

Title

Capacity development and participatory tools for improved land and natural resources management at local level

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Abstract

Conflicts related to land and natural resources' management have a long history in Nicaragua, a country where low levels of productivity per agricultural surface unit exist since soil and water utilization by big farmers are following extensive and predator patterns. In Nicaragua, half of the farmers do not own their land or own small and low quality plots. Inappropriate land use, poor access to it and the lack of articulation between national land policies and local land rights practices are at the origin of a strongly conflictive environment.

There is a demand on the part of communities and cooperatives for adequate solutions. Action Against Hunger (ACH by its initials in Spanish) wondered about how local institutions can contribute to the prevention and resolution of conflicts related to land and natural resources' access and use and how can the process of recognizing producer's land rights be made more efficient and accessible to poorest.

In early 2004, the Gaspar Garcia Laviana cooperative, located in the community of Telpaneca in Nicaragua, requested technical assistance from ACH for the purpose of carrying out an inventory of land parcels. Thereupon a project was designed to seek a local alternative solution, including a low-cost methodology with a pronounced social dimension that would be easily accessible to all local organizations. They tried out and developed the Communitarian cartography, a method oriented towards the prevention and resolution of conflicts related to land and natural resources' access and use, through dialogue between all concerned actors and easy handling precision tools (GPS and GIS). 288 families were involved and 688 parcels were measured. The cooperative has a geo-referenced map of the community of Santo Domingo in which are identified each of the agricultural parcels, forest, rivers, roads and footpaths, also located are coffee growing areas, basic grains plantations and unused land. A public file of the properties measured is also available and can be consulted by any member.

Introduction

In Nicaragua, the 2001 Livelihoods Survey estimates that 45.8% of the population lives below the poverty line and that 15.1% is extremely poor. Nicaragua is one of the economically most vulnerable countries in Latin America, with a per capita GNP for 2002 of approximately US\$500. Even though poverty affects over half of the Nicaraguan population, it is not distributed equally amongst the various parts of the country. The province of Madriz, where the project was implemented, is located in North-Central Nicaragua, one of the most vulnerable regions in the country (7 of its 9 municipalities are listed as extremely poor).

With a population of approximately 134,000 inhabitants and a population density of 76 inhabitants/km², Madriz is a province with a climate that is adverse to agriculture, with scarce rainfall (800mm/yr. on average), and is thus prone to suffering prolonged drought. Its topography is craggy, marked by steep slopes, and only some 7% of the land is covered by forest. The drop in international prices for agricultural products, especially coffee, has only made matters worse. Based on this context, the following structural elements can be listed that add to the crisis in Madriz province.

- Vulnerable production systems with an undiversified capitalization base that rests on virtually single-crop farming of basic grains and depends for cash on the sale of surplus production once the basic subsistence level has been exceeded.
- Access, use and tenure of productive land. The development of the rural sector is strongly linked to these elements, and in Madriz they are characterised by the fact that approximately 9% of current properties stem from the unfinished Sandinista agrarian reform process in the Eighties which left behind considerable insecurity in the land tenure system. Land leasing arrangements are usually for the short term only (rarely longer than six months), which prevents adequate land management or investments that might lead to optimal production. Approximately 25% of small producers have no documentation to prove their land is entered in the Property Register. There is no cadastre system, which implies that existing information regarding property is often erroneous, leading to conflicts over borderlines between properties as well as between municipalities. Technical and economic limitations in both civil society and among public authorities in Madriz hamper the use of innovative methods to promote and disseminate local mechanisms that might allow for proper land and natural resources management and territorial planning.

Faced by this unsatisfied demand for solutions, ACH sought ways in which to provide assistance intended to contribute to conflict prevention and resolution as regards resources, as well as making the process of recognising producer's rights, acquired over time and through their work, more efficient while simultaneously placing it within reach of the poor. ACH thus designed a pilot project with a more integral and innovative focus, seeking a methodology with a strong social dimension and implementation cost accessible at local level.

In 2002, ACH carried out a study on land tenure and the market for land. This was followed by the development of a participatory cartography model to be used as a tool for local natural resources and land management. These activities in turn led to the onset of a process of reflection with local organizations and small farmers, known in Nicaragua as 'producers'.

The main conclusions of the study were as follows:

- In Nicaragua, half the farmers do not own the land they work, or own only small, low quality parcels. Inappropriate land use, poor access and the lack of articulation between national land policies and local land rights practices are at the origin of a setting characterized by serious conflicts over land tenure.

