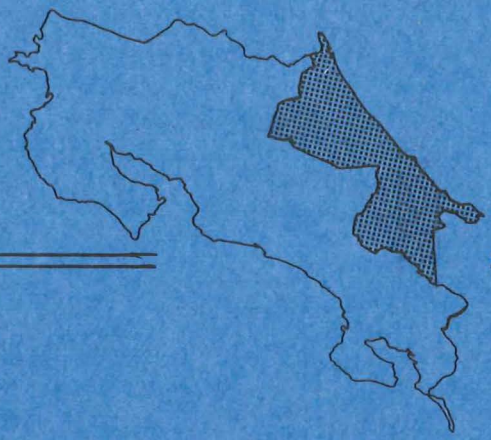

Atlantic Zone Programme

Working Documents No. 1

WORKPLAN FIRST HALF 1987

J.F. Wienk
H. Waaijenberg (ed.)
F.R. van Sluys
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Turrialba, January 1987

CATIE
MAG
Costa Rica
Agricultural University
Wageningen

The Atlantic Zone Programme (CATIE-AUW-MAG) is the result of an agreement for technical cooperation between the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE), the Agricultural University Wageningen (AUW), The Netherlands and the Ministerio de Agricultura y Ganadería (MAG) of Costa Rica. The Programme, that was started in April 1986, has as a long-term objective multidisciplinary research aimed at rational use of the natural resources in the Atlantic Zone of Costa Rica with emphasis on the small landowner.

El Programa Zona Atlántica (CATIE-UAW-MAG) es el resultado de un convenio de cooperación técnica entre el CATIE, la Universidad Agrícola Wageningen (UAW) Holanda y el Ministerio de Agricultura y Ganadería (MAG) de Costa Rica. El Programa, cuya ejecución se inició en abril de 1986, tiene, como objetivo a largo plazo la investigación multidisciplinaria dirigida a un uso racional de los recursos naturales, con énfasis en el productor pequeño de la Zona Atlántica de Costa Rica.

Working Documents comprise work plans, research proposals, progress reports and other documents with limited distribution.
Opinions expressed and conclusions presented are not necesarily those of the Programme.

Working Documents comprenden planes de trabajo, propuestas para la investigación, informes de progreso y otros documentos con una distribución limitada.
Las opiniones expresadas y las conclusiones presentadas no son necesariamente las del Programa.

ATLANTIC ZONE PROGRAMME

Working document No. 1

WORKPLAN FIRST HALF 1987

J.F. Wienk (ed.)
H. Waaijenberg (ed.)
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W.G. Wielemaker

Turrialba, January 1987

CENTRO AGRONOMICO TROPICAL DE
INVESTIGACION Y ENSENANZA - CATIE

AGRICULTURAL UNIVERSITY
WAGENINGEN - AUW

MINISTERIO DE AGRICULTURA
Y GANADERIA - MAG

Contents

1 GENERAL INTRODUCTION

During the first half of 1987 a start will be made with the baseline study envisaged in the CATIE/AUW/MAG programme document (ANON., 1987). This study forms the second phase of the survey of Huetar Atlantica, which has as the most important objective the identification of problem areas for future research projects (BOERBOOM et al., 1985). The first phase comprised an exploratory survey, which was carried out in the period April-July 1986. Its objectives were (1) a rapid identification of the most important agricultural production systems, i.e., actual situation and problems, the land units and the socio-economic conditions, and (2) the selection of study areas where the agricultural production systems and their ecological and socio-economic environment can be studied in more detail (baseline study). For the main results of this exploratory survey the reader is referred to a summarizing report by SLUYS et al. (1987).

The objectives of the baseline study are (1) identifying the problems besetting the agricultural production systems, and (2) collecting data on the most important transformations as a benchmark for future reference.

Following the exploratory survey two study areas were identified. An area in the north with Cariari, Guapiles and Guacimo as the main centres of activity, and the Talamanca canton in the south.
The baseline study planned for the first half of 1987 will be carried out in three subareas selected in the northern part of Huetar Atlantica. For brevity reasons these subareas are referred to as Cocori, Rio Jimenez and Neguev. For their delineation see figure 1 and annex 1. Cocori is characterized by transformations from rain forest to pasture and other forms of land use. In Rio Jimenez farmers are forced to intensify because of population pressure, but with little coordinated assistance from government or other institutions. In Neguev the major transformation is from pasture and forest to crops. Neguev differs from Rio Jimenez in that the transformation is guided by IDA.

The baseline study is interdisciplinary. Basically the approach will be from three angles, with emphasis on (1) the land as natural resource, (2) land use and farming, and (3) the socio-economic and institutional context. The study comprises three parts.

