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**Preliminary Results of the Study on
Food and Nutrition Safety in the Border
Zone of Costa Rica and Nicaragua**

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Preliminary Results of the Study on Food and Nutrition Safety in the Border Zone of Costa Rica and Nicaragua

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Abstract

The project, "Improving Food and Nutrition Safety in Border Communities by Appropriate Family Farming" was presented under the Interuniversity Program, with the goal of supporting Costa Rican-Nicaraguan trans-boundary sustainable local economic development, in which two Costa Rican and one Nicaraguan university were involved. The project was approved and funded through the agreement PRESANCA II-CSUCA (Regional Programme for Food Security and Nutrition for Central America supported by the European Union and the Central American University Council).

The communities studied in the Costa Rica-Nicaragua border area are: Morrito, San Miguelito, Los Chiles and Upala; which show low human development, high vulnerability to climate change and fragility of farming systems.

The research used qualitative analysis methodology, field visits, interviews, surveys to rural farm working families, farmers and rural schools. Also participatory research techniques were used with the families from both countries. Work began in November 2012 and will be completed in August 2014, so this work is a presentation of the preliminary data.

One of the most important aspects of the project is to involve universities in solving cross-border problems in both countries and to search spaces and find viable solution for production systems of family farming.

In this context it has been possible to determine the status of food safety, the status of production systems, and the articulation of these channels with marketing, production and processing practices in family production systems.

The first results of the application of this work, confirms the need for balanced, fair and equitable agricultural development for these communities in order to achieve food safety in an area of extreme fragility of natural resources and environment.

Introduction

Food Safety and Nutrition (SAN) has been one of the keystones in several areas of work, as a contribution to the quality of life for residents. In this sense, the project aims to create solutions that can be implemented by the people involved in the issue of SAN in the various areas of development in the selected communities of both countries PRESISAN PRESANCA II (2001).

Family farming, with more than 500 million farms in the world, is the predominant form of agriculture, and is inseparably linked to global food safety. Ideally, women and men should have access and the need to engage in food production support while their children perform appropriate tasks after school and play time. Farm families play a central role in ensuring the sustainability and conservation of biodiversity. They are part of regional networks and local cultures, and boost the local economy by spending their income mainly on local and regional markets. However, over 70% of the population suffering from food safety problems is composed of family farmers in the rural areas of Africa, Asia, Latin America and the Middle East. They cannot reach their full production potential due to a lack of access to natural resources, credit, policies and the technology they need. http://www.boletin-sfaf.com.ar/?page_id=169, accessed May 3, 2014.

This work is part of the work initiative and bi-national cooperation for the development of cross-border communities between universities in Costa Rica and Nicaragua, as expressed in the "Interuniversity Programme to Support Sustainable Local Economic Development at The Costa Rica-Nicaraguan Border". After two working meetings we held: the first in March at the Universidad Autonoma de Nicaragua and the second in May at the Instituto Tecnologico de Costa Rica, San Carlos, the institutional support from all participating universities has been stated, as well as sharing the needs of border communities and projects to be developed in the future in both countries.

The UN, giving relevance to family agriculture, on December 22, 2011, proclaimed 2014 as the International Year of Family Farming. It also urges Member States to carry out activities within their respective national development programs in support of the International Year of Family Farming States.

Moreover Laura Lorenzo, at the World Rural Forum, during session 38 of the FAO Conference in June 2013, shares "family farmers are producing food and most are able to end poverty and hunger in the world". We believe that supporting family agriculture is the main tool to fight poverty. Family farming is a human face, it is the farmer who works his land, some may have even paid farmers... for us family farming is the mainstay of rural development in all regions..."

Consequently, this project is part of the underlying problem "food and nutrition safety" and works with family farmers in an attempt to contribute to the solution of the problem, so the following objectives have been set:

Objectives

General objective. Contribute to food and nutrition safety in border communities of Costa Rica and Nicaragua through appropriate family farming.