- The legalization and registration of rural property, particularly smallholdings, are a problem, as the legalisation of one manzana¹ of land costs as much as purchasing an additional manzana.
- There is a demand on the part of communities and cooperatives for adequate solutions to local management and physical planning of the territory.

The Gaspar Garcia Laviana cooperative, which has participated in this experience from the beginning, is located in the community of Santo Domingo de Telpaneca in the province of Madriz. It was established on land expropriated during the agrarian reform process that took place in the Eighties, and specialized in the production of coffee and basic grains (beans, maize, sorghum). The government that took office in 1990 suppressed most aid to agriculture, and the cooperative faced problems as regards access to credit. In addition, the former owners returned and claimed the land. Thus the members of the co-operative began to divide the land among themselves, while keeping the overall property intact under the original title. Two kinds of parcels were distributed, depending upon whether the land was apt for coffee or basic grains production. Along the same lines, the patios adjoining individual homes were “privatised” to the families of members of the co-operative, and even to families that did not belong but lived in the community. The co-operative left some areas of coffee and forest to collective management for the purpose of honouring their collective debts. The leaders expressed the need to make this division of the formerly collective property “official”.

1. Detailed description of the experience

The pilot project was born from a request put forth by the cooperative, and the methodology was developed as the project advanced. The ACH technical team became increasingly specialized as the project advanced, and exchanged information with GIS experts in order to correct any problems.

At the beginning of the project, a meeting and public assembly was held with the inhabitants of the community (approximately 200 persons). Details of the project and its origin were explained, along with development activities and expected outputs. This allowed ACH to clear questions and organizes the community to participate in the various activities to be carried out. Thereupon Santo Domingo community leaders were organised and producers interested in helping the technical team were identified in order to start the first trial geo-referenced survey. Two teams consisting of six persons each were organised. They were trained by a technical team in the use of Geographic Positioning System (GPS) equipment, participatory mapping, and land surveying techniques. Both teams thus became familiar with the Geographic Information System (GIS) its purpose, use and different ways in which to take a reading.

The first survey work involved geo-referencing points at rivers, roads, agricultural parcels, forested areas and homes in the community. This information allowed for testing the initial work, correct errors, and generate some degree of critical discussion with local leaders from which valuable information was obtained for validating the way in which the methodology was being applied (ground-truthing). The experience further made it possible to calibrate the topographic map being used and obtain reference points for the community. This activity was very important at the beginning, because it allowed for setting precedents before embarking on the measurement of the agricultural parcels *per se*.

Before any actual land surveying took place, tools were established by which to register order and file the information to be obtained, including a field form for including descriptive

¹ 1 manzana = 7,000 m² or 0.7 hectare.

information for each parcel and a spreadsheet in which to store the information to be collected.

The database was designed joint with producers, based on the needs they expressed. The database was designed to collect information regarding measurements, agricultural production and the presence of conflicts concerning the land use and natural resources. The table lists the variables contained in the database.

Table 1

Variables
Date
Name of owners
Zone
Area estimated by the owner
Years of use
Current crops sowed
Production per crop
Organic
Probability of error as estimated by GPS equipment
Observations ref. natural resources
Observations ref. conflicts
Observations ref. possible loss of GPS signal

Once trial activities concluded and meetings had been held, groups of owners, witnesses and persons owning adjoining land were brought together to carry out geo-referenced surveys of the parcels and thus obtain a map of how the properties fit together. The groups were formed taking in consideration the location of the parcel and the willingness of the owner to participate. By decision of the leaders and owners, work began at the most remote section of the community, where most of the land is used for growing coffee and forestry. This organisation by groups was maintained through the duration of the project. The classification of parcels and the taking of data regarding the land were developed in three different sections:

1. Perimeter of the cooperative
2. Boundary limits between communal areas, forests and protected land
3. Property lines between parcels owned by producers who are members of the cooperative

For the first stage, regarding the size of the cooperative, it was established that it consists of 890.5 hectares, with a perimeter of 26 km. This took several days, and 12 producers participated. Two persons held the GPS equipment and took readings, while another two cleared the underbrush in areas of difficult access due to overgrown vegetation. In the case of establishing the borderlines between community spaces and protected areas, which totalled 80 hectares and were sub-divided into twelve areas, again several of the producers in charge of the zone participated.

