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ORGANIC AGRICULTURE IN THE GUANACASTE PROVINCE, COSTA RICA

René Ruiter

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CENTRO AGRONOMICO TROPICAL DE
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AGRICULTURAL UNIVERSITY
WAGENINGEN (AUW)

MINISTERIO DE AGRICULTURA Y
GANADERIA DE COSTA RICA (MAG)

The Research Program on Sustainability in Agriculture (REPOSA) is a cooperation between Wageningen Agricultural University (WAU), the Center for Research and Education in Tropical Agriculture (CATIE), and the Costa Rican Ministry of Agriculture and Livestock (MAG). In addition, REPOSA has signed memoranda of understanding with numerous academic, governmental, international, and non-governmental organizations in Costa Rica.

The overall objective of REPOSA is the development of an interdisciplinary methodology for land use evaluation at various levels of aggregation. The methodology, based on a modular approach to the integration of different models and data bases, is denominated USTED (*Uso Sostenible de Tierras En el Desarrollo*; Sustainable Land Use in Development).

REPOSA provides research and practical training facilities for students from WAU as well as from other Dutch and regional educational institutions.

REPOSA's research results are actively disseminated through scientific publications, internal reports, students' thesis, and presentations at national and international conferences and symposia. Demonstrations are conducted regularly to familiarize interested researchers and organizations from both within and outside Costa Rica with the *USTED* methodology.

REPOSA is financed entirely by WAU under its Sustainable Land Use in the Tropics program, sub-program Sustainable Land Use in Central America. It operates mainly out of Guápiles where it is located on the experimental station *Los Diamantes* of MAG.

REPOSA (*Research Program on Sustainability in Agriculture*, o sea Programa de Investigación sobre la Sostenibilidad en la Agricultura) es una cooperación entre la Universidad Agrícola de Wageningen, Holanda (UAW), el Centro Agronómico Trópical de Investigación y Enseñanza (CATIE) y el Ministerio de Agricultura y Ganadería de Costa Rica (MAG). Además REPOSA ha firmado cartas de entendimiento con organizaciones académicas, gubernamentales, internacionales y non-gubernamentales en Costa Rica.

REPOSA ha desarrollado una metodología cuantitativa para el análisis del uso sostenible de la tierra para apoyar la toma de decisiones a nivel regional. Esta metodología, llamada USTED (Uso Sostenible de Tierras En el Desarollo) involucra dimensiones económicas y ecológicas, incluyendo aspectos edafológicos y agronómicos.

REPOSA ofrece facilidades para investigaciones y enseñanza para estudiantes tanto de la UAW, como de otras institutiones educacionales holandesas y regionales.

REPOSA publica sus resultados en revistas científicas, tesis de grado, informes, y ponencias en conferencias y talleres. REPOSA regularmente organiza demostraciones para investigadores de Costa Rica y de otros países para familiarizarlos con la metodología USTED.

REPOSA es financiado por la UAW bajo su Programa del Uso Sostenible de la Tierra en los Areas Trópicos. La sede de REPOSA está ubicada en la Estación Experimental Los Diamantes del MAG en Guápiles.

CONTENTS

INTRODUCTION

Modern agriculture in general is caracterized by a high input and high environmental costs. Organic agriculture is one of the options to improve the sustainability of agriculture. In Costa Rica as well organic agriculture is becoming more and more important. For about 10-15 years non governmental organizations (NGO's) have been active in organic agriculture. During this time these organizations gained a relative high level of organization on a national level. Foreign influences from Europe and the United States have been of major importance for the development of the NGO's and of organic agriculture in Costa Rica. Even now foreign activities in Costa Rica are important for organic agriculture.

After a change in government some 3 years ago a policy on organic agriculture was formed. Before this time organic agriculture was not taken very seriously. Since two years the ministry of agriculture and livestock (MAG) of the costarican government has a department for organic agriculture.

1.1 The project

REPOSA (REsearch Program On Sustainability in Agriculture) is an interdisciplinary research program initiated in 1987 and carried out by Wageningen Agricultural University (WAU, the Netherlands), the Centro Agronómico Tropical de Investigación y Enseñanza (CATIE, Costa Rica) and the Ministerio de Agricultura y Ganadería (MAG, Costa Rica). Since 1991 the main thrust of REPOSA is the development of an interdisciplinary methodology for the analysis and evaluation of ecologically and economically sustainable land use (Jansen and van Tilburg, 1996).

Land use analysis is defined as the process of evaluating potentials of land use, under well defined changes in biophysical or socioeconomic conditions. For this task methods that quantify input-output relations are necessary. These facilitate optimization of land use in relation to one or more goals, such as maximizing net economic benefit, and to one or more constraints, such as availability of labor and land, or limits to the use of natural resources (Jansen and Schipper, 1995). For this a method called USTED (Uso Sostenible de Tierras En el Desarrollo) is designed. The framework of this model consists of:

1. A linear programming (LP) model, to calculate optimal land use given a goal. A set of constraints and a series of technical coefficients reflecting the options for land use. Goal and constraints can include socioeconomic and biophysical aspects, including sustainability indicators.