(1) Inventories and surveys. In each subarea the soils will be mapped and evaluated, a broad farm survey will be carried out, and the regional socio-economic and institutional context will be studied.
(2) Specific studies. Specific topics and problems identified during the exploratory survey or the surveys referred to sub (1) will be studied in more detail.
(3) Verification. The preliminary findings of the surveys and specific studies will be discussed with farmers, farmers' organizations, extension workers and officials in order to correct, deepen or complete the information. The results will furthermore help to improve the methodology to be used in additional surveys.

The findings of the baseline survey will eventually be published in the form of monographs, i.e., separate reports for each of the sub-areas.

The work planned for the first six months of 1987 is specified below. Table 1 presents the time table. Though the approach is inter-disciplinary, for practical purposes the different elements of the work have been grouped somewhat mono-disciplinary, i.e., in accordance with the three angles from which the problems are being studied.

Table 1. Time table of main activities and reporting schedule for the first half of 1987.

	Jan	Feb	Mar	Apr	May	Jun
SOIL SURVEY						
Subareas	----	----	----	--		
Elsewhere	----	----	----	----	----	----
FARM SURVEY						
Subareas	---	----				
Literature studies and institutions			----	----		
SOCIO-ECONOMIC SURVEY						
Literature studies and institutions	----	----	----	----	----	
SPECIFIC STUDIES						
Land resources	----	----	----	----	----	----
Land use and farming		--	----	----		
Socio-economic and institutional context		--	----	----		
VERIFICATION AND COMPLEMENTATION						
Integrated				----	----	
REPORTING DEADLINES						
Programme document	•					
Workplan 1987 I		•				
Workplan 1987 II (draft)				•		
Workplan 1987 II (final)						•
Exploratory survey		•				
Surveys 1987 I (drafts)				•		
Monographs (drafts)						•