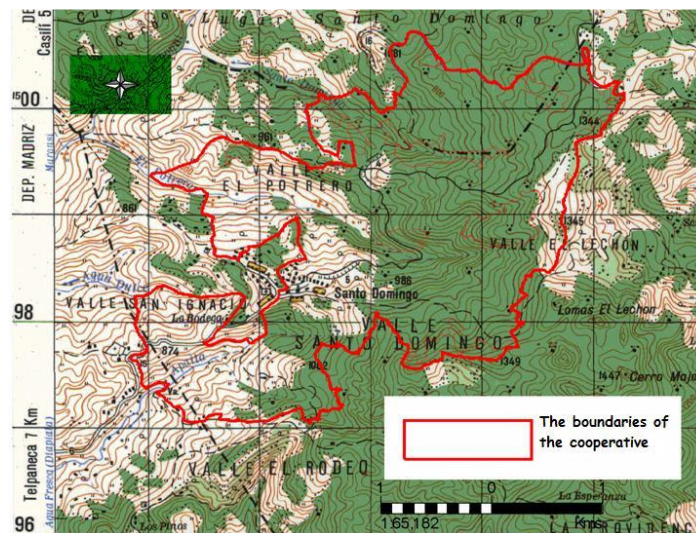
Finally, for the establishment of exact boundaries between the parcels themselves, measurements were made by the owners themselves, who used the GPS equipment in the presence of all other neighbouring owners and two witnesses, who certified the information being registered. They further ensured that these boundaries were respected and that no further conflicts arose. Following that, the information on the parcel in question was entered into a field form.



The data was collected in the field using GPS Garmin 12XL, equipped with antennas.

The owner measures his parcel. A second measurement was taken for verification purposes and to eliminate technical errors.

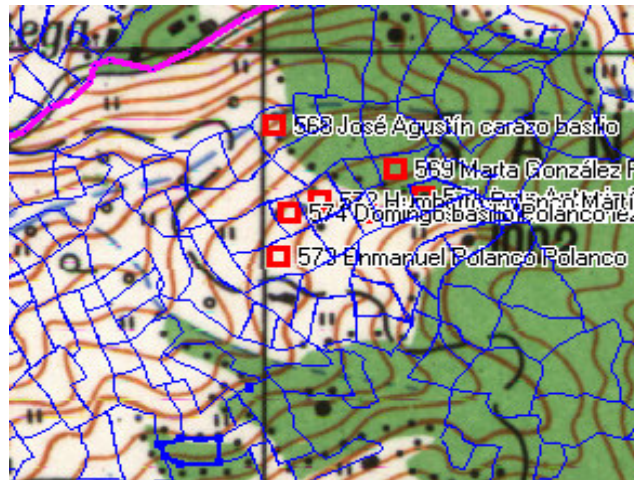
The recovery of data surveyed using GPS was made using FUGAWI software in Spanish.



Source: ACH

Figure 1

The map shows the boundaries of the cooperative using for its background a topographic map at a scale of 1:50 000.



Source: ACH

Figure 2

Here are shown the boundaries of the various parcels, identified by owner.

