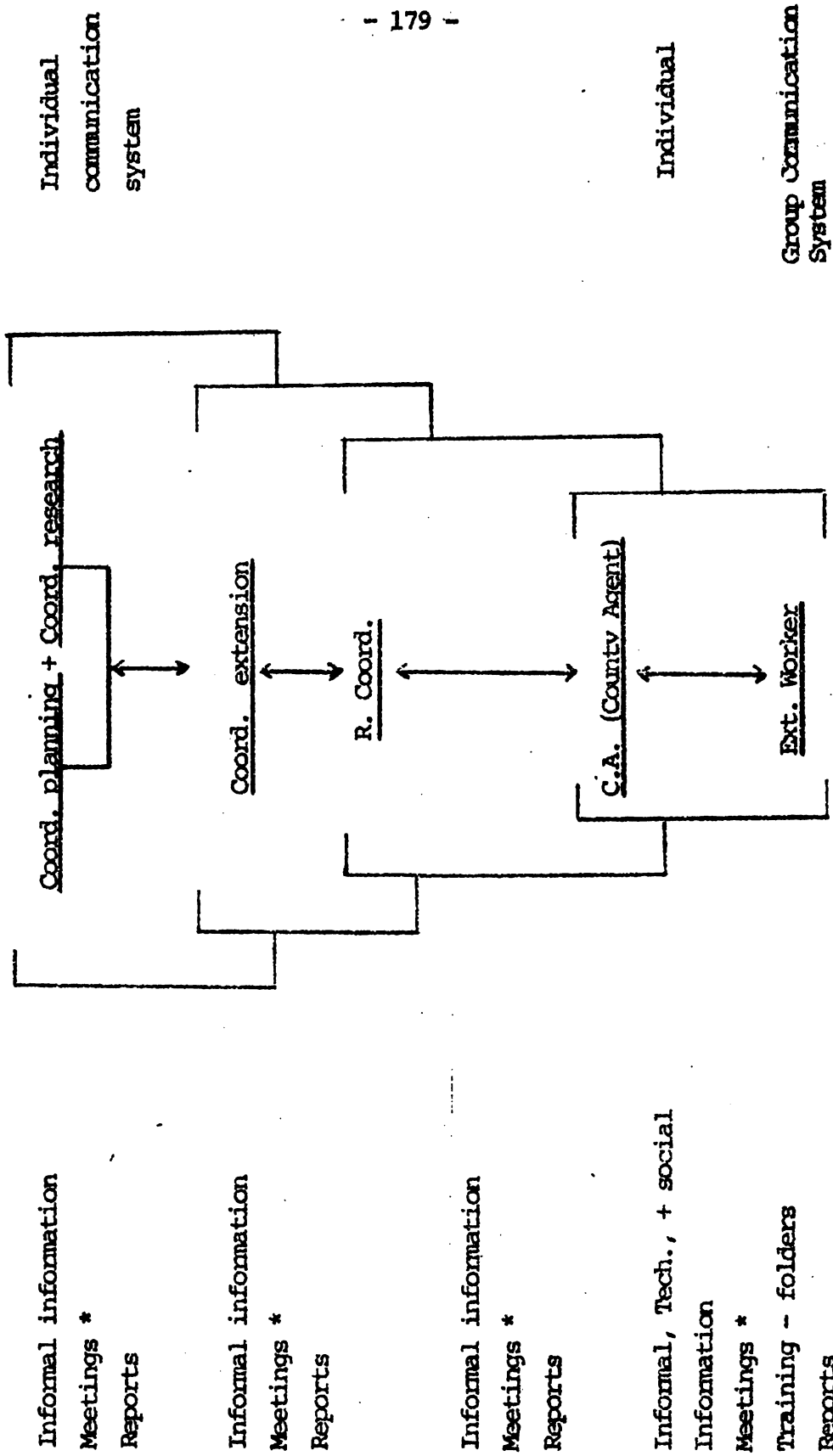
Planning  
Programming  
Evaluation

Demonstration  
Meetings  
Exhibitions  
Conversations  
Observation

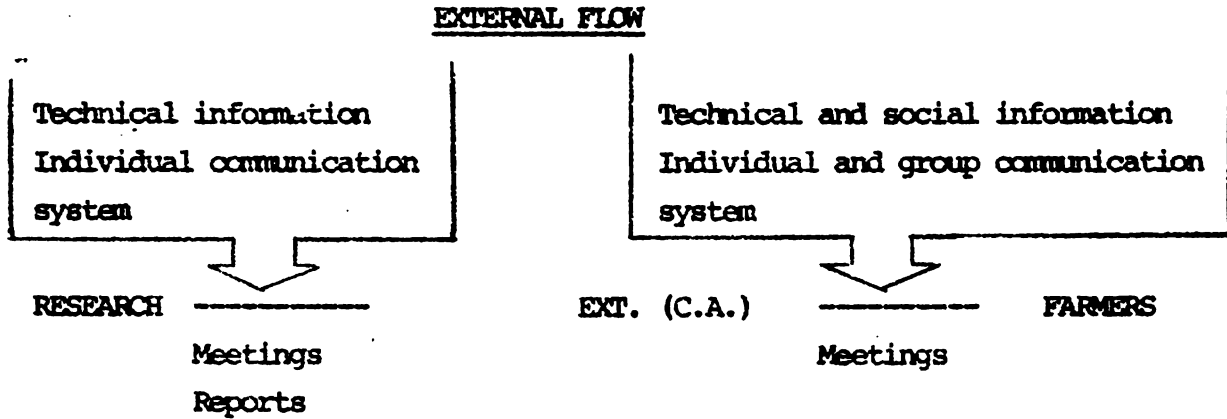


2. COMMUNICATION

INTERNAL FLOW



\* These meetings are scheduled and take place at planned internals.



III. DATA COLLECTION

An efficient extension service requires adequate access to information to permit appropriate decision-making and planning. Among the data the agency needs to have:

<u>TOPIC</u>	<u>WHAT DATA</u>	<u>HOW TO COLLECT IT</u>
Meteorological	Temperature; rainfall; evapo-transpiration, exaporation rate, wind direction, wind speed.	- By making use of information gathered by the meteo stations in the farming area's.
Soils	Soil structure; soil P.H.; Soil elements etc.	- By cooperation with departement of Nat. Farm resources also with soil research L.P. - Observation
Water	Irrigation and drainage water table levels water balance	- By cooperation with (C.T.) water management specialists
Crop problems and performance	Disease, pests, crop-management, deficiencies in soil	- By observation and individual contact with the farmer.

Social and cultural	Religion, family size, housing, level of education, cultural habits. Different social groups.	- By observation and individual contacts with the farmers. Social workers, home economists and extension workers.
Farm	Farm size, types of crops (mono/mixed) yields, costs, cropping system, transportation, equipment, informants. Production costs, farm income.	- Individual contact with farmer and statistical information from the Department of Statistics.
Farmer	Decision maker, participation of family members in the farm. Division of labor Family relations Family size.	- Observation, communication, parties, meetings.
Visits	Purpose of the visit Contacts: content of visit. Problems discovered, discussed results of visits.	- By using standard forms, reports.
Meetings and other activities	Did the people attend How many attended What was the purpose, content, discussion, conclusions, follow-up.	- Making reports (notes about meetings).

#### IV. PERSONNEL

At present there is no clear idea about the role of the extension workers and their functions in the organization. It is necessary to develop a clear policy on personnel and establish adequate job profiles of the extension agents. A tentative description of the extension workers task function is developed below:

A. Guidance for farmers

1. Give technical advice. 2. Give social advice. 3. Give farm management advice. 4. Stimulate, develop rural organizations (cooperative development). 5. Develop + carry out educational and training programmes.