Specific objectives:

- ✓ To study the experiences of family farming in two border communities between Costa Rica and Nicaragua.
- ✓ To promote production systems of appropriate family farming in the beneficiary communities.
- ✓ To promote the integration of the productive surplus in the agrifood chain to boost the economy of both border communities.

Materials and Methods

The project proposes the development in two countries, Costa Rica and Nicaragua, specifically in the border territory. To this end, we chose: Costa Rica in the province of Alajuela, in the Cantons of Upala, Los Chiles and Guatuso. While in Nicaragua in the department of Río San Juan and the municipalities of San Miguelito and Morrito (Figure 1).

Study period. The study was originally raised in the period from November 2012 to May 2014. However, due to situations beyond the control of the researchers, the project will run until August 31, 2014.

Location of the Study Area

Figure 1. *Geographical Location of the Project Impact Areas*



General Information of the Area of Influence

Table 1. Information Hinterland Study, Costa Rica and Nicaragua. 2013

Country	Province / DEPARTMENT	CANTON / MUNICIPALITY	INDICATORS	UNIT	STATISTICAL
NICARAGUA	SAN JUAN	MORRITO	SIZE	km ²	677
			HEIGHT	masl	45-100
			POPULATION	individuals	5648
		SAN MIGUELITO	SIZE	km ²	923
			HEIGHT	masl	13-538
			POPULATION	individuals	9634
COSTA RICA	ALAJUELA	UPALA	SIZE	km ²	1580
			HEIGHT	masl	48
			POPULATION	individuals	43953
		LOS CHILES	SIZE	km ²	1358
			HEIGHT	masl	43
			POPULATION	individuals	23735
		GUATUSO	SIZE	km ²	758
			HEIGHT	masl	250
			POPULATION	individuals	15508

Source: Por Costa Rica: Instituto Nacional de Estadistas y Censo, 2011; por Nicaragua: INEC, 2004

To fulfill the specific objectives of the project, three phases were established, each with at least one component and their expected results.

Phase I.

Component 1 SAN, evaluated in families and schools; on the borders of both countries.

Expected Outputs. Diagnosis of the situation of communities.

Phase II.

Component 2. Proposal for appropriate family farming model that satisfies the SAN and generates surplus production.

Expected output. It will have at least two models of appropriate family farming, one for each country.

Component 3. Development of sample farms in the two countries.

Expected output: At least two farms will be developed one for each country.

Component 4. Farmers trained in family cultures that affect food diversification.

Expected product. Improved capacity of at least 100 producers in each country.

Phase III.

Component 5. Local chain production solutions that expand the economic influence territory of family farmers and improve the supply chains of schools.

Expected: communities with responses to productive chain.

Once the project begins, a communication path and implementation of activities is defined and to do this, two specific mechanisms are established: first, conducting binational meetings for sharing of methodology; and second, the creation of a web page, which allows researchers to place the two countries' progress at each stage, thus keep informed of the best possible way.

Outcomes

The data presented here is the preliminary result of a project that is in process and therefore, some information may change or be modified when the project is finally analyzed.

A website was created, where readers will be able to find the full project document, assessment tools, criteria for the selection of communities, criteria for selection of beneficiary families to develop the appropriate model family agriculture, progress reports and related documents.

<http://seguridadalimentariacostaricanicaragua.org>

Systematization of Information and Unprecedented Initiatives in Family Agriculture and Food Security and Nutrition (SAN)

There has been a review of information and initiatives on family farming and Food and Nutrition Security (FNS) in both countries, taking into account institutions and organizations involved as well as related national policies, FAO (2004) FAO (2011) Hernán Mejía González (2010, INEC (2004).

We reviewed projects completed or in progress in the areas of the project as well as program linkages and partnerships in related cooperation programs and projects related such as Support Program compliance with SPS. PROMESAFI MAG-EU projects involved AECID, IICA (2012).

Experiences with Family Farming in Two Border Communities

First, the project proposes a zone of influence and delimited agro-ecological zones for Costa Rica and Nicaragua, this still remains to raise what would be the target community to study. To do this, the researchers took advantage of the experiences of other institutions or organizations, and established selection criteria for the selection of communities to develop the appropriate model family farming.