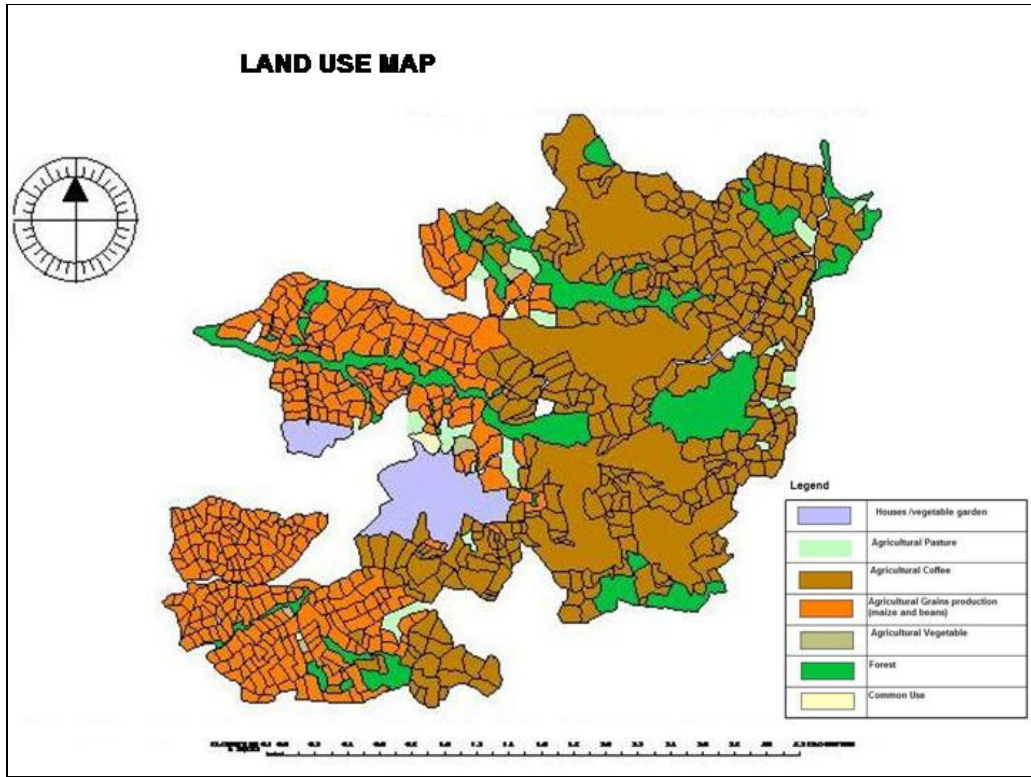
GIS: Thematic maps were generated (scale 1:5000), using Map Maker Pro software. Several thematic maps were generated on subjects such as land use, organic agriculture or the sub-division of parcels by size and function.



Source: ACH

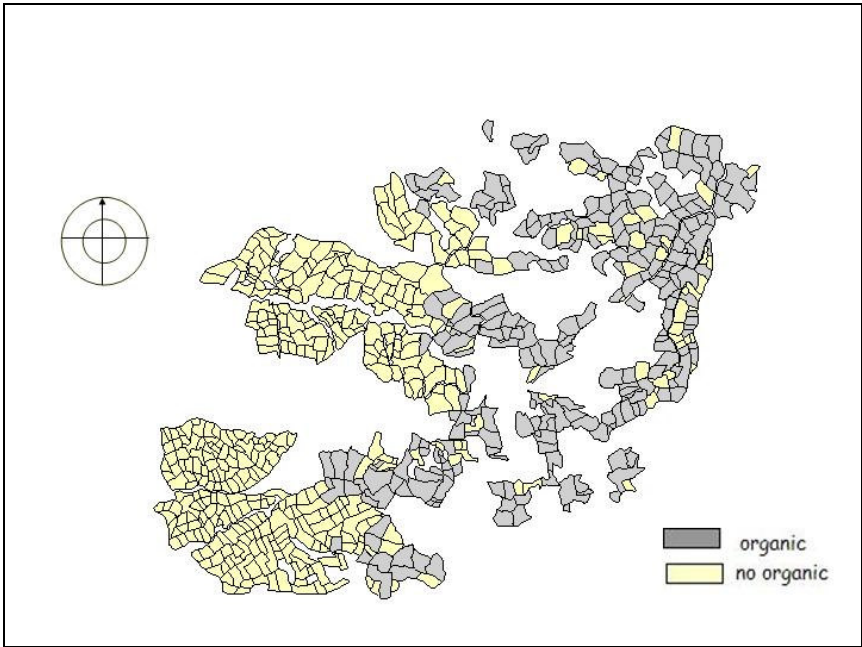
Figure 3

Using GIS software, divisions between parcels were made using different layers of information.