2. A geographic information system (GIS), to facilitate storage and analysis of spatial data, including geographical distribution of soil types and their characteristics; and to visualize model output in maps.

3. A data management tool (MODUS: MOdules for Data management in USted), to facilitate data transfer with USTED; and to calculate the technical coefficients for the LP model.

The model uses technical coefficients derived from LUST's (Land Use Systems at a defined Technology) descriptions. LUST's describe the physical input/output relations for a particular land use type (which is a crop or livestock), under a particular management on a particular land-unit. To determine the sustainability of land use indicators for this are selected and incorporated in the model (Jansen et al., 1995).

1.2 The country

Costa Rica has an area of 51 100 km^2 and is limited by Nicaragua in the north and Panama in the southwest. On the south and east side the country is limited by the Pacific Ocean whereas on the west side it is the Atlantic Ocean. The population of some 3.4 million people is concentrated in the fertile Central Valley and in the coastal regions where ports are located. The two mountain chains in Costa Rica cause different climate zones on a relative small area, this causes a wide variety in land use and natural resources within the country (Herrera, 1986).

The dominant source of the national economy is agriculture, particularly export crops of which coffee and banana are the most important.

This study focuses on the province of Guanacaste (fig. 1). Guanacaste is located in the north-western part of Costa Rica. Annual rainfall ranges from less then 1400 mm in the lowlands up to over 6500 mm in the central mountain chain. The wet season is from may to November (Herrera, 1986). The dominant land use is extensive grazing (Eding and Suchy, 1994).

1.3 The objective

Because of the growing importance of organic agriculture in Costa Rica and the objectives of REPOSA the objective of this study is:

To incorporate organic agriculture in the studies of REPOSA. This is done by:

1. Identifying the existing network in the organic 'world' in Costa Rica, specifically Guanacaste, and

2. identifying one or more organic farmers whose systems can be described in LUST's to incorporate them in the model.

The definition of organic farming within this study is very simple. Organic farming is that type of farming without the use of artificial inputs; chemicals and fertilizers.

The purpose of the first part of the objective is that after this information about organic agriculture can be more easily obtained in the future and to get an idea of the locations and amount of organic agriculture in Guanacaste. The purpose of the second part is to be able to run the model with 'organic' data so a comparison between this type of land use with other types can be made. The competitiveness of organic agriculture can than be compared with other kinds of land use under different circumstances.

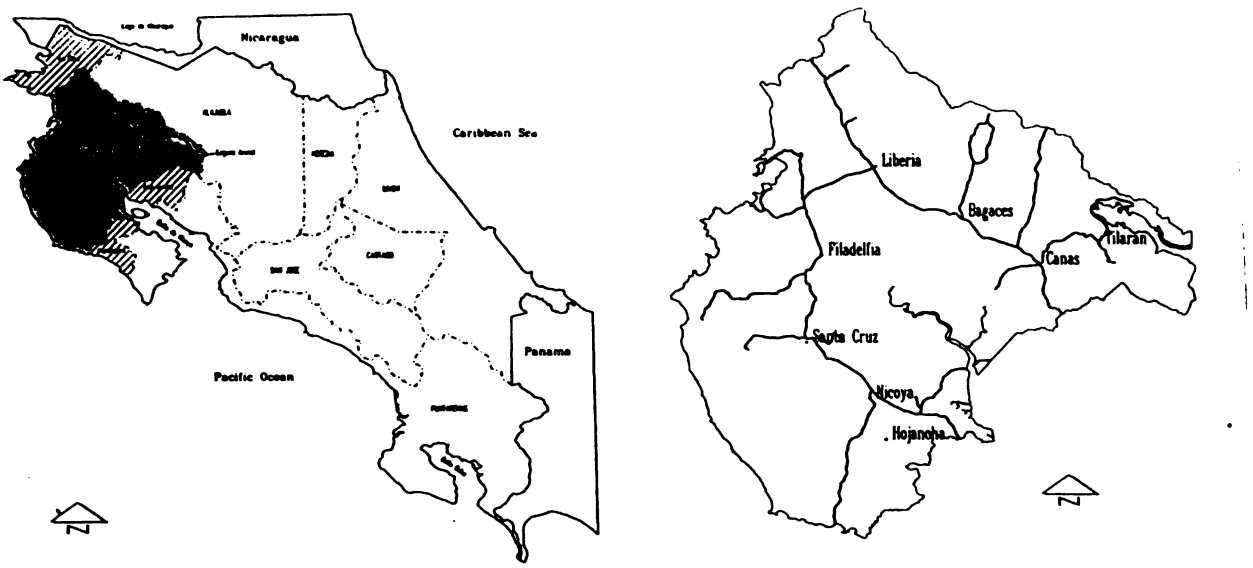

Figure 1: Location of the province of Guanacaste in Costa Rica and a more detailed map of Guanacaste.