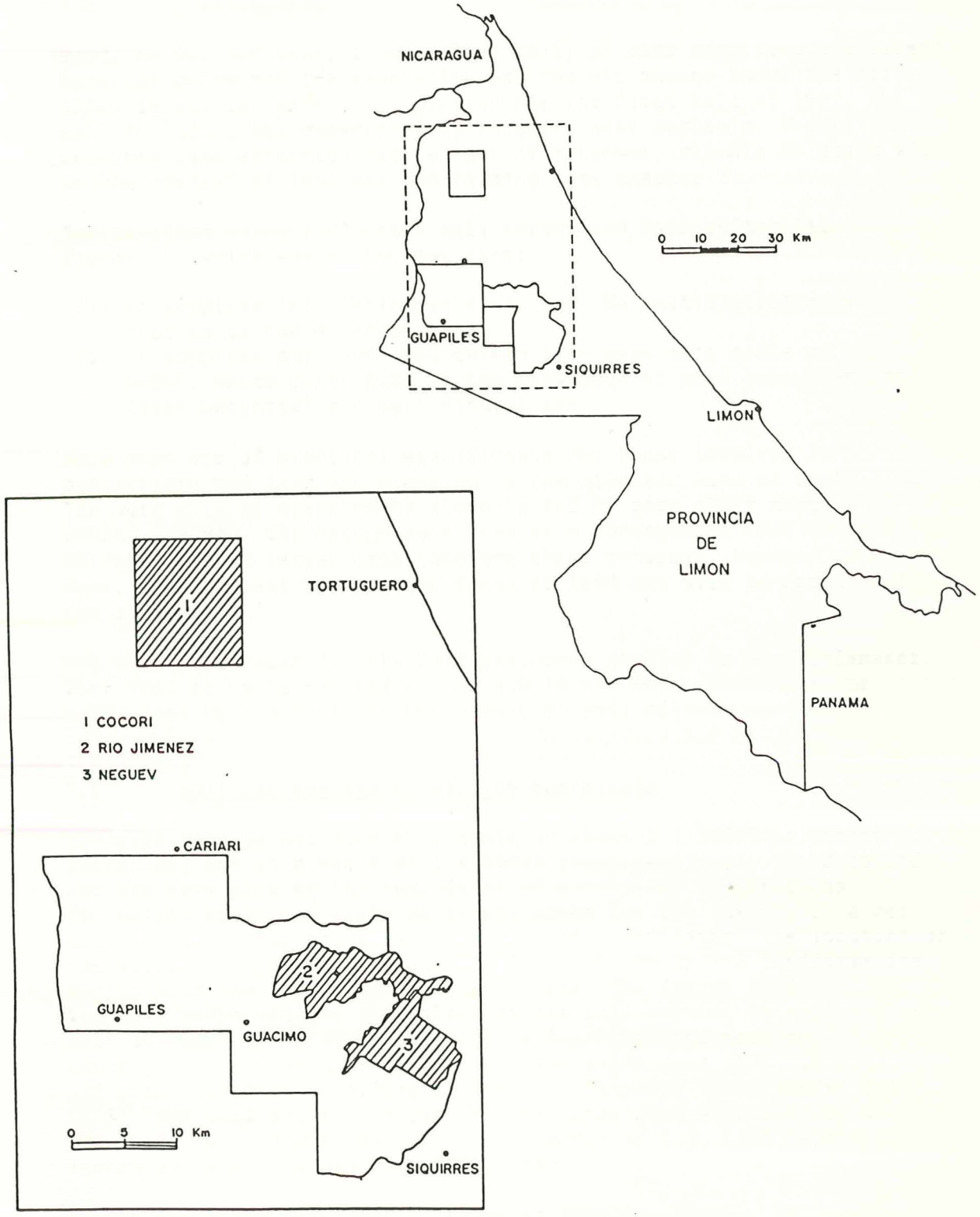

Figure 1. Areas where during 1987 the soils will be mapped and evaluated, with subareas (hatched) for the baseline study.

2 LAND RESOURCES

2.1 Introduction

Land, as defined here, is more than soil; it also comprises the parent material below and the vegetation and the air masses above the soil (FAO, 1976). In the studies planned for the first half of 1987, the soil including the geomorphology receives most emphasis. Vegetation receives less attention due to lack of manpower; climate is dealt with in the context of land use and farming (see chapter 3).

The baseline study includes a soil survey and land suitability appraisal, which serves two purposes:

(1) It supplies information on soils for the multidisciplinary studies in the subareas, and
(2) It supplies soil and land suitability maps on a scale of 1 : 50000, which contribute to the knowledge of soil resources and their potential for agricultural use.

Such maps are of practical significance for those involved in agriculture and land use planning in the Atlantic Zone of Costa Rica. The work will be executed by students and by some staff members of ASBANA and MAG. The second point has as a consequence that the soil is surveyed over a larger area than the three subareas. Besides soil maps, maps of past and present forms of land use will be produced for the subareas.

The main supervisor for the land resources studies is Wim Wielemaker. Work that is to be carried out at AUW in the Netherlands will be supervised by staff of the Department of Soil Science and Geology.

2.2 Soil surveys and capability appraisals

The soil surveys are done at a scale of about 1 : 20000 or larger (detailed) and at a scale of 1 : 50000 (semi-detailed). The detailed surveys form part of the semi-detailed surveys of larger areas. The mapped areas may serve as sample areas for the survey of larger areas at a smaller scale, which may be surveyed later. The location of the areas surveyed is indicated in figure 1. Soils and landforms are mapped with the aid of aerial photographs. The degree of detail of the soil units will be equivalent to the soil series. In each soil unit at least one profile pit will be described and sampled. Description is done according to the FAO-guidelines (FAO, 1977) and classification according to the Soil Taxonomy (SOIL SURVEY STAFF, 1975). The soil survey results will be correlated with earlier work. The suitability appraisal follows the modified U.S. Land Capability System as used in Costa Rica (CCT, 1985).

So far two areas have been surveyed in detail:

- Part of Hacienda Bremen, mapsheet Guacimo on a scale of 1 : 17500 and with a surface of about 2000 ha.
- Part of asentamiento Neguev, mapsheet Guacimo on a scale of 1 : 17500 and with a surface of about 1500 ha.

2A1 Subareas of Rio Jimenez and Neguev
About 3000 ha will be mapped in the period February - April. Surveyors: Gerard Hazeu and Rien Dam.

2A2 Guacimo
About 10000 ha west of the line Rio Jimenez-Pocora and east of the line corresponding with coordinate 5.70. This survey was started in July 1986 and will be completed in January 1987. Surveyor: Hans van Leeuwen.

2A3 La Rita
About 30000 ha south of Cariari up to the road Guapiles-Guacimo, bordered in the east by the line corresponding with coordinate 5.70 and in the west by the Rio Toro Amarillo. This survey was started in September 1986 and will be completed in April 1987. Surveyors: Egbert Spaans and Jetse Stoorvogel.

2A4 Cocori
About 10000 ha in mapsheets Tortuguero and Chirripo Atlantico, north of coordinate 2.78, between the coordinates 5.72 and 5.61. This survey is preceded by a geomorphological survey in the months of December and January. Surveyors: Quirijn de Jong van Lier and Andre Nieuwenhuyse. The last one continues the work with a soil survey, which will be completed by July 1987.

