

ATLANTIC ZONE PROGRAMME

Programme Paper No. 2

PROGRAMME DOCUMENT

**Agricultural research programme
in the Atlantic Zone of Costa Rica**

Turrialba, January 1987

**CENTRO AGRONOMOICO TROPICAL DE
INVESTIGACION Y ENSEANZA - CATIE**

**AGRICULTURAL UNIVERSITY
WAGENINGEN - AUW**

**MINISTERIO DE AGRICULTURA
Y GANADERIA - MAG**

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SUMMARY

This document describes the activities of the Agricultural Research Programme in the Atlantic Zone of Costa Rica, commonly called the Atlantic Zone Programme.

This programme is implemented by the Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) in Turrialba, Costa Rica in cooperation with the Agricultural University Wageningen (AUW), the Netherlands. The third partner in the cooperation is the Ministerio de Agricultura y Ganaderia of Costa Rica (MAG). The programme is designed for a period of 5 years, 1986-1990. Cooperation agreements have been signed between the partners for the period April 1986 - January 1988. These agreements can be extended by an exchange of letters.

The long-term objective of the programme is to contribute to stable socio-economic and ecological development and increased well being of the population of the Atlantic Zones of Central America and Panama. Dominant structural transformation processes will be investigated by the three cooperating partners, leading to useful building blocks for agricultural policy making and development planning. The research will start with an exploratory survey and a baseline study. On the basis of data collected and problems identified during these studies, further research into major transformation processes will follow. As funds to carry out these research projects cannot be fully supplied by the 3 partners, external finance will have to be procured as from 1987.

The leading partner in the research is the Agricultural University Wageningen, supplying 4 investigators, 2 junior research workers and postgraduate students to do the field work. CATIE participates in the studies with senior research officers and graduate and post-graduate students. MAG technicians participate in the research and receive in-service training.

The baseline study is executed in the cantons Pococi, Guacimo and Siquirres in the northern part of the Atlantic Zone of Costa Rica, and in the canton Talamanca in the southern part. The approaches of the study are based on land resources, land use and farming and socio-economic and institutional aspects.

The programme is directed and monitored by a committee consisting of the director of CATIE, the director in charge of research and extension of MAG, and the representative of the Agricultural University Wageningen. CATIE and AUW each appoint a programme coordinator. The programme will be evaluated in spring 1988.

The headquarters of the programme is at CATIE in Turrialba, Costa Rica. The field office for the first two years is in the MAG premises of the Los Diamantes Experimental Station, Guapiles.

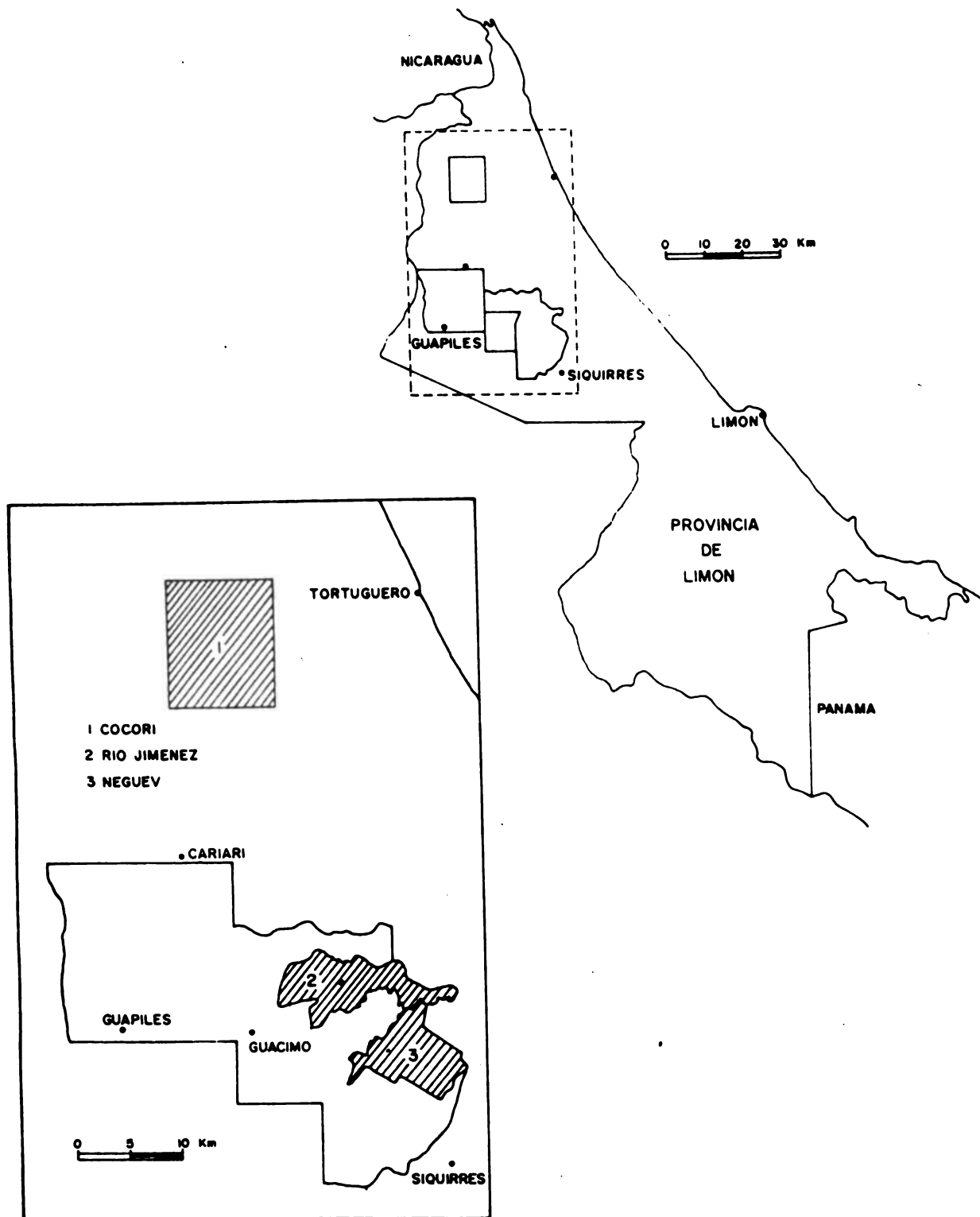


Figure 1. Areas and subareas (hatched) where soils will be mapped and evaluated during 1987 for the baseline study.

1 INTRODUCTION

This programme document describes the Agricultural Research Programme in the Atlantic Zone of Costa Rica. The programme is part of the research and training cooperation between the Centro Agronomico Tropical de Investigacion y Ensenanza (CATIE) in Turrialba, Costa Rica, the Ministerio de Agricultura y Ganaderia of Costa Rica (MAG) and the Agricultural University Wageningen (AUW), the Netherlands.

