

INDIGENOUS KNOWLEDGE OF MARINE ECOSYSTEMS;

Consumption, Commercialization and Management in the Miskito
Community of Sandy Bay and the Rama Community of Punta Aguila,
Caribbean Coast of Nicaragua

Master thesis

By

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Abstract

This thesis an effort is made to present the indigenous knowledge of marine ecosystems in the communities of Sandy bay (Miskito) and Punta Aguila (Rama) of Nicaragua. The aim is to identify and show how these fishing communities are using and transmitting their knowledge for resource harvesting and management. As indigenous people are facing changes in their daily life; conflict of resources use, land tenure, variation in the ecosystem and the environment in which they live their knowledge change and the communities to adopt new methods of management.

The people Punta Aguila and Sandy Bay harvest lobster, turtle, fish from the sea. They also do agriculture activities for their subsistence. My research problem focuses on their knowledge of the marine ecosystem and whether their knowledge is used for management purposes. How are these perceptions, ideas and beliefs shared within the communities?

The theories of indigenous knowledge is the theoretical framework for this thesis . The methods used to collect primary data during the two months of fieldwork in the two communities, undertaken in July and August, 2004 were;

- structured, intensive interviews with fishermen and –women who live from the sea ,
- conversations on tape recorder,
- workshop and groups discussion to identify the different fishing grounds
- observation of activities and daily life in the communities .

The presentation of the primary data is mostly of qualitative character. The material presented shows that these indigenous communities do have extensive knowledge of the ecosystem. Despite their knowledge, and in spite of the management systems introduced by the government and other institutions, the marine resources are threatened with overfishing. I also found that outside fishing operations were seen as an intrusion and as a threat to the natural resources. While the communities may have knowledge relevant to the management of the natural resources and the

balance of the ecosystem, management authorities pay little attention to such knowledge. This knowledge has been a way of interacting with nature and the environment for improving their lives and bringing harmony with their God.

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"la educación es al hombre lo que el molde al barro: le da la forma"

List of Acronyms

ADB: Asian Development Bank.

AdPESCA: Administration of Fisheries and Aquaculture.

BCN: Banco Central de Nicaragua.

CBA: Corredor Biologico del Atlantico.

DIPAL: Desarrollo Integral de la Pesca.

EEZ: Exclusive Economic Zones.

IREMADES: Instituto de Recursos Naturales y Desarrollo Sostenible.

ICJ: International Court of Justice.

IDSIM: Institution of Social Development of the Moravian Church.

IDB: International Development Bank.

IMAE: Indice Mensual Economico.

ITK: Indigenous Traditional Knowledge.

IK: Indigenous Knowledge.

LEK: Local Ecological Knowledge.

MINSA: Ministry of Health.

MARENA: Ministerio del Ambiente y Recursos Naturales.

MIFIC: Ministry of Foment Industry and Commerce.

NGOs: Non-governmental Organization.

PNUD: Programa de Naciones Unidas.

SIRENA: Secretaria de Recursos Naturales.

URACCAN: University of the Autonomous Region of the Caribbean Coast of Nicaragua.

Explanation of words:

La Barra: Bar mout (frontier between the sea and the lagoon).

Panga: Out board engine.

Midwife: Ladies that attended pregnant women.

Veda: Off-season.

Moskitia: Was the first name of the Atlantic Coast of Nicaragua

Suquia: Ritual of medicine preparation.

CHAPTER I: INTRODUCTION

The republic of Nicaragua is the largest nation in Central America. About half of the Nicaraguan territory consists of eastern lowlands, known as the Mosquito territory, which extends 70 km inland from the Caribbean. Nicaraguan history describes clearly that, for more than 500 years ethnic groups such as the Ramas, located 15 km south of Bluefields, and the Miskitos, located in Sand Bay Sirpy in the Rio Delta, 108 km Northeast from Bluefields, have been living in, which today is known as, the South Autonomous Region of the Caribbean Coast of Nicaragua. The people in these communities possess traditional knowledge about their marine natural environment, which has been conveyed from generation to generation.

The research has focused on the Rama and the Miskito indigenous communities, their knowledge, perceptions, ideas and beliefs about marine resources and ecosystems. The people in these communities base their subsistence on fishing and agriculture, and their knowledge reflect that as well as their cultural traditions. Punta Aguila, is a small community with a population of 70 inhabitants of Rama origin. The community of Sandy Bay has 1600 inhabitants, mostly Miskito. The principal activities of both communities are fishing and agriculture. These two ethnic groups have many similarities, including their perception of the natural resources, their culture and way of life.

During the Revolution of 1979, the Miskito and the Rama suffered a drastic transformation in their way of living and was also isolated from Nicaragua. The struggle of these communities to maintain their tradition and culture has been a hard struggle. There are several formal institutions focusing on both communities, PNUD¹, which aim is to strengthen the institutional authorities of these communities, based on the Autonomy Law and the political constitution of Nicaragua. URACCAN² is also a great support for both communities on issues

¹ Programa de las Naciones Unidas para el Desarrollo

² Universidad de las Regiones Autonomas de la Costa Caribe Nicaraguense

related to the Caribbean. Its principal activity is to give a follow up on the autonomy law and its regulation. It is a great challenge for both communities to maintain and conserve their tradition in a world that is continually changing.

The people of Punta Aguila and Sandy Bay harvest lobster, turtle and fish. They also engage in agricultural activities for their subsistence. The people in the two communities use their traditional method of harvesting fish, without the use of much modern technology. They have a strong belief in their God. They also have extensive knowledge of the marine ecosystems, which has provided them daily with food. Both communities have their perceptions, ideas and beliefs of how nature works around them. This knowledge, which is shared within the communities, pertain to when it is the right time to harvest, to rest, to give thanks to God, and so on.

Traditional knowledge, beliefs and practices in rural and indigenous communities have received considerable attention the last decade. It is also widely assumed that such knowledge may be useful for management purposes. Indigenous knowledge is gaining recognition in the western world and by many scientists. In searching for alternative solutions to resource conservation and management problems, indigenous knowledge may provide some answers. There nevertheless is a risk of abstracting traditional knowledge from its cultural and historical context. Such ecological knowledge is informal, based on interpretations of what local people see and observe in their natural habitat and what they experience from interacting with it (Agrawal, 1995).

Indigenous knowledge is often a part of people's culture and cosmo-vision, and is usually consistent with the way they see the world and the relationship between man and nature. The knowledge is shared within communities and becomes a common stock of ideas and wisdom. Such knowledge will also contain rules and regulations as to what the community members are allowed to do, what they can harvest and what they should avoid. It is transmitted and refined from generation to generation. Quite often, indigenous people will be exposed to different types of changes in the environment, and challenges to their traditional way of living. What

are the consequences of such changes to their knowledge? This is a main focus point of my thesis.

1.1. Theories of Indigenous Knowledge

Indigenous knowledge is currently an important issue in the scientific discussion. The human society consists of many groups, with different knowledge, beliefs, and perceptions. The identification of indigenous knowledge is confusing to the world today, mainly because of the lack of understanding towards integration of ancestral knowledge vs. scientific knowledge. This multitude of perceptions is directly related to cultural diversity around the world. Indigenous knowledge is in many ways as important as scientific knowledge. When focusing on sustainable management, we also have to find ways of integrating this knowledge.

Identification of indigenous people is difficult. Indigenous peoples communities reflect tremendous diversity in their culture, history, tradition and surroundings. According to the Asian Development Bank indigenous people should be regarded as those with a specific social or cultural identity, distinct from the dominant or mainstream society. The marginality of indigenous people makes them vulnerable in the process of development.

Indigenous people have been subjected to discrimination in many ways. Indigenous people are disadvantaged or vulnerable to intervention, because of their social or cultural identity, which often makes them disregarded in decision taking. Michael (2003) defines indigenous people by “the experiences shared by a group of people who have inhabited a country for thousands of years, which often contrast with those of other groups of people who reside in the same country for a few hundred years”.

Indigenous people have a strong link or association with nature itself:

“The isolation of many such people has meant the preservation of traditional way of life in close harmony with the natural environment. Their very survival has depended on their ecological awareness and adaptation. But their isolation has

also meant that few of them have shared in national economic and social development; this may be reflected in their poor health, nutrition and lack of education. These communities are repositories of the vast accumulations of traditional knowledge and experience that links humanity with its ancient origins. (...) It is a terrible irony that as formal development reaches more deeply into rain forest, deserts, and other isolated environments, it tends to destroy the only cultures that have proved able to thrive in this environment (Brundtland 1987)."

Among peasant farmers and tribal inhabitants of the tropical forest are men and women who are versed in the diversity and uses of local plant life. These folk perpetuate legacies of cultural knowledge, and they have few peers as stewards of biological resources. According to Brush and Stabinsky (1996), there are four facts which suggest the need for indigenous people to control and market their knowledge:

- 1) indigenous people control and maintain significant amounts of biological resources,
- 2) these resources are useful to industry and world community,
- 3) both indigenous people and biological resources are threatened, and
- 4) intellectual property is an accepted way to encourage the creation and sharing of intellectual goods such as knowledge of plants..

According to Warren (1991), indigenous knowledge is the local knowledge that is unique to a given culture or society. Indigenous knowledge is relevant in this new world; because it helps to contribute to a better understanding of nature. This knowledge do not use modern technology or methods to improve a better sustainable management of the resource, but living in nature and with the environment gives the inhabitants knowledge which may be an important contribution to the sustainable management of the natural resources.

Traditional ecological knowledge can be defined as "a cumulative body of knowledge, practice and belief, evolving by adaptive processes and is handed down through

generations by cultural transmission” (Berkes 1999: 8). However, because of their different world views and other factors, scientists and local people often disagree about what is causing the problem and how to go about solving it. Clearly, scientific and indigenous knowledge differ in their approach. One view these differences might be to see them as different areas of expertise that complement rather than contradict each other (Moller et al 2004). In this view, resource users are assumed to work within and add to a local system of knowledge that has arisen from years of observation and experience respecting the local environment and its ecology. After all, achieving and building a livelihood, today as well as in the past, is contingent on the resource user’s applications of their knowledge about environmental factors, ecological relationships, and species behavior (Davis et al, no date).