MATERIAL AND METHODS

To get an idea about the quantaty and quality of organic agriculture in Costa Rica a literature study and interviews with different people working in organic agriculture were made. People representing organisations, farmers and the head of the department of organic agriculture of the Costarican government were interviewed.

The information necessary to describe the farms was obtained through a farm survey.

To get familiar with the situation of organic farmers in Guanacaste a four day field trip was made. The objectives of this trip were;

- getting to know the type of organic agriculture in Guanacaste in order to make a questionnaire which fitted for organic farming in Guanacaste,
- getting to know the people and projects working on organic agriculture in the region in order to make contacts,
- obtaining directions of the different farmers in order to be able to locate them for questioning, when necessary .

As a basis for this questionnaire other questionnaires earlier used in the project to obtain data were used. The differences between organic and 'normal' agriculture were covered by extra questions about specific 'organic' items.

The questions were about the labor, equipment and input used. Most important items were:

- Landpreparation.
- Sowing and planting.
- Weeding, fertilizing etc..
- Watering system.
- Harvest.

Most important organic items covered were:

- Soil conservation.
- Production of different types of manure and compost.
- Application of them.

- Production of different types of repellents.
- Application of them.

Open-questions were used to obtain the information needed. This had two reasons; organic farmers have many different cultivars, which made it impossible to cover all the options for all the cultivars in a closed type of question. A second reason was that the questionnaire was an oral one. The advantage of only a limited amount of answers is especially true when a farmer has to fill in his own questionnaire.

The technical part of the questionnaire was revised with a professional on questionnaires and with one on Spanish language. Things like simplicity and correctness of the questions were taken into account. A close look at if the questions did not leave room for more than one answer was taken.

After this a field-test with 3 organic farmers took place. The objective was to test the questionnaire in practice and to see if all important items discussed in the field were covered by the questions.

In between every step the questionnaire was corrected, the result is shown in Appendix I.

RESULTS

3.1 Organic agriculture in Costa Rica

Most of the organic agriculture is located on little farms. Some 80% of the farmers are organized in cooperations, foundations or associations. The question why mostly small holders practice this form of agriculture has the following answers:

- Organic agriculture is not always done because of an environmental consciousness but also because of a lack of capital. some small holders have not been able to generate enough money to buy input like chemicals and fertilizers. In coffee for example an organic way of growing almost died out in Costa Rica. Farmers, even the small ones, could reach a relative wealth by growing. When capital avalability increased farmers bought extra inputs.

- Most NGO's working in organic agriculture have goals in rural development as well so they work mostly with small farmers. Their proyects often coincide with education of the farmers and their families, projects for women and ecotourism. For farmers the assistence of local organizations opens a way to contacts with the government, financial help of foreign organizations and the obtaining of credit. The help of a organization is a bridge to more possibilities because the farmers have a representant and a source of knowledge.

There are other 'secondary' reasons that play an important role in the decisions of farmers to grow products in an organic way.

- The already mentioned assistence and possibilities which NGO's provide for organic farmers.

- Organic agriculture, and the organizations which come with it, give the farmers a framework to organize themselves in. Organized farmers can obtain a better position than unorganized farmers. Items on infrastructure, capacitation and contacts with the government can better be handled together. A group has more influence than a single person.

Three types of organizations play an important role in organic agriculture:

Foundations

The foundations provide education, initiate projects and have an important function as a facilitator. The most important foundation, at the national level, in organic agriculture is:

- COPROALDE (Coordinadora de Organismos no gubernamentales con Proyectos Alternativos de Desarrollo): this organization has a net of, mainly, independent local organizations throughout the country. The organization was founded in 1988 and coordinates, initiates and stimulates activities of their members. They also have their own activities.

One member needs to be mentioned in particular, its ANAPAO (Asociación Nacional de Pequeños Agricultores Orgánicos). This is the only organization within COPROALDE which is active at the national level, and only for farmers.

Cooperations

The main goal of the cooperations is the marketing and selling of products. Besides assistence and information for example on obtaining credits and on cultivation. In general the interference of farmers in cooperations is less than in associations. Cooperations have a strong management which often decides about things of which the farmers do not have sufficient knowledge.

Associations

The most important national association on organic agriculture in Costa Rica is:

- ANOA (Asociación Nacional de Productores Orgánicos): National organization for the organic farmers. While COPROALDE has different activities on sustainable development, ANAO is specialized in organic agriculture.

The main difference between associations, cooperations and foundations is the legal status they have and, because of this, the way in which they are organized.

National (semi-)governmental organisations do not play an important role at this moment. The function of the organic deparment of MAG has been limited until now due to its age and the bureaucracy of the government. The main goal of the new department of organic agriculture is the development of a national trademark for all organic products. Production will have to follow international standards, this is why the government cooperates with IFOAM (International Federation of Organic Agricultural Movements) and the E.U. (Europian Union) on this.