Source: ACH

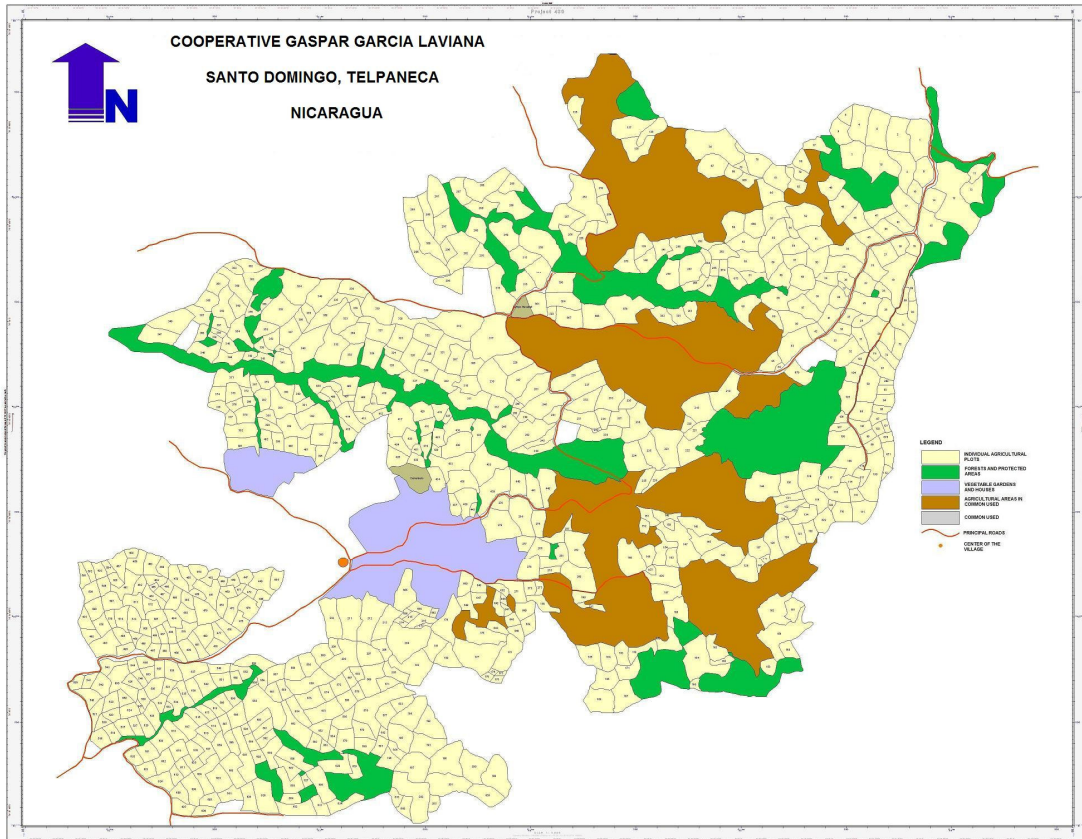
Figure 4: Land use map



Source: ACH

Figure 5: Map of parcels used for organic production

An important result of the project is a map of the parcels owned by members of the community as represented on a geo-referenced map of the Santo Domingo community. On that map (scale 1:5000) are the 688 parcels that make up the cooperative, including eight forested areas and the important points such as rivers, roads and footpaths. The type of crops being grown or soil use in each area of the cooperative can also be seen (coffee, basic grains, unused), along with land not yet incorporated to the cooperative and land for which individual titles have been granted.

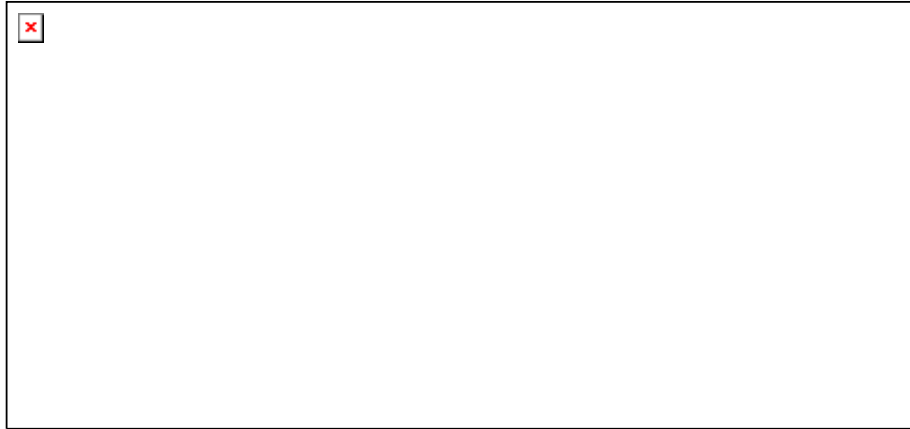


Source: ACH

Figure 6: The complete set of parcels of the Gaspar Garcia Laviana Cooperative.