2 BACKGROUND

In March 1984 CATIE and AUW signed a letter of intent as a first step towards long-term cooperation in the field of joint multidisciplinary research and training. The first joint activity to be undertaken was identified as the research of structural transformation problems in the Atlantic Zone of Costa Rica, with the ultimate aim of providing the relevant insights needed for agricultural planning purposes. Within this context the problems of sustained land use, small farm development and rapid deforestation were to be highlighted. The initiative received strong support from Costa Rican authorities like MAG and MIDEPLAN (Ministerio de Planificacion Nacional y Politica Economica).

In April 1985 an AUW mission visited CATIE to formulate more specific research proposals that would fit within the general objective of studying structural transformations in agricultural systems prevalent in the Atlantic Zone. The region was visited and several institutions dealing with rural research and development in Costa Rica were consulted. The mission concluded that insufficient information was available for selection of specific research domains or specific geographical areas of study. Hence, for 1986 an exploratory survey was proposed, to be followed by a baseline study in 1987 before specific research projects would be formulated, to be initiated as from 1988.

In March 1986 the official cooperation agreement between CATIE and AUW was signed, and in May 1986 an agreement between CATIE, AUW and MAG followed (see annexes). Additional agreements have been signed with the Instituto Geografico Nacional (IGN) and the Asociacion Bananera Nacional (ASBANA). Agreements with other institutions may follow.

The exploratory survey was carried out in May and June 1986, and resulted in the selection of study areas and in a more specific formulation of themes to be studied in the baseline study (SLUYS et al., 1987).

The present programme document was drafted in December 1986, after six months of activities in the field. It defines the general framework of the Agricultural Research Programme in the Atlantic Zone of Costa Rica and formulates the general plan of operations for 1987 and 1988.

3 OBJECTIVES

The long-term objectives of the programme are of three different kinds: research, training, and a contribution to development planning.

- The research concentrates on major transformations in the agricultural systems prevalent in the Atlantic Zone of Central America and Panama.
- The research is to be executed by researchers of AUW, CATIE and possibly other institutions, with the aid of AUW, CATIE and other M.Sc. and Ph.D. students. The training of these students is the second objective of the programme.
- The research is development-oriented and may be used by third parties to design applicable development policies for both government institutions such as MIDEPLAN, MAG or IDA (Instituto de Desarrollo Agrario; the land reform institute of Costa Rica) and private organizations such as farmers' cooperatives and associations, like ASBANA.

Although the general area under consideration is the Atlantic Zone of Central America and Panama, the research starts focusing on the Atlantic Zone of Costa Rica, defined by MIDEPLAN as the region Huetar Atlantica. This includes the entire Province of Limon and the district of Horquetas in the Province of Heredia.

4 RESULTS OF THE EXPLORATORY SURVEY

The exploratory survey was done between April and July of 1986, with the objective of making a rapid identification of the dominant land use systems, physiographic land units, problems and transformations. This identification aimed at the formulation of research items for the baseline study and the choice of representative study areas.

The exploratory survey team comprised the following disciplines: soil science, vegetation science, landscape architecture, social forestry, forest technology, rural sociology, agricultural economics, animal husbandry and agronomy.

The survey started in the Netherlands with the compilation of a bibliography, literature study, interpretation of aerial photographs, design of checklists and general field work preparation. The field work was done in May and June. In this period transformations in land resources and land use were examined, and informal interviews were held with farmers, labourers and rural institutions. Subsequently a preliminary working document was drafted (ANON., 1986). A final summarizing report (SLUYS et al., 1987) was written by the permanent field staff on the basis of reports submitted by the individual team members. The situation in the Atlantic Zone was characterized as follows.

A number of major interrelated processes have shaped and still are

shaping the Atlantic Zone. These processes are deforestation, the influx and colonization of people from outside the area, the (re)distribution of land, the construction of new roads, the movement of foreign banana companies, the changes in crop patterns, and the tendency towards intensification. Based on these processes two geographic areas were distinguished within Huetar Atlantica.

The 'central railway area between Limon and Guapiles', which is characterized by:

- Relatively early settlement, since the second half of the 19th century.
- Strong influence of banana companies on, amongst other things, land, market, employment and infrastructure.
- The relatively well developed railway and road connections with San Jose and Limon.
- A pronounced presence of government and semi-government organizations like MAG, IDA and CNP (Consejo Nacional de Produccion).
- The redistribution of land by settlement schemes, land invasions, and by buying and selling).
- The diversification and intensification in cropping and livestock systems, influenced by changes in factor prices and marketing opportunities.

The 'coastal area south of Limon', including the Estrella and Talamanca valleys, which is characterized by:

- A population of Amerindian, African and more recently of Spanish origin, each with their own culture or way of farming and living.
- Relative isolation from the rest of the country, resulting in little integration with the national economy and a strong orientation towards export markets.
- A vulnerable economy depending on a few cash crops (banana, cocoa, plantain), and lack of alternative activities and employment opportunities.
- The recent and ongoing improvement of the road network and other infrastructure, related to oil and pitcoal exploration and exploitation by RECOPE (Refinadora Costarricense de Petroleo S.A.).
- A somewhat drier climate than in the rest of Huetar Atlantica, of interest in view of the prevailing fungus diseases.

A third area of interest is formed by the 'agricultural frontiers' found dispersed over the area under review. Though not a distinct geographical area these frontiers, where new farm land is opened, deserve special attention because of the role deforestation and colonization play there. Examples are the foothills of the Cordillera de Talamanca, the Lomas de Sierpe (Azules), and the Llanura de Tortuguero. For the sake of this treatise these frontiers are considered as one.

Characteristic of these frontiers is:

- The logging of valuable timber species.
- The strong immigration from other parts of Huetar Atlantica and Costa Rica.
- The interrelated phenomena of land occupation ('precarismo') and land speculation.
- Expansion of farm land, notably for extensive grazing.

The logging and the strong immigration are particularly marked in the

northeastern part of the Atlantic Zone where there are no strong Amerindian claims on the land.

5 RESEARCH AREAS

The criteria for the selection of areas for the baseline study have been the following:

- Representative for the most important agricultural transformation processes in the Atlantic Zone of Costa Rica.
- Including more than one dominant farming system to enable multi-disciplinary study of the interactions between these systems and between them and their environments.
- Attractiveness for training purposes.

The exploratory survey team recommended two areas for the baseline study:

- The cantons Pococi and Guacimo, with both the 'central railway area' and several 'agricultural frontiers': Lomas de Sierpe, Lomas de Cocori, slopes of Turrialba and Irazu volcanos.
- The district Sixaola in the canton Talamanca, representative for the 'coastal area south of Limon' and the 'agricultural frontiers' in the foothills of the Cordillera de Talamanca.

Within these areas subareas had to be selected in such a way that both a deforestation area and settlement schemes would be represented.

