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Enhancing Natural Resources Management and Livelihoods in Zapatera Archipelago National Park, Nicaragua

An Action Research Study with Residents of two Communities in Zapatera Island

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There is an island in the shallows

slender

as the hand of an Indian god.

It offers red fruit

to the birds

and to the shipwrecked

the sweet shade of trees.

There Cifar was born,

the sailor.

His mother's time came

while rowing alone to Zapatera.

She steered the boat to a pool

while sharks and shad

circled,

drawn by the blood.

- *"The Birth of Cifar".* Pablo Antonio Cuadra.

Abstract

Zapatera Island is the second largest island of Lake *Cocibolca* or Nicaragua and the heart of Zapatera Archipelago National Park in Nicaragua. The park was created in 1983 by the Sandinista Revolutionary Government after the seizure of land from big land owners. Today, land conflicts in the island still persist and illegal logging by mafias are rampant. Illegal hunting, fishing and other nature resource based extractive activities are the base of the livelihoods of more than 1000 inhabitants of the island. Moreover, the plundering of archaeological remains continues, despite the efforts of Nicaraguan authorities to find solutions to the problematic situation in the island.

Using elements of Soft Systems Methodology, Action Research, and Participatory Rural Appraisal, the present study seeks an answer for the question: How could natural resource management and livelihoods of people in Zapatera Island be enhanced?

The study found that there are considerable differences between communities, households and individuals in terms of access to different forms of capital, and that the control of the Environmental Ministry has created even more livelihood insecurity and environmental damage. At the same time, Action Research and other iterative processes created the conditions that brought some changes to the current state of affairs in the island, by promoting knowledge creation and exchange, and community empowerment. The study also helped different stakeholders to identify issues of concern regarding natural resources management. Among these, land tenure was considered the most urgent issue to be addressed. Finally, the study suggest that natural resources management in Zapatera Island can be improved by addressing the issue of poverty among local communities; and by increasing the cooperation in research between local communities, environmental authorities, practitioners, researchers and donors.

Keywords: *Natural Resources Management, livelihoods, participation, stakeholders, Nicaragua.*

Content

Acknowledgments

Abbreviations

AR	Action Research
CWF	Children's Wellness Fund
FSLN	Frente Sandinista de Liberación Nacional
GDP	Gross Domestic Product
HIPC	Heavily Indebted Poor Countries Initiative
IRENA	Instituto de Recursos Naturales
MARENA	Ministerio del Ambiente y Recursos Naturales
MDGs	Millenium Development Goals
NGO	Non-Governmental Organization
NRM	Natural Resources Management
PPP	Purchasing Power Parity
PRA	Participatory Rural Appraisal
RRA	Rapid Rural Appraisal
SSM	Soft Systems Methodology
USA	United States of America
USSR	Union of Soviet Socialist Republics

1. Introduction

1.1. Why this study

The negative impact of human activities in nature is becoming more and more evident nowadays. Over-exploitation of fish stocks is threatening the most important source of animal protein for billions of people; around 7.3 million hectares of forest area per year are being deforested, particularly in some of the world's most biologically diverse regions; and access to safe and enough drinking water is still very limited for millions of people around the world (United Nations 2008). Climate change is intensifying disasters, including extreme weather events, storm surges, floods and droughts (United Nations 2008). Such dramatic change in the world requires dramatic actions as well.

In September 2000, all the world's countries and the world's leading development institutions adopted the United Nations Millennium Declaration. These nations and institutions agreed on a new global partnership to reduce extreme poverty and setting out a series of time-bound targets – with a deadline of 2015 – that have become known as the Millennium Development Goals (MDGs) (United Nations 2008). The goal number 7, "Ensure Environmental Sustainability", was divided in four different targets. One of those targets is to "integrate the principles of sustainable development into country policies and programmes and reverse the loss of environmental resources" (United Nations 2008). Sustainability, beyond the impossibility of an ultimate definition (Pimbert 1995), is very complex and challenging for policymaking and development practice. Target 7b: 'Reduce biodiversity loss, achieving, by 2010, a significant reduction in the rate of loss' has been translated into habitat conservation by creating more protected areas (UNSTATS 2008). Under this perspective, protected areas are conceived as an important mechanism for protecting biodiversity (Boitani et al. 2008), places of high social and economic value (UNEP-WCMC 2009), and irreplaceable tools for species and habitat management and recovery (Boitani et al. 2008). Over the last four decades the global protected area estate has increased "from an area the size of the United Kingdom to an area the size of South America" (Dudley 2008). The World Commission on Protected Areas (2006, cited in Boitani et al. 2008, p.1) has included more than 100,000 sites (11.5% of the Earth's land surface) on its list of protected areas.

In Central America there are 554 protected areas, covering an area of around 129,640 Km^2 (AECI). This represents approximately 25% of the Central American territory. The seven Central American nations (Panama, Costa Rica, Nicaragua, Honduras, Guatemala and Belize) occupy a mere 0.51% of the planet's surface, but around 9% of the world's biological richness is concentrated in this region (McCarthy 2003). This includes 206 ecosystems and more than 300 types of landscapes (McCarthy 2003). It is often argued that high levels of poverty and extreme poverty in the region (IUCN 2009); (McCarthy 2003), especially among rural communities (AECI), has lead to an unsustainable use of natural resources in Central America (McCarthy 2003). The explanation is that the poorest populations, usually living in rural and remote areas, depend on the traditional agrarian sector. On the other hand, very often their situation of deprivation blocks their access to the benefits provided by the state. This provokes an inefficient use of nature resources, with the resulting depletion of the natural capital base of their livelihoods (AECI).

In Nicaragua, the combination between the high levels of poverty and an unsustainable use of natural resources is leading to serious environmental problems (GTZ Nicaragua 2007). Despite of having 74 protected areas, Nicaragua is the

Central American nation with the highest negative rates of forest area change in terms of area loss relative to forest cover (TroFCCA n.d.). One of those protected areas is Zapatera Archipelago National Park. It is composed of several small islets and the second largest island in Lake Nicaragua, Zapatera Island. By 2008, the Nicaraguan Ministry of Environment and Natural Resources (MARENA) identified serious threats to the island's environment: the transformation of forests into farmlands and pasture; illegal exploitation of timber, fuel wood, fauna, and fishing for commercial purposes; destruction and plundering of archaeological remains; and population growth by new births and the formation of new settlements inside the island (MARENA 2008b). There is a clash between the intentions of MARENA to manage natural resources in protected areas and the needs of local communities to sustain their livelihoods. Based on Soft System Methodology, using Action Research, and tools of Participatory Rural Appraisal, the presented study was conducted with the aim to understand and create conditions for the improvement of the Management of Natural Resources and the livelihoods of two communities in Zapatera Island, Nicaragua.

1.2. Country background information

Table 1. Facts about Nicaragua

Nicaragua	
Capital:	Managua
Population:	5,603,240
Total Area:	130,373,47 sq km
Ethnic groups:	Mestizo 69% White 17% Black 9% Amerindian 5%
Languages:	Spanish 97.4% Miskito (1.7%) other (0.9%) English and indigenous languages on Atlantic coast
Religion:	72.9% Catholic 17% Protestant faiths 8.5% not identify religion 1.5% other religions
Human Development Index Rank:	120 of 179
GDP per Capita (PPP):	USD 2,441
Workers' Remittances:	USD 739.4 million
Workers' Remittances as Percentage of GDP:	12.2%

Source: BBC News (2009)

No Central American country has been more stricken by poverty than Nicaragua. It is considered the second poorest country in Latin America, after Haiti, with 47 percent of the population of 5.6 million living on less than two dollars a day (Silva 2009); (The Fund for Peace 2007). The majority of Nicaragua's poorest people live in the countryside, and are the most vulnerable to the natural disasters that frequently affect the country. These disasters include volcanic eruptions, hurricanes, earthquakes, droughts, fires, and floods (CIDA 2009). Chronic malnutrition affects 20 percent of children under 5 years of age, and the figures reach 50 percent in some areas (WFP 2009). The access to health services and quality education is very difficult for many Nicaraguans (CIDA 2009). Wealth distribution is also highly unequal in Nicaragua: the richest 20 percent own 60 percent of wealth; the poorest 20 percent owns 3 percent (WFP 2009).

Nicaragua gained independence from Spain in 1821 and has traditionally relied on agricultural exports to sustain its economy (The Fund for Peace 2007). Unfortunately, agro-exports benefited mainly a few elite families of Spanish descent, primarily the Somoza family, which ruled the country with US backing between 1937 and 1979 (BBC news 2009). The leftist "Sandinista National Liberation

Front" (FSLN) overthrew Somoza regime in 1979 (The Fund for Peace 2007). The Sandinistas began redistributing property and made huge progress in the spheres of health and education, but their leftist orientation also attracted US hostility, which drove them to turn to the USSR and Cuba for support and strength (BBC news 2009). Consequently, the USA armed and financed thousands of rebels, or *Contras*, in order to carry out attacks on Nicaragua from bases in Honduras. The USA also imposed trade sanctions and mined Nicaraguan harbours (BBC news 2009). The contras destroyed facilities and killed the workers of programs that were put in place to carry out the poverty alleviation goals of the Sandinistas during the 1980s. These attacks included, for example, the assassination of environmentalists working for the newly created Nicaraguan Institute of Natural Resources (Vandermeer 1991). Agricultural cooperatives, schools, health care centres, bridges, power lines, and other infrastructure were destroyed by the contras (Klerlein 2006). War claimed the lives of 60 000 persons or 1,5 % of the population, between 1981 and 1990 (Ahearn & Noble 2004).

During the 1990s, the government ran large budget deficit (The Fund for Peace 2007). The huge debt of Nicaragua has two main causes: the reimbursement of around US$ 900M to property owners for seizures of land, factories and businesses during the Sandinista regime; and the debt assumed by the Nicaraguan State after the collapse of four private banks with liabilities of over US$500M (Cromwell et al. 2005a). Given that the country has been one the world's most indebted nations, Nicaragua achieved debt relief in 2004, as part of the HIPC initiative. Annual debt repayments fell from over US$ 300 million to less than US$ 100 million. Only 40 percent of HIPC funds have been spent on poverty relief: "the rest has gone to fill a veritable black hole of internal debt, largely stemming from bank failures" (Cromwell et al. 2005b). By 2007 Nicaraguan foreign debt was still a remarkable 70 % of the GDP (The Fund for Peace 2007).

1.3. Overview on protected areas in Nicaragua

The first protected area in Nicaragua, the *Peninsula de Gosigüina* Wildlife Refuge, was established in 1958 (Saalismaa 2000). By 2008, Nicaragua had 72 protected areas covering 15, 26 % of the country's area (UNEP-WCMC 2009). The ministry of Natural Resources and Environment (MARENA) is the institution that directs, regulates and manages protected areas through the General Direction of Protected Areas (SINAP). In Nicaragua, protected areas are classified according to nine management categories (see fig. 1) (Government of Nicaragua 1996). In Nicaragua co-management of protected areas is becoming more common. It is defined as a model of administration in which the national government cedes the administration of a protected area to non-profit Nicaraguan organizations or institutions, municipalities, universities, scientific institutions, cooperatives, ethnic and indigenous communities, in a form of shared responsibility. Currently there are nine areas protected in co-management, summing an area of 27,413 ha. or 1.22 % of the SINAP.
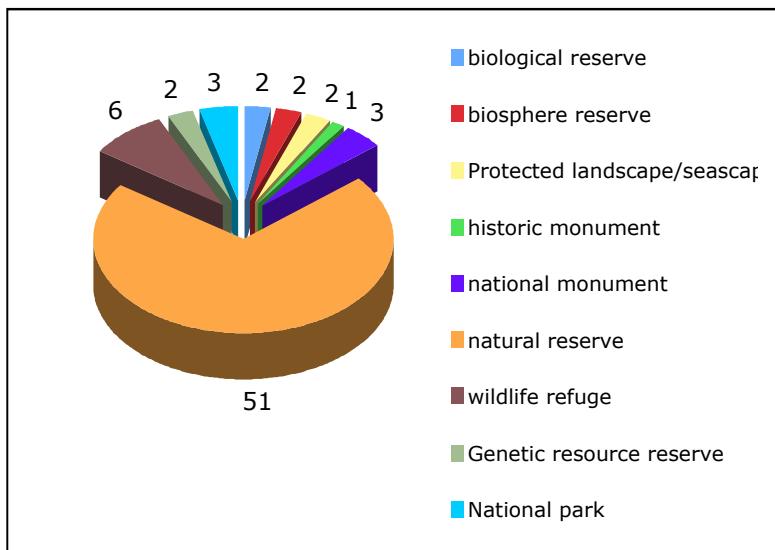
Fig. 1. Management categories and number of protected areas of Nicaragua.