B. Communication with farmers

1. Lead group discussion. 2. Lead face to face conversation. 3. Give presentation. 4. Use of audio-visual aids. 5. Give instruction to farmers.

C. Organization and management of the extension office

1. Develop extension plans. 2. Develop and carry out work programs. 3. Prepare the budget. 4. Develop and manage client information system. 5. Develop and manage the internal communication system. 6. Develop and manage the external communication system (with other organizations and services). 7. Manage personnel. 8. Develop and manage the documentation system.

1. Position

The extension workers' position is between the policy-makers and researchers on one hand and the farmers on the other.

2. Functions

Planning on the local level; technology transfer; identification of farmers' need and problems; generation of new methods for better production, community development; work with women and youth.

### 3. Selection

In order to ensure maximum output of the extension function it is necessary to select skilled people. We consider that they should be graduates of NATIN.

### 4. Training

It is necessary to give both induction training and inservice training in courses such as: crop production (rice, citrus), pesticide and disease control; cooperatives, agricultural economics, planning, programming, extension techniques etc.

### 5. Professionalization

Possibility of further training in other countries which have conditions similar to Suriname and have been successful in carrying out extension programmes.

### 6. Incentives

It is necessary to provide adequate incentives to the extension worker. These could include:

- greater participation in decision-making and planning.
- yearly evaluation of performance
- greater promotion possibilities
- bring wage rates in to line with wages for comparable work in the private or semi-public organizations (SEL, SML, IOC).
- compensation should be commensurate with responsibility.

A better functioning extension programme will contribute to increased production and increased national income.

V. STRUCTURE OF EXTENSION

1. Specialist support

There is need for subject-matter specialists at each level of the extension programme.

<u>Level</u>	<u>Specialist areas</u>
- National	Farm mechanization, economics, fisheries.
- Regional	Soil scientists, fertilization, farm economists, extension specialist, pest and disease control, cooperatives, home economics, veterinary.
- Local	Crops (rice, citrus, vegetables), animal health, home economics, cooperatives, statistics, fisheries, plant protection (these dependent on the area).

The specialists at the regional level, may be research scientists working in the research station with a part-time commitment to extension, serving at the same time as liaison person between the two services.

Those at the local level would be extension workers with specialized training in a specific field.

## 2. Decision-making

Role and competence to decide on personnel, budget and technical programmes by level of organization.

Level	Role	Personnel	Budget	Technical programmes
National	Supervision	to hire or fire	Sf 10,000.00 and over	Projects
Regional	Coordination	to hire, to suspend	Sf 5,000.00 Sf 10,000.00	Programmes Emergencies New diseases
Local	Implementa- tion	warnings	up to Sf 5,000.00	Pests and disease, crop management, industrial waste, pesticide residens, (water + soil polution)

The decisions should be tested according to planned economical and social goals. Programmes should be specified in terms of time, budgetary requirements and priority.

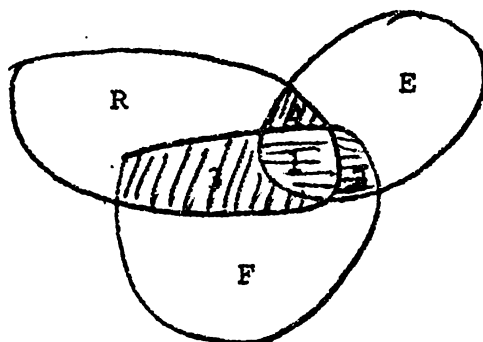
The decisions should be linked to a competency table.

Suggested structural links of extension at the national and regional level.

- National extension supervisor: establish general extension policies, strategies etc.

Regional level: coordinate extension activities in the region according to the policies of extension and area needs.

3. Linkages between farmers, extension and research



Linkages of: 1. Farmer - research - extension, through programmes and applied research, (on farms trials) farming systems, approach.