The ecosystem is a very important source of subsistence for indigenous people. The marine ecosystem may to some extent be managed by indigenous people. The sustainable use of renewable resources and the sustainability of human society are closely linked. People are simultaneously part of the ecosystem and also dependent upon it. By bringing community interest into the formula, resource conservation is more likely to be ensured. Human communities depend upon natural renewable resources and the goal is for these to remain accessible for generations to come.

Indigenous knowledge is to some extent collective. Assembled by past generations and passed down to its present inheritors, such knowledge is more than just matter of fact information. Rather, it is usually invested with sacred quality and systematic unity, supplying the foundation on which members of a traditional culture see their communities, personal identity, and ancestral anchorage. It provides a distinctive worldwide view, of which outsiders are rarely aware.

Indigenous knowledge may be defined as the ‘the common sense knowledge and ideas of local peoples about the everyday realities of living’. Such knowledge includes the cultural traditions, values, beliefs, and worldviews of local peoples as distinguished from Western scientific knowledge. Such local knowledge is the product of indigenous peoples’ direct experience of the workings of nature and its relationship with the social world. It also a holistic and inclusive form of knowledge (Agrawal 1995:418)

Ruddle (1991) proposes that traditional knowledge, particularly in rural communities, is of central concern to the regulation and balance of exploitative pressures that permit an ecosystem to maintain stability and regenerate capacity. Fishermen's knowledge of local marine environment is seen as a means to improve and complement traditional knowledge base of fisheries management (Maurstad 1998). Local ecological knowledge research has long been directed towards the goal of improving resource management practices through a fuller utilization of existing knowledge (Wagner and Davis 2002). Indigenous knowledge may have important contributions to science, society and the environmental management. As we integrate such knowledge we are creating and strengthening our knowledge of how to manage our resources. Indigenous knowledge is expressed in different terms, which can be: through arts, language, nature description of the weather, premonition of a better day, religious activity as well in oral tradition associated with plants, animals and features of natural environment. Also these terms need full benefit into environmental management and require the protection of all intellectual property rights. All these terms mentioned have described the total information, practice, belief and philosophy unique to each indigenous community.

People active in the environmental movement has turned to indigenous peoples, who are pictured as savage ecologists living in harmony with nature. Some scholars have also contributed to this discourse. The interest has not only given international legitimacy to indigenous perceptions of nature but has also given them the aura of great ecological wisdom.(Kalland 2000). Traditional indigenous people often live in rural areas, work within the natural system and culturally tied. Indigenous people who live close to the land can bring direct observation and special understanding of the natural cycles, of animals and plants. Their traditions extend back hundreds of years, a perspective science simply does not have. For all indigenous peoples, cultural roots are solidly planted traditional knowledge and practice. Indigenous traditional knowledge represents a unique opportunity for different projects of development given out by institutions to increase their information base, to improve their effectiveness and efficiency, and to add new world views and perspectives that are a part of development project planning and implementation (Alan 2000). Certain and essential LEK, (local

ecological knowledge), research concerns the means by which local knowledge experts are identified.

Information from fishermen can give indications of resource and fishery trends prior to a collapse. Sometimes, fishermen's explanations for those trends can also be important. In this way, it can help resolve scientific debates about origins of such collapses (Neis and Felt, 2000). Ecological knowledge has been accumulated through regular, ongoing interaction with their environment that may span several generations. It is practical or local in the sense that "it is derived from the direct experience of labor process which is itself shaped and delimited by the distinctive characteristics of a particular place with unique social physical environment" (Kloppenborg, 1991:528).

Local peoples have, in many cases, developed regulations which have had a conservational effect on natural resources, although these originally might have been motivated by other considerations. A key concept is co-management in which management is shared between local communities and governmental bodies seek to integrate local knowledge with that of scientific studies.

The degree of traditional and government integration will depend to a large extent on the degree of local decision making and empowerment agreed to by those within the central and the traditional system of governance. Collaborative and community based management can also assist in integrating environmental and resource management activities into peoples' everyday lives. Where a community makes some resource management decisions that affect their activities, management becomes a part of their lives. As mentioned above, problems are not just environmental and therefore all aspects of the community context must be addressed.

It is assumed that indigenous peoples have only two options: to return to an ancient and "primitive" way of life, or to abandoned traditional beliefs and practices and become assimilated into the dominant society. Increasingly, indigenous groups have been expressing preference for a third option: to retain culturally significant elements of traditional way of life, combining the old and the new in ways that maintain and enhance their identity while allowing their society and economy to evolve. Traditional

knowledge has become a symbol for indigenous groups in many parts of the world to regain control over their own cultural information, and reclaiming this knowledge has become a major strategy for revitalization movement (Berkes 1999:168).

Many environmental scientists regard traditional knowledge as anecdotal, non quantitative, out of date. Others argue that it lacks scientific rigor and objectivity. Related to this point is how the holders of traditional knowledge view their own knowledge. Some local people may even view their own knowledge as “backward” (Grenier 1998).

Since the publication of Hardin’s “The Tragedy of the Commons” in 1968, more than twenty five years have passed, during which authors have tried to demonstrate the usefulness of communal management of very different types of natural resources: beavers, fish, lobster, irrigation water, pastures and forests. The general thrust of many publications is to prove that through time appropriator or user communities all over the world, managing all kind of different resources, have been able to do so in fairly enduring and sustainable manners (Brouver 1995):

“What existed in fact was not a ‘Tragedy of the commons’ but rather a triumph: that hundreds of years--...—land was managed successfully by communities. That the system failed to survive the industrial revolution, agrarian reform, and transfiguring farming practices is hardly to be wondered at (Brouver 1995:283).”

The effective management of fisheries is based on knowledge that meets related, but independent tests. It must be accurate, and it must be perceived as accurate by stakeholders. Incongruence between this knowledge base and management institutions is an important reason for overexploitation and the resulting impoverishment in fishing dependent communities. Many experiences in fisheries development, point to a need to rethink and rework the approach.

The introduction of new fishing techniques and commercial fishing attitudes have destabilized traditional management and resulted in a reduced respect for traditional

chiefs and elders. Traditional and customary practices have been recognized within national laws, suggests how the appropriate aspect of traditional practices can be drafted into policy and law within the different tiers of government, (local, provincial or state). Traditional knowledge, in practice, can be useful in two areas: for education, and for design and implementation of an appropriate sustainable community resource management model. The conservation of marine resources is imperative to fulfill the needs of the population and to develop long term tourism. However, numerous concerns over the status of these resources have been raised. In this world of differing values, numerous internal and external forces are changing the lives and societies of local fishing people and also threatening their traditional knowledge. However, traditional resource management is increasingly recognized as a key tool for sustainable management of natural resources. This is particularly the case of fragile marine ecosystems, where time honored practices have ensured that over-harvesting or environmental damage is to control the interests of long term community survival.

The three pillars of traditional resource management are traditional land and marine tenure, (which define the area of protection); traditional knowledge, (which define why and how resource is to be protected); and finally customary law, (which ensures the application of traditional knowledge for the benefit of conservation). National legal systems are typically super imposed over customary laws, frequently undermining chiefly power and traditional decision making practices. As the interest in reviving traditional natural resource management practices increases, so does the interest in reviewing the role of customary law and practice, and its application to new resource management issues, such as access to genetic resources and traditional knowledge (Ruddle et al 2004).

As Nicaragua is a country of multiethnic in heritage, it has been facing a drastic struggle over the different management plans imposed by the central government. One issue is that the different communities located on the Caribbean Coast of Nicaragua are losing their rights to access their land, sea and the environment itself, as each day goes by. No measurement is place concerning the right of exploitation of the resource, as corruption leads its way and at the same time depleting all rights and traditions concerning the different ethnic and indigenous groups.

1.2 Research Questions

- What knowledge do indigenous people have about marine ecosystems and how species interact?
- How do people understand and explain resource abundance or scarcity?
- To what extent is indigenous ecological knowledge focused on management and conservation, and the need for such?
- Do people have any sense of the concept of carrying capacity?
- What measures of resource conservation do they perceive as being needed, and what makes them believe that these measures will be appropriate?
- What are their perception of the governmental regulations introduced in the area?

1.2 Hypotheses

- People have great faith in their own knowledge about the marine environment and resources.
- People have developed more knowledge about individual species than the ecosystem as a whole.
- People's knowledge is generally shared in the community as common knowledge.
- People acquire such knowledge as they grow up in a community.

- People will explain resource abundance and scarcity by factors beyond their control.
- People have no precise ideas about how their own fishing practices affect scarcity or abundance.
- People apply and respect their own regulations more so than those of the government.

1.3 People at a disadvantage

During my fieldwork I met people that were facing great disadvantages. They lack basic information of the management measures and other regulations imposed by the authorities. They have no daily transportation for to the city of Bluefield's. They do not participate in public decision making and debates, in part is because of the language they speak. Analyzing these patterns of disadvantage and limitations is my main reason for writing this thesis. What can be done to overcome these problems? I will investigate whether the indigenous knowledge of marine ecosystems can be mobilized in order to improve their situation.

1.4 Fieldwork and Data Collection³

This thesis provides information about indigenous knowledge of marine ecosystems, the interaction between man and nature, the harvest of marine resources in both communities, commercialization of the different species and consumption which provides them daily with food from the sea and the lagoons. Some information was

³ The questionnaire was made in Spanish and the resulting information also. It was necessary to make a translation from Spanish to English, in order to have a concrete understanding of the results from the questionnaire. Information was recorded in Spanish and translated to English, this was done because the community felt comfortable expressing them self in Spanish.

obtained from non-governmental organizations such as DIPAL⁴, IREMADES/URACCAN⁵, Regional Government/SIRENA⁶, Alcaldía (mayor office) and MARENA.⁷ However, it is fair to say that the thesis is based mostly on information given by both communities, Punta Aguila and Sandy Bay.

This study combines secondary sources with field work. A most important aspect was based on interviews addressed to all fishers. This includes both genders with no exception in both communities. In order to obtain the essence of my interviews I quoted my interviewees as they express in their own words.

A workshop was conducted to inform the people about the importance of the study, a tape recorder was used to record all information given by the fishermen and by the community. The fishermen drew on paper the fishing grounds of their community. They illustrated where they target commercialized species, and where they fish for consumption. A map was made for this purpose. Pencils and note books were given during the workshop for them to take notes and to be informed about what was taking place.