Source: MARENA (2008)

MARENA has often limited funds, which limits its capacity to control and enforce environmental law. For example, by 2003 each park ranger was in average in charge of 12 526 ha (UICN 2003). Moreover, only 22 protected areas had approved management plans and 27 more were still in different stages in the process to approval by 2008 (MARENA 2008a).

1.4. Zapatera Archipelago National Park

Zapatera Archipelago National Park was created in 1983 under the rule of the Sandinista government. Zapatera Island and a small number of islets surrounding it form the national park. With an area of 52 Km^2, Zapatera is the second largest island of Lake *Nicaragua* or Lake *Cocibolca*, which is also the largest lake of Central America. The highest point of the island is called Zapatera hills (629 meters above the lake surface). On its southwest side*, Punta Ojachal*, the island is separated from firm land by a narrow space of water of around 400 meters. The sedimentation of *Ochomogo* River has created a rather extended sandbank in this particular area. It is predicted that in a near future the island will be connected to firm land in this corner known as *Punta El Menco*. The island is also rich in ancient ceremonial centres, stone constructions and pieces of ceramics. Therefore, since many years ago, it is the target of an uncontrollable plundering of archaeological pieces, which in many cases have ended up private art collections. Zapatera hosts a great amount of flora species. These include different species of trees such as *Madroño* (Calycophyllum candidissimum) and *Pochote* (Bombacopsis quinatum). Fauna has diminished in the island, due to deforestation, forest fires, extended agricultural fields, illegal hunting and illegal recollection of minor fauna (MARENA 2008b). The most important and closest human settlements to the protected area are the city of Granada and the villages of Punta el Menco. Around 90 % of the land in the island is claimed to be privately owned, and this includes forests, farmland and pastures. Land conflicts have been reported in Zonzapote, where immigrants from the northern part of the country came to this zone in 1994–1996, fleeing from violence during the Contras civil war (Tierrayagua 2006).

1.5. Problem statement

Zapatera archipelago is a class II protected area. This means that only activities of research, environmental education and interpretation, sustainable tourism, and recreation are permitted. The only infrastructure allowed is infrastructure for promotion, monitoring and control of the park (MARENA 2008a). Nevertheless, none of these regulations are followed in practice. Despite the efforts of MARENA, illegal hunting is reducing fauna in the island (Mulligan 2007). New archaeological remains are still being discovered but no real action or even planning for their preservation is taking place (Pérez 2007). Today, as in the past, land conflicts still persist and, despite the continuous seizure of big loads of timber by MARENA, illegal logging by mafias is still rampant (Cerda 2005). Above all, local communities in Zapatera are trapped between illegality and the right to gain their livelihoods. At first sight, it is evident that the problematic situation manifested in Zapatera Island, is complex and requires urgent action for improvement. As Pound et al. (2003) suggests, "…a reversal of environmental degradation requires new livelihood options that change people's incentives…"

The present study is based on and seeks answers to a major question:

How could natural resource management and livelihoods of people in Zapatera Island be enhanced?

1.6. Objectives

- Obtain an understanding of the livelihoods of two communities living in Zapatera Island
- Identify the main issues of concern related to Natural Resources Management in Zapatera Island through a systemic and participatory process
- Propose ways of improving the livelihoods of communities in Zapatera Island, and steps towards improving natural resources management in Zapatera Island

1.7. Research questions

- How is the situation of the livelihoods of two communities in Zapatera Island?
- Which are the main issues of concern in relation to Natural Resources Management in Zapatera Island?
- How can the livelihoods of two communities be enhanced using action research and participatory processes?
- How can natural resources management be improved in Zapatera Island?

2. Literature review

2.1. Basic concepts and theories

2.1.1. Livelihoods

A livelihood "comprises the assets (natural, human, financial, and social capital), the activities and the access to these (mediated by institutions and social relations) that together determine the living gained by the individual or household" (Ellis 2000, p.10). At the same time, it cannot be assumed that livelihoods are static, whether at the individual or household level. It has to be seen as an ongoing process of construction, with elements constantly changing. This makes the issue of access, the core of livelihoods analysis (Ellis 2000). "Access to resources and opportunities may change for individual households due to shifting norms and events in the social and the institutional context surrounding their livelihoods (Ellis 2000, p.10). Moreover, livelihoods activities developed by individuals or households determine the sustainability of a livelihood. In the case of a rural livelihood, it can be considered sustainable when it is "resilient enough to bounce back from stresses and shocks, maintaining its assets without degrading the natural resource base" (Pound, Snapp, McDougall & Braun 2003).

2.1.2. Protected Areas

The International Union for Conservation of Nature IUCN (2008) defines a protected area as an "area of land and/or sea especially dedicated to the protection and maintenance of biological diversity, and of natural and associated cultural resources, and managed through legal or other effective means". While all protected areas fit in the previous definition, in practice there is a great difference in the purposes for which protected areas are managed (UNEP-WCMC 2006).

2.1.3. Natural Resources Management

Natural resources management can be defined as the management of nature resources use considering the costs to nature and the limits of that use, i.e. "recognizing the limits and developing capabilities to prevent those limits from being exceeded" (Goodbody & Thomas-Hope 2002). NRM involves technical skills and knowledge about biophysical processes as well as the social component, i.e., negotiation of rules and sanctions, policy formulation, organization development, land use planning, including conflict and information management (Probst & Hagmann 2003). Different variations and approaches for natural resources management have emerged through time and disciplines. According to Probst & Hagmann (2003), these different variations have evolved through more than 30 years of attempts to bring multidisciplinary approaches into agricultural sciences. In other words, NRM is still a concept in evolution (Probst & Hagmann 2003). I t has evolved from farming system research in the mid-1970s to sustainable production and natural ecosystem management in the 1980s, throughout Integrated Natural Resource Management in 2000s.

2.1.4. Participation

Ngunjiri (1998, p. 470) conceives that participation is the involvement of people in the process of helping themselves, and can be considered as a cornerstone of good development. However, there are many components and, different forms of participation (See table 2). According to (Pimbert 1995), "only certain types of participation will lead to sustainable conservation".

Table 2. Typologies of Participation

Typology	Components of each type
1. Passive Participation	People participate by being told what is going to happen or has already happened. It is unilateral announcement by an administration or project management without any listening to people's responses. The information being shared belongs only to external professionals.
2. Participation in Information Giving	People participate by answering questions posed by extractive researchers and project managers using questionnaire surveys or similar approaches. People do not have the opportunity to influence proceedings, as the findings of the research or project design are neither shared nor checked for accuracy.
3. Participation by Consultation	People participate by being consulted, and external agents listen to views. These external agents define both problems and solutions, and may modify these in the light of people's responses. Such a consultative process does not concede any share in decision-making and professionals are under no obligation to take on board people's views.
4. Participation for Material Incentives	People participate by providing resources, for example labour, in return for food, cash or other material incentives. Much in-situ research and bio prospecting falls in this category, as rural people provide the fields but are not involved in the experimentation or the process of learning. It is very common to see this called participation, yet people have no stake in prolonging activities when the incentives end.
5. Functional Participation	People participate by forming groups to meet predetermined objectives related to the project, which can involve the development or promotion of externally initiated social organization. Such involvement does not tend to be at early stages of project cycles or planning, but rather after major decisions have been made. These institutions tend to be dependent on external initiators and facilitators, but may become self- dependent.
6. Interactive Participation	People participate in joint analysis, which leads to action plans and the formation of new local groups or the strengthening of existing ones. It tends to involve interdisciplinary methodologies that seek multiple perspectives and make use of systematic and structured learning processes. These groups take control over local decisions, and so people have a stake in maintaining structures or practices.
7. Self-Mobilization	People participate by taking initiatives independent of external institutions to change systems. Such self-initiated mobilization and collective action may of may not challenge existing inequitable distributions of wealth and power.

Source: Pretty (1994) adapted by Pimbert (1995)

2.2. Natural Resources Management and livelihoods

Since the creation of Yellowstone in 1872, most national parks in low-income countries have been created on the model pioneered at that protected area (Pimbert 1995). In most countries the state chooses which land or water areas should be declared as national parks, and designs and execute park management plans in an independent way. Under this conception, humans always had a negative impact on nature and shall be excluded from protected areas (Pimbert 1995). In the mid-1990s some of those ideas started to change. In this new conception it became implied that protected areas "should be managed in ways that sustain both local livelihoods and the conservation of nature" (Pimbert 1995). In the area of research for development there is a growing acceptance that governance aspects have to be more fully integrated into the livelihood research approach in order to create coherence between policies and interventions at all levels. (Havnevik, Negash & Beyene 2006, p. 28). Carney, (1998, cited in Pound, Snapp, McDougall & Braun 2003) argues: "when innovation in resource management is driven by perceived tradeoffs, participatory assessments of livelihood strategies are important for developing a common understanding of how these depend on natural resource assets".

2.3. Systemic Action Research as approach for intervention

Conservation science is firmly set within positivist paradigm and has adopted a reductionist approach, with specialist disciplines prevailing. This has produced "a mode of working that has systematically missed the complexity of ecological and social relationships at local level" (Pimbert 1995, p.17). In nature conservation, as in most human-nature interactions, all actors, and particularly those stakeholders with a direct social or economic involvement and interest, "have a uniquely different perspective on what is a problem and what constitutes improvement" (Pimbert 1995). "Rural people as managers of complex systems have many different criteria which they weigh up and combine in the choice of management activities that influence the fate of biological diversity" (Pimbert 1995). The difference of perceptions is often a source of conflict among actors, and reductionist approaches can make things worst. In contrast, Systemic Action Research deals with real contextual issues in their true complexity, and in a holistic way. By starting a process of dialogue and genuine participation, Systemic Action Research not only seeks greater research efficiency but also to empower people to act through the generation of knowledge by critical reflection (Packham & Sriskandarajah 2005). In this sense, dialogue is a means for learning and, later on, improvement. Therefore, it is important to include all those affected by proposed changes in the discussion as a way to secure learning and further engagement in the process of change for improvement.