In Costa Rica meetings were held with the Ministry of Agriculture and Livestock (MAG), with the Ministry of Planning (Ministry of Planning) Economic Policy and the City of Los Chiles, the first region remained the subject of study. Likewise we have toured recognized agro-ecological zones, organized meetings with producer groups, like the Union of Agricultural Producers (UPA Nacional) and interviews with local leaders. The purpose of

these tours was also to know the reality on Family Farming and SAN in the region under study.

For Nicaragua meetings were held with the mayors of the municipalities involved, as well as contacts with the relevant actors in the region such as the National Council of Universities (CNU) and University Extension Centers. Recognition field trips to target communities have also been done. In order to reach this the technical support of the two Municipalities of San Miguelito Morrito were truly useful. We also managed to visit the matching office of the Ministry of Education (MINED), which allowed us to identify and improve the rating variables in the SAN from the nutrition component.

The instrument “selection criteria for the target communities” was constructed. These criteria helped us select the target communities.

Selection of Organized Groups Subject to Project Study

The evaluation study of Food Safety and Nutrition (SAN) in communities and schools and local agrifood chain study has been delimited to the territorial administrative level in a community. A selection methodology has been designed and criteria for the selection of this community. These criteria can be summarized as:

1. That the community be as near as possible to the Costa Rica – Nicaragua border.
2. That the community be organized or is in a position to do so.
3. That the community be composed of a minimum of 50 farming families. It is important that the community be very small in view of the fact that a mathematical model for the selection of the sample in which the assessment tools will be applied.
4. That the target community is provided with at least one school.
5. That the target community has access roads all year round
6. That family farming be the main target community
7. That the main form of life of the community is family farming.

The criteria allowed us to carry out the following selection: For Costa Rica, the community of La Palmera was chosen, in the canton of Upala and the community of Las Nubes, in the canton of Los Chiles. For Nicaragua, The community of Morritos Urban Sector 3 Morrito Township and community Los Pantanos of the municipality of San Miguelito, Table 2.

Once the communities were sectioned, a tool for participatory assessment (survey) was built and applied that allowed us to collect the information needed to diagnose the situation of the communities studied. Previously a mathematical model was applied that allowed work based on a community sample set, GeilfusFrans (1997).

Mathematical Model for the Selection of the Sample:

$$n = \frac{Z^2 p * q * N}{Ne^2 + Z^2 p * q}$$

Where:

- *n*-size of the sample
- *Z*-confidence level (90%)
- *p*- probability for (0,5)
- *q*-probability against (0,5)
- *N*-universe
- *e*-estimation error (0,1)

Table 2. *Communities Selected in the Different Cantons and Municipalities of Costa Rica and Nicaragua, Respectively, 2013*

Country	Region / Municipality	Communities	Total families	Sample (valued families)
Costa Rica	Los Chiles	Las Nubes	71	35
	Upala	La Palmera	46	27
Nicaragua	Morrito (Río San Juan)	Morrito Urbano Sector 3	70	34
	San Miguelito (Río San Juan)	Los Pantanos	59	32

Preliminary Results of the Analysis of Surveys

Table 3. *Familiar Structure. (Relation) of the Communities Studied in the Project. 2013*

INDICATORS	UNITS	NICARAGUA		COSTA RICA	
		San Miguelito	Morrito	Los Chiles	Upala
		Los Pantanos	Morrito Urbano 3	Las Nubes	La Palmera
RELATIONSHIP					
SON OR DAUGHTER	%	50,63	48,45	44,16	51,82
GRANDCHILD	%	10,63	11,80	7,79	1,82
MOTHER	%	20,00	18,63	20,78	21,82
FATHER	%	14,38	18,63	20,78	19,09
OTHER	%	4,38	2,48	6,49	5,45

Table 4. Familiar Structure. (Marital Status) of the Communities Studied in the Project. 2013