2. Farmer - extension through field-days, demonstrations, meetings, boards of farmers, means of communication.
3. Farmer - research through, demonstrations, field-days, instructions, on-farm trials.
4. Extension - research: concreted planning activities at national and regional level, extension contact, liaison personnel and subject-matter-specialists, project groups and programmes, crop guides, etc.

VI EXTENSION METHODS AND TECHNIQUES

The basic extension methodology is the use of: individual, group, and mass-media techniques.

Techniques:

- training of a nuclei of farmers (contacts) in modern skills and agricultural techniques, using these as a means of reaching their neighbours to diffuse their innovations.
- bringing groups of farmers to demonstration plots both or contact farmers' farm, and at the resort extension offices (specialization of crops or product by resort).



2. Aids

Equipment for teaching, written materials, audio-visual materials, posters, etc. Equipment for agricultural training: demonstration field, tractors and implements, sprayers (manual and motor) pumps, tools, etc. Planting materials, pesticides, herbicides and other chemicals (supplied from county agent; budget allowance for this purpose).

3. Support

There should be a special department which translates and interprets technical publications from national and international sources, making this material accessible to the extension agents and farmers (communication support service), crop and research guides.

4. Other functions

Training and advising of women's and youth's groups for home economics and 4H. These programmes need the support of specialists in order to activate them.

Internally this support should come from the department of agricultural education and sociology.

Externally linkages should be established with the Ministries of Welfare, Culture, Youth and Sport, Education and Health.

Community Development

There should be a "human" social contact with the farmers, helping them to develop skills in organization and problem-solving with a view to help them develop their communities. To involve them actively in this process they should participate in planning and implementation.

Mechanisms to achieve this are meetings, committees, organizations etc.

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RECOMMENDATIONS



RECOMMENDATIONS

- 1) To use reports of Mr. van Dijk on reorganization of the structure of L.V.V. as a basis for the reorganization of the ext. Services.
- 2) To recognize the need to set priorities and the means of implementing ideas from this course.
  - a) Give the extension worker participation in the planning and programming process.
  - b) Restructuring of the extension and research services to improve the communication between them and the planning, implementation and integration of programmes and projects at regional and local level.
  - c) At the level of the region establish a coordinator, for planning, programming, guiding and evaluation of the ext. programs.

At the national level a full-time extension service coordinator with functions of linkages between the extension service and research and other services, programme development, training etc.
  - d) Extension agent should if possible be full-time but if not with at least 60% of his time dedicated to Ext. This requires a clear definition of functions.
- 3)
  - a) Training of Extension workers should be on extension philosophy principles, methodology, techniques as well as on technical subjects.
  - b) There should be a systematic progressive and permanent process of training (induction and in Service) permitting the continual up-grading of extension staff. This should be the responsibility of the national coordinator of extension. This should be based on needs evaluation at regional level.
  - c) There should be possibilities for training in extension in specific countries with successful experiences in extension especially in densely populated areas.

- 4) Objectives standards and procedures for the selection of personnel.
- 5) Creation of evaluation (process) system of personnel which should form the basis of promotion, salary increase and sanctions.
- 6) Promote periodic regular meetings of extension personnel at a national and regional level, to interchange ideas and experiences and evaluate the results of their activities.
- 7) Set-up at the national, regional and local level annual programmes with clearly defined goals, priorities, resources and activities, and subjected to a systematic process of evaluation.
- 8) Establish a communications support system for the extension service with responsibility for preparing crop guides audio visual and advising and training extension agents in communication techniques etc. radio and t.v. programmes etc.
- 9) Explore the possibility of using specialist personnel of the research service as subject matter advisers to extension services programmes.
- 10) Establishment of local, regional boards of farmers, extension and research personnel to identify problems, policies and programmes in production, marketing, research, farmers education, credit etc. .
- 11) Set up at the national, regional and local level an institute to train the youth and other new farmers in general farming based on practical training.

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### EVALUATION OF THE SHORT COURSE

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The evaluation of the course was made on a day to day basis through the discussion group reports which allowed the instructors to assess the degree to which the participants understood the material under analysis. This also permitted instructors to include content matter sought by the participants. An initial survey of group goals and work problems was carried out the first day to provide information about the needs of the participants.