2A5 Alegria
A geomorphological map at a scale of 1 : 35000 of an area of approximately 5000 ha between Siquirres and Alegria. The survey will be done in the period January and February 1987. Surveyors: Jack van der Wees and Daniel Jeldres.

2A6 Neguev
About 25000 ha in mapsheets Bonilla and Guacimo, bordered in the north by the Rio Jimenez and in the east by the Rio Reventazon. It extends southwards to Alegria and borders in the west with the area of Guacimo. This survey incorporates the detailed surveys mentioned above and the geomorphological map of Alegria (2A5). Surveyor: Sytse de Bruin.

2A7 Land use maps
Land use maps of the three subareas are prepared on the basis of interpretation of aerial photographs, thematic mapper images, available literature, maps and field checks. The maps are made for different years to obtain some idea about the transformations in land use. The work will be done in the period January-April by a team of land resources and land use and farming students. Co-supervisor: Henk Waaijenberg.

2.3 Specific studies

In addition to the surveys specific studies are carried out paying attention (1) to the changes the soils undergo as a result of transformations in land use and (2) to the impact this has on the performance of land for agricultural production. The data on soils in

combination with crop performance (chapter 3) are integrated for a land evaluation putting emphasis on the selection of sustained forms of land use and the limitations and constraints preventing or hindering such use.

2B1 Physical and chemical characterization of soils with andic properties
Physical properties such as bulk density, moisture retention at 15 bar, liquid limit and plasticity index, and chemical properties such as pH-NaF and P-retention, are indicative for the clay mineralogical composition of soils with andic properties. The mentioned characteristics are strongly related to engeneering properties and to the fertility of such soils. Forest clearing and consequent changes in land use usually have an important impact on the same characteristics. Determination of those characteristics and an estimate of land use on it, is important for separation of soils with andic properties and for an evaluation of their fertility and engineering properties. This study will be started in April. Student: Jetse Stoorvogel.

2B2 Structure formation and degradation in relation to land use
Processes of structure formation and degradation are greatly affected when forest is cut and other types of land use introduced. Which changes occur in forms of structure ,how this relates to the activity of soil fauna and to the land use system and what it means for physical soil characteristics such as bulk density, porosity and infiltration rates, are important questions for the research on three soil types in the Neguev, where profiles will be studied under forest and several other types of land use.
Morphological field characteristics were studied in the months of October and November; chemical and micromorphological characteristics will be studied in the Netherlands. Student: Angelique Lansu.
Physical characteristics of the same soils will be studied in the period January to March. In addition oxygen and water availability will be estimated using tensiometers and pF equipment. Student: Hans van Leeuwen.

2B3 Effect of clearing on soil properties
It was noted that clearing has an important impact on physical soil properties, which may persist in the soil over a long period of time and thus influence rootability and availability of water and oxygen for plants. The effect of clearing on morphological, physical and biological properties of soils in the Cocori area will be studied in the period January-April. The study includes drawing forest cover maps for different years. Student: Gerard Baltissen.

2B4 Soil compaction, pasture composition and pasture productivity
It was noted that under cattle grazing topsoil structures tend to degrade, which leads to compaction, stagnation of water in the root zone and limited oxygen availability. The hypothesis is that degree of compaction is reflected in pasture composition and productivity of cattle farming. The research is to answer the following questions:

(1) What are the relations between pasture management, soil type and degree of compaction?
(2) What effect has compaction on pasture composition?
(3) How do soil compaction, pasture composition and pasture management interact with productivity of cattle farming?

The study will be carried out in one or more subareas in the period February-June. Student: Henk Nobbe.

2B5 Nutrient availability in some soils of the zone
Pot experiments will be done in the Netherlands with samples of three representative soil units in order to determine their fertility levels under controlled conditions. Student: Hans Janssen.
This research will be followed up by a field study in all subareas with maize as indicator crop. See also 3B6. Student: Olaf Erenstein. Co-supervisor: Henk Waaijenberg.

2B6 Suitability of soils for banana
Bananas are of great economic importance for the zone. It seems that yield levels are not constant but decline if soils are cultivated continuously with bananas. The research is to answer the following questions:

(1) How is the relation between yield levels, soil type and management?
(2) How is the decline in yield levels related to soil type, years of cultivation and management?
(3) What causes the decline in yield levels and why are banana plantations abandoned?

The study makes use of available data, literature, aerial photographs and satellite images, besides field checks. The study will be done in the period February-May. See also 3B4. Students: Rien Dam and maybe also Sytse de Bruin.