For the first half of 1987 the following subareas have been chosen:

- The Lomas de Cocori and surroundings, 50 km north of Guapiles, covering about 120 km², with 150 households. In this area the land is deforested by precaristas, bought by urban landlords and subsequently used as grazing land for beef cattle.
- The western half of Rio Jimenez district, 20 km ENE of Guapiles, 55 km², with about 200 farm households. The subarea has a relatively long settlement history. Railway remnants witness that large parts were once used for plantation agriculture (banana, abaca). Nowadays the land is used by small and medium scale farmers for milk and beef production and maize, rice, cassava, cocoa and fruit tree growing. Increasing scarcity of land and changes in marketing possibilities force farmers towards intensification and specialization.
- The IDA settlement scheme Neguev, 25 km ESE of Guapiles, about 55 km². Neguev was once a large extensive cattle estate and has been subdivided into 310 farms for settlers of various origins. Intensification processes in Neguev, amongst others from pasture to annual crops, are guided by IDA.

Where relevant the surroundings of the subareas may also be studied, such as banana plantations where farm household members find off-farm employment.

Subareas for the second half of 1987 are still to be selected. Their number and characteristics depend on the experiences of the first half of 1987. Some options are:

- The slopes of the Turrialba and Irazu volcanoes, where deforestation and soil degradation are apparent.
- Hone Creek in the canton Talamanca, where the past (?) decline in cocoa yields and areas created unemployment and stagnation.
- Margarita or Paraiso in the canton Talamanca, where plant diseases and marketing are major problems and where landrights are disputed between the official owners and occupants.

6 METHODOLOGY AND OUTLINES OF THE BASELINE STUDY

6.1 The research approach

The objective of the baseline study is to gain a deeper insight into transformation processes in the Atlantic Zone. The approach used is based on three major research components to be studied separately and in mutual relationship.

- (1) The land as natural resource;
- (2) Land use and farming;
- (3) The socio-economic and institutional context.

For practical and methodological reasons the total field of research has been split up into three areas. Their interrelation is shown in figure 2.

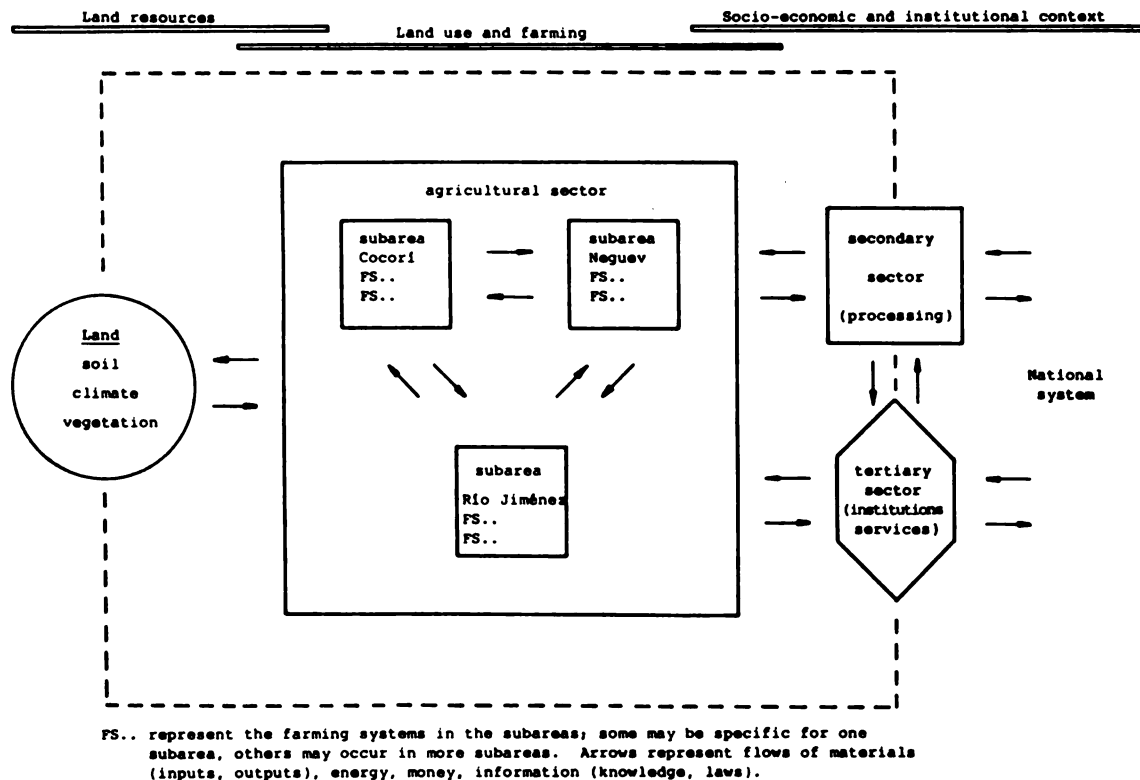


Figure 2. The Atlantic Zone regional system (adapted after FRESCO, 1986) and the research components of the CATIE/AUW/MAG programme.

Of all components both the history, actual situation and ongoing transformation processes will be analysed and described. This will provide the benchmark data needed for future reference, and will reveal the positive and negative impacts of the dominant transformations within the study areas. The outputs of the baseline study will be the starting point for the formulation of further interdisciplinary research projects and will serve research and development planning.

Major disciplines involved are soil science, forestry, agronomy, animal husbandry, agricultural economics and rural sociology. The rationale for their participation, and their expected contributions in the three major research components are outlined below.

For each of the components the baseline study comprises three parts.

- (1) Surveys and inventories. A soil survey and land evaluation, revealing land use systems and environmental phenomena, leading to recommendations for technically stable land use systems. A broad farm survey aimed at studying farming systems and farmers' activities, revealing farm development as seen from the point of view of the individual farmer. A socio-economic and institutional survey at regional and local level, of both private and government institutions. This survey is to reveal the social and political dynamics within the study areas.
- (2) Specific studies. Special subjects or special problems identified during the exploratory survey or the surveys referred to above are studied in more detail.
- (3) Evaluation. The preliminary findings of the surveys and specific studies will be discussed with farmers, farmers' organizations, extension workers and institutes to correct, deepen or complete the information obtained so far. At the same time this evaluation and confrontation provide the basis for further planning or strategy development.

6.2 Land resources

The search for sustainable forms of land use in the Atlantic Zone of Costa Rica is an important objective of the research programme. The rapid transformations in the agricultural systems produce considerable changes in natural resources, especially natural vegetation and soil. The Atlantic Zone is an area with 3 - 5 m annual rainfall, where rain forest thrives best. Deforestation not only brings about a considerable loss of valuable floristic and faunal communities, but can also lead to a rapid decline of soil productivity. This in turn can cause yield reductions in agriculture and animal production. It is therefore of importance to devise durable land use systems that limit soil degradation.