INDICATORS	UNITS	NICARAGUA		COSTA RICA	
		San Miguelito	Morrito	Los Chiles	Upala
		Los Pantanos	Morrito Urbano 3	Las Nubes	La Palmera
MARITAL STATUS					
SINGLE	%	59,76	53,46	48,33	54,17
MARRIED	%	27,44	29,56	33,33	28,13
WIDOW	%	0,61	0,00	0,00	2,08
COMMON LAW	%	12,20	16,98	18,33	12,50
DIVORCED	%	0,00	0,00	0,00	3,13

Table 5. Familiar Structure. (Education) of the Communities Studied in the Project. 2013

INDICATORS	UNITS	NICARAGUA		COSTA RICA	
		San Miguelito	Morrito	Los Chiles	Upala
		Los Pantanos	Morrito Urbano 3	Las Nubes	La Palmera
SCHOOLING					
ILLITERACY	%	18,35	16,25	2,60	9,09
READING AND WRITING	%	18,99	23,75	3,90	5,45
PRIMARY	%	37,34	33,75	50,65	36,36
SECONDARY	%	18,99	23,13	27,27	44,55
UNIVERSITY	%	6,33	3,13	5,19	2,73
PRESCHOOL	%	0,00	0,00	2,60	0,00
N.A	%	0,00	0,00	7,79	1,82

Table 6. Familiar Structure. (Occupation) of the Communities Studied in the Project. 2013

INDICATORS	UNITS	NICARAGUA		COSTA RICA	
		San Miguelito	Morrito	Los Chiles	Upala
		Los Pantanos	Morrito Urbano 3	Las Nubes	La Palmera
HOME OCCUPATION					
FARMER	%	38,26	37,41	20,78	32,73
ADM HOME	%	27,52	28,06	24,68	20,91
TRADER	%	1,34	0,00	0	0,00
TRADER	%	24,16	30,94	23,38	29,09
EMPLOYEE	%	8,72	3,60	18,18	10,91
UNEMPLOYED	%	0	0	1,30	1,82
N.A	%	0	0	11,69	4,55

Models of Production Systems of Appropriate Family Farming in the Beneficiary Communities

The basis for the fulfillment of this goal has been the analysis of the information collected from the selected communities. With this information, the support of other experiences, recommendations from allied institutions and community leaders helped develop the instrument, which defines the criteria for selection of families subject to study communities. With this the task of proposing and implementing the appropriate model family farming starts.

Eligibility Criteria for Families:

1. Readiness to change in the adoption of new technologies
2. Willingness to share experiences.
3. Counterpart to implement the plot
4. Law - ownership of the property
5. Accessibility to the plot
6. Social commitment from family to family
7. Presence of children in the farm family

As a result of this exercise, four families, two Costa Rican and two Nicaraguan were selected. (Table 7)

Table 7. *Selected Families in Communities Subject of Study from Costa Rica and Nicaragua. 2013*

COUNTRY	Selected family			
	San Miguelito	Morrito	Los Chiles	Upala
	Los Pantanos	Urbano Sector 3	Las Nubes	La Palmera
COSTA RICA			Gutiérrez Ramírez	Vivas López
NICARAGUA	Ávalos Torres	González Robles		

Proposed Models for Appropriate Family Farming

Probably, this is one of the most sensitive results within the expected topics. Families traditionally have a productive and food culture that is difficult to change. In this sense, the methodology applied with families involves the application of a participatory Rapid Assessment. Researchers have had to extensively study the selected family. They must properly use the information gathered in the interview (survey); and strengthen good affective relationships to enter the DRP. This allows for brainstorming, allowing to demonstrate effectively what the situation of food safety, eating habits, favorite products, food production farm, purchasing power are among others. From this information it is possible to sensitize families to generate the change towards a model of appropriate agriculture.

The proposal should be agreed between the family and investigators, so that families are entirely satisfied. Joint Working Examples are seen in Figures 2 , 3, 4 and 5.

From this information it is possible to sensitize families to generate the change towards a model of appropriate agriculture.