2.4 Verification and complementation

The results of soil mapping and land suitability appraisals will be tested with the experience of farmers and other agricultural workers. Are the soil data and the suitability appraisals relevant from their point of view and what can we learn from their experience? Student: Sytse de Bruin. Co-supervisors: Fred van Sluys and Henk Waaijenberg.

2C1 Field excursions
After completion of soil surveys and suitability appraisals field excursions will be organized to discuss the results with extension workers, researchers and farmers.

2C2 Interviews with farmers
Results of surveys, suitability appraisals and specific studies will be discussed with farmers. See also paragraphs 3.4 and 4.4.

3 LAND USE AND FARMING

3.1 Introduction

The baseline study focuses on patterns of agricultural transformations in Huetar Atlantica. One of the directions to view these processes is from within the farm: farming systems approach.

The farming systems studies described in this paper 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 are done. First a broad farm survey among 50 randomly selected farms in each of the subareas, thereafter specific studies on smaller subsamples of farms about 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 on-farm field work consisting of structured and open interviews and qualitative and quantitative field observations.

3.2 Broad farm survey

3A1 Field work

In each subarea 50 farms are selected at random. The sampling is based on lists per segment of the 1984 census of agriculture (Rio Jimenez), if necessary complemented with data from IDA (Neguev) or from preparatory field work (Cocori). The interviewers first will explain the purpose and methods of the programme to (the head of) the household. 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. The emphasis is on straightforward and easily to be collected data, as present knowledge of the farmers and their farms is too limited to engage in complex interviews. However, by careful interviewing both facts and farmers' views should be distinguished and recorded. At the end of the interview the farmer will be asked if he is interested in further cooperation.

The broad survey of in total 150 farms will:

- introduce the CATIE/MAG/AUW programme to farmers and ask for their cooperation;
- provide a general picture of the agriculture in Huetar Atlantica;
- enable comparison between subareas and validation of the assumed differences between them;
- help to classify farming systems;
- identify the main problems experienced by farmers.
- place specific studies of smaller samples in a wider framework.

The field work starts on 2nd February 1987 with 8 mixed teams of a Costa Rican and a Dutch student. Given 2 interviews per team per day 150 farms require about 10 interview days in the field. By mid February the field work will be completed. The pre- and postcoded data are entered into DBase III files (IBM PC-XT computer) and analysed using DBase III/SPSS programmes.

3A2 Literature review
Literature study and discussions with key informants of institutions, o.a. CATIE, to collect and review already existing knowledge of farming systems and their subsystems in Huetar Atlantica, published and not published.

3.3 Specific studies

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) 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.
(3) Farm subsystems: off-farm work, cropping, livestock and agro-forestry systems.
(4) Weather, production and workability. The influence of the weather (notably rainfall) in connexion with soil properties on crop 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 farmer's background, resources, possibilities and environment, and of the way he judges these. Moreover the present (sub)systems are the starting point for future transformations. The following aspects of each major production subsystem are studied (with variations): history, occurrence, the farm system of which it forms part, scale, importance, aims and decision making, inputs (land, labour, capital), management and technology, weeds, pests and diseases, outputs, ecological stability, technical efficiency, economical performance, social attractiveness, future developments and alternatives. Relations with other farm subsystems and with input supply, marketing, research, extension, credit will be taken into account. Emphasis is on changes, reasons for changes and practices, problems and possibilities.

The specific studies consist of analysis of broad farm survey information, literature review, visits to relevant institutions and field work (interviews, qualitative and quantitative observations) xcarried out in subsamples of the farms visited for the broad farm survey; the number of subareas included and the sample sizes depend on the subject. As the emphasis is on the deepening of insight and less on the collection of statistical data, for most specific studies about 10 farms will be selected. Some subjects may have to be studied outside the subareas. For other subjects not individual farms but e.g. farmers' organizations may be the object of study. The studies are formulated in such a way that one or a few students can adequately cover them under supervision of one staff member. Most of the students involved in the specific studies have previously contributed to the broad farm survey.

3B1 Farm case studies 1
A few farms will be visited frequently in order to get detailed insight in the farm management, the way people think about objectives, land resources, institutional environment, risk management, alternatives, future, etc. To be carried out in all subareas by Henk Waaijenberg in order to keep in direct touch with the farm reality.

3B2 Farm case studies 2
Each of the students is requested to describe and analyse one farm involved in his/her specific study in detail. This will deepen understanding of how farms work and provide examples for education and the illustration of publications.