The search for sustainable forms of land use requires efforts in soil survey and land evaluation. As yet, there is little systematic knowledge available as to what changes occur in the soil as a result of deforestation, and how present land use affects soil characteristics and future productivity of land. Decline of various important land qualities has been noted, but it is not known to what

extent, and predictions about future development are difficult. It is evident that ecological aspects are important when assessing durability of land use systems. On the other hand, land use systems should also be durable in the socio-economic sense. In other words, evaluation of the relevance of land use systems requires cooperation between the disciplines involved in the research.

Specific questions to be answered by the soil survey and land evaluation programme during the baseline study and thereafter are the following:

- (1) What is the extent of various soil types in the region and what are their characteristics?
- (2) How do soil and land characteristics change, if forest is removed and replaced by other types of land use?
- (3) What is the productivity of land for various land use alternatives and how do present forms of land use affect the productivity of land?
- (4) What are sustainable forms of land use for various land units and which alternatives are possible?
- (5) Are soil resources in cleared areas used optimally? If not, what are the constraints for their better usage?
- (6) If resources in cleared areas were better utilized, could it stop or slow down deforestation? If not, what are the motives for deforestation and what should be done in the field of nature conservation?

The following inventories and studies are necessary to answer the above questions.

- (1) Inventories of soils, vegetation, land use systems and production capacity of land.
- (2) Specific studies regarding (a) effects of land use on characteristics of land, (b) land evaluation.

The inventories form an integral part of the baseline study. They provide the necessary framework for the formulation of specific studies. Moreover, they are indispensable for the assessment of land characteristics in the areas covered by the farming systems studies. In view of the limited time available not all necessary specific studies can be covered during the baseline study.

A general characterization of the vegetation and biotope in the subareas, including their function for soil and water conservation, is part of the studies executed by the forestry scientists participating in the research. The legal and the de facto status of the forests are studied in the setting of formal and de facto forest policy. Furthermore, the use of the forest by the local population and others is studied in the formulation of forest management technology and the ecological consequences of deforestation. Where appropriate, processing and marketing of forest products will be described. The reforestation process and the management and exploitation of existing tree and forest plantations are studied together with aspects of labour use in forestry, agriculture and non-agricultural employment.

6.3 Land use and farming

Some of the most conspicuous expressions of the transformation processes in the Atlantic Zone are the development and changes in land use and farming. The baseline study focuses on patterns of agricultural transformations. One of the directions to view these processes is from within the farm: farming systems approach. The studies envisaged analyse the transformations from the farm(er)'s point of view. They focus on the way the farmer views his changing ecological environment and socio-economic and institutional context, on the way he responds to the conditions and changes, and on changes he initiates himself: transformations in the farm structure.

As part of the baseline study three types of farming systems studies will be done. First a broad farm survey among 50 randomly selected farms in each of the subareas, thereafter specific studies on smaller subsamples of farms for selected themes, followed by a third phase in which the obtained results and views are tested and complemented by confronting them with farmers' views. All steps involve literature study, talks with key informants in institutions and - most important - on-farm field work consisting of structured and open interviews and qualitative and quantitative field observations.

During the broad farm survey first the objectives and methods of the programme are explained to the farmers in the subareas and they are asked if they are interested in cooperation. Then there will be a short structured interview about the following aspects of farm and household: history and background, household composition, resources, activities, relations and problems. Further the farmer's opinions on his land and on his socio-economic and institutional context, notably on institutions that render services to farmers, are asked. The emphasis is on straightforward and easily collected data, as present knowledge about the farmers and their farms is too limited to engage in complex interviews.

The results of the interview:

- provide a general picture of agriculture in the subareas and a first contact with farmers' problems and opinions;
- enable comparison between subareas and validation of the assumed differences between them;
- help to classify farms for stratification and the selection of farms for the specific studies;
- place specific studies of smaller samples in a wider framework.

Specific studies are intended to study agricultural activities, problems and possibilities in more detail. Those on land use and farming fall into 4 main categories:

- (1) Farm case studies: detailed analysis of the overall management of a few selected farms in order to understand how farms function.
- (2) Farm subsystems: off-farm work, cropping, livestock and agro-forestry systems.
- (3) Household: decision making, labour and consumption. Social organization and dynamics within the farm household: perceptions and goals of different members and how they try to attain them,

who takes which decisions, how is labour divided, rights with regard to use of farm products.

- (4) Weather, production and workability. The influence of the weather (notably rainfall) in connexion with soil properties on crop and livestock yields and on the planning and execution of farm activities.

The emphasis of the specific studies is on the study of production subsystems as material reflections of past transformations, of the individual farmer's background, resources, possibilities and environment and the way he judges these. Moreover they are the starting point for future transformations. The following aspects of the major production subsystems will be studied (with variations): history, occurrence, scale, importance, aims and decision making, inputs (land, labour, capital), management and technology, weeds, pests and diseases, outputs, ecological stability, technical efficiency, economic performance, social attractiveness, and alternatives. Relations with other farm subsystems and input supply, marketing, extension, credit will be taken into account. Emphasis will be on changes, reasons for changes and practices, problems and possibilities.

Knowledge of farming systems only gradually takes shape. During the first steps of the baseline study farmers and researchers have to get used to each other, important aspects may have been overlooked, or due to lack of insight it may not yet have been possible to translate them into appropriate methods/questions. Moreover the integration of the several disciplines involved in the studies also needs time. The verification and complementation step has two objectives:

- to collect additional, more complex or sensitive information;
- to check the obtained views against farmers' knowledge and opinions.

For the on-farm component the verification takes place by interviewing farmers who participated in the previous two steps, and key informants. Part of the interviews will be structured, to enable quantification, a large part will be informal and open, a discussion with the farmer and his household.

6.4 Socio-economic and institutional context

Focusing on agricultural transformations in the zone, economic and sociological studies bear on long and short-term changes in demographic, economic and sociological parameters that result from past changes in land use at the same time causing present and future transformations in land use and farming.

The zone is characterized by a relatively late settlement in the 19th century, under the influence of plantation agriculture. It existed in virtual isolation from the rest of Costa Rican society until the 20th century, when the region's economic and social configuration and context started being shaped and consolidated.

Pronounced changes occurred from the sixties as a result of a series of social and demographic phenomena together with an active participation of the state in the development of the Atlantic Zone.

Consequently the configuration and socio-economic context can be described and understood by studying the interaction between state policy, population and social aspects, and private enterprises, mostly banana plantations linked with (inter)national capital.

At this moment, more or less as a result of that interaction, the social and technical organization of agriculture varies greatly in the region:

- (1) Indigenous forms: having disappeared from the northern part of the zone, with some remnants still present in the Cordillera de Talamanca.
- (2) Plantations: emerging in the 19th century with banana production. These have maintained themselves in the zone and still define a good part of the social relations of production in particular areas (Rio Frio, Guapiles, Cariari, Villa Franca, Siquirres, Valle de Estrella, Sixaola).
- (3) Various forms of smallholder agriculture: emerging as a result of 'spontaneous' land colonization and occupation, or guided land settlements through IDA.
- (4) Large cattle estates: generally following 'spontaneous' colonization, and associated with both national and foreign financial interests.
- (5) Various forms of commercial crop production on medium-sized farms: crops like ornamentals, macadamia and pejobaye are increasingly cultivated on fairly labour-intensive farms, using modern inputs and having close links with national and world markets.