The role of CATIE is not very big at this moment either. There are plans to increase investigation on, specifically, organic agriculture but this depends on if there will be money available for the plan. In the CATIE program on integrated pest control knowledge about different 'organic' items like biological control of pests is generated.

The European and American interest in organic products give farmers an opportunity to receive higher prices. Costa Rica is exporting mainly fresh products for baby-food, drinks etc. Because of the foreign interest and the wish to expand the area of organic agriculture, certification is one of the main concerns of farmers and organizations in organic agriculture. Now 80% of the products does not have any kind of certification.

Certification is done by private companies or organizations of farmers. The need for certification is recognized by all people involved in organic farming. In an enquiry in 1994 87% of the farmers mentioned the need for certification. Certification of the product and segmentation of the market will open more possibilities to improve the market for organic products. At present 66% of the farmers uses intermediaries for the commercialization of the products, the whereas other 40% sells directly.

Although half of the amount of farmers receives some kind of knowledge from third parties (courses, colleagues etc.) improvement on this part is possible as well. Financial help is only sporadically provided, mostly, by foreign organizations. This makes the farmers more dependent on the higher price some receive for their products (Gómez, 1995).

The most important constraint for the organic agriculture in Costa Rica now is the obtaining of credit. For lots of farmers this is very difficult. Banks are still hesitating to give credit to projects with which they are not familiar. As stated above the organizations of and for the farmers play an important role in the solving of this problem.

Appendix II presents a list of organizations and contacts dealing with organic farming and states the addresses of the farmers visited.

3.2 Organic agriculture in Guanacaste

A description of all the organic farms visited in Guanacaste is given below. The projects in organic agriculture are concentrated in two areas. One is the area of Nicoya the other is the area of Arenal (fig. 1). Exact addresses can be found in apendix III.

A very common land use type for organic farmers are different types of vegetables like tomatoes, different types of cabbage, onion, carrot and different root-crops. When this land use type occurs on a farm, in the description just the term 'vegetables' is stated.

Nicoya

For the Nicoya region one of the members of COPROALDE, FEDEAGUA, is an active NGO. They provide a framework for the orgnanizatior. of small local farmers. They offer services like education and capacitation on organic agriculture and initiate projects like the 'farmers bank'. The 'farmers bank' is an initiative of FEDEAGUA to provide credit for organic farmers, cheaper credit with better conditions. Now the obtaining of credit is a big problem for the farmers. Also a study is being done on the possibilities of a center in Nicoya where they want to sell the organic products of their members.

1. Asociacion de agricultores orgánicos de Cerro Negro.

This group has a potential area of 40 hectares of which 4 hectares are cultivated. One hectare with organic agriculture and 3 with agriculture in transition. They have 4 years experience with organic agriculture. The community consists of 15 persons. Main source of income is coffee, which is not grown organically. The organic crops includes different vegetables of which the majority is used within their own households, the rest is sold in Nicoya. Untill now they do not recieve a higher price for their products in Nicoya.

Their most important contact is FEDEAGUA and through them they have relations with MAG (local extension), INA (Institucion Nacional para la Aprendizaje), ANAPAO and CNP (Consejo Nacional para el Producion). MAG receives more knowledge from the farmers then they can give. In MAG their is hardly any knowledge on organic agriculture. INA gives a course on soil conservation and drainage. CNP works with FEDEAGUA on a plan about the commercialization of organic products. In this only members of FEDEAGUA participate.

Until now their organic products do not have a certification. When problems occur in the organic crops which threaten the yield, chemicals are used. In the future Cerro Negro wants to produce all her products organically linked with a type of certification.

2. Asociacion de agricultores orgánicos de Virginia.

The associations has a potential area of 10 hectares all of it is cultivated in an organic way. The group consists of 14 persons. They have 4 years experience in organic production. Main source of income is papaya and pineapple. All the products are sold in Nicoya. Other organic products are different citrus-fruits, platano, manga and some root-crops. Chemicals are used in case of an emergency.

The situation in the number and quality of contacts of Virginia is the same as for Cerro Negro because they are affiliated with FEDEAGUA.

Virginia has relative large areas of the same produce (monoculture), future plans are to begin to work with intercropping and to extend the area of production by buying more land with the group of farmers. The 'farmers bank' will play an important role in this. Virginia has a strong commercial vision, they are thinking about production for an international market.

3. Movimiento de campesinas y campesinos madre tierra de Juan Díaz.

They have a potential area of 10 hectares of which 4 are cultivated. The group consists of 7 farmers and they are beginning with organic agriculture, they had their first organically grown coffee crop this year. In this case organic means one year without chemical input, although coffee is a perennial crop. The rest of their crops are chemical. Main source of income is coffee.

Juan Díaz has good intentions but little experience. They are members of FEDEAGUA as well, but their relations with them are not as close.

Future plans are to switch to a complete organic way of producing.