In the case of Costa Rica, Figure 2 shows, the young, Gerald Eduardo Vivas, 17, his mother Maria Eugenia Vivas, and in her arms, her 1-year-old baby Valentina. In the photo on the right, the other two members of the family, Aracely 14 and Jose Angel 11 feeding hens. The photo on the left belongs to the day of the Participatory Rapid Appraisal DRP in which Gerald Antonio, co-leader of the family farm describes the family farm explaining and drawing agricultural inventory on board. This family unit with a 4.5 Ha farm located in the community of La Palmera requires great efforts to overcome the economic situation being experienced. The fixed family income is \$ 90 a month, plus what Gerald occasionally earns during his free time before going to night school. Currently, he is working on the implementation of the proposed model.

Figure 2. *Family. Vivas López de la Palmera, Upala of Alajuela, Costa Rica, 2014*



In Figure 3, the family home Gutiérrez Ramirez, while part of the research team explain to Don Eduardo (family head) on a whiteboard, some changes that could occur to the current model. In this particular case an excellent productive culture is presented. Don Eduardo would like to implement a more efficient farming method, with which he could produce more curd than the local market needs and that would eventually generate a better income. He is quick to accept the proposal to transform his small livestock into a more efficient and productive system proposed by the researchers.

Figure 3. *Family: Gutiérrez Ramirez. Nube de los Chiles, Alajuela, Costa Rica, 2014*



In the case of Nicaragua, in Figure 4, the family González Robles interacting with students attending the project and some researchers observed. Part of the productive culture is evident in the photo on the right.

Figure 4. Family: González Robles, Urban Sector 3, of Morrito, Rio San Juan, Nicaragua, 2014



In Figure 5. Avalos Torres family, listening to the explanations of researchers. As to the right shows some fodder for animals.

Figure 5. Family Avalos Torres, Los Pantanos, San Miguelito, Rio San Juan, Nicaragua, 2014



Figure 7. A. Current Status of the Family Farm: Gutierrez Ramirez and B. Design of Agriculture Model to be Built. Clouds of Chiles, Alajuela, Costa Rica, 2014.

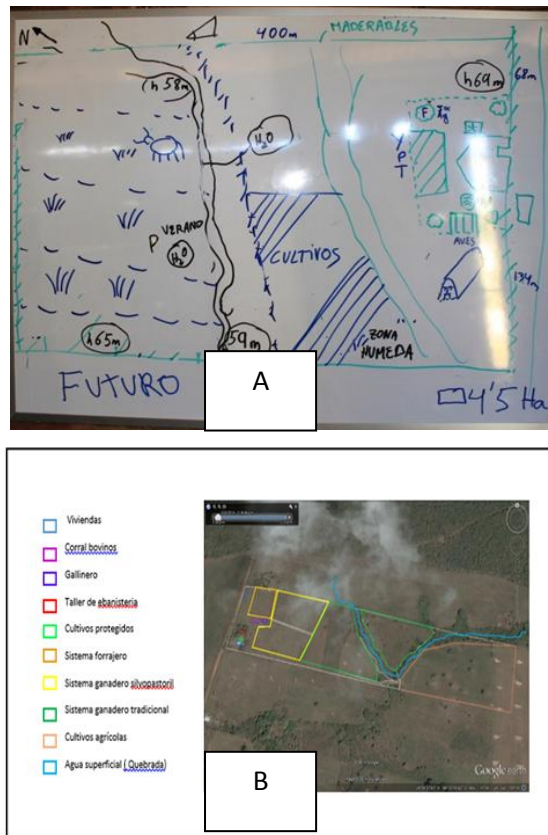


Figure 8. A. B. Initial Inventory and Actual Disposition of the Estate, "El Paraiso" of the Producing Family of Sr. Juan Pablo Avalos, Sra. Ubaldina Torres, Srtas. Darling Yadira Avalos and Yorling Talavera at Los Pantanos, San Miguelito, Department of Río San Juan, Nicaragua.