To study the socio-economic and institutional context of changing land use and farming (especially smallholder agriculture) three approaches are made.

- Historical: how have general demographic and cultural trends affected the Atlantic Zone in the last two centuries?
- Structural: what are the actors and prevalent social relations of agricultural production in the zone and how are they linked to interests beyond the zone?
- Institutional: which private and public institutions are operating in the zone, how and with which policies do they function and how do they relate to their various constituencies, clientele or competitors?

Central issues to be studied in connexion with these approaches are the access to and control over land, development, communication and transfer of technology, and furthermore marketing, labour, capital and finance, all of which are considered basic elements related to transformation of land use and farming. Most of these issues will be the subject of specific studies.

General subjects such as state policy, demographic and social aspects, including farmers' organizations and the agrarian history of the Atlantic Zone, are studied on the basis of literature reviews and interviews with informants, institutions and organizations, presenting a survey of economic and social transformations in the Atlantic Zone.

Surveys and specific studies at the national, regional and subarea

level will specify the farmers' vision and strategies, the institutional policy or strategy and their interaction as to issues or elements such as land, technology, markets, labour and finance.

Confrontation and evaluation of preliminary outcomes will take place in special meetings or workshops with farmers' groups and institutional agents in order to integrate elements of the different research components and to promote the active participation of the different groups involved in the development of the region or subarea.

6.5 Remarks on the integrated approach

An interdisciplinary and integrated approach is recognized to be difficult. But it is indispensable if the various interrelated transformation processes in the Atlantic Zone are to be understood

A way to ensure a permanent integrated analysis of the interaction between physico-biological and socio-economic (trans)formations, is a regular confrontation and discussion of the preliminary findings and conclusions. This will take place at institutional as well as at farmers' level. Such confrontation and evaluation, i.e., an integrated analysis with active participation of the various groups involved, implies an important training element. Apart from an integration of disciplines, the object of this approach is combining the technical top-down vision with the more subjective bottom-up farmers' view and the empirical knowledge available at grassroots level.

In the process new issues or phenomena are being identified for specific studies or may provide a basis for the formulation of further interdisciplinary research or development programmes.

6.6 Outputs

The expected outputs of the baseline study are:

- (1) A review of the available literature, non-published results of research and other studies relevant for a synthesis of the different surveys and inventories on each of the major research components.
- (2) Monographs, one for each sub-area, presenting the most important structural transformations so far, a quantitative description of the major elements of the three components described sub 6.1 and a diagnosis of the most important constraints to ecologically sound and socially acceptable agricultural development.
- (3) Treatises on specific subjects like important farming sub-systems, soil compaction, maize prices and markets, access to institutions, and transfer of technology.
- (4) Maps. For each sub-area and for part of the study areas maps on demography, infrastructure, institutes, soils, actual and potential land use.
- (5) A final summarizing report indicating the most significant transformation processes and problems in the study areas and presenting alternative proposals for further research aimed at solving these problems.

These outputs are to be available by the end of 1987 and early 1988.

7 ORGANIZATIONAL STRUCTURE

The Atlantic Zone Programme is a joint effort of CATIE and A UW in collaboration with Costa Rican ministries and institutions. CATIE and A UW have signed an agreement for cooperation starting 1 April 1986 and ending 31 December 1987. Prolongation of this agreement is envisaged. A similar agreement has been signed between CATIE/A UW and MAG. Whenever required CATIE/A UW will formalize the collaboration with other institutions through separate agreements.

CATIE, A UW and MAG have created a directing committee, consisting of the director of CATIE, the representative for activities in Costa Rica of A UW, and the director of research and extension of MAG, or their appointees.

CATIE and A UW have each appointed a programme coordinator who is responsible for the proper coordination of the scientific, logistical and administrative inputs of his respective parent organization. They jointly coordinate programme policy and planning.

A technical advisory committee will be created consisting of scientists of CATIE, A UW, and MAG and of independent advisors appointed by the directing committee.

Apart from the programme coordinator, A UW has manned the programme with three permanent researchers:

- (1) A soil survey and land evaluation specialist;
- (2) A farming systems agronomist;
- (3) A rural sociologist.

They will be assisted by some junior research workers, and by several postgraduate students from both institutions.

The responsibility for each subject matter lies with the scientist concerned irrespective of the subarea where the study is being carried out. Logistic responsibilities per subarea are shared between the research workers.

The organizational structure of the programme is shown in figure 3.

8 TIME SCHEDULE

The programme time schedule, indicating major activities and report output, is shown in figure 4.