Table 2: The following table reflects the total land surface measured:

Land use	Manzanas
Settlements	54,9
Forests	145,0
Collective agricultural production	215,2
Individual agricultural plots	794,7
Total cooperative surface	1209,8



Source: ACH

Figure 7: Division of the land surface measured in percentages

Along with the process of compiling data, legal seminars, organised by ACH, were held to explain legal aspects related to the collective title and individual use being made of the parcels in the cooperative. These seminars were intended for members of the community and leaders of the cooperative. Other workshops, organised by ACH and where have participated members of the community, tackled subjects of communal interest and addressed many of the concerns expressed by community members. Rights regarding natural resources in rural areas were discussed, as were pertinent laws passed over the last century or so. Other legal issues talked about included the rights of indigenous people, property rights, access to and land use, water and forestry resources (fuelwood, animal life, vegetative material) that are used by the various actors sharing the same rural territory (owners, producers, users). The information provided in the workshops was presented with a historical perspective, always relating rights, laws and practices. This methodology allowed for an exchange of opinion and reflections were made by participants, based on concrete examples taken from the territory and the community. Another subject at the workshops was the Nicaraguan law pertaining to the national cadastre, its *raison d'être* and functions, along with laws that mention the combination of individual and communal rights in the management of land and local resources.

In addition, as the process has been accompanied by legal workshops, conflict resolution has been facilitated. The inventory of parcels allowed for making public several conflicts existing at the cooperative. These were resolved when the land was surveyed in the presence of witnesses at the moment of surveying or during assemblies of members of the cooperative.

Table 3

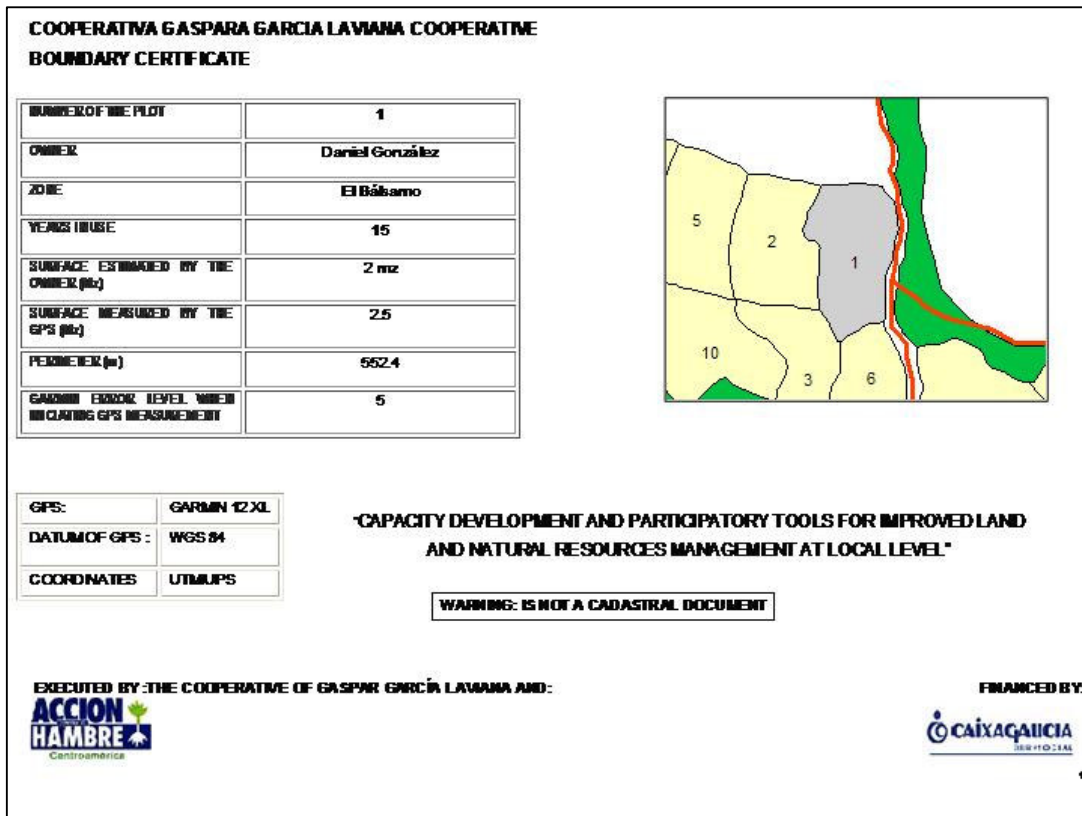
Typology of conflicts related to natural resources use		
RESOURCE	CONFLICT	Nº OF CASES
LAND	Disagreement in the drawing property lines	15
	Movement of monuments or landmarks	5
	Use of rights of way	2
	Appropriation of unallocated parcels	2
	Conveyance of land not paid	1
FOREST	Advance of agricultural frontier into forestland	17
	Use of forestland on individual parcels	12
	Disagreement on land use near property lines	3
WATER	Dispute over water use rights	2
	Poor management of wells on individual parcels	3

To those quantitative outputs results some qualitative results may be added, such as conflict resolution, local management of natural resources and the democratic consolidation of the land division process.