A final evaluation of the course by the participants was carried out by these by means of a questionnaire prepared by the instructors. The results of this appear below:

1. Usefulness of the course: 16 considered it to be very useful while 6 considered it to be useful none felt it to be of little use.
2. The topics that the group felt were more useful to them were: Planning, programming and evaluation (13), communication (11), technology generation and extension processes and systems; extension methods; marketing; structuring of extension (5 each), only cooperatives received negative evaluation.
3. The degree to which participants felt that they had achieved their course goals was: very much 9, much 12, little 0
4. In general all the topics dealt with were considered to be presented at the appropriate level for the students. Those that received criticism were cooperatives and to a lesser degree credit and marketing, principally because the group wanted more information. Some members of the group felt that they would like more time spent on communication and extension methods.
5. The use of work groups was highly praised, being unanimously considered to be beneficial, and 17 participants mentioned them as being what they most liked about the course as they permitted participation, increase comprehension of the subject matter, and the opportunity to express their ideas and talk about their experiences.

6. Other items liked were the opportunity to meet fellow workers and individual preferences for different topics or focusses.
7. The group liked least the fact that the panel was cancelled (9), and there was an absence of policy-makers (2), the timetable was also criticised by a few participants (3).
8. With regard to facilities these were in general esteemed to be acceptable (21), the only criticism again being directed about the timetable (5).
9. Suggestions concerning the improvement of future courses were:
  - Written support papers should be given out before the different lectures to facilitate comprehension (5)
  - There should be participants from: policy-makers, reseachers, and farmers. (4)
  - The timetable should be shorter (finishing at 3 p.m.) although the course could be longer (3)
  - Courses should be held more frequently, and perhaps at a regional level.
10. Topics mentioned as content for future courses were:
  - cooperatives (9), planning, programming and evaluation (9), communication (6), extension in general (5), marketing (3), and management (3).
11. In general considerable: satisfaction was expressed by the group in its responses, and the desire was stated for further training and follow-up.

CLOSING REMARKS



From the Course Coordinator LWV

Mr. Minister of LWV, Mr. Director of LWV, Mr. Director of IICA, Mr. Le Morvan, honoured guests, ladies and gentlemen.