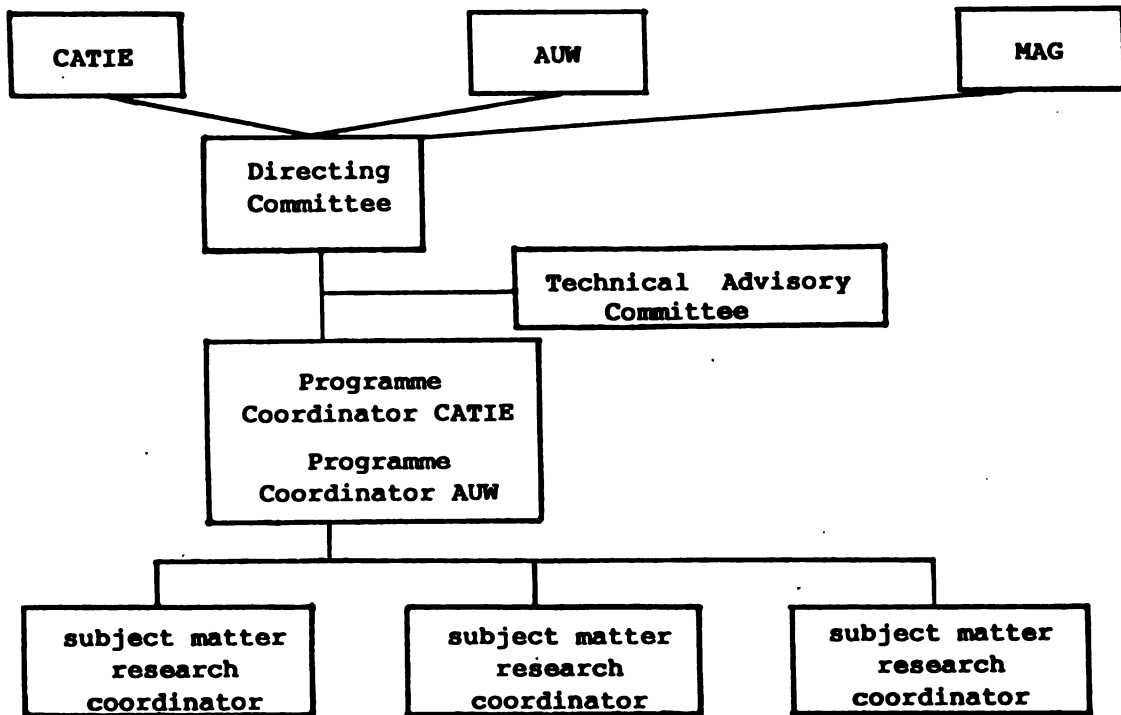
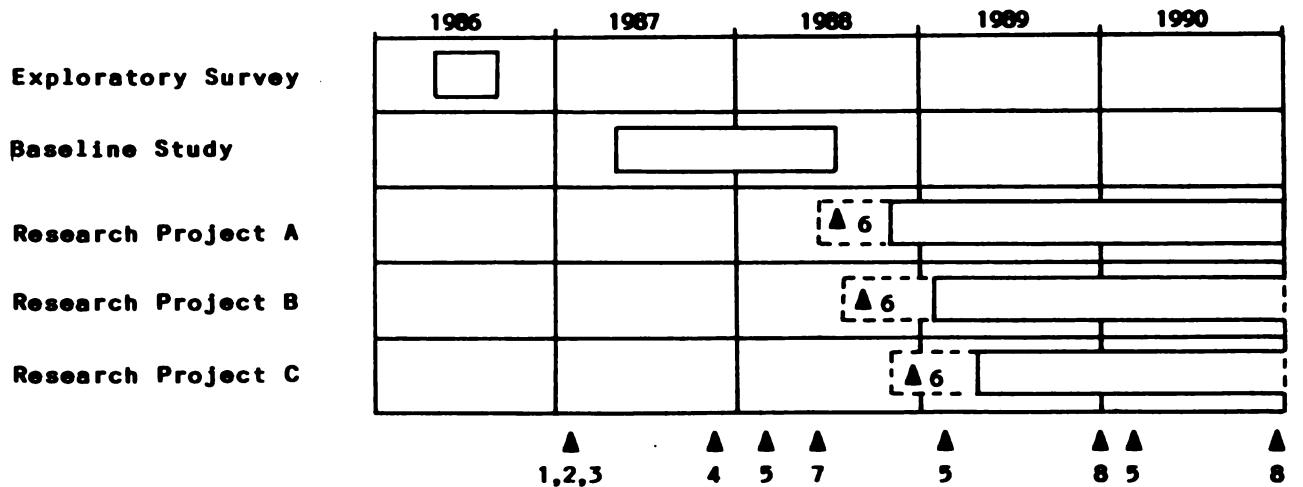


Figure 3. Organizational structure of the programme.



- | | |
|---|--|
| <ul style="list-style-type: none"> 1 Programme document 2 Exploratory Survey report 3 Workplan 1987 4 Drafts Baseline monographs and detailed study reports | <ul style="list-style-type: none"> 5 Annual Research progress reports 6 Research projects proposals 7 Baseline Study report 8 Research project reports |
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Figure 4. Time table of planned research activities and reporting schedule.

9 BUDGET AND LOGISTICS

9.1 The budget

AUW has agreed to finance programme overheads, logistic support and research operation costs for the period 1986-1990. Available funds for that period are Hfl 470,000 per year. These budgets will not be sufficient to cover all research expenses of the projects envisaged, so that additional financing will have to be obtained from external sources.

9.2 Logistics

CATIE will provide office space, access to its library and laboratory and other facilities open to its partners.

MAG will provide office and lodging facilities at their Experimental Station Los Diamantes. It will also assist in soil analytical work at their laboratory in Guadelupe.

WAU will provide funds for office equipment, vehicles, travel allowances, salaries of local personnel, general overhead costs and research equipment.

ANNEX 1. MEMORANDUM OF AGREEMENT CATIE-AUW

**MEMORANDUM OF AGREEMENT BETWEEN THE CENTRO
AGRONOMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA AND
THE WAGENINGEN AGRICULTURAL UNIVERSITY FOR THE
ESTABLISHMENT OF A PROGRAM
IN DEVELOPMENT ORIENTED RESEARCH AND TRAINING**

1. INTRODUCTION

The Centro Agronomico Tropical de Investigacion y Enseñanza, hereafter referred to as CATIE, represented by its Director Dr. Rodrigo Tarté Ponce, and the Wageningen Agricultural University, hereafter referred to as WAU, represented by the Executive Board.

Considering that CATIE is a regional research and training institute, dedicated to fundamental and applied research in tropical agriculture.

Considering that CATIE stimulates the intellectual exchange of ideas with other institutions for agricultural research, and that it wants to stimulate these exchanges by joint efforts in research and training in various disciplines.

Considering the general agreement between the Intituto Interamericano de Cooperación para la Agricultura (IICA) and the Ministry of Agriculture and Fisheries of the Netherlands, signed August 8th, 1983 in San José and the cooperation Agreement between CATIE and IICA as well as the fact, that IICA is a regular member of CATIE.

Considering that WAU is also oriented towards research and training for tropical agriculture, and has a long history of cooperation with different institutions in tropical countries.

Considering that WAU wants to establish with CATIE a joint multidisciplinary research and training program.

Considering further the letter of intent between CATIE and a WAU mission signed March 16th, 1984 in Turrialba.

Both parties in principle agree on the following.

2. ON THE OBJETIVES OF THE COOPERATION

The long-term objectives of the agreement are:

- a) To increase knowledge and insight into the ecological and agricultural problems of the member countries of CATIE through the implementation of mutual research, teaching and training projects.
- b) To contribute to the rural development of the member countries through the implementation of applied research and the provision of assistance to the formulation of development oriented programs.
- c) To realize mutual benefits in the field of training both qualitatively and quantitatively.

- d) Research and teaching projects are distinguished.

3. ON THE PRINCIPLES OF RESEARCH PROJECTS

- a) The research will be based on the principle of equal partnership.
- b) The research will be of interdisciplinary nature.
- c) The research will be multifunctional serving scientific, educational and developments goals.
- d) The research will be long term.
- e) Participation of third parties will be sought where necessary.

4. ON THE TEACHING AND TRAINING PROJECTS

- a) CATIE and WAU will strive to improve the quality of teaching and training at both institutes through the exchange of teachers and teaching materials and by the implementation of special teaching and training projects.
- b) The participation in teaching and training of WAU staff allocated to research projects consists of in-service training,, seminars on subjects related to the research, and supervision of thesis work. The total amount of teaching time should not exceed 10 per cent, unless agreed differently.

5. ON THE DEVELOPMENT OBJECTIVES

Where possible CATIE and WAU will support local services aimed at sustained agricultural production and the improvement of the living conditions of farmers with limited resources.