3. Methodology

3.1. Study area

The research was conducted in two of the seven villages that are located inside Zapatera Island. The villages were selected after the first exploratory trip to Zapatera Island on January the 29th, 2009. The site selection criteria were: (1) the study area should take place in at least two villages in order to involve as many people as possible and to facilitate a comparison that allows a broader understanding of the situation in the island; (2) the villages should be located rather close to each other as the transportation costs were very high; (3) there should be the possibility for the researcher to stay with the families in the villages to interact and work with community members on a daily and permanent basis. With these criteria in mind, the villages of *Cañas* and *La Guinea* were selected as the sites for conducting the research. Nevertheless, three other villages were selected for triangulation purposes, and for discussions towards overall improvement in the island. These communities were: *Terrón Colorado*, *San Miguel Vigil* and *Sontolar*.
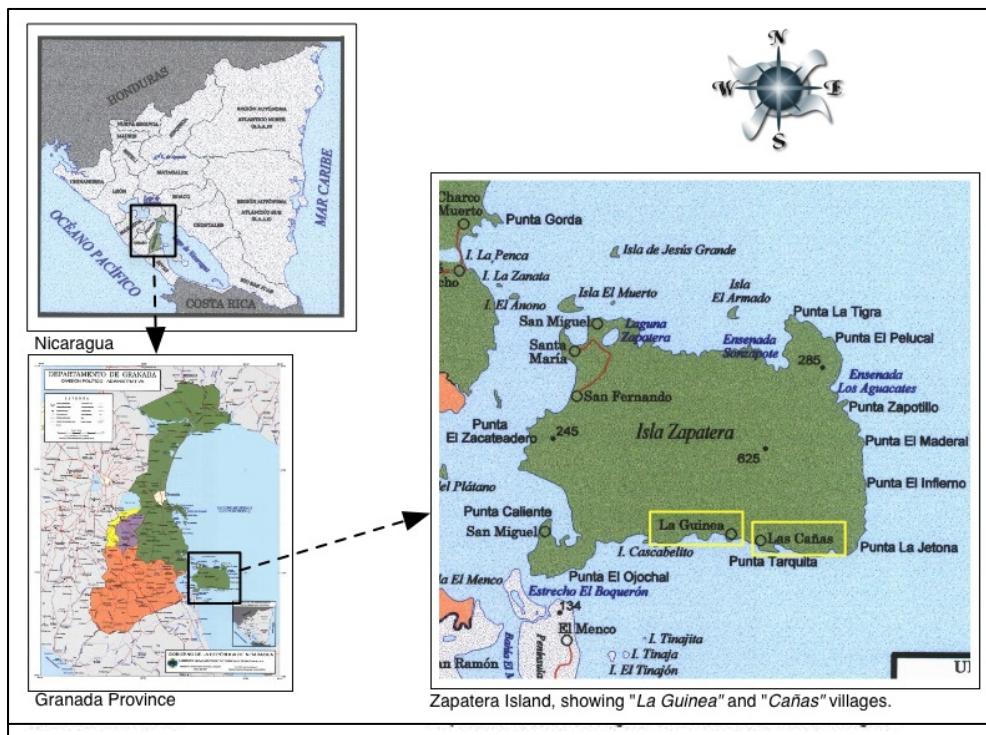
Fig. 2. Study area. Map source: Instituto Nicaragüense de Estudios Territoriales, 2002.

3.2. The Methodology Described

3.2.1. Soft Systems Methodology

Soft Systems Methodology is an organized and flexible process for dealing with situations in which human perceptions, behaviour or actions seem to be the dominating factors and where goals, objectives and even the interpretation of events are all problematic (Checkland & Poulter 2006), p.4; (Naughton 1984). SSM is a methodology, i.e. set of ongoing principles, which can be both adopted and adapted for use in any real situation in which people are intent on taking action to improve it (Checkland & Poulter 2006). According to Naughton (1984), SSM is based in some key ideas: (1) Problems are constructs of the concerned mind; (2) People have different appreciations of situations because they see them in genuinely different ways due to different *weltanschauungen* or worldviews; (3) what might constitute

"solutions" are also intellectual constructs; (4) conflicting *weltanschauungen* leads to disagreement about the descriptions of the actual state of affairs as well as about what might constitute a desired state; (5) in real life, every problem interacts with other problems, creating a "mess"; (6) Soft systems analysts assists the people in a problematic situation to engage in a debate about it, and generate proposals for fruitful change and; (7) the analyst cannot be divorced or detached from the analysis, he/she is not only attempting to understand the situation but also to help change it for better.
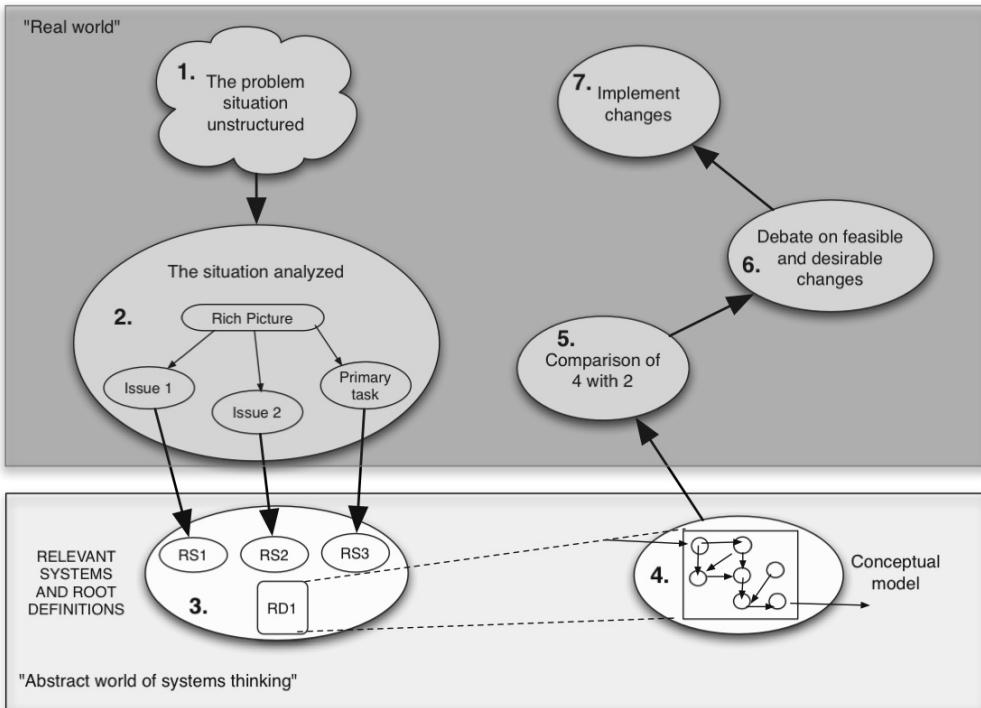
Fig. 3. Soft Systems Methodology at glance. Source: Naughton (1984)

Soft Systems Thinking, originally proposed by Checkland (1978), provided the theoretical basis for the development of the methodology used in this study. Though the initial intention was to adopt the Checkland's SSM methodology with its "classic" seven stages as shown in Fig. 3, practical difficulties related with access to the study area and time constraints created the need to redesign the research framework. In the end, parts of SSM were taken in to build the 'methodology in use' to understand and improve the situation in Zapatera island. Based on Checkland & Poulter's (2006, p. 14) design, this new framework (see fig. 3) did not proceed towards the development of relevant human activity systems and their conceptual modelling, i.e. the "abstract world" of systems thinking. In that sense, although SSM provided the basic elements of the methodology, the research in its entirety could not be considered as a soft systems analysis per se. Instead of that, Action Research served as the essential framework; PRA provided the methods and tools; and the researcher himself developed the methodology, in collaboration with the main supervisor of the study.

3.2.2. Action Research
Natural resource management and rural development issues, as those found in Zapatera Island are not characterized by problems with single answers, but rather by complexity and confusion. According to Tyler (2006, p.4), the international efforts in the areas of rural development and environmental and resource degradation increasingly identify the need for innovative approaches. These approaches must "focus holistically on diverse ecological and social contexts, and emphasize the

meaningful participation of local people in their planning and implementation" (Tyler 2006, p.4). Therefore, the capacity of action research as a paradigm or approach to deal with complex situations is behind its growing use within environmental research and development initiatives (Allen 2001). Action research (AR) comprises a family of research methodologies that seeks to bring about improvement and creation of new knowledge by means of reflective action. It seeks to bring together action and reflection, theory and practice, in participation with others (Reason & Bradbury 2001, cited in Brydon-Miller, Greenwood & Maguire 2003). In action research the process of integrating research and action is done in a series of flexible cycles, in the form of holistic rather than separate steps (Somekh 2005). Different authors, however, differ slightly on how many, how to define, and how to use these cycles in practice (Drummond & Themessl-Huber 2007, p. 422). For example, Lewin (1946, cited in McNiff & Whitehead 2002), who also coined the term action research, considered action research as a spiral of steps involving planning, fact-finding (or reconnaissance) and execution. Others as Somekh (2005, p.6) consider the collection of data; the analysis and interpretation of data; the planning and introduction of action; and the evaluation. For the purpose of the action research work in Zapatera Island, the generally accepted cycles of planning, acting, observing and reflecting (McNiff & Whitehead 2002, p.41) were used. Although action research has its origins in social and educational research, different variations of action research have grown and been advocated in a wide variety of domains (Packham & Sriskandarajah 2005, p. 124). Reason (2006) argues that all those currents in action research share four characteristics in common: (1) the pursuit of worthwhile practical purposes, addressing issues of concern to individuals and communities in the everyday conduct of their lives; (2) promote democracy and participation; (3) the acceptance that there are many ways of knowing, that go beyond the orthodox empirical and rational western epistemology and; (4) an emergent developmental form, i.e, a kind of research that emerges over time in an evolutionary and developmental process, where there is no "end of the game".

Table 3. Research stages and activities

Research stage	Purpose	Research activities
Entering the situation	Gathering local secondary data and establishing the first contact with local communities in Zapatera Island.	
(1) Finding out	Finding out about the initial situation which is seen as problematical by collecting primary data★	(i) PRA exercises (ii) Participant Observation (iii) Workshops (iv) Semi-structured interviews with key informants and actors
(2) Creating Rich Pictures	Express crucial relationships in the situation and, to provide a base for discussion.	Drawing Rich picture
(3) Discussion/ debate	Using the rich pictures to questions the real situation, by promoting discussion and debate, to identify issues of concern, and to find desirable and culturally feasible changes.	Participant Observation Workshop in Granada Workshop in Cañas Workshop in Terrón Colorado Workshop in San Miguel Vigil Workshop in MARENA's Head quarters, Managua
(4) Defining/ Taking action	Define/ take action to improve the situation★★	Workshop in Cañas Workshop in Terrón Colorado Workshop in San Miguel Vigil Workshop in Managua with MARENA

As said before, the research design evolved through the research process itself, but followed the five stages of the research framework.

⋆All this data was collected during seven visits to the communities that lasted between 1 and 10 days each. Semi-structured interviews and secondary data collection were conducted in Zapatera, Managua and Granada.

⋆⋆ Since the learning cycle is in principle never-ending it is an arbitrary distinction as to whether the end of a study is taken to be defining the action or actually carrying it out. Some studies will be ended after defining the action, some after implementing it (Checkland & Poulter 2006).

Most of the research activities were documented in the form of photos, field notes, mind maps, recorded audios, and flip charts. There were cases where taking pictures or audio recording was avoided due to the sensitive issues being discussed and/or complicated situations going on. In some of the cases, documenting was constrained by the fact that the researcher was also taking the role of facilitator.

3.2.3. Participatory Rural Appraisal

PRA is described by Chambers (1994) as a growing family of approaches and methods to enable local (rural or urban) people to express, enhance, share and analyze their knowledge of life and conditions, to plan and to act. PRA has its origins in rapid rural appraisal (RRA), the methods and the tradition of: activist participatory approach, inspired by Brazilian thinker Paulo Freire; Agroecosystem analysis, developed by Gordon Conway; applied anthropology and ; field research on farming systems (Pretty & Guijt 1995). Although PRA has much in common with RRA, it differs from RRA in the use and ownership of information, and the nature of the process. In RRA information is more elicited and extracted by outsiders as part of a process of data gathering; in PRA it is more generated, analyzed, owned and shared by local people as part of a process of their empowerment (Chambers 1994, p. 1253).
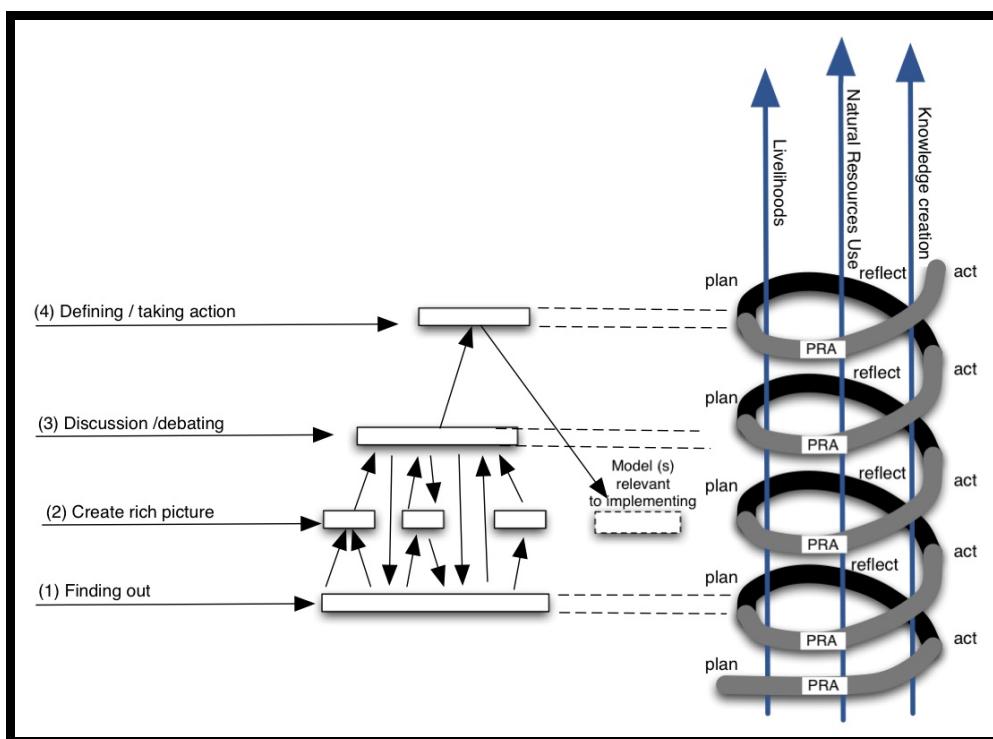
Fig. 4. The research design.