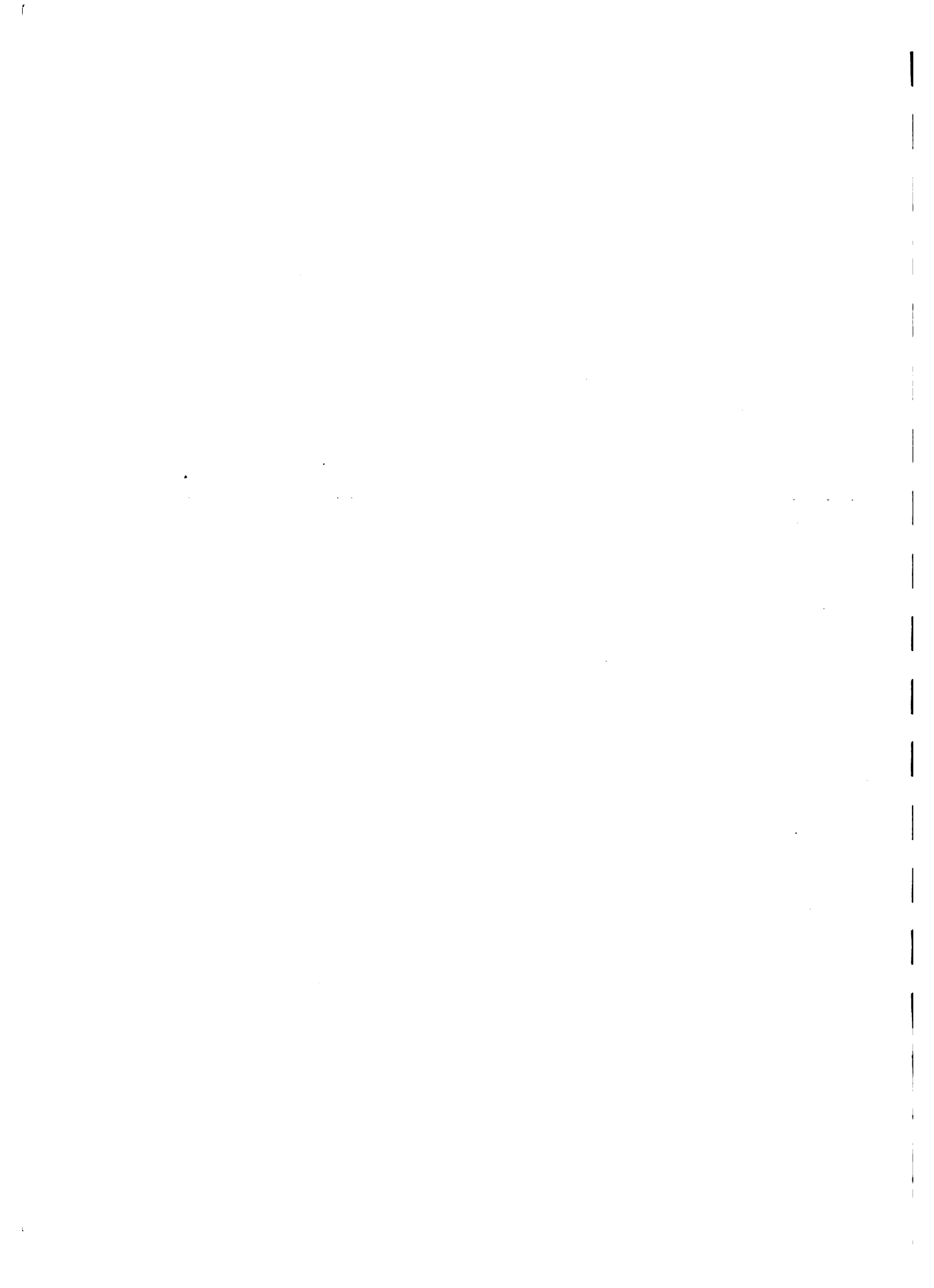
In closing this in-service training we are gathered here to request the Minister to hand out the certificates to the participants, by which I will also invite the Director of LWV and IICA to have a share in presenting the certificates.

In evaluating the course we can state that based upon full participation out of 25 candidates we will hand out 24 certificates to the group of participants.

We have come to a set of recommendations, inspite of the fact that a panel discussion did not take place according to schedule and that this will be presented later to the Minsiter of LWV.

After we have given a spokesman among the participants the opportunity to express their gratitude coupled with some gifts to Mr. R.R. Huiswoud, Mr. G. Villanueva and Mr. Le Morvan we will ask the Minsiter to declare the training for closed.