The workshop was divided in two groups; this was done because each fisher has different visions and ideas about marine resources.

The first days in the community were used to arrange the meeting and get familiarized with the community, the leaders and the environment, which was essential. The second approach was the target group which was the fishermen of the communities: Two days of intensive workshops, three days of interviewing people in the community. One day devoted especially with the leaders of the community.

Time was a limiting factor, and made it difficult for me to acquire more information concerning indigenous knowledge. This is because people go out fishing early in the

⁴ - Desarrollo Integral de la Pesca Artesanal

⁵ Instituto de Recursos Naturales Medio Ambiente y Desarrollo Sostenible

⁶ -Secretaria de Recursos Naturales

⁷ Ministerio del Ambiente y Recursos Naturales

morning and don't return until the following day. Many people in the community don't tell you much because of the many researches that have been going on now and in the past, but hasn't given any feedback to the community. Another factor is that women did not participate much in the interviews, because they are timid and afraid of talking. It was extremely difficult to get any kind of information or documents concerning the Miskito of Sandy Bay and the tradition in the community. In Punta Aguila people were much more attentive to the research and willing to share their thoughts and information.

1.5 Thesis out line

The following content of the thesis is divided in five chapters.

Chapter 1: Present the introduction of the study and the theory of indigenous knowledge.

Chapter 2: Presents the general background and situation in Punta Aguila(Rama) and Sandy Bay community. It also provides information on regulations toward the fishing sector.

Chapter 3: Describe the marine resources, fisheries and management, and description of the fishery in Nicaragua..

Chapter 4: Presents the results of the study, and is the essential part of this thesis. It will also be a tool for the community to understand more about their knowledge concerning the environment and natural resources.

Chapter 5: Present the discussion on my findings in view of the theories of indigenous knowledge, and my concluding remarks, followed by a list of references.

CHAPTER II: THE MISKITO AND RAMA INDIGENOUS COMMUNITIES OF THE CARIBBEAN COAST OF NICARAGUA.

Introduction

The remote Nicaragua Moskitia is a vast area which contains intact Caribbean lowland forest and is home to the Miskito, Rama, Creole, Sumu indigenous groups and also some Garifuna communities. This area is characterized by being rich in natural resources. Today 8% of the national population lives in this area which is 42% of the Nicaraguan territory.

The Miskito are by far the largest indigenous group. When first encountered by English traders in the seventeenth century, the Miskito were restricted to the Sandy Bay and Cabo Gracias a Dios district. The majority of the Miskito lives in villages and towns in the northern autonomous region. They practice hunting, fishing, forest product extraction, mining and subsistence agriculture.

At one time the Rama probably occupied the entire coastline between Bluefield's and the present day Costa Rica border, as well as a substantial part of the hinterland. Today, however, they are diminished in numbers. Their largest community is Rama Cay, a densely populated island on Bluefield's lagoon. There are also a few hamlets in the interior along the Kukra rivers, Corn River, and also along the coast south of Bluefield's lagoon at Cane Creek, Wiring Cay and Punta Aguila⁸. The great majority of the Rama population no longer speaks the original Rama language.

2.1 The Miskito of Sandy Bay

The Miskito are supposed to have originated from rainforests of South America. This can be concluded from their language, which is very similar to the dialects of the Chibcha family. The name Miskito could have been derived from the word

⁸ The Rama language now is only spoken in Punta Aguila by the elders of the community, which is densely populated by Ramas.

“Mosquete”, the guns of the British settlers. The details of their history are not very clear. The Miskito themselves claim that they have been in the region for ever, but ethnologists and anthropologists have found evidence that the Miskitos are a mixture of local habitants like Tawahkas with European and African Settlers, having their origin in the 17th century (anonymous, 200?)

The Rio delta was inhabited by indigenous peoples before the conquest. The 5 communities that the population was composed of don't have more than a 120 year history. In 1820 a traveler observed that the Indians that lived on the river line of the Rio delta were subordinated to the Miskito. These Indians, possible Prinzu or other tribes of so called Sumu, had assimilated the Indian culture or traveled to the interior, when the Miskito arrived from the north and founded the actual community

Oral history recognizes that Sandy Bay Sirpi was founded around the year of 1870. The founders emigrated from Dokura and Sandy Bay Tara. Other tribes were integrated from another village called Karaslaya, 15 miles south from Sandy Bay Sirpi. A small percentage of the population of Sandy Bay is dedicated to agricultural activities, harvesting rice, beans, corn etc. Those who are dedicated to this activity for shorter periods of time, travel a distance between 8 hours or three days in canoes, (Paiz 1988), from their community with their entire family. The men that are fishing, (more than the 60%) commutes every week, beginning Monday and returning in the afternoon. During this period the women are engaged in domestic and communal activities; attending visitors, looking after their kids and other home improvement activities.

2.1.2 Population

In Sandy Bay Sirpi, the total number of inhabitants is around 1,434 people, with a total of 241 houses. Table (No.1) below gives a brief description of the Sandy Bay population.

Table No. 1 Population of Sandy Bay community

Inhabitants	Women	Men	Children	Total houses
1,434	366	355	713	135

Source: Corredor Biologico del Atlantico (CBA 2003).

90% of the 241 houses in the community have wooden floors and concrete walls. 20% out of the houses have roofs that are made of palm leaves⁹; the rest have roofs made out of zinc.

2.1.3 Location

Sandy Bay Sirpi is part of a group comprising 5 communities in the Rio delta. The closest neighboring community is Karawala, 6 km away. It takes 20 minutes to reach it by panga or 1 hour and 45 minute walking. The distance from Sandy Bay to the Bluefields regional department is 108 km and it requires 3 hours of travel in panga or two days in passenger boats. Sandy Bay have regular transportation to Bluefields twice a week. This makes commercialization of their products difficult to achieve. The travel cost is also high, C\$ 250.00 cordobas one way. This is very expensive relative to the income of the population.

2.1.4 Leaders

This community has their own leadership, formed by members of the community. This group decides and imposes rules and regulations for the community in accordance with their traditions and values. This group consists of elders and resolves all conflicts within the community. The members of the group are elected among community members. As a group, they have extensive knowledge about the entire community. They are respected and represent the community in any decision- making. The Group, which also is called COYUL, help decide over important aspects of the community development.

The mayor's office also helps co-ordinate different activities with the leaders and the church for development purposes in the area. The mayor office is located in Sandy Bay and share all the responsibilities for the other communities. All projects are coordinated by th mayor office. This office main purpose promote development project in the area with the participation of the elders and the churches

2.1.5 Ecosystem

Sandy Bay is located in a natural environment that can be described with reference to tree types of the ecosystem. These are Humid Tropical Forest, Sabena and Lagoon. The humid tropical forest is characterized by its exuberant vegetation. The forest is extremely productive, but the majority of its energy and its nutrients are stored in the vegetation. The soil is poor in nutrients, especially when the forest is cut down and no reforestation takes place there. The humid tropical forest contains a huge variety of species of flora and fauna. Among the species, timber is mostly used for economic purposes (e.g. Rose wood).

The Sabena an open area of natural pastures with place for occasional pine, (*Pinus caribea*), that grows naturally (Paiz 1988).

There are several lagoons in the vicinity of Sandy Bay. The most important are the South Lock lagoon, the Ebo mouth and the Top Lock lagoon. The ecosystem contains abundant aquatic and terrestrial life, but the diversity of species is relatively low. One part of the marine life is located in the lagoon and the ocean i.e. white shrimp, which emigrate from one lagoon to another for the necessity of reproduction and water salinity. The cays, coral reefs and shallow waters near the coast can be considered as a completely different ecosystem. The species with the most economic importance are lobster, (*panulirus argus*), white shrimp (*Penneus schimittii*), green turtle (*Chelonia mydas*) and drummer (*Diapetrus rhombeus*). It is important to mention that the

⁹ The palm leaves (*Elaeis guinensis jacg*) is well known in the community and well used by them. Traditionally palm leaves are used to construct houses.

economic activities of this community are principally the fishing taking place in the Caribbean Sea, in rivers and lagoons.

2.1.6 Health

The community of Sandy Bay Sirpi has a small health center. This is attended by one doctor and three nurses. One of them is contracted by IDSIM (Institution of Social Development of the Moravian Church) and the other from the Ministry of health (MINSa). In the community actually there are five health brigades. The health center is made out of concrete and it is in good condition. The diseases that dominate in the community are malaria, dengue and diarrhea. A principal problem of the health center is the lack of medicine. In co-ordination with the neighboring community, (Karawala), the health center possesses a panga which it is used in case of emergency.

2.1.7 Culture and tradition

This community practices different religions. These are Moravian, Anglican, Baptist and an original Miskito church (Magia Miskita). The majority of the population is bilingual and in some cases speaks 5 different languages; Miskito, Sumu Twanka, Sumu Ulwa; Creole and Spanish. The majority of the inhabitants of Sandy Bay Sirpi, speak English or Spanish beside their traditional Miskito language. The elders of the community prefer to speak English, the language of their primary education. The population that is less than 40 years of age and with little education prefers Spanish. The historical culture is manifested in the fabrication of craft (artesania) of coral and wood.

2.2.1 The Ramas of Punta Aguila

The Rama Indians are an indigenous group of approximately 1200 people that inhabits the southeastern part of Nicaragua. Most of the Rama, (approximately 900), have their primary settlement on a small island of Rama Cay, in the southern part of Bluefields

and in San Juan del Norte. The Ramas are distantly related to the Miskito and Sumu neighbors to the north. The Rama subsistence lifestyle is rooted the rich marine life of coastal Nicaragua, of which they have extensive knowledge.