3.2.4. The research design

The research followed the stages of the Soft Systems Methodology (SSM), and was conducted using the iterative cycle of Action Research as a method, and the participatory component of PRA tools and techniques as instruments for reflection, planning and action. The "finding out" stage of SSM included planning, acting and reflection, as well as all the stages of SSM followed during the research process. It was not just about data collection. For example, mapping was not used just to know where different houses were located in the village and where people use to collect firewood or fetch water. The mapping tool was also used to reflect and discuss about the use of natural resources in the community, to discuss the future and the past of the use of natural resources, which and why certain resources were considered more valuable than the other; the different perceptions men and women had about the same thing, etc. However, moving from one stage to another in the SSM, or from one loop of the iterative cycle to another, does not mean we could not go back to the (1) finding out stage. On the contrary, the information collected from new PRA exercises, which also included planning, action and reflection, was used to enrich the picture constructed with previous exercises in a continuous process. In stage (3) discussion/debating, a main workshop was arranged with leaders of 5 out of six villages that exist in Zapatera. The workshop was used to inform about the preliminary findings of the research work, to promote discussion/debate about these findings, and to promote mutual learning. Other similar workshops were conducted in each of the five villages; as well as with professionals and high ranked officials of MARENA.

3.3. Methods and tools used

Table 4. Methods and tools used in the research work.

Method /tool	Place and date	Nº and gender	Criteria of choice	Outputs
Participant Observation	La Guinea (January–April)	3 households	Collect primary data while working with people in the communities. Daily activities of members of the community are not interrupted and, hence, people are more willing to participate in the information gathering process. Communication and exchange of information in a more relaxed contest.	Field notes in research diary. Photos
	Cañas (February–April)	2 households		
	Terrón Colorado (March–April)	1 household		
	San Miguel Vigil (March–April)	1 household		
Semi structured interview	La Guinea, 13/02/2009	02 women	Information gathering following a conversational and informal style. Conversation around subjects instead of precise questions. It permits a more fluid conversation and to explore subjects beyond prefixed questions.	Recorded audios, mindmaps
	Managua, 04/03/2009	01 man		
	Managua, 05/03/2009	01 woman		
	Granada, 11/03/2009	01 woman		
	Cañas, 10/02/2009	01 woman		
Venn diagram	La Guinea, 12/02/2009	2 men and 2 women	Analyze the influence and importance of institutions and organizations from the perspective of the communities.	Flip charts Field Notes Photos
	Cañas, 11/02/2009	2 men and 5 women		
	Terrón Colorado, 15/02/2009	4 men and 2 women		
	Sontolar, 25/02/2009	1 men and 5 women		
	San Miguel Vigil, 25/02/2009	4 men and 4 women		
Community Mapping	La Guinea	5 boys and 5 girls	Get the perception that members of the communities have about their own physical environment in relation to natural resources.	Flip charts Field Notes Photos
	Cañas, 11/02/2009	2 men and 3 women		
Livelihoods	La Guinea	3 men and 2 women	Understand the different activities and the access to different assets that have the communities.	Flip charts Field Notes Photos
	Cañas	2 men and 4 women		
Time line	La Guinea, 11/02/2009	1 men and 1 woman	Get to know the most important historical events in the island, establishing a parallel with the use of natural resources.	Flip chart
Community Meetings	La Guinea, 01/02/2009	Not determined	Discuss the purpose of the study and its scope. Exchange perceptions and expectation both from the community and the researcher.	Field Notes
Workshops	Granada, 20/03/2009/	11 men and 2 women	Exchange of information and ideas. Create an space for reflection and planning for further action. Present and understand different worldviews together in order to create a mutual learning context	Flip charts Field notes Photos Information sheets
	Cañas, 26/03/2009	12 men and 9 women		
	San Miguel Vigil 01/04/2009	8 men and 9 women		
	Managua (MARENA's headquarters) 03/04/2009	6 men and 9 women		

3.4. Data Analysis

Data was gathered in form of flipcharts, field notes in a research diary, and audio recordings. Audios were not transcribed but organized into a graphic format called mindmap, as well as secondary data collected. These outputs were later analysed and used to create rich pictures. During the research process new and even more enriched versions of the initial rich picture were created. An edited version of the final rich picture was collectively analyzed and discussed in 7 different workshops. These workshops produced the final findings.
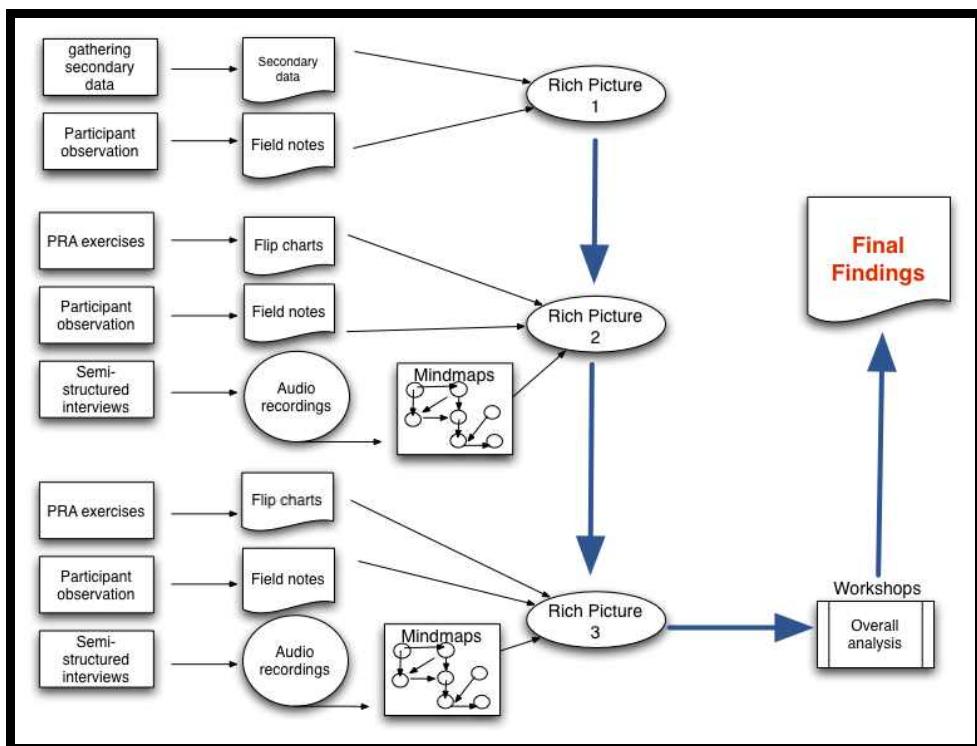
Figure 5. The data analysis workflow

3.5. Scope and limitation of the study

The study covered issues of livelihoods only in two villages of Zapatera Island, namely La Guinea and Cañas. Therefore, the results cannot be generalized for all communities in the island. The study included as well other three communities: Sontolar, San Miguel Vigil and Terrón Colorado, to discuss issues related to natural resources management in Zapatera island. The community of Zonzapote was not included due to constrains of time and access. The study was conducted only with voluntary participants. Therefore not all members of each community were included.

4. Results

4.1. Entering the situation

4.1.1. Gathering Secondary data

The starting point for the research was the gathering and analysis of secondary data. Most of the information was gathered through online resources, and library research at Nicaragua's National Centre of Agrarian information and Documentation (CENIDA). Information about Zapatera Island is very limited. Most of the literature available is related with archaeological studies conducted in Zapatera at the end of the 19th century. A great part of the information about the island was collected from online Nicaraguan and international press. Other sources were official documents from the Ministry of Natural Resources and Environment (MARENA). Very little has been published about the communities living inside the island and their activities. In that sense, the study had to create its own information base. The study discovered that much of the information about Zapatera, provided by MARENA on its website is outdated and inaccurate. The last evaluation conducted in Zapatera was done in 1999.

4.1.2. First contact

Besides the limited amount of published information about the island, the researcher had no local contact in the island. As outlined already, though the research work was thought to include all communities in the island, the study only covered two communities due to a number of practical constrains. The first trip showed that the long distances between communities, the lack of paths to connect different communities in the island, and the rather rough geography of the area would consume most of the limited amount of time for research. When the first community was contacted, the local people showed some interest about the study. However, when the researcher explained in detail the purposes of the study, and the members of the community realized that it was not part of a development project, their interest disappeared immediately. Besides, they wanted to get paid U.S. $ 20 for each day the researcher planned to stay in the community, plus the costs of food. It was not probably a good way to start. Other villages were contacted, and the adjoining communities of *La Guinea* and *Cañas* were chosen as the research area.

The first reaction of people in La Guinea, though polite and respectful, was rather "cold" and not very enthusiastic. Grief and sorrow seem to be the logical explanation. Two days before our arrival, one of their community members was shot to death. However, it took three days until it became obvious what went wrong. Both the Nicaraguan supervisor and the researcher arrived to the island in the motorboat of MARENA.

> A 3-year-old boy asked his sister what my name was. "Alex"– said the 8-year-old girl. "Yes, but he is also a policeman, isn't he? Why otherwise he would have arrived with MARENA's boat?"– finished the boy wisely.
> I asked the children's father about the child's "mistake". The man laughed. – "That's nothing. Early I asked my brother to bring you to the forest so you can learn things about it and help him to collect firewood. No way, said my brother. I am sure this guy is just a spy of MARENA, pretending to know nothing, but taking pictures of us so they can come and arrest us later"

People in both communities, as well as the other communities in the island, have a strong dislike about MARENA. They perceive MARENA as a repressive and corrupted organization, due to the prohibition and the seizure of timber and the fuel wood community members use sell in order to obtain cash.

4.1.3. Building rapport and trust

The reaction of the community challenged the research schedule and the preconceived expectations. Soon it became clear that the first stage of the research process was to build rapport and create trust, and not collecting primary data. The visit, planed for three days, lasted for almost a week. The entire community was invited to a big meeting to present and discuss the ideas and the aims of the research work. Trust was built using participant observation, sharing daily activities, sometimes avoiding picture taking and voice recording, and informal conversations. However, it was not the end. Rapport and trust building was a continuous process during the whole research work.

Picture 1. Fishermen in Zapatera. Photo. Alex Arévalo

4.2. Finding out

4.2.1. Gathering primary data

Primary data was gathered using PRA tools once confidence and rapport was established with community members of *La Guinea* and *Cañas*. As shown in fig. 4, the finding out stage was a continuous rather than a linear process, following the iterative cycles of action research. Each PRA exercise followed also the planning, acting and reflecting stages. For example, in order to conduct a community mapping exercise, first we needed to agree on the time for the exercise, the aims of the exercise, and how to carry it out. Afterwards, participants had to agree on the content, who and how to draw the map. Later, once the map was drawn, all participants started a joint presentation and discussion of each map. In this sense, the reflecting part was also used to clarify and expand ideas. The outputs, usually paper charts, were photographed by the researcher and together with participants it was decided who would take care of the charts. While the exercise process themselves were conducted in a participatory manner, the selection of tools was done exclusively by the researcher. Everyone was invited to participate in the exercises, except in one occasion when a community mapping exercise was carried out only with young members of the community as focus group. Usually, only small

Picture 2. Women of Zapatera doing a Community Mapping. Photo. Alex Arévalo

groups of people did participate in the exercises. The researcher, as a facilitator of the exercises, divided the working groups by gender. It was done to avoid

dominance of one gender in the process, and to contrast the different perceptions of the same situation during the discussions. Semi-structured interviews were conducted with key informants in Zapatera, Granada and Managua. These included large-estate owners, NGO workers and MARENA officials. Community members were informed about the purpose of those meetings. All key informants were directly involved in the situation of the island. They were also important actors that needed to be included in the discussion and analysis of the situation in Zapatera. Group discussions, in the form of workshops, were also used as opportunities for collecting more primary data and getting feedback from participants.