6. ON THE INITIAL RESEARCH SUBJECTS

- a) The research will initially concentrate on ecological and agricultural problems of the Northeastern Atlantic Zone.
- b) An exploratory survey and a baseline study will be carried out in the period 1986-1987.
- c) The exploratory survey will be followed by a further elaboration of research themes and research areas. Preliminary thoughts on research themes are about land use history, deforestation problems and farming systems on land which has been used for banana cultivation.

7. ON THE ORGANIZATION OF THE COOPERATION

- a) The duration of the agreement is five years. The cooperation is subject to evaluation after two and a half years and at the end of the agreement period.
- b) CATIE and WAU will both appoint a General Program Coordinator. The two coordinators are responsible for the administration of the CATIE-WAU program. Both are accounts able to their respective parent organizations.
- c) If funds of CATIE and WAU are insufficient to implement research and training activities, the projects concerned can be presented to third parties for financing.
- d) Where needed, research and training projects can be implemented in collaboration with other research and training institutes both public and private.
- e) Design of projects shall be the responsibility of both parties. For each project a separate project document and a project budget will be required.
- f) Once projects are approved by both sides the responsibility for execution stays with the research coordinator or the individual scientist within the organizational frame of CATIE.
- g) Project staff should in principle be supplied by both parties.
- h) Publications of research project findings will carry the names of both partners, and if applicable of any other party participating in the research.
- i) The official language of communication between both partners is English.

8. FINANCIAL AND LOGISTICAL ASPECTS

Financial and logistical aspects of the cooperation are regulated in a separate annex of this Memorandum. The annex forms an integral part of the Memorandum and will be signed by both parties.

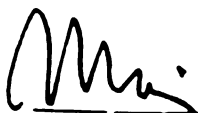
9. AMENAMENTS

The terms of this agreement can be amended with the approval of both parties by means of an exchange of letters.


In witness of the above, done in two equally valid copies of the english text at Turrialba.

Wageningen, 1985.10.09.

Agricultural University Wageningen
The Executive Board

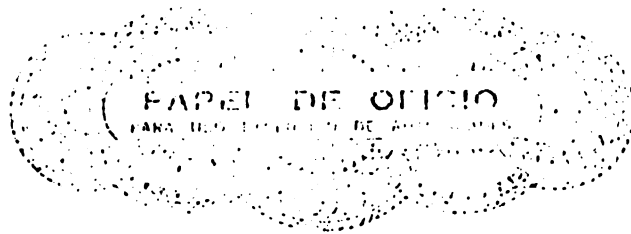


ir. R. Maris
Secretary General



Dr. Rodrigo Tarté
CATIE

ANNEX 2. MEMORANDUM OF AGREEMENT CATIE-AUW-MAG



1 CARTA DE ENTENDIMIENTO ENTRE EL MINISTERIO DE AGRICULTURA Y GANADERIA (MAG) DE
2 COSTA RICA, EL CENTRO AGRONÓMICO TROPICAL DE INVESTIGACION Y ENSEÑANZA (CATIE)
3 Y LA UNIVERSIDAD DE WAGENINGEN (UAW), HOLANDA.-----

4 El Ministerio de Agricultura y Ganadería (MAG) de Costa Rica, representado por
5 el Ministro Ing. ALBERTO ESQUIVEL VOLIO, el Centro Agronómico Tropical de Inves-
6 tación y Enseñanza (CATIE) representado por su Director Doctor RODRIGO TARTE
7 PONCE y la Universidad Agrícola de Wageningen (UAW), Holanda, representada por
8 el Doctor Jan F. Wienk, Coordinador del Programa CATIE/UAW.-----

9 CONSIDERANDO:

10 1. Que el CATIE y UAW firmaron una Carta de Entendimiento que sirve de marco
11 global a proyectos de cooperación.-----

12 2. Que el MAG, el CATIE y la UAW desean llevar a cabo un Programa de entrena-
13 miento en mapeo y evaluación de suelos a desarrollarse en la Zona Atlántica
14 de Costa Rica.-----

15 3. Que el CATIE y UAW están desarrollando un proyecto conjunto de investigación
16 multidisciplinaria, inicialmente para la Zona Atlántica de Costa Rica, orien-
17 tado al desarrollo agrícola y al uso racional de los recursos naturales.-----

18 4. Que la Zona Atlántica es de gran importancia para el desarrollo de Costa Ri-
19 ca.-----

20 5. Que los recursos naturales y humanos de la Zona Atlántica no están debidamen-
21 te cuantificados, aunque los estudios preliminares dan evidencia de que esta zo-
22 na presenta un gran potencial agropecuario.-----

23 6. Que de acuerdo con el Plan Nacional de Desarrollo, las demandas crecientes
24 de alimentos, fibras y maderas del país, hacen necesario un ordenado desarrollo
25 de esta zona.-----

26 7. Que tal desarrollo requiere el apoyo de investigaciones en el campo ecológi-
27 co y social para evitar que el mismo sea desequilibrado.-----

28 8. Que el MAG requiere los inventarios precisos de los recursos naturales y huma-
29 nos de esta zona para planificar más apropiadamente su desarrollo.-----

30 ACUERDAN:

1 CLAUSULA PRIMERA: OBJETIVOS.

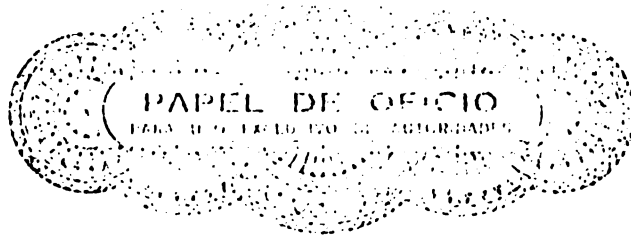
- 2 1. Llevar a cabo conjuntamente la ejecución del presente programa de inventario
3 de recursos naturales y humanos de la Zona Atlántica de Costa Rica, para formu-
4 lar medidas más apropiadas de uso, manejo y conservación de los mismos.-----
5 2. Permitir el acceso recíproco a la información técnica disponible.-----

6 CLAUSULA SEGUNDA: VIGENCIA Y DURACION.

7 La presente Carta de Entendimiento y su Anexo entrará en vigencia una vez que
8 esté debidamente firmada por las partes y tendrá validez por un período de 21
9 meses, a partir del primero de junio de 1986 y será prorrogado automáticamente,
10 si las partes no manifiestan lo contrario al menos con tres meses de antelación
11 a la conclusión de la primera fase de ese programa.-----