4. Buana Vista

The farmers have a potential of 16 hectares of which 8 is cultivated. Half of this is done in an organic way. The group consists of 8 persons. Main organically grown crops are watermelon, bean and some vegetables. The chemical part, which is in transition, consists of maize, rice, yucca and papaya. In organic farming they have 2 years experience.

As members of FEDEAGUA they have the same possibilities as the other members, but, as with Juan Díaz their participation on the organic level in less intense.

Future plans are an increase of the area of organic produce.

5. Demonstration project of FEDEAGUA and the community of Nicoya.

The project has an potential of 2 hectares of which one is used now. Does not have a commercial objective but one of education. The project is managed by an expert on organic agriculture of FEDEAGUA, the project is in its first year.

6. El Flor de Carrolillo

This group of 20 women has some 2500 m^2 of pure organic agriculture. Their objective is to grow enough vegetables for the use in their own households, what is left is sold in the village.

AGUADEFOR a NGO in Nicoya is giving them support.

7. Hojancha

Here a group of farmers is working in organic agriculture. They have close contacts with MAG. I found out about them during the last week of my stay in Costa Rica, I do not have any information on them, for that a visit is required.

Arenal

Within this region ACA is an active and important organization which stimulates organic agriculture. ACA is an governmental organization which is financed partly by foreign governments.

1. Leonidas Mongrillo

Has an area of 1.5 hectare pure organic agriculture. There are (area-wise) possibilities to expand agriculture but he is just working with his family on the farm. He has been working 4 years in organic agriculture now, mainly vegetables. The farm is his main source of income. Some of the produce is sold in Nuevo Arenal and sometimes he works for other farmers for extra money.

The project is supervised by ACA (Area Conservacion de Arenal) and CENAP. They give technical assistance. Leonidas is a very active farmer, a member of ANAO and he makes studytrips to other farmers with experiences in organic agriculture. Because of this he has a high level of knowledge.

His objectives are to be able to be self-sufficient with his family. He has no plans for commercialization of the product or expanding the area. He wants a sustainable household.

2. Ecological ecotourism center 'La Catarata'.

They have an organically managed area of about 0.5 hectare with medicinal herbs and vegetables for the kitchen of the restaurant. It is an initiative with different activities; renting of cabins, restaurant, ecotourism-tourism and organic agriculture. The objectives of the organic garden is for the education of farmers in the neighborhood and tourists who visit.

They get help from ACA as well, but have only little experience on a small area. This year they want to start a bigger project of 3 hectares with local farmers.

3. Adrian Bega

Adrian has a 2 hectare farm with some 500 m^2 of organic tomatoes. He has some 3 years experience in organic agriculture as well. Main source of income is chemical coffee. He is also working, with two others, on a ACA-project in Cabeceras. This site is nearly abandoned now. Adrian could not handle it alone and the other two were not very motivated to continue with the project.

Adrian is a well educated farmer with a lot of knowledge about organic farming. Although his farming is not on a commercial scale now he wants to convert his coffee to a completely organic one within three years. COOPELDOS, the cooperation on coffee in that neighborhood, wants to start a project on organic coffee too.

Interesting projects for the future

1. DRIP (Desarrollo Rural y Integral para la Peninsula)

DRIP is located in Paquera (Puntarenas). It is an NGO which is working with local groups of farmers, objectives are; stimulating a sustainable land-use, education of women and children and further development of small communities.

They have not got any type of organic agriculture now but are planning to begin with this in the next years. They want to combine this with a type of data-management about certain 'organic' cultivation methods. At this moment experiments with different types of organic manure, and an experiment on biological control of the mango-fly, take place.

2. PAO (Proyecto de Agricultura Orgánica)

The project started in 1993 as a project of UCR (Universidad de Costa Rica) and the Japanese government. The project works on a farmer level. The objective is to create self-sustaining organic farms with a closed system and to observe these systems to obtain data to see what is really happening on a organic farm.

Right now all the farmers which are working within the project are in transition. In 2-3 years they have to be totally organic. The farmers receive knowledge and information from the university about the different organic subjects. In the Guanacaste region two projects take place, of which the oldest is 2 years. Observation to obtain data is planned for next year. Here they work together with APANG and CEMPRODECA. They are local organizations for farmers and represent a framework for the farmers.

ANALYSIS

The majority of the farmers cultivate a part of their farm organically and a part chemically. On some farms organic farming is concentrated on easy to manage crops, crops which do not need a lot of chemical input in the first place. On the chemically managed part of their farm they use both organic cultivation technics, repellents, compost and manure as well as chemicals. These parts are in transition. In case of a direct threat of the yield of their organic crops the organic farmers use chemicals to prevent a great yield loss. Because of all this a first observation is that the concept of organic agriculture is in vague. The concept is not guaranteed by a type of certification. The definition of present day organic agriculture is now for a great deal determined by the farmer.