4.2.2. Zapatera Island

Socioeconomic context

There are around 1 000 persons living currently in Zapatera Island. The inhabitants are distributed around small settlements of less than four households and seven larger communities. These communities are *Cañas*, *La Guinea*, *Terrón Colorado*, *Santa María*, *San Miguel Vigil*, *Sontolar* and, *Zonzapote*. In *Terrón Colorado* the ex-workers of the Caligari Vigil family, whose lands were confiscated by the Sandinista government in 1980, compose most of the households. In *San Miguel*, few households were, and still are, workers of the Caligari Vigil Family. More people, from nearby islets have arrived to *San Miguel* in recent years. The workers of the Cordova family are the majority of the people that populate *Santa María*. Some ex-workers of the Cordova Alvarez family, grouped around the "Pedro Joaquin Chamorro" cooperative, took possession of land in the area known as *Sontolar*.

In *Zonzapote* there are 10 families grouped around the cooperative "Alfonso Nuñez" composed by local families and people that immigrated from Waslala, in the north of Nicaragua. People from Waslala arrived to the island fleeing the violence created by demobilized *contras*, known as *recontras*, who were targeting people with connections to the FSLN and the different forms of organizations created during the Sandinista government.

People from *La Guinea* and *Cañas* are known as native people, since they have been living for more than three generations in the area. At the end of the nineteenth century, Mario Lanuza inherited the land from his father Victoriano Lanuza, the patriarch of the Lanuza family, who funded *Cañas*. On his turn, Mario Lanuza divided the land between two of his sons: *La Guinea* to Humberto and *Cañas* to Eduardo. The descendants of these two men populated the two villages. Even today, most of the households in both villages are headed by or related to members of the Lanuza family.

The remoteness of Zapatera is perhaps its biggest hindrance to market integration. The city of Granada, the province's capital, is the main market for most of the products from Zapatera Island. It is also the place were Zapaterians purchase goods. Although Zapatera is closer to firm land in the area known as *Punta El Menco*, it does not represent a market for the products nor is a place for purchasing goods or services, as *El Menco* suffers the same difficulties related with remoteness. Trade of fish is done in the island itself with two middle ladies who have control of the prices and the fish market in the whole island. Fishermen in *La Guinea* and *Cañas* never sell fish to other buyers as they are usually tied to the middle ladies by means of debt. Boats are the only means of transportation with other areas, even between communities in the island. There are no forms of public transportation neither in Zapatera nor in *Punta el Menco*.

Recent history of Zapatera Island

The first known inhabitants of Zapatera were the ancient *Chorotegas*, who built stone altars for sacrifice, gigantic statuary idols and tombs. Therefore it is believed that Zapatera and the islets surrounding it were antique ceremonial centres and had

a sacred value for its early inhabitants. Most of the stone idols are now at San Francisco convent in Granada. Swedish researcher Carl Bovalius and the North American Ephraim Squier conducted studies and excavations in the island in the mid-nineteenth century.
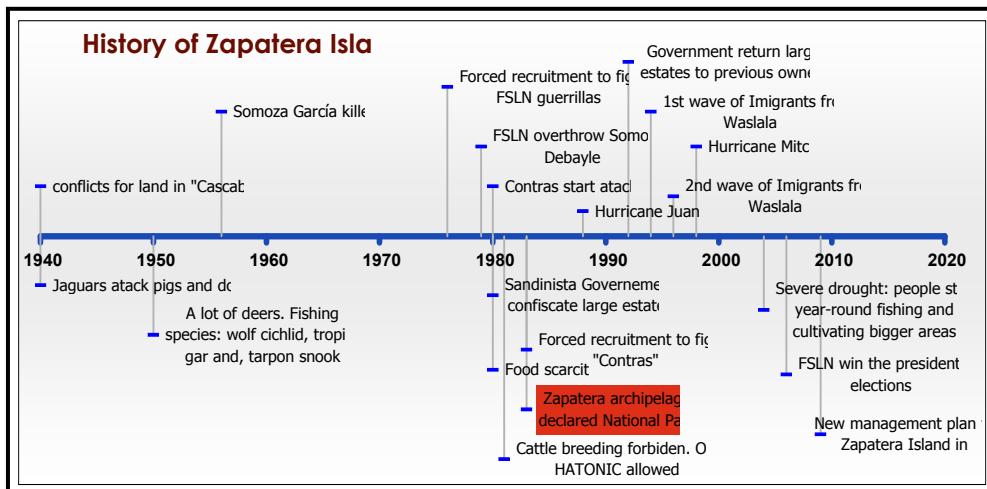
Figure 6. Timeline of recent history in Zapatera Island.

In 1887 Victoriano Lanuza funded "Cañas", the first village in the Island. In 1940, the first conflicts for land between the Lanuza and Vigil families arose in the area known as "Cascabel". By 1950, local people in Zapatera use to fish wolf cichlid (*Parachromis dovii*), tarpon (*Megalops atlanticus*), tropical gar (*Atractosteus tropicus*) and, tarpon snook (*Centropomus pectinatus*). Other fish species as gizzard shad (*Dorosoma cepedianum*, and midas cichlid (*Cichlasoma citrinellum*) were not appreciated and were discarded immediately.

In 1976 military conscription was declared compulsory in the whole country, and young men in Zapatera hided in the centre of the park to avoid the conscription aimed to gather soldiers to fight FSLN guerrillas. In 1979, the leftist inspired guerrilla group, defeated the National Guard and overthrew Somoza. By then the island reached its peak of cattle production. More than 3000 cattle, belonging mainly to two families, are said to be grazing all around the island. Grazing land occupied 4 000 *manzanas*, i.e. almost a 40% of the island. In 1980, the Sandinista Government confiscated large estates in Zapatera Island and forbade cattle rising. In 1983, the government changed its plans of transforming Zapatera into a jail for the Somoza Guard, and created Zapatera archipelago national park. Between 1983 and 1985 the control in the park was enforced with the presence of park rangers and a park director.

In 1992, the government of Violeta Barrios gave back the large estates, confiscated by the Sandinista government in Zapatera Island, to their previous owners. The status of National Park, nevertheless, was never changed.

Between 1994 and 1996, a group of families arrived to the island fleeing from violence in the North of the country, specifically Waslala. In 1995, they were expelled out of the island using the army, but returned months later.

By 2009, the Ministry of Environment and Natural Resources (MARENA) was still using the management plan of 1983. In March 2009, MARENA started the studies to elaborate a new management plan for Zapatera Archipelago National Park.

Land ownership

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Zapatera is basically a private owned island. 90% of its 52 km^2 is private and the remaining 10 % belong to the Nicaraguan State. Important large-estate owners are the Caligari Vigil family, which is considered to own around 80% of the island, and the Cordova Alvarez family. The communities of *La Guinea* and *Cañas* are the only ones with entitlement over their lands. The land, however, is kept as communal property in both communities. People of *Terrón Colorado* and *San Miguel Vigil* live in the lands of the Caligari y Vigil family, and they acknowledge that. On the other hand, people in *Sontolar* claim property on the land they occupy. In the 80's, the Sandinista government gave them possession but not entitlement over the land they occupy. It means that they have got the right to stay in that land but not sell it. The Caligari Vigil family claims property over the land occupied in Sontolar as they were given back the land confiscated by the Sandinista government in the 1980s. Since then, the situation is trapped in a long legal process. Solving the problems of land property is not the legal responsibility of MARENA. The uncertainty about land property has affected families in *San Miguel*, *Sontolar*, and *Terrón Colorado*, as some development projects decide not to enter and construct infrastructure in areas considered under legal dispute, or in the hands of private owners. Although the evaluation for 1999 recommended the "relocation" of entire communities to areas outside the island, the government does not have the economic capacity or the will considering the high social and political costs of such measure.

4.2.3. Livelihoods

People of La Guinea and Cañas traditionally used forest and lake resources to gain their livelihoods. Nevertheless, their extractive activities were limited in the past by the control of their neighbours, the large-estate owners. The confiscation of land from large-state owners by the Sandinista government transformed the scenario. The forest resources that once were in the hands of private large-estate owners became available to everyone. Some years later, when Zapatera Archipelago national park was created, the extraction of forest resources became illegal. This created a sort of limbo were local villagers were forced to rely on illegal activities to earn their livelihoods. In the 90s, nevertheless, the large estates were given back to their previous owners, but the new government did not change the status of the park. Without resources and capacity to reinforce law deforestation, Illegal hunting and logging, archaeological theft, and minor fauna trafficking has increased in the island. Despite prohibition, both Cañas and La Guinea rely heavily on forest resources to gain their livelihoods. At the same time, most people are very conscious that resources are getting scarcer and would eventually disappear in the near future.

The issue of land and the access to it is perhaps the most crucial issue to be addressed in the case of Zapatera and particularly in the case of *La Guinea* and *Cañas*. From a legal point of view, people in *La Guinea* and *Cañas* own the land they are in. The thirteen households that exist in La Guinea have entitlement. As the population started to grow, the Lanuza brothers decided not to divide the land among them but keep it as commons. Only those areas where a household is cultivating a crop can be considered as the household's property, but this can vary the following year. There is, however, some grazing land that has been fenced off with barbed wire, which means that it has a more permanent character. In the case of *Cañas*, the patriarch of the community did not fixed the entitlement for his children. In other words, the community own the land but, legally, it is considered as the property of the deceased father of the Lanuza from *Cañas*. Ironically, the common property of land in Cañas guarantees the poorest households access to land. The size of land to be cultivated in La Guinea is only limited by the amount of labour each household has. In the case of *Cañas* they are limited by the small amount of land the community owns. Gender issues play also a vital role in the distribution of land. Those households where the wife, not the husband, is a

member of the Lanuza family are disadvantaged in terms of access to land and influence in decision-making processes.

Although villagers consider themselves as belonging to the same class, the poor, there are significant differences in the ownership of assets among different households and communities. In general terms, people in *La Guinea* have access to more assets and therefore, their livelihoods are more secure than those of *Cañas*.

Despite the availability of timber some families do not own boats because they cannot afford to buy an outboard motor. In this case, the families usually have smaller rowing boats. These allow the families to catch small cichlids, but not the bigger cichlids or the more profitable species as they are usually found in the middle of the lake. Those who do not have motorboats work for those who have them. In other words, the households having more than one boat have the capacity to catch more fish as they can hire labour from other members of the community.

Access

Most of the activities developed by members of La Guinea and Cañas, as well as the different communities in Zapatera Island, are restricted or prohibited by the regulations imposed by MARENA as part of the management of the national park. Nevertheless the access to assets is influenced or provided by other organizations, social relations, and institutions.

Picture 3. CWF's Workers bringing medical assistance and medicine to the communities in Zapatera. Photo. Alex Arévalo

The Children's Wellness Fund (CWF) is by far the most appreciated organization by community members. The USA funded organization provides medical attention and support to education to almost all communities around the island. Community members of Sontolar, Terrón Colorado, and smaller settlements have even got support with construction material to build better houses. Children at primary school level get food at school and their mothers are asked to cook the food. Most of the food comes from the central government as part of the programme "Zero Hunger", through the Education Ministry, and also from the CWF. Microcredits and small projects are also part of the work of the CWF.

Table 5. Forms of capital and access to them in *La Guinea* and *Cañas*.