The Rama build a type of boats called durries. Because of their skillful navigating and knowledge of sea conditions, they have for a long time been recognized as the best seamen on the coast. Many Rama families have their home on Rama Cay, but spend a large part of each year at their agricultural plots in the middle of the upper reaches of the Kukra, Dakuno, and Torsuanni Rivers. The lower reaches of the rivers are mostly lined by silico (yolillo palm) swamps, and are unsuitable for cultivation (Muller 2000). The differentiation between the Rama of Rama Cay and those living further south along the mainland dates back a few centuries to when a portion of the Rama moved northward from Punta Gorda region to Rama Cay. While the differences between northern and eastern Rama are not as pronounced today as it used to be, it is still noticeable. Although the younger generation of Rama in the Cane Creek/Punta Aguila¹⁰ community uses Creole English as first language, a number of them still use and understand the original Rama language and a number of the community elders still use it regularly. In both parts of the community, up to the creek and along the coast, hunting provides an important source of protein, as is the case elsewhere. The most important hunting in these communities appears to be wari, with other hunted animal included sahino or collared peccary (Muller 2000).

The community of Punta Aguila is well recognized for its tranquil way of living. The community is facing the open sea towards San Juan. This is a great advantage since facing the open sea and the fresh wind of the ocean there are no mosquitoes.

Punta Aguila is a poor community in all terms.

2.2.3 Population

¹⁰ Cane Creek is a small community belonging to the Punta Aguila, 5 minute transport and communication is very fluent.

The population of Punta Aguila is around 72 inhabitants, 60% of which is children. Miss Paula is the oldest and original Rama living in the Punta Aguila community. She is well known as “aunty Paula” by many who lives in and visits the community. She neither speaks nor understands other languages other than Rama.

2.2.4 Leaders

Punta Aguila is a well organized community. One member of each community is represented in the committees for Monkey Point or Cane Creek. The leadership structure consists of two representatives to the regional government of the Atlantic Coast Autonomous Region. The committees also have a secretary, and two vocal (listeners). The leadership is very active and has been a part of all decision making towards the development of the community. A major confrontation engaging the leaders of this community is the intruders or colonizers. These are people invading their traditional lands. At the moment the conflicts over land claims are very intense, as the colonizers also claim that the land is part of Nicaraguan territory and that they have the same right to use it as the Rama. The areas of Rama territory that are currently being invaded, such as the headwaters of streams Wiring Cay and Cane Creek, are the places that have always been inhabited by a number of spiritual creatures from Rama cosmology.

2.2.5 Location

Punta Aguila community is located approximately 44 km south from Bluefield’s, and about 7 km south from Monkey Point. A few km further along the coast lies Bar Mouth of Cane Creek. At some point the Rama Cay community recognized these communities (Cane Creek, Punta Aguila and Wiring Cay) as the real Rama, because they had little interaction with the city of Bluefields and other communities. The community of Punta Aguila is facing the open sea. Traveling on the open sea to Bluefield’s takes you 2 hours by panga, and by canoe the entire day depending on the weather.

2.2.6 Ecosystem

The landscape of Punta Aguila is beautiful, especially when you approach from the south by sea. Huge forest and wetlands contain Papta, Pijibaye (suopa), yolillo, Cassava (yucca), Plantiin (plan-in), Cane and Pineapple. The forest is the source of products and an important foundation for the community income. The mangroves in this community provide essential habitats for marine species. The open seas especially in the vicinity of the offshore cays make fishing a daily subsistence activity for the people in the community. All hours of the day you can see them fishing. “Long Beach” is one of the most exuberant beaches that belong to the community. This is now disputed by a foreigner, who claims that the beach is his property by an earlier (illegal) sale.

2.2.7 Health

The Health Ministry is not present in this community. When they take ill, the people must go Monkey Point nearby, where a nurse is stationed. But medicine is scarce and people sometimes go directly to Bluefields. The condition of the small health center in Monkey Point is chaotic, which in many cases make it difficult to attend to emergencies. In Punta Aguila there is still the tradition of bush doctors and midwives who attend all kind of sickness from the community without expecting any payment. The community’s requests to the regional government and different institutions concerning a health center in the community have been in vain.

2.2.8 Culture and tradition

The Rama of Punta Aguila speak the Rama language. They also speak the creole-rama, which is a broken English and Spanish. The elders of the community are conserving the Rama language and working hard to transmit the knowledge and the way of speaking to the younger generation. There is no religious institution in this community, but it is said that they are Moravian, just as the rest of the Rama from the Island. There is one small pre-school partly financed by Uraccan/Tromso project. One teacher is teaching in Spanish. With the help of the parents also teaching the Rama

language. The houses on the island are made of palm leaves and wood, with no windows or doors.

2.3. Indigenous legislation National and Regional

Indigenous people's desire to protect their cultural identity and to preserve aspects of their culture based in ancestral lands and resources, are receiving increasing recognition within the international development community. Some countries have experienced conflicts between the interests of indigenous people and the dominant culture. These conflicts most often relate to the control over and exploitation of natural resources in the areas that indigenous peoples claim as traditional domains. Appropriation of ancestral territory or resources in these territories by governments or external interest is often justified as a part of economic development and growth. Indigenous people's sparse occupation of large areas of land and no-intensive use of resources often is characterized by external interests as economic inefficiency or lost opportunity (ADB 2003).

Indigenous people trying to reclaim the lands of their ancestors are facing violent opposition from landowners and companies exploiting natural resources. Nicaragua has been facing a true demand from the indigenous people, as in the "Awas Tingni" case. This has been the first case where indigenous people have taken the lead to defend their lands. The "Awas Tingni" human rights complaint was originally submitted to the Inter-American Commission on Human Rights by the Indian Law Resource Center. The Center is an indigenous rights law firm based in Helena, Montana (USA?). The complaint charges that Nicaragua approves destructive logging concessions on indigenous communal lands without consultation with or agreement of the affected communities. Hence, Nicaragua failed to carry out its legal obligation to demarcate and legally secure indigenous lands. The complaint requests a ruling from the court requiring that Nicaragua compensates Awas Tingni for encroachment on its land. If the case is won on this merit, Nicaragua will be required to establish a formal process for demarcating indigenous lands and for protecting indigenous rights to those lands.

The Miskito, Rama and Mayagna (Sumu) are the original indigenous people that have historically populated the Nicaraguan Atlantic Coast, preserving their languages, customs, culture, and use of their communal lands. These indigenous peoples are organized into distinct, autonomous communities, each one with its own traditional social and political institution. The Atlantic Coast indigenous communities have a communal property system in which the land belongs collectively to all members of the community. They use the land, forest and rivers for subsistence agriculture, hunting and fishing. A preliminary step is now underway to demarcate indigenous lands in Nicaragua. Made aware of the OAS proceedings by Indian Law Resource Center attorneys, the World Bank offers a financial aid package to Nicaragua on its development of legislation to demarcate indigenous land. With much fanfare late last year, Nicaragua's president proposed a legislation that would provide a framework for indigenous land demarcation. Unfortunately, however, the president failed to include indigenous communities in the development of this legislation and failed to provide adequate protection for their lands. The legislation will require immense revision and negotiation before it is acceptable to the indigenous leaders. This type of response on the government's part, nonetheless, indicates the importance of the Awas tingni case in the Inter-American Court (Anaya 2000).

The autonomy for these communities on the Atlantic Coast of Nicaragua has been recognized by the central government, as it says:

“That the new constitution order of Nicaragua establishes that the Nicaraguan people are by nature multi-ethnic; recognizes the rights of the Communities of the Atlantic Coast to preserve their languages, religions, art, and culture, to use and enjoy the communal waters, forest, and lands, to create programs which further their development and ensure the rights of these Communities to organize themselves and to live in the ways which correspond to their legitimate traditions (law No. 28).”

CHAPTER: III MARINE RESOURCES, FISHERIES AND MANAGEMENT

3.1 Marine Resource

Although fishing has long been a primary source of food for the domestic market in Nicaragua, the rich fishing grounds of the Caribbean began to be exploited for export of shrimp and lobster in the 1980s. In 1987 loan by the International Development Bank (IDB) allowed the country to double its fleet to ninety boats. However the damage by Hurricane Joan in 1988 to the processing plants and the United States trade embargo kept production levels far below the potential catch. Restoration of the trade embargo in 1990 did produce exports, and the government hoped that the fishing would provide a significant share of export earnings in the 1990s onwards (anonymous No.1 no date).

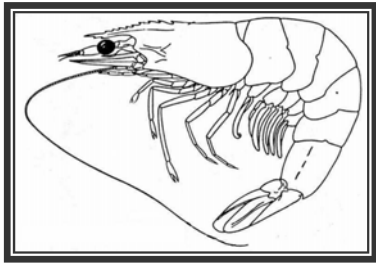
The Atlantic Region of Nicaragua has an inshore fishery potential that is estimated to \$ 50 million per year. At present much of this is un-harvested, or harvested by pirate boats with negligible benefits to the local economy. Indigenous leaders in Nicaragua have identified the development of a sustainable economy and land tenure strategy as the top priorities of the region. They have been adamant that they do not wish that the development to stop while they are finalizing their strategy, because they need the income, but they want to have the systems put in place to ensure sustainable use of their resource (Dunn 1995).

Nicaraguas fishery is classified in three groups:

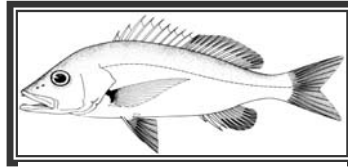
- Shrimp from the Pacific and the Atlantic
- Spiny lobster of the Caribbean
- Scale fish on both littoral (Pacific and the Caribbean) on continental waters.

Predominantly, the scale fish is largest in terms of volume landed and exported, but in value the lobster followed by the shrimps are most important. The importance of scale fish is due to the high social impact that it has, knowing that the majority of the fishing activities is due to the artisanal sector.

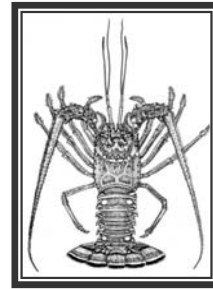
Figure 1: Important species in the Nicaragua fishery



White
Shrimp



Scale fish



Lobster

This fishery of the Caribbean is a coastal fishery and also by industrial fleets according to the Nicaraguan fishing platform. The main species of Caribbean Lobster: Spiny Lobster, *Panulirus argus*. The principal fishing bank is located around the Pearl Cays and Corn Island. These areas are fished by national, international and also a considerable artesanala fleet. Pacific Lobster: is the Green lobster *Panulirus gracilis*. It's appeared as accompaniment in the fauna and in gillnets, in occasion it is caught by divers.