To begin organising the information collected on the parcels, the technical team and the leaders of Santo Domingo discussed the mechanisms and procedures to be developed. This discussion was based in large part on work done to prepare the formats for collecting information. A decision was made to order the information in a general and individual manner:

- A paper registry of properties

Each owner that worked on the GPS survey received a document reflecting the features of his/her parcel.



Source: ACH

Figure 8: Boundary certificate

- A public file of the properties “measured”

A printed file was made including all the information pertaining to the parcels and given to the cooperative. The file is made up of a copy of each document handed out for the individual parcels. The aim is that this information be in the “public domain” of the cooperative and can be consulted by any member.

- The database

The information collected during project implementation means there is now a database with information that has been discussed and on which consensus has been reached by the producers involved.

Feedback from members of the community has been ongoing since the project began a factor which favoured implementation. ACH technical team has presented the result to the community in a general assembly and has accompanied the cooperative in the presentation of the results and their use.



Presentation of the results in an assembly of members of the cooperative

2. Impact

The impact of the experience can be measured in the demand for education and assistance it has generated at local level, three mayor's offices, two municipal development associations, indigenous people living in the province of Madriz, and the Land Group at national level.

Once the project concludes, the Gaspar Garcia Laviana cooperative will continue to promote the prevention and protection of communal areas and has presented its inventory of parcels to the Telpaneca mayor's office.

In the case of the results obtained by the cooperative, the cooperative Administrative Board has a property registry that can be updated, including the maps made and a database. Besides, the members of the community received some legal training and an experience in conflict resolution that will allow it to deal adequately with any future problems regarding environmental and legal management (inheritances, buying/selling, etc.). The participation of the entire community from the beginning to the end of the project led to its taking of ownership.

This experience was implemented as a pilot project, and the methodology has been directly applied by ACH technical staff. The idea is that in the future local organizations and institutions will be able to do the same thing after some training and technical assistance. The technology used is accessible and inexpensive. The software is free in the case of *Mapmaker*, or at least low in cost when compared to other GIS software. The purpose of the involving the mayor's offices in the process was to strengthen sustainability, as they have tools and their own safe installations at which to store and follow up on results.

At environmental level, sustainability is ensured as the application of the methodology employed seeks to improve local management of natural resources.

This experience has been successful because it grew out of local concerns and responded to a specific request from the cooperative. The intervention methodology was designed exactly to reflect this demand and was adapted throughout the implementation period, as alternatives were sought to the problems encountered.

It should be added that the cooperative is well-organized and its members are very much involved. These were also key factors in the success of this experience.

Conclusion

The activities developed in the community of Santo Domingo contributed elements that can be used and applied in two ways:

- The methodology is perfectly adaptable to local management of natural resources. It allows for graphic reconnaissance work, promotes participatory discussions on the situation and encourages their sustainable exploitation upon reaching consensus in a participatory manner.
- The other point is the consolidation of the democratic participatory process. The activities achieved eventually a spirit of positive discussion, exchange of views and consensus. All these elements tend to strengthen the concept of social participation as an important mechanism to find lasting and sustainable solutions.

The easy adaptation and participatory approaches ensure a good level of replicability. New initiatives are being carried out using this methodology. However, it's important to consider that the methodology of intervention is focused on the conflict resolution as well as the participatory management of natural resources and not on the achievement of a millimetrically exact measurement of the plots.

Once the methodology will be validated, the main objectives will be the dissemination of a larger scale, even at the international level. In fact, the methodology can easily be replicated in another context and be used with different objectives: property inventories, conflict resolution, demarcation of communities and resources management.

To gain the recognition of all the actors involved in decision making could be the best way to generate positive changes not only in the management of natural resources but also in the sustainable territory planning.

References

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