Assets	La Guinea	Cañas
Natural capital	Fresh water from lake and wells Crops: maize, beans, rice, sorghum, plantain, cassava, some fruits. Fine wood: *pochote* (Bombacopsis quinata) and ceder (Cedrela fissilis), Bush meat: deer, black iguana; agouti, armadillo, turtle Domestic animals: hens, and pigs Fuel wood Land: larger areas Fish: tarpon (few households), gizzard shad, cichlids	Fresh water from lake and wells Crops: maize, beans, rice, sorghum, plantain, cassava, some fruits. Fine wood: *pochote* (Bombacopsis quinata) and ceder (Cedrela fissilis), Fuel wood Bush meat: deer, black iguana; agouti, armadillo, turtle Domestic animals: hens, pigs, ducks, turkeys, and guinea fowls Fuel wood Land: limited Fish: tarpon (few households), gizzard shad, cichlids
Physical capital	Motorboats (most of households) Chainsaw (Some households) Fishing nets (only a couple have nets for tarpon) Health facility Medicine and medical personnel (nurse and doctor from CWF) Primary School (the same of Cañas) Wells Latrines No electricity (one household has solar panels and another has a mini power plant)	Motorboats (few households) Fishing nets Health facility (the same of La Guinea) Medicine and medical personnel (nurse and doctor from CWF) Primary School facility Wells Latrines No electricity
Human Capital	65 children in primary school Secondary school in Granada Volunteer teach English to secondary students Few people has secondary education Gastritis is very common among adults Malnutrition among children Smoking starts at early ages Selling alcohol is banned in the two communities Fishing skills only among men	65 children in primary school Secondary school in Granada Volunteer teach English to secondary students Few people has secondary education Gastritis is very common among adults Malnutrition among children Smoking starts at early ages Selling alcohol is banned in the two communities Fishing skills only among men
Financial capital	Credits from middle ladies who buy fish Credits only for those who have boats Cattle (few households own most of it) Remittances from family members in Costa Rica	Credits from middle ladies who buy fish Credits only for those who have boats Cattle (few households) Remittances from family members in Costa Rica
Social Capital	Strong kinship relations Lanuza family have strong influence Low level of community organization Women have less influence Catholic church representatives have strong influence	Strong kinship relations Lanuza family regular influence Mid level of community organization Women have more influence in comparison with their pairs from La Guinea.

The Nicaraguan state has very little presence and influence in the area. At the same time, communities have a negative perception of the state as an institution. MARENA and the National Police are in practice the most noticeable presence of the state in the area. The government, nevertheless, provides food assistance and teachers for the children. In practice, the teachers are the only regular link between communities and the Nicaraguan State. The health ministry coordinates and provides a great part of the medicines distributed for free by the personnel of the CWF.

The communities themselves are perceived as important actors in the reality of the island. Large estate owners are considered as important but have not much presence in La Guinea and Cañas. Other villages depend on one large estate owner, because

it is thanks to her permission that they can live and cultivate in the lands of the landowner without fees or other form of payment. Moreover, some activities of CWF require the previous approval of large-state owners.

The Catholic Church has a strong influence in the country and particularly in La Guinea and Cañas. Even though there is a catholic temple in *Cañas,* the priest from nearby department Rivas only comes to the temple once per month. Therefore, the activities and rituals are performed instead by the "*delegados de la palabra*", a sort of laic representatives of the Catholic Church in small villages. It is a

Picture 4. *Delegados de la palabra* during a catholic celebration in *La Guinea. Photo.* Alex Arévalo

strategy of the Catholic Church in Central America to prevent the expansion of Protestant churches in the countryside due to the decreasing number of priest in the world. In other communities of the island protestant churches have more or similar influence than the Roman Catholic Church. The middle persons and buyers are regarded as important, as they have the connection to the market. Other organizations are absent or do not work in practice.


Figure 7. The organizational environment in Zapatera island, as perceived by community members and large state owners.

Activities

Most of the livelihood activities in *La Guinea* and *Cañas* are natural resource-based activities. Non- natural resource-based activities represent only a small part of their livelihood strategies. Only few families are involved in this kind of activities. Table XX provides a more detailed list of the different activities in *Cañas* and *La Guinea*.

Table 6. Main activities of people in *La Guinea* and *Cañas*

Natural resource-based activities	Non-natural resource- based activities
Fishing of tarpon, gizzard shad, and varieties of cichlids.	Constructing boats
Cutting firewood for selling	Sell labour
Timber logging and selling	Run small stores
Cattle raising	Migrate for jobs to Costa Rica
Cultivating rice, beans, maize, sorghum, cassava and plantain for household consumption	
Cultivating fruits as jocote (*Spondias purpurea*), cashew (*Anacardium occidentale*) and orange (household consumption)	
Hunting for meat consumption	
Raising domestic animals as hens, pigs, ducks, turkeys, and guinea fowls	

4.2.4. Natural Resources Management

Policy Formulation

The environmental authorities and the congress make all the rules about the conservation of protected areas. These rules are basically prohibitions and are enforced by the national police. The Nicaraguan environmental law encourages the participation of local communities in the decision-making processes about protected areas. However, in the case of Zapatera, there are no mechanisms for participation or even debate about the situation of the island with environmental authorities and/or other actors. The creation of the national park in 1983 did not take into account the human settlements as those of La Guinea and Cañas, which were already placed in the island since the 19th century. In general terms, there is a frequent incompatibility between regulations, their enforcement and the needs of the inhabitants of the island. According to MARENA, the only legally accepted income activities in the island are eco-tourism and the fishing of different species of cichlids and gizzard shad. In fact, the very existence of houses and cultivation fields in the island are against the law. Most of the products sold by local people to Granada and other markets are prohibited by MARENA. These include firewood, timber, minor fauna species, and tarpon.

Negotiation of rules and sanctions

Local people in Zapatera usually argue that they have no choice than to violate the law as they are poor and have no other means for income production. The claims of the villagers have in some way created the conditions for a more flexible approach among MARENA officials. Logging can be permitted, with previous evaluation and authorization from MARENA, for house and boat construction purposes; firewood can be collected only if it is destined to household consumption. The same flexibility applies to cattle raising and production of beans, rice, maize and sorghum. Fishing is also allowed in lake Cocibolca, except in the case of tarpon (*Megalops atlanticus*), tropical gar (*Atractosteus tropicus*), Nicaraguan shark (*Carcharhinus nicaraguensis*) and sawfish (*Pristis perotteti*). This flexibility is also shared by some of the large-state owners who allow entire communities to live on their land without other obligation than to recognize the ownership of land.

Picture 5. Seized timber and firewood at MARENA's office in Granada. Photo. Alex Arévalo

Extraction of forest resources such as timber, firewood and minor fauna, for commercial purposes is heavily controlled. MARENA, with the support of the national police, constantly intervene villagers transporting the park's resources illegally to Granada. Nevertheless, most of the households still base their income activities on illegal extraction of forest resources. Therefore the transportation is done hidden and outsiders asking about it create suspicion.

Punishment for breaking the law has various forms. In most cases MARENA officials only seize the product and send the violator back home. In other cases, especially if the law-breaker has done it before, punishment may include the seizure of their motorboats, and/or jail. In any case, no one has ever been in jail for more than eight days. This situation has created a mutual negative perception between villagers in Zapatera and officials of MARENA.

Planning land use
The conflicts for land are one of the main issues of concern in the island. The state recognizes that 90% of the island belongs to private owners. In practice, only the 10% of land, belonging to the state, can be subject to planning from MARENA. Large-state owners, who use to have cattle during the 1970s, feel frustrated for not being able to go back to this economical activity. In other words, they feel frustrated for owning a land where they cannot do the activities they know best. Therefore, one of the large-estate families has been trying to convince the authorities that they should declare their lands of public utility, to get a compensation for it and then leave the land to state control. The state, nevertheless, argues that the law does apply only to newly created protected areas. Although eco-tourism is permitted, only one family has a hotel and develops some tourist activities in the island. In *Zonzapote*, the community is developing tourist projects with the support of some NGOs.

4.3. Rich Pictures

The information collected was analysed and used to construct rich pictures of the situation. As in all the stages, rich picture construction was also an ongoing process. The more data was collected the more detailed versions of the rich picture were constructed. More information was added and some of it was discarded as triangulation and further discussion with people suggested changes. The researcher, with discussion and observation of the research supervisors, developed the different versions of the reach picture. Therefore, its construction cannot be considered as participatory in its broader democratic sense. The final rich picture was presented, in a simplified version, as part of the first joint workshop with the different actors.
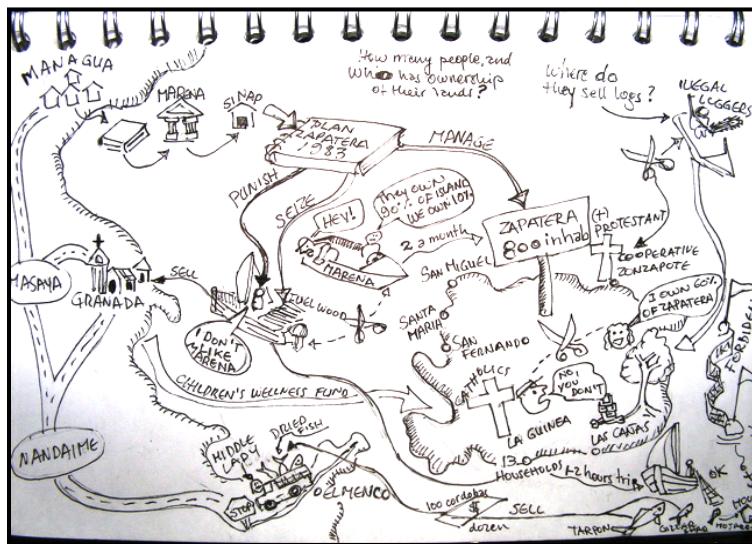
Figure 7. Rich picture 1. February the 8th, 2009
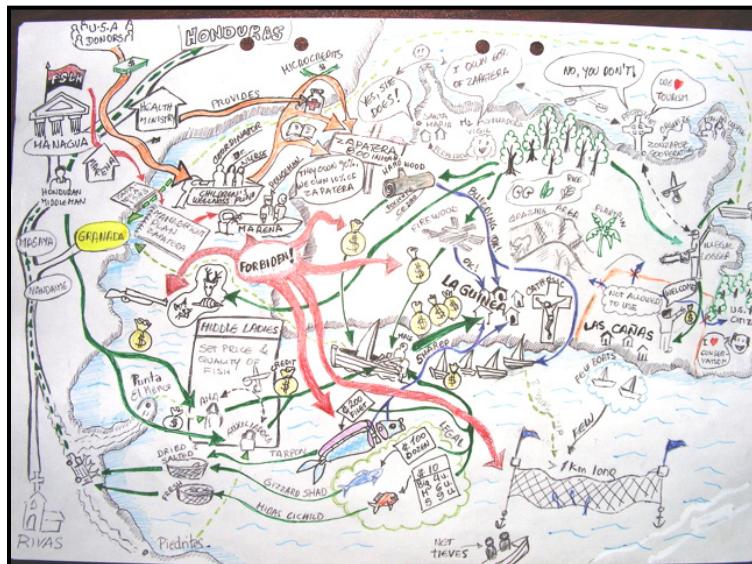
Figure 8. Rich Picture 2. February 27th, 2009
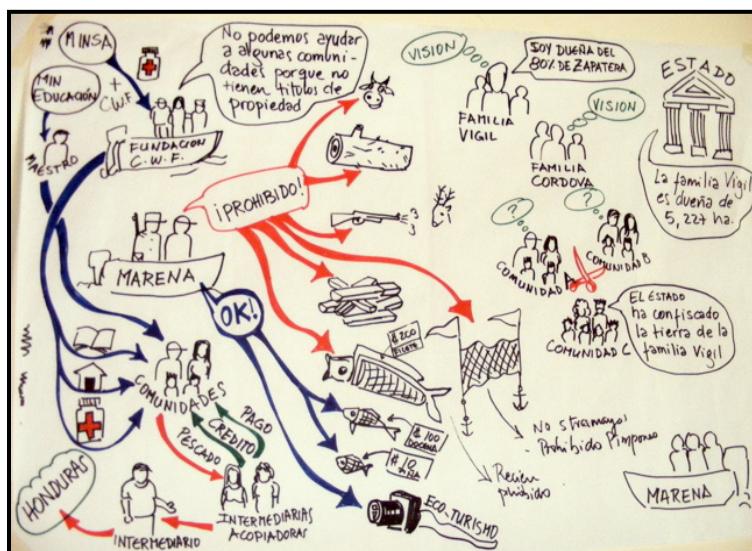
Figure 9. Rich Picture 3. March the 20th, 2009

4.4. Discussion / debate

On March the 20th, 2009, the researcher and the two supervisors of the study carried out a workshop in Granada. The aim of the workshop was threefold: inform

Picture 6. The researcher presenting the preliminary findings with communiy members. Photo. Silvia Vargas.

about the preliminary findings of the research; create a space for discussion and exchange of ideas about the current situation in Zapatera, and to be the starting point for consensual decision and future action-taking to improve the situation in the island. For that reason, leaders of five communities, including *La Guinea* and *Cañas*; a representative of the CWF; representatives of two large-estate owning families, and high-ranked MARENA officials were invited to participate in the discussions and debates about the situation of the island. Limitations of time did not permit to contact and invite other large-state owners in the island as well as representatives of the Zonzapote community.