The scale fish fishery is oriented around species such as Snook, Drummer, Shark, Jew fish, snapper, Stone bass etc. In 2000 Nicaragua obtained 2000 MT for the Mackerel fishery.

Table 2: Potential of some marine resource in Nicaragua:

Name	Biomass	Sustainable yield
Shrimps	10,000 MT	3,500 MT
Lobster	9,000	3,000
Sardine	42,000	26,000
Jack	11,000	6,000
Drummer	46,000	6,000
Stone bass	50,000	8,000
Green week fish	45,000	6,000
Snapper	75,000	10,00
Total	288,000 MT	64,600 MT

Source; MIFIC(2003)

These species mentioned above are the priority species, which have been exploited by the different artisanal and industrial fleets. The Caribbean Coast of Nicaragua has 308 species of fish, including 20 species of shark. Only 15 species are actually exploited for exportation and approximately 9 species for the local market the rest, 287 species are not interesting in terms of exploitation. According to CBA (2003), the management plan should be conducted to those species with high value and exploited in a rational way. The species with lowest value in the market will help maintain the balance of the marine resource, with the participation of all users groups to improve a sustainable fishery.

The Atlantic Coast has a great potential of natural resources. The exploitation of these resources has contributed in a substantial way to the national development. The exploitation of the fishery has been one of the principal issues during the last few years. According to Regional data, the Atlantic Coast has reported 36% of the national production of fisheries with a volume of 12 million pounds (of a total of 38 millions) (CBA, 2003). Due the over exploitation of the marine fishery, the Administration of fisheries and Aquiculture(AdePESCA)) has imposed a veda (off-season closure) of Lobster and Shrimp. This is to protect the species during the spawning period. The

fishermen will not be able to participate in the fishery during a three month period. Many companies have proclaimed that the period of the veda is too long.

3.2 Marine Ecosystems

The marine platform of the Caribbean Coast of Nicaragua is a continuation of a continental mass. The water is not deep (18-22 m) with a green blue color. Three of the most productive ecosystems of the planet are on this littoral. The biodiversity of this ecosystem is rich. The majorities of the estuaries and semi-close go out first to the lagoons coast. This type of ecosystem is the principal point for the recruitment of the different species in the larval stage such as; Brown shrimp, white shrimp. The balance for this population is fundamental for the economic use in the open sea.

This ecosystem has a high economic value because it produces habitats for many species of commercial interest. Furthermore it also permits the recycling of nutrients. This ecosystem has been used by indigenous people from ancient times, where their main activity has always been their artesanal harvest.

3.3 Fishing industry

The communities of the Atlantic Coast of Nicaragua play an important role in the processing and marketing of marine products. Fishing plays an important role in this aspect, even though this activity often is combined with other activities.

In Nicaragua there actually existed 23 different processing plants. Out of 13 plants that existed in the Caribbean, 11 are currently operating, and out of the 10 plants on the Pacific, all plants are operating. On the Caribbean, the processing plants; Oceanic, CAf, PASENIC, located in the port of Bluff¹¹ and Corn Island, which is dedicated to

¹¹ Bluff is an island located 10km from Bluefields, to reach there the only way of transportation by out board engine and canoes.

the processing of shrimp and frozen lobster, Corn Island accumulated 50% out of the 148 thousand pounds of its frozen capacity, the other 50% is shared between the other 10 processing plants in Puerto Cabezas (Rivera 2001).

Exports from Nicaragua were \$ 604 million in 2003, which is more or less the same level as in the two previous years. Although traditional products such as coffee, beef, lobster, shrimp, gold and sugar continued to lead the list of Nicaraguan exports, the only product that grew steadily in the period of 2000-2003, was beef exports: Fishery has been an important earner especially for communities on the Nicaragua's Atlantic Coast, as well as for shrimp farmers in the northwestern Pacific estuaries. The main market of exportation is the United States of America (Luftman 2004).

3.3.1. Industrial Structure; Artesanal and Industrial

Figure: 2 and 3 Artesanal fleet and Industrial fleet.



The lobster fishery of the Moskitia, Atlantic Coast of Nicaragua, is divided into what are locally called the “artesanal” and “industrial” sectors. The artesanal fishermen work on a small scale, from open boats of 10 m length or less, powered by sail (durries) or by outboard motors or small inboard diesels. They often operate in small partnerships, sharing investment, labor and revenues. In contrast the “industrial” sector typically uses decked steel vessels of 12-25 m length, powered by diesel inboard engines of 50-400 hp and the participants operate as small businesses, with investors assigning a captain/manager to vessel (Arcadis 1999). There is a permanent crew to handle the boat and in the case of the dividing, each accommodate a group of divers and boatmen whose income depends on their individual daily catches. “Industrial” boats focus on lobster and shrimp, while the artesanal sector targets lobsters, turtles

and also fish. In both the artisanal and the industrial sectors lobsters are caught by two different methods; diving and trapping.

According to the Ministry of Foment Industry and Commerce (MIFIC), there was no new project or investment into the fisheries sector in (year) even though there are firms that are exploring the possibility of exploiting tuna, knowing that the decrease of landing in Lobster and shrimp have been effecting the fish population. As MIFIC mentions there have been some studies that reveal an overexploitation of lobster and shrimp (Alvarez 2003).

There is no evidence that the executive or legislative branch of the government actively impedes investments. However, corruption in the judiciary often has a discriminatory effect against individual projects. Dispute resolution can be especially complex in the Northern and Southern Atlantic Autonomous Region, where most of the country's fisheries, timber and mineral resources are located. In these large districts, making up more than the third of the national territory, the division of authority between the central and regional autonomous governments is often murky, and local judges often act without effective oversight (Luftman 2004).

3.4 Fishing Pressure

It is recognized that an excess of fishing pressure in different species on Nicaragua's continental waters is may be excessive and can treaten the the ecosystem. The fishing pressure is threatening the biodiversity. This can cause the loss of the integrity of the fish population. The principal factor of the fishing pressure is constituted by the fishing industry, national and international, which in many cases don't respect the veda and the three miles zone, inside which they are prohibited to fish. Another factor that is creating a lot of damage is the shrimp trawling. The by catch of other non targeted species is also a threat because there is no strategy of catching selective species, and also no selective technology.

According to MARENA, licenses have been given out without any kind of regulation. The lack of regulation of the different fleets operating on the Caribbean and the different policies of fishery law, which is not fully implemented, are some of the causes of the fishing pressure. All communities have felt the impact of loss of species and they blame the government and the different companies operating on the region. Education is needed for the population, especially how to appreciate the biodiversity and to know the effect of human activities. The extensive platform of Nicaragua's marine environment and the resource scarcity makes control difficult. While the Coast guard and the Nicaraguan police have been patrolling the continental platform to avoid the illegal fishing, their success in preventing such practices is low. The magnitude of lost produce by the illegal fishing may be as much as 30 millions dollars annually (MARENA 2004).

3.5 Conflict of foreign fishing international agreement

There has been a long dispute (see map fig, 2)) between Nicaragua and Colombia, and also between Nicaragua and Honduras concerning the sea territory around a great numbers of island where the ground is very prone, causing a lot of illegal activities. The lobster is very valuable for these underdeveloped countries. Fishers constantly fish in their neighboring waters; Honduran and Colombian fishers are constantly caught fishing illegally in Nicaraguan waters, sometimes resulting in armed conflict. Vice-versa, Nicaraguan fishers also fish illegally in Colombian waters, because the fishing grounds there are very productive, as well for lobster fishing. This leads to conflicts between Nicaragua and Colombia, and each country claim the fishing grounds as their own (Monnereau 2003).

Figure 4. Map of dispute area



Source; International Boundaries Research Unit, University of Durham¹²

Nicaragua, Colombia and Honduras Territory dispute

Nicaragua requested that the ICJ, (International Court of Justice), determine the course of a single maritime boundary between areas of territorial sea, continental shelf and exclusive economic zone, (EEZ), appertaining respectively to Nicaragua and Honduras, in accordance with equitable principles and relevant circumstances recognized by general international law as applicable to such a delimitation of a single maritime boundary (Rebecca 2002). There haven't been any agreement on the International level for fishing rights in these countries.

Nicaragua banned Honduran and Colombian trawlers from its waters after a border conflict over Caribbean fishing grounds among the three nations. Out of 250 trawlers authorized to fish in Nicaragua waters, 46 are Honduran and two Colombian. As

¹² [http://www.american.edu/territorio sea dispute between neighboring countries, Nicaragua, Colombia and Honduras. 2004](http://www.american.edu/territorio%20sea%20dispute%20between%20neighboring%20countries,%20Nicaragua,%20Colombia%20and%20Honduras.2004)

Nicaragua refutes with neighboring country what in game is the maritime space that contain, the continental platform, soil and sub-soil its richness and the economic zone. Actually Nicaragua has released 100 Honduran fishermen it had held for up to six months after they were allegedly caught fishing in Nicaraguan waters. (Anonymous No 2, no date)

3.6 National and Regional Regulation on fishing

The implementation of national and international regulation is a challenge for the Nicaraguan regime.

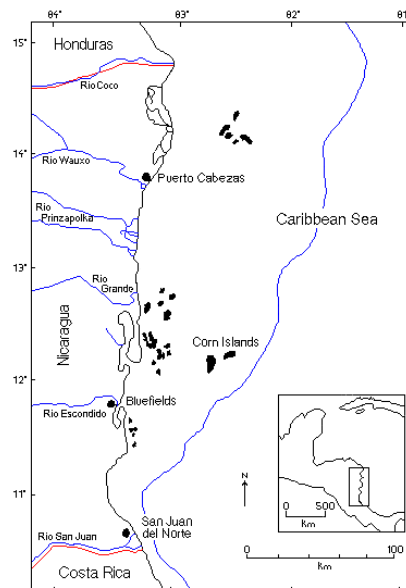


Fig 5. Map of Nicaragua's Caribbean Coast.