The suitability of farms or projects for further studies depend on:

1. Knowledge and experience of the farmer.

The ability of a farmer as a manager depends on this. Indicators are the amount of organizations which cooperate in the project or with which the farmer has contacts and the age of the farm or project.

2. Age of farm or project.

An biological equilibrium is created over time and necesarry for organic farming .It takes time before the effects of former use of chemicals, depletion of organic matter, erosion etc. are neutralized. The better the equilibrium, the more optimal is the land use. To get a fair comparison between different kinds of agriculture, which is the objective of REPOSA, the optimal forms have to be compared.

3. Future plans.

If REPOSA wants to conduct the research later it is important to know how the farm or project is going to develop. Also are future plans and ambitions a important indicator to get a better picture of the farmer.

4. Area of the crop and the farm.

In general a larger area of a crop means a better defined management of that crop.

5. The land use type.

REPOSA wants to analyze types of 'organic' land use to compare them with their 'chemical' counterpart. This means that certain land use types are more interesting to study than others depending on the type of land use REPOSA wants to study.

6. Goals of REPOSA.

There are different types of organic land use. Organic farmers who just want to sustain their own family or community and farmers with a more commercial goal. This more commercial approach usually includes certification, exportation of the product and a higher use of (organic) input. For example import of organic fertilizers and of more sophisticated means of disease control. According to the most common sustainability standards these systems are less sustainable, although the land use type is completely organic, according to the definition in this research.

To conclude what farm is best for further study I used the first four criteria. The other criteria are as important but depend on the political choices REPOSA makes.

The observations are now presented per (group of) farmer(s) in the same order as they are presented in chapter 3.

Nicoya

1. The people of Cerro Negro have a relative high level of knowledge because of the experience they have and the number of organizations they have contacts with. It is a very open group. The area of products is very small so management is not as optimal as with a bigger area. A great number of crops is cultivated on this area which it makes difficult to quantify management per crop. The fact that the group is working four years with organic agriculture now and still has only 1 hectare makes their future plans, expansion of the area of organic produce, not very credible.

2. The Virginia group has about the same level of knowledge as Cerro Negro and a big area of organic produce. Not only the area in total is big, but the area per crop as well. Management per crop will be relatively easy to quantify. It is a more closed group which is very afraid of competition on the market, because of this they are more careful with providing information. This makes it more difficult to obtain information of them. They seem to be less active in their contacts with FEDEAGUA too.

3. Juan Díaz is not an option for a close investigation. Almost no experience and a very small area.

4. Buena Vista has certain crops, bean (3 hectares) and watermelon (2 hectares), on large areas. These are crops which are easy to grow in an organic way. The have some knowledge too. It is a very rational and open group. Easy to obtain information from.

5. The Nicoya demonstration project is not suitable because it has a non-commercial objective, this will affect management for a great deal. The management is not done by farmers but by experts. This project is not an example of a real option in land use.

Arenal

1. Leonidas has the 'purest' form of organic agriculture which I have seen, but his goals are not very commercial. He has a lot of knowledge, more than the others, on organic agriculture. It is a relatively small farm with only intercropping, management per crop will be hard to determine.

2. La Catarata

Is too small to be a serious option. For their income they are not dependant on the organic garden, this will affect management as well. Mixed cropping.

3. Adrian Bega has a lot of knowledge and motivation but only a small part of his farm his completely organic. The advantage is that he works with a relatively limited amount of crops. He is one of the more active members of ACA as well.

Future projects

1.The DRIP project is very interesting. In the future they want to obtain data on labor and management of farms which are organic. This will take a while because there is only a little bit of knowledge on organic aspects with the farmers. Disadvantage is that DRIP is located outside the research area.

2. PAO is a scientific project on a farmer level. The farms are in transition now and the obtaining of data will begin very soon. The scientific framework guarantees stability in the project, all the farmers are selected on motivation. Also management will be monitored and quantified.

If the other farmers are going to do what they say, all of them are future possibilities for REPOSA.

CONCLUSIONS AND RECOMMENDATIONS

Experience and knowledge wise Cerro Negro, Virginia, Leonidas Mongrillo and Adrian-Bega are the best options to study. Their level of knowledge guarantees a defined management and a complete use of the different available methods, repellents and manures in organic agriculture.

Area wise Virginia is the best option for further analysis.

One can conclude out of the combination of these two observations that Virginia is the best option for a detailed study on organic agriculture in Guanacaste.

Future plans of farmers and projects which have just started give the impression that in the future organic agriculture is going to be more important in the region and that possibilities for further investigation will increase. Of special interest in this are the DRIP and PAO project.

Of the farmers Virginia and Adrian Bega have the most concrete plans to expand their organic farms and to optimize their management. Leonidas Mongrillo will probably not change his production much. His farm is an interesting study object but, because his objectives are different, the relevance for REPOSA depends on what type of farm they want to study.

For now further studies on the Virginia community are recommended. Care has to be taken to gain the confidence of the farmers. Also a close look at future developments of the other farmers is necessary.