R. Huiswoud



From the Director of IICA/Suriname

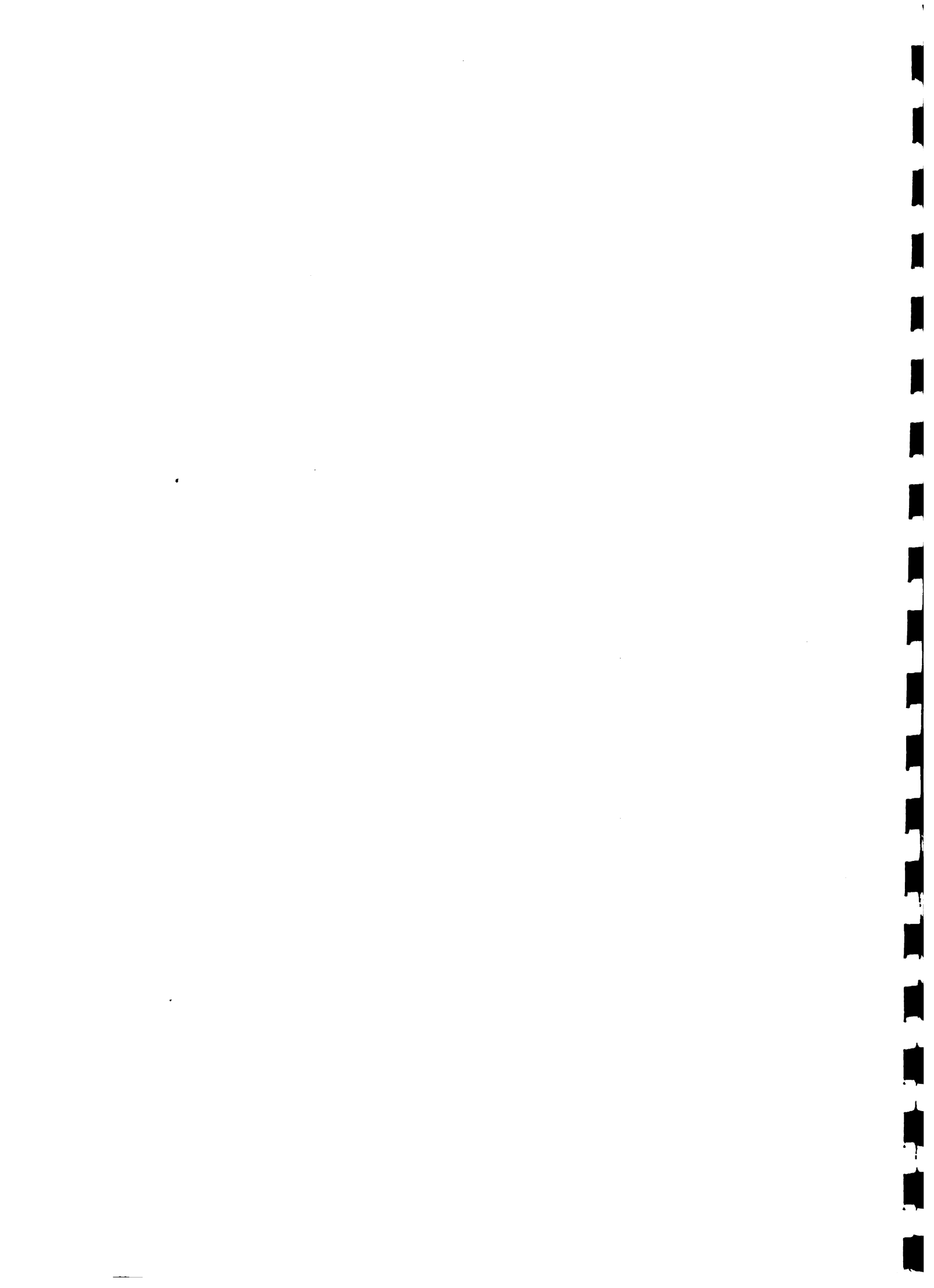
Today once again the joined efforts of IICA and IAV end up in closing one technical event successfully programmed for the current year.

We may say that it was successful because the goals and objectives of this course on agricultural transfer of technology were reached thanks to the active intervention and cooperation from each of the participants. They were receptive to the concepts and methodologies discussed during the different sessions of this course. For two weeks this group of technicians has worked very hard for the benefit of research and extension, in particular, and for the agricultural sector in general. They had contributed tremendously providing the information and recommendations for the integration of research and extension service. I have the confidence that this group of technicians will bear in mind that the existing technology does not have to be totally replaced or changed and that their efforts have to be aimed to improve the traditional system. In this way the farmer plays a very important role because he is the one who could say what parts of the new technology have to be adapted.

We would like to use this opportunity to express our gratitude to those who have worked in the organization and the implementation of this activity and our sincere congratulations to the 26 participants.

THANK YOU !!!

G. Villanueva





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