The line in the ocean is the edge of Nicaragua's continental shelf (Source: UNESCO, 1994)¹³

On the fishing ground of the Caribbean Coast, the lobster is currently the most valuable single-species fishery. There is a concern for the future sustainability of this resource and other fisheries resources. There is a wide spectrum of people interested in the current activities and future of the Caribbean Coast lobster fishery. The illegal fishing is believed to lead to a larger decline than the figures of total landings and

¹³ Unesco, 1994; environment and development in coastal regions and in small island; paper nr.3. www.unesco.org/csi/pub

average size might suggest (Arcardis 1999). The development of the fishery has been greatly influenced by the political turmoil of the government. Changing fishing policies have continuously influenced the fishery, and led to an increasing industrial sector, both national and international (Monnereau 2003).

The closed season for lobsters in Nicaragua has not been enforced for the national fishermen during the last five years. While the idea of a closed season has widespread support, including among the artisanal divers themselves, a shortage of work in the region and the cultural disinclination to save makes it difficult to implement in practice. A closed season is in any case a way of reducing total effort and increasing efficiency, rather than a method of protection of breeding animals or promotes recruitment. A new veda has now been installed for the Caribbean spiny lobster, with the support of the government and neighboring countries, (Costa Rica, Honduras, and Colombia). This veda began the first of April and will last until the 30th of June 2005. To this veda there are also regulations that impose strong sanctions to all those who violate the rule.

3.7 Government policies to conserve the marine resources

The constitution of the republic of Nicaragua contains as a fundamental principle the right of the Nicaraguans to dwell in a healthy environment is a part of their social right. The state has the obligation to preserve, conserve and recover the environment and the natural resources. One key effort initiated by the government of Nicaragua has been to introduce different criteria regarding the sustainability in the utilization and management of its natural resources. This was the formulation of the environmental action plan, which formulated strategies and guide lines for the development and wise management of the marine resources.

The particular objective of the fishery policy and aquaculture, is upholding the sustainable yield of the marine resources and the aquaculture production. By the optimization of the fishery uses and traditional fish farming, the promotion of non-traditional fishery and preservation of the quality of the environment and its ecosystem it also aims to improve their rentability of the economic actors, and promote their

direct or indirect involvement in this sector. Some instruments that will be used for the measurement on the impact of the fishing activity will be; the increase in the annual data of exportation of fishery products, the diversification of markets for consumption per-capita of fish products, the increase of income generation. These parameters of the fishing policy are what Nicaragua is basing its improvement of its management to conserve the marine resources.

During the last years the pressure on the ecosystem has increased, followed by different processing plants, co-operatives, which also has increased the non-traditional way of catching (Blanco., et al 2004). The increase in the population and new technology has led to the non-sustainable extraction of resources. The different fishing grounds of the Atlantic actually have been over exploited..

There have been different conflicts for the uses of the resources especially between communities, Nicaragua and other neighboring countries. The indigenous communities are poor and unable to invest in trapping gear. They therefore depend on the low capital input diving industry. Other ethnic groups, like the creoles blame the divers for ruining the lobster stock and for emptying the lobster pots at sea. The Ramas are also complaining of the invasion of the colonizers entering their territory, engaging in agriculture activities and demarcating lands without their consent, at sea the industrial fleets are trawling in the tree miles zone, where it is prohibited to fish.

The Nicaraguan Caribbean Coast is composed of different ethnic groups and as such presented with a huge problem for defining and agreeing on different goals. Many institutions, including the universities have been working closely with these communities to define strategies of development towards their needs. But some times indigenous peoples risk being pushed into conservation projects that are not directly in their own needs. Institutions responsible for government interaction with indigenous peoples do not always possess the social, legal and technical capabilities in order to carry out proposed development activities. Controversies emerge as institutions impose their rules in some of these communities on the Atlantic Coast.

As Joseph (2002) mentions, decentralized approaches to natural resource management, of which co-management is one type, have received great attention from government around the world in recent years. This is a response to the failure of centralized management and the need for improved performance in resource conservation. Thus co-management of natural resources, and approach within development planning, empowerment and capacity building, due to consciousness of the limitation of the natural resources may be an important factor in the development of rural communities. One important point is that members should work together and share responsibility for development and management as a team. Even if the development is at the community level where traditional management is conducted, external management and advisors is also needed. But they must remember that there is a trade off which takes place and fisheries development fails if the communities fail in working together. If community members become greedy and selfish, their activities are impossible to control.

CHAPTER IV: INDIGENOUS KNOWLEDGE OF THE MARINE ECOSYSTEM

4.1 Introduction

This chapter presents information on indigenous knowledge of marine ecosystems. The information was gathered during my fieldwork in July and August 2004. When I first began my field work, I was quite nervous about what I would be facing in these communities and their attitude towards me. I knew from the beginning that it would be a challenge for me to accomplish my objective. When I arrived at the wharf of Sandy Bay, so many faces looking right at me, asking the question who is he? But when I first smiled, I got some smiles back in return and that made me feel quite safe.

That night, I first looked for all the leaders of the community and sat down with each one and explained to them the objective of my visit. At first I noticed that there was a total silence as I began explaining about my research theme. They were murmuring in the Miskito language and I was curious to know what they were saying. Many were confused and relevant questions emerged such as; what do you want to know about us, more than what others already know? I reacted calmly and smiled, and then answered, convincing every one of my intentions.

During the night there would always be a lot of noise; music with loud volume from all houses of different sizes. This community is well off compared to the other neighboring communities. It has good infrastructure, hotels, discothèque and a small movie theater made out of board. As this community is located facing the open sea, you can admire the tranquility when walking on the beach and admire people, meditating, enjoying the bright moon light. When I approached an elderly man, and began asking some questions to settle my curiosity.

As I asked Mr. Reynaldo Mc Crea, 53 years old; what the stars means to you in your days; he replies, bountifulness of food and happiness, but the sea gives and takes away

also, we can not predict with certainty about nature because everything is changing so fast and then he looked at me and smiled. Sitting there with this man was indeed inspiring; the roar of the blue sea, the long beach with brown sand.

“As he continues, times are changing fast and so are we, I don’t know what this world has for us more in the future, because I see my people are desperate to conserve nature and the little we have. As the wind blow on your face, you can feel a free sensation of freedom, its mean don’t worry about tomorrow.”

Men go out to fish early in the morning despite the weather. At midday a lot of people will gather at the seashore, to see the huge turtle that most people catch. Everyone helps, carrying it to the house and the helpers are rewarded with some pounds of turtle meat in gratitude. The majority of the houses are made of concrete, wood, and palm leaves. In many cases, I saw the women teaching kids the meaning of different items, stories and sayings, about their ancestors;

“Your fathers father, use to be a good hunter, he could understand the sound of the trees, read the footprints of an animal and predict the weather for the following day very well. Once he said; look at the sky, focus on the stars, there are four stars which show the four corners of the earth, each one has a strong meaning, the north start is about the people, south start about weather, east start production from the sea and land, and the west start is how the world is changing and we must secure our life and the life to come.”

Some men will gather in groups and discuss the day’s events, and how the fishing activity was, how much they caught, how much they profitted, and planning for a better result the following day. But the conversation was in Miskito, so it was hard to understand.

“A man mentions, I will go out early when the fish are a sleep so I can surprise them, others mention, that’s not the way, let us listen to the wind and see to which side it blows and to prepare for a better harvest. One of the men replies; I found that the key

were the fishes, them love to go and there I will be waiting for them, I promise anyone of you that tomorrow will be the best day in my life, today I wasn't my lucky day."

The Ramas of Punta Aguila are a quiet people, but with a good sense of humor, especially the women, who always have a silent smile on their faces. As I approached the ladies, they will hide in their houses, spying on me through a window and not making a sound. First I settled myself in a well known house in the community, (Don Jose), and he helps me to get in touch with the rest of community. They decided to attend a brief meeting with me. I was surprised to see that the majority of people turning up were men and that the ladies remained home. This community has no infrastructure, living under extreme poverty.

During the night, a complete silence emerged. I could not hear a sound, not even from mosquitoes. Many of the inhabitants will go to the beach to bathe and have fun. Inside the houses you will hear no talking and everyone goes to sleep early. In the morning everyone go into the woodland to work on the plantation, (agriculture activities), and they make canoes, which is also a hobby with all the kids. As I sat and talked to some of the inhabitants, I observed that they are aware of many things, but they just don't like to express it. Their favorite dish is rosefish with cassava (yuca).

Many men and women will talk about the sea and the change of wind, what it brings for tomorrow. They know the sea just as the palm of their hand; they can tell fish stories and tiger stories in such an outstanding way that amazed me. They travel the sea with the entire family in small canoes, and they sit steady in it, as the waves of the sea emerge. They will just smile at it. It is an obligation for the kids to follow their father's and mother's footsteps wherever they may go. The men usually talk about the land and the scarcity of food in the sea, fish that they don't fish anymore, the colonizer issue, selling of islands etc....

The environment that this community lives in, gives you an extreme out look of what life's was in those days of the Rama, before they gathered in large settlements like Ramas, and the cosmo-vision towards nature and the ecosystem was known. These communities also hunt during the night, since they only fish in the daytime. They

divide the time between fishing, hunting and agriculture. For them time is precious. There is a unique understanding of nature and the interaction and the meaning it brings to them, especially in days of crisis and hunger.

Listening to the story, Mr. Harold says:

“In my early days, my father used to tell me about the sun and the rain; when ever the sun rises early morning we will have some trouble between the sun and the rain, as the rain began to rise to the highest point, just in a second it began to get dark, so started raining very hard, storm, storms, and at the same time the sun is hot like hell. It happened as follows, if the sun won we will have sun hat for 2 days very hot, and if the rain won we will have heavy storm for 2 days, meaning that they will celebrate victory whoever won, but that is god work, no men intervene.”

The indigenous people of Sandy Bay and Punta Aguila all share a common problem and also their knowledge towards the natural resources. The fishing grounds of those communities are part of rich ecosystems with a great diversity of species. Fish from the lagoons are used for consumption. Fish from the sea is utilized for commercial purposes, providing them with their daily income. There are a variety of species that are fished and sold to the different firms and co-operatives in the regions.