3B3 Household: decision making, labour and consumption
A study of dynamics within the farm household: perceptions and goals of different household members and how they (try to) attain them, who take which decisions, labour division between sexes, rights with regard to use of farm products. To be carried out in the La Lucha part of Rio Jimenez subarea. Student: Margreet van der Hel (rural sociology). Co-supervisor: Fred van Sluys.

3B4 Cropping systems: banana
The export crop banana is of great importance for the economy of both Huetar Atlantica and Costa Rica. This study is connected with 4B5, creation and transfer of banana technology. Most field work will be around the Rio Jimenez and Neguev subareas. See also 2B6. Student: Anje Kruiter (rural sociology) with support from Jan Helmer (agricultural economics). Co-supervisor: Fred van Sluys.

3B5 Cropping systems: cocoa
Until the end of the seventies a major cash crop in Huetar Atlantica. Since then declining yields have diminished its importance. This study is connected with 4B3, farmers' technology development. Field work will be done in all subareas, with emphasis on the Cocori subarea, where the crop is being introduced. Student: Ab de Groot (tropical crops) with support from Jan Helmer (agricultural economics). Co-supervisor: Fred van Sluys.

3B6 Cropping systems: maize
The major small farmers' food crop and cash crop for both small and medium scale farmers. As maize is an important indicator crop for soil fertility it will be studied in all three subareas, with emphasis on the Rio Jimenez subarea. See also 2B5. Student: Martin Brink (tropical crops) with support from Jan Helmer (agricultural economics). Co-supervisor: Wim Wielemaker.

3B7 Cropping systems: root and tuber crops
Cassava, cocoyam and yams are locally grown as food and cash crops, partly for export. Emphasis will be on the Rio Jimenez subarea. Student: Trix Overtoom (crop protection) with support from Jan Helmer (agricultural economics).

3B8 Cropping systems: fruits
For several small and medium scale farmers the sale of fruits is an important source of income. The importance of fruits and vegetables may increase once the new Guapiles - San Jose road is opened. These

crops are studied with emphasis on the Rio Jimenez and Neguev subareas, both with rather good road connections. Student: Simone van Ee (tropical crops) with support from Jan Helmer (agricultural economics).

3B9 Cropping systems: comparative study of economics
A comparative study is made of the production costs (farm and nonfarm inputs), financing, profitability and marketing of the above crop products. This study may clarify why particular farmers (have to) choose particular crops. To be carried out with data from the above studies. Student: Jan Helmer (agricultural economics).

3B10 Intensive livestock systems: dairy
The limited Costa Rican demand for milk, possibly caused by low income of consumers, may lead to the introduction of a quotum on the number of farmers who receive extension and other services from and can sell milk to 'Borden' and 'Dos Pinos'. This tendency is in conflict with the movement towards intensification of agricultural production in densely populated areas. These processes affect farmers' activities and income. There may be scope for lowering production costs. To be carried out in Rio Jimenez and Neguev subareas and in the El Indio settlement scheme. Student: Jacob Ottens (tropical animal husbandry) with support from Bert Jan van de Kamp (agricultural economics).

3B11 Extensive livestock systems: beef
Much of the farm land in Huetar Atlantica is being used for beef production, partly for export. The slaughtering of unwanted dairy cattle in Europe and USA limits the prices and export possibilities of Costa Rican beef, with consequences for farmers' activities and incomes. Field work is concentrated in the Cocori subarea. Student: Pia van Hijfte (tropical animal husbandry) with support from Bert Jan van de Kamp (agricultural economics).

3B12 Dual purpose livestock systems
There is a large group of small farmers in Huetar Atlantica who have a few heads of cattle for both milk (often for home consumption) and beef production. Definitions have to be made of beef production, fattening, 'cow/calf' operations, dual purpose cattle (is it a characteristic of the cattle or of the management). To be carried out in the Neguev and Rio Jimenez areas. Student: Iede Koffeman (tropical animal husbandry) with support from Bert Jan van de Kamp (agricultural economics).

3B13 Livestock systems: comparative study of economics
A comparative study is made of the production costs (farm and nonfarm inputs), financing, profitability and marketing of the above livestock products. This study may clarify why particular farmers (have to) choose particular livestock systems. To be carried out with data from the above studies. Student: Bert Jan van de Kamp (agricultural economics).

3B14 Agro-forestry systems
Agro-forestry is of importance for the ecological stability of farming systems. Several types of agro-forestry are studied, a.o.: live fence posts (fodder), timber from isolated trees, timber from on-farm forest stands. To be carried out in all subareas. Student: Ernst-Paul Zambon (forestry).