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APPENDICES

APPENDIX I

Encuesta dirigada a campesinos y profesionales que están trabajando en agricultura ecológica. (Un questionario por cultivo, si hay una mezcla de cultivos se realizará una encuesta)

Fecha:

Información personal

Nombre del campesino:

Dirección:

Está usted asociado a una cooperativa, organización o fundación relacionada con agricultura ecológica?

si / no

Cuál?

Información de la finca

Superficie de la finca (en hectáreas):

Superficie en producción con agricultura (Has):

Producción total en el último año (en peso):

Características generales de la plantación

Cultivo (si hay cultivos mixtos todos los nombres):

Variedad(es) (de cada uno, si hay cultivos mixtos):

Superficie de cultivo:

Distancia entre las plantas y entre las lineas:

Tipo de terreno (plano/quebrado)

Tipo de suelo:

Textura (limoso / limoso-arcilloso / franco / franco-arcilioso)

La preparación

Cómo prepara usted su terreno antes de sembrar?

	Mecánico (Me) o Manual (Ma):	Cuál equipo o herramienta:	Días antes de sembrar:	Jornales;
Nivelando:				
Limpiando:				
Arando:				
Alomillando:				
Otro:				

La siembra

Usted prepara las semillas antes la siembra?:

Equipo:

Jornales:

Fecha de la siembra del cultivo:

Cuánta semilla por m^2 (o por parcela):

Usted usa semillas orgánicas? si - no

Usted cultiva sus proprias semillas? si - no

Cuál es el precio para las semillas?:

Jornales para sembrar:

Conservación del suelo

Siembra el contorno (rompeviento, prevenir erosión, coger agua o para sombra), jornales y equipo para estas actividades?:

Zanjas y desagues:

Terrasas:

Mano de obra (jornales) y equipo por esos:

Fertilizacion:

Qué tipos de abonos verdes usted utaliza?

Tipo:	Plan de rotacion:	Mes de la aplicación:	Mano de obra por aplicación:
1.			
2.			
3.			

Cuántos aplicaciónes cada mes/año?: Qué tipos de abonos foliar usted utaliza (mano de obra por aplicación)?

Tipo:	Cantidad:	Ingredientes:	Proceso de producción:	Mes de la aplicación	Mano de obra
1.					
2.					
3.					

Cuántos aplicaciónes por mes/año?:

Qué tipos de compos usted utaliza (Mano de obra por aplicación)?

Tipo:	Cantidad:	Ingredientes:	Proceso de producción:	Mes de la aplicación	Mano de obra
1.					
2.					
3.					

Cuántos aplicaciónes por mes/año?

Cómo sabe usted si hay deficiencias de nutrientes (tomar muestras)?

Cómo usted puede adaptar la cantidad de los diferentes nutrientes en su abono?

El riego

Tipo de fuente:	
Tipo de aplicación:	
Frecuencia:	
Mes:	
Equipo (mecánico/manual):	
Mano de obra por aplicación:	
Mano de obra por mantenimiento (del sistemo y del bomba):	
Drenaje artificial:	
Tiene usted que pagar por el agua:	

Malezas, plagas y enfermedades

Cuáles son las medidas orgánicas más importante para prevenir y atacar malezas, plagas y enfermedades (preventivo, curativo o higiénico)?

Usted usa rotación de sus cultivos para prevenir enfermedades?

si - no

Cuál plan?

Cuáles repelentes hay para atacar y prevenir enfermedades y malezas en agricultura orgánica?

Nombre:	Para atacar cuál enfermedad?:	Ingredientes:	Mano de obra para producir:	Mes en que usted lo hace:
1.				
2.				
3.				
4.				
5.				
6.				
7.				

Cuántas veces usted necesita producir los repelentes por mes/año?:

Combatirlo

Malezas de suelo y de planta

	Manual (M) o con repelentes (R)	Mano de obra por aplicación	Equipo	Mes
1.				
2.				
3.				

Cuántos aplicaciónes por mes/año?:

Usted quita un parte de las semillas germinadas?

si - no

Cuántos jornales?:

Enfermedades y plagas

	Manual (M) o con repelentes (R)	Mano de obra por aplicación	Equipo	Mes
1.				
2.				
3.				
4.				
5.				
6.				
7.				

Cuántos aplicaciónes por mes/año:?

Manejo especifico del cultivo

Mano de obra, equipo y mes de aplicación?

La cosecha

Cuándo cosecha usted el cultivo?

Cuántos jornales dura la cosecha?

Equïpo?

Cuál es el producción en cantidad?

Cuál porcentaje del producción usted puede vender?:

Cuál es el precio promedio?

Se da el mismo precio en productos orgánicos que en productos agroquímicos?

Si - no

Cuál es la diferencia?

Cuántos son los costos para transportar el produccion?

Mano de obra

Cuántas personas trabajan en esta finca/en esto proyecto?