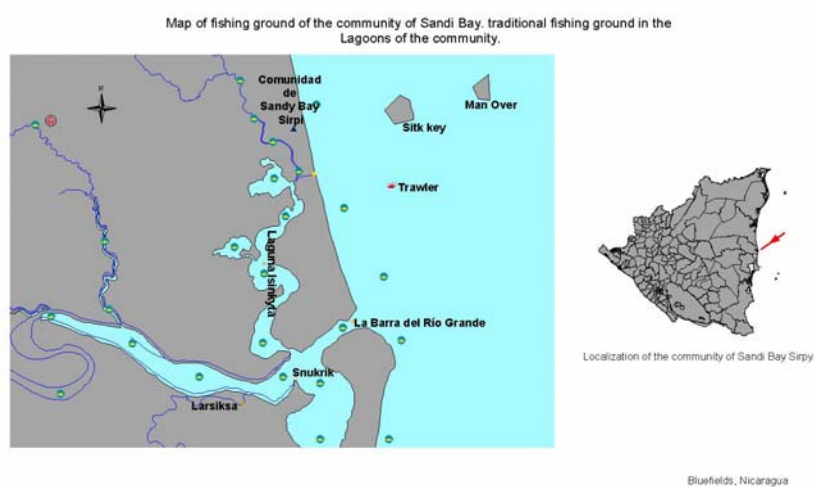
Some fishermen have their own equipment for the making lobster traps. Others are dependent on help when constructing those traps for personal income, employing workers from other communities. Sandy Bay is a more developed community with good infrastructure and with more opportunities than Punta Aguila. Punta Aguila is an extremely poor community with no infrastructure. Here people are more dependent on the forest and sea for income.

In Sandy Bay the management plan introduced by the government is affecting the fishing activities of the community, prohibiting the community to fish for turtle in time of veda, knowing that this species is in danger of extinction. This regulation is not well seen by the community, where people claim that turtle is a part of their tradition and income. Despite the regulation, people in this community fish turtle during the entire

year, with no restriction. At Punta Aguila this same regulation applies. However, there is no traditional turtle fishery in Punta Aguila don't fish turtle. Instead, they concentrate on lobster, fish and other species.

4.2 Fishing grounds of Sandy Bay

Figure 6: Map Sandy Bay S. fishing ground



The map shows the fishing ground of the community of Sandy Bay, including the lagoon and the ocean. The following names are the traditional names occupied by the community to identify the different fishing grounds where they fish by tradition. Sitkey', Man Over¹⁴ located on the ocean. La Barra, Snukrik, Larsiksa, laguna Isinkyta, these are located in the lagoon area. In the community the inhabitants are aware of the importance of the fishing, as Mr. Kenneth Garcia¹⁵ explains.

“We know that in Sandy Bay we are always fishing Turtle, and lobster as sea production, even if we don't have the material to fish the right way. We have a big lagoon and big creek but we are taking care of it, anytime we want something is just for the kitchen , some people ask why we do that, and I tell them we think on the other

¹⁴ Those cays (sitk cay and Man Over, are located on open sea, were they fish for lobster and other commercialize species.

¹⁵ President of the fishermen board in Sandy Bay.

day; we have fish but we don't molest it, and out to sea we have plenty fish, lobster and turtle, people mostly want. Example we don't catch big belly turtle as other people do, we let them go. So when lobster finish that is it. Nobody buys the fish from the lagoon, because everyone can go and fish."

The people of Sandy Bay such as Prinzapolka, Puerto Cabeza, Kara, Tara, Karawala, peoples from Bluefields and others invade and fish in the Sandy Bay territory and that this is creating a huge problem. Many have been captured by the police, but as Mr. Kenneth G explains;

"First time we use to have fish like rice, but since the thief them begging to come in our water we don't have that much. We used to haul seine on the beach and we used to catch a lot of fish, but now, if you do that you may just catch few. It is no use for us to catch the thief, when you do it, and you carry them to the police and explain to them what they had done with our fish, they just let them loose the next day and then we are in danger, so we put our law" meaning that they apply the community rules."

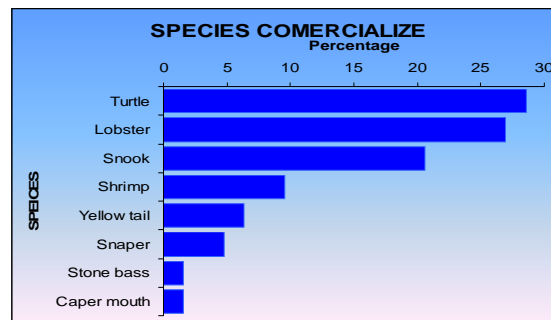
"We still know when fish will be in the sea and in abundance; in summer when it don't rain we know that them will be no lobster; but when it is raining a lot and very dark and full moon you will find no lobster at all and we manage that good, so we manage the time of catch."

Sandy Bay is a very rich community in term of fish resources, which has been one of the reasons why intruders arrive. They fish 24 hours daily, leading the resource to be depleted. The community members' mention that they use different fishing gears more effective than the traditional gears the Sandy Bay fishers. The Sandy Bay community has a special way of sustainable managing the resources. Sunday is a day when they don't fish, because it brings bad luck for the fisherman. Everyone is obligated to go to church instead of going fishing. They have to abide with the law of the community. They catch fish with lines in the lagoons from Monday to Saturday. As Mr. Alex William says;

“I have more than 20 years on the sea. I grow up in this community, and what I am seen now is so different, first I use to go out to fish at 8 am the morning and I bring a lot of fish home, but now if I need more fish I have to go out at sea from 2 a.m in the morning and if it is possible sleep out on sea and even so I still no get the amount of fish to sell nor to eat. This is a total crisis; we will soon die for hungry.”

On Sitkey and Man Over , there is a co-operative which buys all the fish from the artesanalal fishermen of the community of Sandy Bay and other communities in the vicinity. The price varies according to size. They mostly buy Shrimp, lobster and in a few cases scale fish, but the most relevant aspect is that there are no small credits in the community toward the development of the fisheries and the necessity to improve there fishing gears more effectively.

Figure 7: Species commercialized by the community of Sandy Bay S (% by quantity of landings).



The species that are commercialize are the species that have high value in the market. The percentages given in Fig 7 is calculated from the volume of fish by fishers. As we can appreciate on the bar the 27% of the product they catch of turtle is sold in the communities, and Bluefields followed by lobster (25%) wich is mainly sold to the firms and cooperatives in the region.

In Sandy Bay, turtle is the most important commercial species both because of its value and the traditions tied to it. Turtle is fished abundantly and the fishermen are not respecting the veda. According to MARENA, the indigenous people can catch the Turtle in time of veda, but it must only be for consumption in the community and not

for sale. But ignoring this the community also sells turtle to Bluefields and other communities during the veda.

4.3 Fishing grounds of Punta Aguila

Figure 8: Map of Punta Aguila fishing ground



The map of Punta Aguila describes the fishing ground of the community; St. Marie Creek, Duck Creek, Alligator Creek, Cane Creek, the Mountain of Christ Creek. The names are well recognized by the community. The fishing ground of the community is very rich in diverse species. The fish in the creek of the community is only used for local consumption, no commercialization takes place as Mr. Jose Castillo¹⁶ replies;

“The indigenous people in history describe that they had ever fish but not for over exploitation, but only fish for necessity in the community, first they use to fish with harpoon, actually we are facing the ordinary fishing with the colonizers, which are exploiting the fishery resources, without taking into consideration the respect of the indigenous people. Hunting now is problem for us, because the colonizers take over the land for agriculture activities, they will soon kick us out of the water and land.”

¹⁶ President of the Rama community board in Punta Aguila

The fishing ground is now claimed by some of the colonizers of the community of Punta Aguila. This issue raises questions and comments because of the land demarcation and the rights to the resources as part of Nicaraguan legislature. This is not well recognized by the community of Punta Aguila, as Reynaldo Mc Crea says:

“Now they want to negotiate with us to use the natural resources, but them (colonizers) only worried about exploiting the fish without thinking on tomorrow, they only think on them belly¹⁷. It is harder now to catch a fish than in those days gone, one thing I miss is the shrimp from the river because it is so taste but now you can count the fish in the lagoon, anyhow we are still fighting to maintain the little we have despite the war the colonizers are given us actually.”

The struggle for preventing the exploitation in the community is huge. Costa Rican fishers have complete access to the fishing activity in this community. Costa Rican fishers have more effective fishing gears, only leading the Punta Aguila community to more poverty. The Costa Rican fishermen sell their fish products into the Costa Rican territory, as Mr. Rito Hondgson observes:

“For me it is sad, I have my nets sometimes for a week and not even a fish I will have in it; this situation is getting critical; we will soon have no rights to nothing. I have live in this community now for more than 40 years, but I still have my beliefs of my older people, of how fish comes and go, specially when them don't know you, them can smell you and them will know if you are from the community or not.”

The conflict of land tenure is the most problematic issue in this community. The agriculture frontier, is leading to disaster in the community, regulation by part of the government hasn't been apply towards the agriculture frontier. From a local viewpoint, they see this as their right:

¹⁷ stomach

“We are also owner of the land and sea and have all right by law, so no one can not tell us what to do, we are Nicaraguans just as you all, we needs land just as you so you must share, and then we can live in peace.”

The indigenous land has been reduced, causing a crisis between the inhabitants of the Punta Aguila and Monkey Point communities. Leaders of these communities have taken a first step in taking this issue up by meeting the colonizers face to face and demanding that they leave the territory at once. The community has a huge Natural reserve, declared by the regional and National government. This is called “Punta Gorda”. With the increase of invaders (colonizers) in the region the colonizers has threaten the Ramas in Punta Gorda that if they exploited any resources in th colonizers area it will bring more conflict for the Rama, so they are not permitted to access the resources. The struggle is a battle to free the land and the sea from these colonizers.

Table 3: The most important species commercialized by the community of Punta Aguila (% by quantity of landings).

Species	Family	Local name	Percentage
Centropomus pectinatus	Centropomidae	Snook/long mouth	25 %
Carcharhinus obscurus	Carcharginidae	Shark/ Tiburon	17,86 %
Micropogonias furnieri	?	Drummer/roncador	14,29 %
Panulirus argus	Palinuridae	Lobster/ langosta	21,43 %
Lutjanus aposus	Lutjanidae	Snapper/snappa	7,14 %
Cynoscion acoupa	Sciaenidae	Capper mouth	14,29 %
Total			100 %

The table above, based on the different species use and commercialize and the percentage of how much fish is sold by the fishers, gives an overview of the most important commercial species for the Punta Aguila community. Mainly the product is sold to the different companies in the region. Prices differ according to the species.