3B15 Weather, production and workability
The influence of the weather, notably rainfall, in connexion with soil properties on maize and cassava yields and on the planning and execution of farm activities. This study is related with 3B6 and 3B7. Subarea Rio Jimenez. Student: Olaf Erenstein (tropical crops).

During the first half of 1987 there is too little manpower for the detailed study of forestry systems and some cropping and livestock systems, e.g. pig holding, rice, bean, macadamia and pejibaye.

3.4 Verification and complementation

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 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. Part of the interview will be structured, to enable quantification, a large part will be informal and open, a discussion with the farmer and his household.

3C1 Interviews of subsamples of farmers involved in previous studies.

3C2 Interviews of key informants, mainly farmers, inside and outside the subareas.

4 SOCIO-ECONOMIC AND INSTITUTIONAL CONTEXT

4.1 Introduction

Socio-economic and institutional factors have had and still are having a marked influence on the evolution of land use and farming in Huetar Atlantica. Most important within this context is the interaction between state policy, population aspects and farmers' strategies, and private enterprises, especially the banana plantations, linked to (inter)national capital.

The studies planned for the first half of 1987 will focus on (1) access to and control of agricultural land, and (2) development, transfer and communication of technology. Furthermore, marketing aspects and the effects of capital and finance are studied. The studies will be global, i.e., at the regional level, and specific at local or subarea level; in other words the different issues are studied from the point of view of farmers' strategies and initiatives. As distinct from the studies referred to in chapter 3, the analysis is above household or farming system level.

The different studies will entail:

(1) Literature reviews, interviews with informants, institutions and organizations.
(2) Specific studies.
(3) Verification and complementation.

During the first half of 1987 emphasis will be on studies related to land and technology. The results are to provide a better insight into the interaction between state-sponsored institutions and small farmers, thus explaining largely the social and institutional context. By studying this interaction, the limitations and perspectives for rural and agricultural development, as far as this context is concerned, will be identified for the three subareas and their smallholder farmers. Most field work will be carried out in the period February-May. The main supervisor for the socio-economic and institutional context studies is Fred van Sluys.

4.2 Global context: regional level

The studies at the regional level are to contribute to an understanding of the global or macro context and of the major conditioning factors for the processes affecting the transformation of land use and farming in the three subareas. This way the results of the specific studies can be placed in the wider, historical perspective of the region's agricultural development and in the general context of state policy, demographic and social aspects.

The studies at this level are generally descriptive and will be based on available information and on work being carried out by others. The specific studies at the local or subarea level are to contribute to the regional analysis of the themes listed below.

4A1 Role of the state and its policy
An analysis of state participation and the way the state promotes and responds to changes and consolidation of land use and farming through its projects and institutions, especially during the last 20-25 years. Emphasis will be on regional and sector policy (plans and projects), institutional and physical infrastructure in relation to access to and control of land, development and transfer of technology, price and credit policy, social or reproductive policy towards the popular sector (health, education, community development). The available literature will be reviewed, with reference to similar cases in Latin America (see 4B6).

4A2 Demographic , socio-cultural and political aspects
A general analysis of the socio-cultural groups in the region and their mutual relations, as far as they play a role in the organization of agricultural production. Emphasis will be on demographic and migrational movements, social movements as affected by the state or by other dominant sectors both within and outside the region. This study is initiated during the period under review.

4A3 Agricultural history
An overview of the history of agricultural development in Huetar Atlantica from pre-Colombian times up to the present. Based on archives and literature. Emphasis will be on changes in land use, land tenure, rural and urban groups, national and international interest groups, distribution of agricultural production, relation with international factors. Mentioned studies are carried out in cooperation with Pieter de Vries and Rolando Rivera, and continue in the second half of 1987.

4.3 Specific studies: local level

The objective of the specific studies is to obtain a better insight into the general processes investigated. Apart from the history of settlement in the three subareas, the access to and control over land, and the development, communication and transfer of technology are studied from two points of view.

(1) The farmers' strategy or views. Farmers develop their own strategies, with or without institutional support, to organize productive activities. They organize themselves to get access to and control over land, and other resources and services. They apply, develop and communicate own knowledge about farming and land use based on experiences and insight. They organize households and decision making (see 3B3). In other words, the farmers take initiative or respond to felt needs and state intervention combining their own and external resources in order to get certain control and management capacity over the most important conditioning factors for agricultural production. The studies 4B2 and 4B3 focus on these aspects.