Initially, three workshops similar to this were planned, but the conditions and time restrictions did not allowed the achievement of that goal. The discussion was based on the findings represented in the rich picture, which was divided in seven different charts by the researcher in coordination with the research supervisors. Similar workshops were held in Cañas, La Guinea and San Miguel Vigil. In this stage, the researcher

Picture 7. The researcher with stakeholders during the main workshop in Granada. Photo. Emilio Perez

presented a list of issues of concern identified during the finding out stage. Each one of the issues was discussed among participants. Afterwards, the participants voted and created a ranking about the issues to be addressed. In this sense, the main workshop in Granada became perhaps the essential part of the research work.

Table 7. Ranking of issues of concern as described by the stakeholders.

Issues of concern	Ranking
Land tenure. People in the island have different ideas about who owns what	★★★★★★
Lack of material support to communities in the island	★★★★★
The need to create a management plan with a 3 000 ha. buffer zone in the island	★★★★★
Lack of community organization	★★★
Uncertain future for the youth in the island	★★
Training the community members in different areas	★
The rules about cattle raising are inconsistent	★
Timber logging by outsiders	★

4.5. Defining / taking action

The main workshop was also used for discussing future and feasible actions (see table x). Different alternatives to improve the situation, suggested by different actors, were presented by the facilitator and were discussed by participants. No final agreements for change were decided. It was not the purpose of the workshops either. Considering the history and the conflictive context of the situation in Zapatera (which included shootings, burned houses, prosecution, legal battles, etc.,), the very fact of having these different participants under one roof was a success in itself. It was the first time that such a meeting took place. At this stage of the study, it was convenient to develop first a platform for discussion and development of trust. Evidently, the creation of such platform itself is not enough to produce desirable changes. However, it is the *sine qua non* for establishing the basis for further discussion and later agreement on desirable changes in Zapatera.

Table 8. Proposals for improvement.

Proposals for improvement
Create an international research centre in the island
Enforce the law to prevent illegal exploitation
MARENA creates a buffer zone of 3 000 ha. in the island
Create a foundation for Zapatera Island
Train adults in ecotourism
Construct more infrastructure (churches, schools, cemetery)
The government helps us to create other sources of income
Put cattle back in the island
We should plan the future for our children
Teach communities to make handicrafts
Give education to the young people so they can leave the island

5. General discussion

The main objective of this research was to understand the Livelihoods of two communities in Zapatera Island and to identify the main issues of concern regarding natural resources management in the island, in order to improve the livelihoods and the management of natural resources in the area. This section discusses the findings of the study.

5.1. Livelihoods in La Guinea and Cañas

5.1.1. Differences in access to various forms of capital.

In Zapatera Island there are considerable differences in access to different forms of capital between communities and among households. Considering all households as homogeneous components of the community is a mistake. For example, the study shows that La Guinea has more physical capital than the community in *Cañas*. At the same time, there are clear differences in capital and wealth among different households within the same community. This is something important to take into account if livelihoods improvement is intended in the area. If a development project aiming to improve the livelihoods of these communities makes the wrong assumption that access to different forms of capital is homogeneous among households, it may end up benefiting only those who already have more. As Ellis (2000, p. 237) expresses: "those who possess high human capital are in a better position to take advantage of opportunities that arise than those not so well endowed". Usually, the expectations for people in the rural communities, no matter what their situation is, are to meet daily requirements of food, income, health and education (Tyler 2006, p. 89) by accumulating capital, i.e. to secure their livelihoods. Therefore, a household or individual standing in better position, regarding assets and access to them, than its neighbours won't necessary stop seizing every opportunity to gain access to even more assets and forms of capital.

5.1.2. Access to land.

In Cañas, land is much more limited and, therefore, the community seems to be less prone to divide land among households with well-marked and static divisions. They keep instead land available as a common property. This form of land access arrangement gives the opportunity to the landless poorer households to gain access to a resource to which they would otherwise be denied (Jodha, 1990, cited in Ellis 2000). Unfortunately, it also creates uncertainty among those who do not have any clear possibilities to get possession of land under circumstances of growing land scarcity. As Ellis (2000) argues, land access arrangements come into being "under circumstances that make it beneficial for all parties to comply with them, and they are modified or abandoned when they no longer fulfil the livelihood role which has resulted in their adoption in the first place". In the case of Cañas, the benefit of sharing the little land available is reaching its limits as population keeps growing and young people are entering the age to build their own families. In La Guinea, similar changes are not likely to take place in the near future, as land availability is greater there. In the long run, however, land scarcity would create conflicts for land and new arrangements will be forced if the current trend continues.

5.1.3. The effects of prohibition

If land scarcity has created uncertainty and is threatening the livelihoods of many households in La Guinea and Cañas, the prohibitions of MARENA have not been particularly helpful. On the contrary, the prohibitions have created more livelihood insecurity and environmental degradation. This situation is quite common in low-income countries where poverty and environmental degradation intensify in areas surrounding parks and natural reserves (Pimbert 1995, p. 8). In the case of Zapatera, for example, the prohibition of catching and selling tarpon has forced islanders to

rely on middlemen to reach markets in Honduras. Fishermen in Zapatera know it is too risky to try to sell tarpon by their own, as they may loose the work of weeks if caught by MARENA officials. Middlemen know this situation very well and set extremely low prices to dried tarpon, which in its turn forces households to try to catch as much tarpon as possible despite the prohibition. Similar patterns were seen in the case of firewood and timber, were locals of Zapatera are left without possibilities to negotiate better prices at the mercy of middlemen. Despite the low prices paid by middlemen, selling firewood, timber and tarpon are still the main sources for earning cash. Anyhow, the illegalized products have better prices than the legal ones and, therefore, more households are willing to engage in illegal activities as their only source of income, leaving behind food crop cultivation and diversification in general. In this way, the prohibitions of MARENA provoked, unwillingly, an overexploitation of high valued natural resources. This becomes detrimental to food and livelihood security of local households, and to the environment of the island and the lake.

5.1.4. Access to markets
The remoteness of Zapatera Island has created households' over-reliance on more profitable extractive livelihood activities. While markets are important to convert natural resources into cash and other forms of capital, the communities of Zapatera themselves cannot be the markets for their own products. Most of agricultural products and services available in the Island are not easy to convert into other forms of capital as the majority of the households have access to the same kind of products and livelihood activities. Reaching external markets are fundamental for households in La Guinea and Cañas but remoteness is a major hindrance for both communities. On one hand, production and transportation costs of agricultural products are greater for households in La Guinea and Cañas than for those communities that are closer to Granada. At the same time other communities are trying to sell, more or less, the same products to Granada with more competitive prices. Therefore, heavy weighted and low valued agricultural products are not seen as a good option. On the other hand, certain products as fresh fish and fruits can rapidly get spoiled in the tropical weather of the region. Therefore, households in La Guinea and Cañas are forced to rely only on high valued products that can allow them to cover transportation costs and that are not available to other communities. Then, the options are reduced to the extraction and selling of high valued and illegal products, namely: timber, firewood and tarpon. Evidently, there is a need to find alternative livelihoods activities and sources of income for people in La Guinea and Cañas. If no opportunity for conversion or substitution exists, then reliance on renewable environmental resource will be intensified over time (Ellis 2000, p. 122).

5.1.5. The role of organizations.
The study also shows that the Children's Wellness Fund (CWF) is the most recognized and highly appreciated organization by communities living in Zapatera Island. The organization has created a sort of protective net for the communities by alleviating the burden of some food, medical and schooling costs that households in the island would have had to pay otherwise. At the same time the CWF provides access to micro-credits and develop project for housing improvement. In practice, the CWF has taken the role of the state in the island and has developed good relations with most of the communities in Zapatera, thanks to the patient work of its personnel. Unfortunately, despite its good intentions, the intervention of the CWF is also creating dependency among households, with an approach that may not sustainable in the long run. The presence and support of the CWF in the area is just taken for granted. Many of the livelihood strategies of different households are based on the assumption that the CWF is always going to be there. Nevertheless, an unpredictable withdrawal of CWF from the area, or a heavy reduction on its budget

would have a dramatic negative impact on the livelihoods and, hence, the living conditions of communities in the island.

5.2. Enhancing community livelihoods using Action Research and other Participatory and Iterative processes.

Participation itself should not bee seen as the ultimate outcome of Action Research but as a precondition for a successful research aiming to promote change. In the case of the present study, it was evident that the research work did not facilitate the access of communities to assets and different forms of capital that may eventually help them to improve their livelihoods. However, the study, through Action Research, created the conditions that could change the state of affairs of the livelihoods of the communities living in the study area. These conditions include knowledge creation and exchange; participation; and community empowerment. However, despite the positive stance of Participatory approaches and methods, it is also important to take into consideration their limits.

5.2.1. Knowledge creation

The iterative character of the methodology used during the study created opportunities and spaces for knowledge creation and exchange. For example, the study collected information about the history of the use of natural resources and was particularly useful to analyse issues of land tenure and governance, which need to be studied in "specific historical contexts" (Havnevik, Negash & Beyene 2006, p. 24). At the same time, the results were presented and discussed by participants and other stakeholders using the information they themselves produced. In this way, different visual tools and methods of Participatory Rural Appraisal contributed to knowledge creation and exchange by conveying messages and promoting discussion in a way that was understandable for everyone. In that sense, visual methods can also empower the weak and disadvantaged by increasing the knowledge about their own reality, working as an equalizer and representing an agenda for discussion (Chambers 1994). Therefore, in line with Chambers' (1994) suggestion, individual semi structured interviews were reduced to a minimum, and more time and effort was given to group discussions and analysis.

5.2.2. Knowledge exchange.

Livelihoods and protected areas are dynamic and in permanent change. Policy makers need the permanent feedback of researchers, practitioners, and communities in the field in order to tune their activities to the needs of those affected by policies, including nature. New approaches are being explored to amalgamate the borders that separate these three groups of human beings. The study promoted participation and collaboration between the researcher, the communities, environmental authorities and the local NGO working in the area. On the other hand, the outcome of research must be made available to governments, policy makers and those responsible for the course of action (Havnevik, Negash & Beyene 2006 p. 28). Action research permitted the sharing and utilization of new knowledge during the research process itself. Workshops were not only useful contexts for information gathering and discussion but also valuable opportunities for learning and experience sharing. Not only communities and environmental authorities had access to the methods, techniques and the outputs of workshops, but also a NGO and large-state owners.