12 CLAUSULA TERCERA: COMPROMISOS DEL CATIE Y LA UAW.

- 13 1. Cubrir los costos operativos por proyecto, de acuerdo a las actividades y
14 presupuestos aprobados por CATIE/MAG/IDW, convenidos en la Carta de Entendimien-
15 to entre CATIE y UAW. -----
16 2. Aportar el personal técnico necesario para la implementación del proyecto.---
17 3. Otorgar al MAG el reconocimiento y créditos correspondientes en todo producto
18 y publicación derivado de los trabajos conjuntos.-----
19 4. Capacitar a través del entrenamiento en servicio, charlas y seminarios a per-
20 sonal técnico nacional y profesional del MAG.-----
21 5. Los compromisos presupuestarios y de entrenamiento de la UAW para el período
22 de junio de 1986 hasta enero de 1988 estarán especificados en forma separada, y
23 serán acordados entre el coordinador del programa, UAW, CATIE y la Dirección de
24 Investigación y Extensión Agrícola, mediante cartas complementarias anexas a es-
25 ta Carta de Entendimiento.-----
26 1. Brindar en la Zona Atlántica facilidades de alojamiento, de oficina y bodegas
27 a personas asignadas al proyecto.-----
28 2. Brindar las facilidades del laboratorio de suelos para los análisis corres-
29 pondientes.-----
30 3. Cooperar en la obtención y procesamiento de fotografías aéreas, mapas cartor-



1 gráficos y otros antecedentes técnicos de la zona (geología, geomorfología, cli-
2 ma, etc).-----

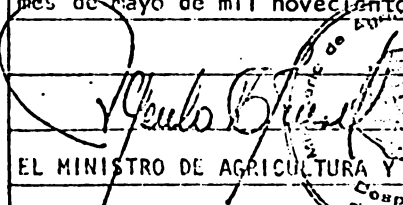
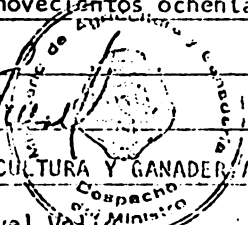
3 4. Coordinar las actividades de este proyecto a través de la Dirección de Inves-
4 tigación y Extensión Agrícola.-----

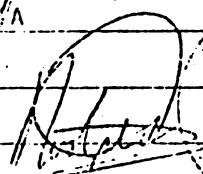
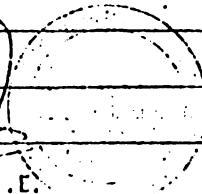
5 5. Los compromisos del MAG para el período de junio de 1986, hasta enero de -
6 1988 estarán especificados en forma separada y serán acordados y asignados por
7 la Dirección de Investigación y Extensión Agrícola, de acuerdo a su propia dis-
8 ponibilidad de recursos.-----

9 **CLAUSULA QUINTA: SUPERVISION Y EVALUACION.**

10 Para la supervisión y la evaluación de este programa se establece una Comisión
11 Coordinadora, la cual estará conformada por un representante del CATIE, una re-
12 presentante del MAG y un representante de la UAW. Esta Comisión Coordinadora -
13 será asesorada por una Comisión Técnica, compuesta por especialistas interdisci-
14 plinarios de las tres instituciones.-----

15 En fe de lo anterior, se firma la presente en San José, a los veintidos días del
16 mes de mayo de mil novecientos ochenta y seis.-----

17 
18 
19 EL MINISTRO DE AGRICULTURA Y GANADERIA
20 Irg. Alberto Esquivel

21 
22 DIRECTOR P.A.T.I.E.
23 

24  Dr. Rodrigo Tarté Ponce

25 UNIVERSIDAD AGRICOLA DE WAGENINGEN (U.A.W)
26 Dr. Jan F. Wienk

ANNEX 3. ACRONYMS

| | |
|-----------------|---|
| ASBANA | Asociacion Bananera Nacional (Association of National Banana Growers) |
| AUW | Agricultural University Wageningen, The Netherlands (Universidad Agricola Wageningen, Holanda) |
| CATIE | Centro Agronomico Tropical de Investigacion y Ensenanza (Tropical Agricultural Research and Training Centre) |
| CNP | Consejo Nacional de Produccion (National Production Council) |
| IDA | Instituto de Desarrollo Agrario (Institute for Agricultural Development) |
| IGN | Instituto Geografico Nacional (National Geographic Institute) |
| MAG | Ministerio de Agricultura y Ganaderia (Ministry of Agriculture and Livestock) |
| MIDEPLAN | Ministerio de Planificacion Nacional y Politica Economica (Ministry for National Planning and Economic Policy) |
| RECOPE | Refinadora Costarricense de Petroleo (Costarican Oil Refiners) |

ANNEX 4. GLOSSARY OF TERMS

The definitions of land and land evaluation are from FAO (1976), those of systems - some adapted - from SHANER, PHILIPP & SCHMEHL (1982) and FRESCO (1986). In the course of the investigation it may be necessary to adapt them to the situation of the Atlantic Zone.

- Agrarian transformation** The process by which the agrarian structure of an area undergoes drastic change. Agrarian transformation involves changes in land use patterns (through extension of the agricultural frontier, changes in cropping, agro-forestry and livestock systems, shifts from extensive to intensive forms of land use and vice versa), and changes in land tenure, settlement patterns, degrees of capitalization, etc. Although processes of agrarian transformation entail a consolidation of particular patterns of land use they need not be linear, i.e., they need not necessarily imply a fixed pattern of successions of clear cut stages. Moreover, they may exhibit marked (sub)regional variations.
- Land** An area of the earth's surface, the characteristics of which embrace all reasonably stable, or predictably cyclic, attributes of the biosphere vertically above and below this area including those of the atmosphere, the soil and underlying geology, the hydrology, the plant and animal populations, and the results of past and present human activity, to the extent that these attributes exert a significant influence on present and future uses of the land by man.
- Land evaluation** The process of assessment of land performance when used for specified purposes, involving the execution and interpretation of surveys and studies of landforms, soils, vegetation, climate and other aspects of land in order to identify and make a comparison of promising kinds of land use in terms applicable to the objectives of the evaluation.
- Cropping system** A subsystem within the farming system comprising one or more crops and all components required for production, including the interactions among crops, other household enterprises, and the physical, biological and socioeconomic environments. Agro-forestry and livestock systems can be defined in a similar way.
- Farm household** The household comprises the farmer and other members of the family, is both a consuming and producing unit, and is a social organization. Households may be under the management of a single person or operate collectively. Members usually live in the same place, share meals,

and divide household duties.

- Farming system** A unique and reasonably stable arrangement of farming enterprises that a household manages according to well-defined practices in response to the physical, biological and socioeconomic environments and in accordance with the household's goals, preferences and resources. The factors combine to influence output and production methods.
- Regional system** A complex large-scale land utilization unit that produces and transforms primary products and involves a large service sector. Components of the regional system are natural resources, human resources, the agricultural sector, the secondary and tertiary sectors.
- System** Any 'set of elements or components that are interrelated and interact among themselves. Specification of a system implies a boundary delimiting the system from its environment. Two systems may share a common component or environment, and one system may be a subsystem of another'.

ANNEX 5. REFERENCES

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