(2) The institutional policy or development views. The state responds to observed needs and to needs felt and expressed by producers or social groups and to problems generated in this process, thus affecting changes and transformations in land use and farming. The organization and functioning of the offical institutions as the expression of state policy will be analysed in the three subareas. Emphasis will be on institutions related to productive activities, for the time being especially land and technology, though social services like health care and education will not be completely excluded. Private initiatives and institutions involved in marketing, credit, technology and extension will receive attention on a more general level. The studies 4B4, 4B5 and 4B6 focus on this institutional development approach. Marketing, finance and income will be studied in direct connexion with specific productive activities (see chapter 3).

4B1 Historical overview of the settlement process in the subareas
Each of the specific studies is placed in a historical perspective using material available and information supplied by informants. Combined it will provide material for a general overview.

4B2 Social organization and farmers' movement
An inventory and study of the different social groups and organizations as well as their alliances, and the way they influence

access to and control over land, technology, markets, finance, roads, and basic social services. Emphasis will be on land and technology, on the way farmers' organizations influence farm activities and the conditioning factors beyond the local level, and on the role (ex)plantation labourers play in the development of peasant organizations in the area. See also 4A2, 4A3 and 4B6. Student: Rolando Rivera.

4B3 Farmers' technology and knowledge development, communication and transfer; a farmer's case
A study of the introduction of 'new' crops in an area recently deforested and colonized. A case study of cocoa experimentation by farmers in the Cocori subarea (see also 3B5). Student: Ab de Groot. Co-supervisor: Henk Waaijenberg.

4B4 Technology and extension: IDA and MAG in the Neguev
There appears a considerable gap between the theoretically available knowledge and the technology farmers use. This discrepancy is explained partly by lack of capital or other requirements to apply the expensive high technologies, partly by the long and inadequate process of technology transfer from research via extension to the farmer, or simply by the lack of adequate technology that really meets the farmers' needs.
An overview is made of the knowledge MAG and IDA have available, and their extension policy. The diffusion and innovation processes in the Neguev settlement scheme are analysed. Attention will be paid to decision making processes related to land use and farming. Student: Huub Mudde.

4B5 Technology and extension: national banana producers
Similar to 4B4 but studying the development and transfer of technology for very different groups, the Asociacion Bananera Nacional and the relatively small national banana producers. Banana production continues to be a significant crop in the region for which technology development traditionally is dominated by the most important multinational banana companies. However, the increasing participation of small national producers working under conditions different from the multinational companies makes it necessary to adapt research and extension. See also 3B4. Student: Anje Kruiter. Co-supervisor: Henk Waaijenberg.

4B6 Land: access, control and tenure in the subareas
Many changes in land use and farming in the Atlantic Zone are the result of insecurity of land tenure in combination with problems of technology and finance to make farming profitable. In this study emphasis will be on mechanisms for acquiring land (sale and purchase, squatting, speculation) and on the policy and experiences of IDA in interaction with users' strategies, especially in the Neguev area. This work will be continued throughout 1987, and is strongly related to 4A1, 4B1, 4B2 and 4B4.

4.4 Verification and complementation

The preliminary results and conclusions from the global analysis and the specific studies are presented to and discussed with farmers,

farmers' organizations, officials and government institutions. Their participation is an essential part of the research methodology of the baseline study, and is an instrument for local and regional diagnostic and for planning of both institutional as well as farmers' strategies.

4C1 Study and verification seminars
Study and verification meetings and seminars are organized to initiate a process of communication, back feeding and verification, discussing and deepening views on different issues with officials, government institutions and farmers' groups and organizations. Methods and techniques will be adapted to the group dynamics and organizational level within the farmers' sector and institutions in the subareas. The approach is integrated and interdisciplinary (see paragraphs 2.4 and 3.4).

5 LITERATURE

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ANNEX 1. DELINEATION OF SUBAREAS

1 Cocori

The subarea is situated in Colorado district of Pococi canton. The western and eastern boundaries are formed by the coordinates 5.62 E and 5.72 E respectively , the southern and northern boundaries by the coordinates 2.78 N and 2.90 N respectively of the Lambert projection of northern Costa Rica. The subarea measures 120 km2 and is covered by the mapsheets Tortuguero (3447 I) and Chirripo Atlantico (3447 IV).

2 Rio Jimenez

The subarea consists of the western half of Rio Jimenez district of Guacimo canton. It covers the segments 1, 2 and 7 - 16 of the 1984 agricultural census. The subarea is about 55 km2 and falls within the mapsheet Guacimo (3446 I).

3 Neguev

The subarea is the Neguev settlement scheme and lies within the districts Rio Jimenez and Pocora of Guacimo canton and Germania and Cairo of Siquirres canton. The subarea is about 55 km2 and is covered by the mapsheets Guacimo (3446 I) and Bonilla (3446 II). About one fifth of the settlement scheme overlaps with the Rio Jiménez subarea.