	Cantidad:	Jornales (por mes):
Familiares:		
Alquilado:		
Asociadas:		
Otros:		

Otras preguntas

Usted tiene otras fuentes de ingresos?

Hace cuántos años usted cultiva con el metodo ecológico ahora?

Cuál fue su profesion antes?

Por qué usted cambió?

Cuáles son los problemas mas importante en agricultura ecológica para usted y su finca?

Qué usted piensa acerca del futuro de agricultura ecológica?

Cuál es la consecuencia de esto para la finca de usted?

FIN

Espasio para extra observaciones

APPENDIX II

COPROALDE (Coordinadora de Organismos no Gubernamentales con Proyectos Alternativos de Desarrollo)

F.T. Montoya Tel./fax: 227-3407

Members of COPROALDE (of the members I have contacted in my time in Costa Rica names and telephone numbers are stated):

ANAPAO (Asociación Nacional de Pequeños Agricultores Orgánicos)
With presence on a national level.

CEDECO (Corporación Educativa para el DEsarrollo COstarricense)
With presence in the regions Sarapiquí and Central.
Carlos Solano Tel.: 240-58 66 or 236-51 98

CENAP (CEntro Nacional de Acción Pastoral)
With presence in the region Huetar Norte
Ana Calderon Tel: 460-10 22

CODECE (Asociación para la Conservación y Desarrollo de las Cerros de Escazú)
With presence in the region Central

FEDEAGUA (Fundación Ecuménica par el Desarrollo Integral y Sostenible de Guanacaste)
With presence in the region Chorotega
Wilmar Matarrita Tel./Fax: 686-63 46

Fundación GÜILOMBÉ

With presence in the regions Atlántica and Central

Cilka Comane

EL PRODUCTOR, Servicios Profesionales y Técnicos

With presence in the regions Brunca, Atlántica and Chorotega

Hugo Villela Tel.: 255-07 29

TEPROCA (Taller Experimental de PROducción y Comercialización Agricola Alternativa)

With presence in the region Central

Another useful source of information is:

ANAO (Asociación Nacional de Agricultura Orgánioca)

Gabriela Soto (working for CIA but director of ANAO) Tel.:224-37 12

Useful extensions of MAG for the Guanacaste region are:

Tilaran

Ing. Carlos Achivo Tel.: 695-50 11

Liberia

Ing. Marina Jimenez Tel.: 666-04 13

Santa Cruz

Ing. Cabalceta Tel.: 680-00 85

There are more MAG extensions in Guanacaste but they do not have information on ecological agriculture.

Other NGO's:

ACA (Area de Conservacion Arenal)

Franklin Areas Tel: 695-59 08

Adrian Bega (public phone in Cabeceras)

Tel: 695-55 33

APPENDIX III

Directions of farmers who were surveyed.

Nicoya

1 and 2. Asociacion de agricultores orgánicos de Cerro Negro and Asociacion de agricultores orgánicos de Virginia.

Take the road from Nicoya to Samara, after a 15 minute drive take a right hand turn on the unpaved road in the direction of Dulce Nombre and Virginia. Ten minutes after passing through the center of the village, la Asociacion de agricultores orgánicos de Virginia is on your right hand. To reach Cerro Negro you follow the road for another half hour untill you see the 'Cerro Negro' sign on your right hand.

3. Movimiento de campesinas y campesinos madre tierra de Juan Diaz.

Take the road from Nicoya to Sant Cruz, after 10 km. there is a blue bus-stop and a sign which states: 'escuala Fray Bartolome', take a left there unto the unpaved road. Take a left at the soccer-field and after a while right at the wooden house. After 15-20 minutes there is a bend in the road with some wooden houses, here it is. Ask for Donald Lopez.

4. Buena Vista.

Take the road from Nicoya to Samara, after 50 minutes you reach Buena Vista. Take a right at bar Las Vegas and you will reach a house with a roof of leafes after 10 minutes. Ask for Walter Arias.

5. Demonstration project of FEDEAGUA and the community of Nicoya.

The project is situated in the center of Nicoya, to visit it contact FEDEAGUA.

6. El Flor de Corralillo.

Go to the crossing on the east side of Nicoya, you can take a right to Santa Cruz and a left to Ferry Tempisque (San José). Do not do this but go straight on on the unpaved road. Take a right at the cemetary and ask in Corralillo.

Arenal

1. Leonidas Mongrillo.

Take the road from Fortuna to Nuevo Arenal when arrive on the unpaved part of the road drive on it for 10 minutes. When you see a well-structured fence on your left hand take a right. Take a right at the end of this terrible road and ask for Leonidas.

2. Ecological ecotourism center 'La Catarata'.

Take the road from Fortuna to Nuevo Arenal 2 kilometers after Fortuna their is a big sign on your left hand which gives the direction.

3. Adrian Bega.

Cabeceras is easy to find on the map. Go east from Juntas or south from Tilaran, in Cabeceras you can ask for Adrian.