Figure 9. A. Initial Inventory and B. Actual Layout of the Farm of the Producer Family Constituted by Sr. Nicholas Gonzalez, Sra. Elsa Robles, Youngsters Norlin and Gabriela González Robles, Community Morrito Urban Sector 3, Department of Río San Juan, Nicaragua, 2014

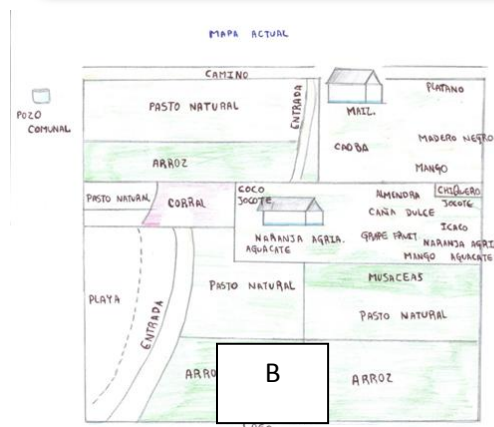
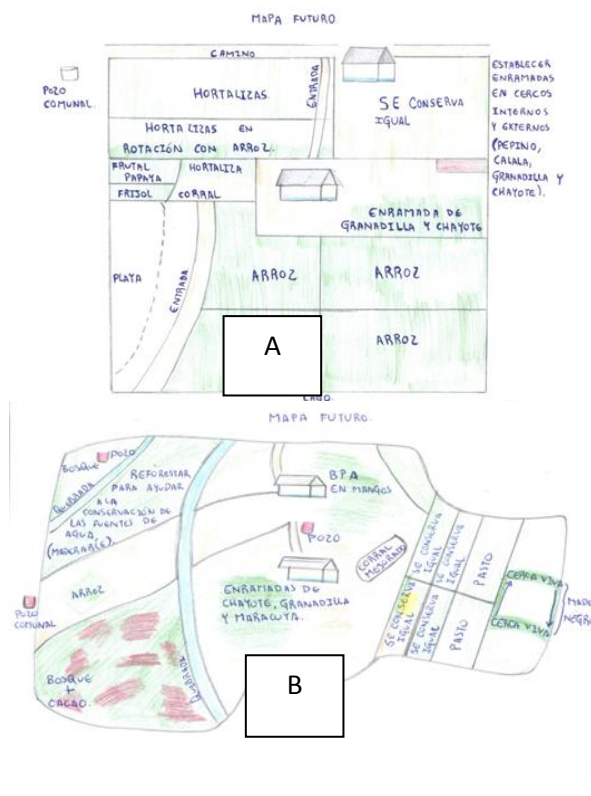


Figure 10 shows sketches or outlines of the future structure of the two farms south of Nicaragua, discussed with selected communities and families.

Figure 10. Schemes Future Farms in Nicaragua, A. Marsh and B. Morrito Urban Sector 3



Conclusions and Recommendations

The completion of the first bi-national meeting between researchers of both countries and the three universities involved, allowed for an assessment of the commitments made upon giving an interpretation of the scope and purpose of the project, which ended in a commitment to solidarity teamwork.

A road map was designed to address the various project activities in an integrated manner, taking into account the particularities of each country and region of study.

The issue of food and nutrition safety, for both Costa Rica and Nicaragua, causes that other institutions and organized groups have no qualms about allying for synergies.

Visits to the communities affected by the project have been strengthened by the enthusiasm with which families have accepted the project.

From the meetings held with producers, visits to the farms, and the gathered data, it is inferred that, to some extent, there has been a loss of productive family culture- a problem which is more evident on the Costa Rican side.

The selection of the Nicaraguan communities and farming families with which the specific project actions will be developed was based on criteria agreed between the municipality and members of the research team.

The research group has aimed to join forces in getting national and international actors to join in order to achieve significant outcomes in the communities.

We have applied the methodology of participatory research by getting the producers of both countries to analyze the current and future state of their farms, to achieve a diet based on the use of their own production and the possibility of achieving a surplus to sell in the community that guarantees the income from an additional economic resource.

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