5.2.3. Community Empowerment

The present study was based on the ideal that communities must be approached with respect, and considered as real partners in the work to improve their livelihoods and the management of natural resources. Moreover, the study had trust in the capability and knowledge of local communities (Sinha 1997) as a point of departure for the research work. Participatory processes paved the way for

constructive discussion, highlighted the need of honesty in research, and were an irreplaceable method for building rapport, understanding of community conditions, and empowerment leading to action (Sinha 1997). In other words, the study used PRA seeking to reverse dominance by empowering people and starting a process more than to extract and gather data (Chambers 1994). During the present study empowerment of local communities had different manifestations. On one hand, people of different communities around the island found a good opportunity to get in contact and start networking with top officers of the environmental ministry, and large state owners taking part of the main workshop. At the same time, the community representatives had the opportunity to tell "their truth" during the debate once the structures of power were temporally removed, and the feeling of walking on "safe terrain" was gained. As Havnevik, Negash & Beyene (2006, p. 18) suggest, "smallholders often do not dare to question government rules or policies openly". On the other hand, some members of the studied communities made regular international phone calls to the researcher to inquiry about his return to the study area. They clearly understood the role of door opener the researcher had to higher levels of decision-making. As Narayanan (2003) argues, "establishing linkages with policy-makers, policy formulation processes and networking with academics are main components of an empowering process resulting from pro-poor research. Finally, by organizing themselves in collective action, the communities seek to "gain more control over their resources so that they continue to provide the foundation of their livelihoods and contribute to the formation of private and social assets" (Tyler 2006, p. 286).

5.3. Issues of concern regarding Natural Resource Management in Zapatera Island

In the case of Zapatera Island, as in any context where conflicting interests around natural resources are the central feature, it is important to identify and understand the main issues of concern from the perspective of different actors of that particular situation. Different stakeholders identified the next issues of concern during the workshop held in Granada city.

5.3.1. Land tenure

Land tenure is the initial step towards improving livelihoods of people in *La Guinea*, *Cañas*, and the other communities in the island. With the continuous growth of population and the resulting diminishing in access to land, current arrangements are likely to disappear, creating uncertainty regarding land rights. This creates not only social unrest but can also lead to "inefficient use of resources, thereby contributing to natural resource degradation and poverty" (Baland & Platteau 1996, cited in Havnevik, Negash & Beyene 2006). In Zapatera, conflicts for land should be resolved through dialogue and facilitation processes. Legal alternatives will be a more costly and not lasting alternative. It is suggested that in countries that were subject to violent conflict, as in the case of Nicaragua, formal systems of land administration operated by government are often used only for land of high economic value, and often have a low capacity to operate effectively even in the absence of violent conflict (FAO 2005). Another consequence of land property uncertainty is that some communities have been bypassed by NGOs and development projects for not having legal possession on the land they occupy. At the same time, uncertainty of land tenure promotes the development of forms of production and land use oriented to short term outcomes which result in the depletion of natural resources outside and inside protected areas (GTZ 2007, p. 29). As land become more and more scarce in the island, people in different communities around the island are very concerned about the uncertain condition of their access to land. Ass Havnevik, Negash & Beyene (2006 p. 24) suggest,

"improving access to land and land entitlement are preconditions for improving rural livelihoods".

5.3.2. Lack of material support from the government

Although it is true that the presence of the Nicaraguan government in the island is scarce, this issue should be approached carefully. On one hand, it is very common to try to solve issues of poverty by simply delivering goods among the members of a community, assuming that all members of the community have equal conditions. In that way the intervention may end up benefiting those whom already are better off. The state intervention should take into consideration the considerable differences that exist between individuals, households, and communities in terms of access to assets and forms of capital. On the other hand, it is a mistake to start intervention in a community by looking for problems and poverty. As Ngunjiri (1998) suggest, "poverty and problems are commonplace and if your mission is to look for them you will always find them". This possesses a double inconvenience: undermining people's own capacity to overcome poverty and, hence, make poverty a self-fulfilling prophecy. In other words, people start to perceive themselves as poor and incapable to overcome poverty because they were told so. Poverty alleviation and livelihoods improvement should be based on the existing capacity of the communities because "even in an apparently poor community there are things that keep it going which can be built on in poverty alleviation" (Ngunjiri 1998).

5.3.3. Buffer zone

The idea of establishing a buffer zone in Zapatera Island requires to put in balance both the positive and potential negative aspects of such measure. First, the definition of the area for the buffer zone and the establishment of rules and sanctions have to be done in communication and democratic discussion among the different actors of the situation in Zapatera. MARENA has to support communities in their self-organization. Some authors suggest that "when the users of a common pool resource organise themselves to devise and enforce some of their own basic rules they tend to manage local resources more sustainable than when rules are externally imposed on them" (Ostrom cited in Havnevik, Negash & Beyene 2006). On the other hand, if different actors have to be involved in the management of Zapatera national Park it is important to know the actors, their particular interests in the use of the natural resources and the best mechanisms for engaging them in the conservation (Barahona 2001). That is the core of the present study. Finally, the creation of a buffer zone in Zapatera has to follow a gradual process of creation and adoption of new livelihood activities in the buffer zone. In the beginning, these new activities should work as buffers to the reduction in resource availability during the early phases of the creation of the buffer zone and its new arrangements (Havnevik, Negash & Beyene 2006, p. 187).

5.3.4. Lack of community organization

Villagers in La Guinea and Cañas organize themselves around catholic celebrations and traditions. Very seldom people organize themselves for fishing. Other forms of formal organization are not seen in *La Guinea*. In *Cañas*, by contrast, people tend to cooperate and gather around activities that demand organization such fishing, preparing food for school children and provide transport for high school students in Granada. Both communities are also organized around a baseball team. They use to meet with other communities in the archipelago and mainland to take part in local baseball championships.

5.3.5. The youth have an uncertain future

Different stakeholders consider that young people in the island are the most vulnerable group in the long run due to land scarcity, diminishing of resources, and population growth in the island. Therefore, the Children's Wellness Fund has a strong focus on education for the children and the young people in Zapatera.

Nevertheless, young boys find it very difficult to study in certain periods such as March-April, the high season for fishing, as they have to work with their parents; in the case their family owns a boat. The students of high school have limited number of hours of schooling that they actually receive in comparison with their fellow students in Granada. In consequence, few of them make their way through university, despite the scholarships offered by the CWF for all youngsters the manage to finish high school and seek to continue their studies.

5.3.6. Training to get more skills

Provide training to local communities has been proposed and tried before with more or less success. Training, nevertheless, should be regarded as any other form of external support. The key issue here is that this external support should come to supplement rather than to replace or duplicate local initiatives or efforts (Ngunjiri 1998). Once again, it is important to know what people have in order to support their initiatives and potential to overcome poverty.

5.4. Improving Natural Resource Management in Zapatera Island

Natural resources management can be improved in Zapatera Island by addressing the issue of poverty in the communities that inhabit the island; and continue to promote the dialogue among different actors involved in the situation.

5.4.1. Addressing the issue of poverty in the communities that inhabit the island.

Any proposal for improving conservation of natural resources in the island has to start from a basic point of departure: "damage to local environments cannot be effectively halted unless poverty itself is addressed" (Ellis 2000 p. 119). In remote areas such as Zapatera, the growth of non-farm activities may reduce the urge of local communities to get involved in extractive practices of natural resources to gain their livelihoods (Ellis 2000). The study suggests that local communities in Zapatera Island are also very aware of the drastic decrease that fish stocks and forest resources are experiencing the last years. Therefore, people in *La Guinea* and *Cañas* are very keen to find alternative livelihoods activities to those who are based on the mere extraction of natural resources. At the same time, it is also important to understand that natural resource use by individuals or groups is only one part of the livelihood strategy of the communities. A reversal of environmental degradation requires new livelihood options that change people's incentives, in particular the benefits and costs of resource use (Pound, Snapp, McDougall & Braun 2003).

5.4.2. Promotion of dialogue and participation of different actors in the island.

The greatest potential, despite ongoing conflicts, is the will to continue the dialogue among different actors in the island. The present Action Research study is based on the assumption that people in the reality of the island have the capacity and the knowledge to analyze its own situation and make plans and take actions towards improvement. As McNiff and Whitehead (2006) suggest "Action Research is rooted in the ideas of social and intellectual freedom, that people can think for themselves, can make their own life decisions, and will come together on a equal footing to negotiate their life plans". At the same time, all communities in the island should be taken into consideration and included in further discussions to improve the situation in Zapatera. No real long lasting changes can be achieved if communities are or feel excluded. Moreover, there is a need to create agreed mechanisms to involve excluded members of the communities in decision-making processes. Particular attention should be given to the situation of women whom usually have limited possibilities to participate as household chores consume great part of their time.

5.4.3. Increasing cooperation in research.

The present study was just the beginning or the first steps towards improvement and by no means the final solution for the situation in the island. It is also very important to highlight that research is, and must be recognized as, an act of power (Havnevik, Negash & Beyene 2006). Therefore, research itself should be democratic and democratizing. The role of foreign researchers, as in this case, is to support local researchers to engage themselves in the process in a genuine and non-patronizing manner. Moreover, the researcher should help to "create space for the people and governments of the south to identify their own development paths" (Havnevik, Negash & Beyene 2006, p. 29). Finally, the proposals for improvement have to reflect always the ideas and desires of the stakeholders within the situation and should not be imposed by researchers or any other external actors. This is the only way to guarantee the promotion and long-term sustainability of changes for improvement.

6. Conclusions

In Zapatera Island, especially in *La Guinea* and *Cañas*, the issue of livelihoods are marked by considerable differences in access to different forms of capital among households and individuals. The access to land is perhaps the most notorious differentiating factor of all. In *Cañas* lack of access to land is creating uncertainty among landless families, threatening the arrangements that facilitate their access to land. The negative effects of the limited access to land, exacerbated by the prohibitions imposed by MARENA, have created even more livelihood insecurity and environmental degradation. The remoteness of Zapatera has provoked an over-reliance on more profitable extractive livelihood activities by community dwellers. Nevertheless, not only MARENA influences and shapes the access to resources and forms of capital in the island. The Children's Wellness Fund is the most recognized and appreciated organization among islanders. This organization has created a sort of protective net for the livelihoods of inhabitants in Zapatera and, in many cases, has taken the role of the state. Unfortunately, it has also created dependency among people in the island.

The present Action Research study created the conditions that could change the current state of affairs of livelihoods in the Island. On one hand the study promoted knowledge creation by planning, reflecting and taking action using tools of Participatory Rural Appraisal. On the other hand, the research also promoted the exchange of knowledge by involving different stakeholders in discussions and debates. Action Research and PRA contributed as well to community empowerment. This empowerment become evident in the access gained by local communities to higher levels of decision-making; and in the self-organizing process they started.

The study helped community members and other stakeholders to identify different issues of concern regarding natural resources management in the island. Among these, land tenure was considered as the most outstanding and urgent issue to be addressed in order to create positive change. All stakeholders agreed on the need to know who owns which and how much land in the island. At the same time, community representatives identified lack of material support from the government as in important issue of concern. Another issue of concern was the need of a buffer zone that could allow new livelihood activities and conservation. Nevertheless, large state owners and environmental authorities pointed out the lack of community organization in the island as a hindrance for conservation. It was also mentioned that young people in the island is one of the most vulnerable groups in the long run due to land scarcity, diminishing of resources, and population growth in the island. The debates with different stakeholders also identified a need to train the members of different communities as an important issue.

The study suggests that natural resources management in Zapatera Island can be improved by addressing first the issue of poverty in the communities that inhabit the island; continue to promote the dialogue and debate among different stakeholders; and by increasing the cooperation in research between local communities, environmental authorities, practitioners, researchers and donors.

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9. Appendices

Appendix 1. Chronology of research activiti

Month	Days	Participant observation	Gathering secondary data	Semi-structured interview	Venn Diagram	Community Mapping	Livelihoods	Community meetings	Time line	Transect walk	workshops	Rich Picture
January	17											
	19		X									
	21		X									
	23		X									
	25		X									
	27	X										
	29	X										
	31	X										
February	1	X						X				
	3		X									X
	5		X									X
	7	X								X		
	9	X		X					X			
	11	X				X						
	13	X		X								
	15	X				X		X				
	17	X					X	X				
	19											
	21										X	X
	23	X										
	25	X									X	
	29										X	
March	1											
	3			X							X	
	5			X							X	
	7	X										
	9	X			X							
	11			X	X							
	13				X							
	15				X							
	17	X										
	19											X
	21											
	23											
	25	X			X							
	27	X										
	29											
April	1	X										
	3											
	9											
	11		X									
	13		X								X	