4.4 Perception of the government regulation in the communities

Is it possible to ensure the agreement between the community, regional and national government? Communities on the Caribbean disagree in many ways regarding the rules of the government and the introduction of laws and regulations on development issues. The different objectives of laws and regulations, and decision making not in consensus with leaders of communities, are drawing more conflict toward resource management.

The government implements some rules such as the type of nets allowed catching different species, hand lines, mesh size for turtle, shrimp net, and the different lobster pots that could be employed. All these parameters and rules are not at all well received by the communities.

As Mr. George Martinez observes:

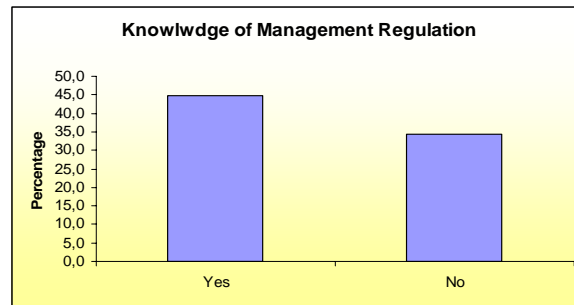
“It is not easy for us to look at these rules and just accept it; I cannot, because I will be doing a lot of sacrifice, first of all, they should give us some other alternative or more, help us to improve the different material, that we use on the sea.”

Observations made by the community ensure that is not viable to follow the rule of AdPesca and MIFIC and is bringing a lot of controversy among the inhabitants of the community, especially the fishers. The negotiations between some fishers and the different fishing vessels are based on exchange of fish products for fishing material, and other sources. This is due in part to some of the rules of the government to improve the fishing material. The fishermen cannot buy fishing material because it is too expensive and the government gives no other option for this.

The only regulation that the community is certain about is the fishing of turtle. When it is in a period of reproduction it is forbidden by law to catch turtles and fishers are obligated to release it. This is due of the low abundance of turtle in the region, which is an important source of food the indigenous people. Some other neighboring communities don't abide with this law, so to enforce it the government has put the

marine navy to carry out a survey in protection of the species. This survey has a high impact on all the communities and inhabitants of the Caribbean coast. The navy's help has been a success so far, with the aid of some communities who are certain about the importance of this species and others.

Figure 9: Knowledge of management regulation in the communities



The bar chart in Figure 9 reflects how well management regulations imposed by the government is known. 45% of the populations in both communities are aware of the management regulation and management plan imposed by the government, but totally disagree with the implementation of it. The reason why they disagree is basically because the community was not a partaker in the creation of it. 35% didn't answer the questions, but according to the interviews, they are not aware of the management plan. They all agree that it has a negative effect on their fishing activities. It is not accustomed in a community to abide to a law that have not been properly explained, especially when it is imposed by the government. The government has been demanding these and other communities to comply to the fishery law, which is rejected in consensus.

The community has seen that the veda in some terms is good, but there must also be some solution to the other needs concerning incomes, because the fishery is the main source of income for these communities. The three month veda has affected the entire community drastically. The prohibition to the fishing ground is driving the community to disobey the law, until the time when there is a solution to their needs. They abide by their own tradition of how to fish and when to fish. The turtle and lobster veda is at the same level, causing a chaos. Turtle is the community's favorite meat, and even if the

regulation says that it is forbidden to catch turtle, the fishers in the communities still carry on their tradition of killing of turtle, but claim it is done in a sustainable way.

As Mr Juan Ortize emphasizes with respond to the governmental point of view and the manipulation of the law:

“The government gives out permission to fish in our territory without consulting us about it, it is just a manipulation of law by the regional and national government. The law is there but what if the government doesn’t apply the law as it supposes to be: Then who to blame if it is them; this is all about corruption.”

Figure 10 and 11 A men slicing turtle to sell and men netting turtle nets.



As the community is still doing their traditional way of killing turtles and selling it in the community, the government is trying to prohibit the catch of it. But this rule isn’t well seen by the community. For years, as a part of their daily life, these community fishermen have always seen the turtle as a way of keeping the tradition. They catch the turtle by net or by hand on open sea (diving). As Ms. Elva Davis responds:

“I will never stop eaten turtle because of the regulation they put on it; they can not come in my land and tell me what to do, or what I should eat or not eaten. I grow up eaten turtle and I will die eating it. I don’t like these rules the government put, they only think on their benefit, not on our benefit, we are Indians, and we know what the

sea and land give us. I don't understand the rule but I will never abide by it. It is a cruelty what they are doing with us."

From the position of the management institutions, the situation looks a bit different.

Says Mr. Danny Siu of MARENA:

"The main objective of this institution MARENA is to divulgate the law, and sees that it is applied the right way. We have different management plans, i.e. no one can not set net for turtle in certain time, due to the current of the sea, as we had notice veda or no veda, the community is still affected, why? Because they just don't respond to the rule. Actually we have the surveillance on shrimp vessels, and this is certain agreement within the community and institution, but for us is a challenge. Other way, no one stops them from their tradition of fishing because we are certain about that, but without rules you will destroy the ecosystem or the natural resources itself, but nevertheless many communities claim that they are happy with the law 445 (demarcation process), the autonomy law 28 (which give them strength to reclaim the natural resources), but all this is just to be applied. We are now focusing on the youth to make them understand the importance of the law."

Rules have to be follow not only by people in the community, but also by the the institutions, as Edgar Chamorro¹⁸ observes:

"In relation with to the fishing sector, the law was approved in the assembly but hasn't been published. When it is published then it will be a challenge to accomplish it, because of the different visions institutions and communities have. Actually we have 2500 artesanal fishers and 400 women that fish, beside all this, the 10% is well organized and the rest are not, which make it difficult for them to receive help, even though we have different cooperatives many of them are organized but are not functioning as cooperatives, they work individually. The communities always see what the government can do, but it is a responsibility of everyone, including institutions, government and communities. For 2005 we will implement a 4month veda, (turtle,

¹⁸ Co-coordinator AdPESCA, Bluefields.

lobster) and we know it will be a crisis, but this is because the reproduction of lobster and turtle is in the same month; despite the veda the communities still fish.”

Mr Roberto Chang¹⁹ adds:

“The autonomous government is administrating the natural resources, but those functions are centralized by the central government; we need to get institutions ready for decentralization. According to the law 445, on the community, is a law that’s brings administration to property and natural resources, gives more right to exercise the right and part of decentralization. Administrative level is a way of getting more participation from the communities; how it will happen I don’t know? We need to exercise the rules to have political stability.”

Mr. Chamorro replied to a question according the open access in the fishery in Nicaragua, and what the institution was doing to regulate that;

“Here no one give quotas but licenses. The licenses is given out by the central government, which we should be doing, they do it as a quota on lobster and shrimp, the government hasn’t implemented any quota as yet. We have corruption her. We have boats with big dimension but it is registered as artesanal boats. A management plan existed, but it is only having been mentioned. AdPESCA at this moment is monitoring vessels that have permission to fish and we are coordinating activities to reduce the illegal fishing. We are trying to regulate the fishery that’s why it is important to impose certain rules on everyone.”

4.5 Perceptions and beliefs of the indigenous people

The Miskito and Rama have some of the richest natural areas in the Nicaraguan territory. The region is green with tropical forest and a vast marine ecosystem rich in variety of species such as deer, wari, white hog, turtles, monkeys, eagles, lobster, fish

¹⁹ Coordinator of SIRENA (Secretaria de Recursos Naturales) Gobierno Regional, Bluefields.

etc. But the cays and islands are more exuberant and also prone with species and a good habitat for different marine species.

Historically, these two ethnic groups (Miskito and Rama), have long and strong beliefs in the nature in which they live. Their beliefs are something that no one can explain. Living with nature, sharing a life time with animal and plants, and the interaction of each one of these, gives them the perception of harmony with nature. These beliefs and practices contribute to the conservation method and biodiversity in the local region. The rituals beliefs and perceptions of fertilizing the soil is a way of maintaining culture. As they kill an animal, the norm is not to drink the blood of it, because it is not considered as healthy. The blood should run on the earth and return back from whence it came, fertilizing the soil for a better production.

Among the indigenous groups, the “Suquia” is well practiced. This is a kind of ritual given to a person, supposed to improve the health. In this ritual plants are mainly used to create a certain medicine for the ill. This tradition is well known by all communities of the Caribbean, and it is well practiced. It is also called “Sunthin”. This is mainly practiced by bush-doctors and midwives. As a part of the ecological knowledge of the different species in the sea, the shark is mentioned as one of the main and healthy medicine. When they catch it at sea, they dry the fat in the sun, and this produces certain oils, which is good for coughs, burns etc.

What is relevant is the perception they have of the rain and thunder, as Mr. Jim Chow says;

“My father used to tell me; when it raining and thundering never go out at sea nor out of the house and worse play with turtle, because if you go out at sea and thunder hit you, you are dead man, and worse if you don’t know to manage the sea, but if you are at home and you have a turtle under your house, don’t go near it, because if it bite you it will never let you until thunder rolled twice and maybe till the following morning it will let you lose, and that is dangerous. This belief we still have and our people are very afraid of these things, which are a true saying.”

The important matter is that the people are keepers of their history and sayings about the natural resource and ecosystem. This forms, no doubt, a part of their knowledge. Maintaining beliefs in what they see and believing in history and sayings is relevant in these communities as long as they carry on this tradition. Indigenous people believe in the ecosystem and that their ecological knowledge is a part of their well being. This is because it enhances a lot of knowledge about living among nature, describing the way things move around them without doubt or fear. As I will emphasize that knowledge is not easy to achieve in a community, and many times it is not shared among strangers. To some extent, the knowledge is hidden inside each and every one of these indigenous groups. As Jentoft 2004 observes:

“The Rama relate to their natural environment with a combination of respect and fear. The first day in the open ocean, the fisherman pours sea water over his face as spiritual preparation for the challenge and he avoids throwing a stone into the ocean, so as not to call upon the strong winds. Such proscriptions are common in most fishing cultures”

The local insight of indigenous ecological knowledge in these communities is based on experience, practices and belief concerning the environment. The use of the sea, the interaction with different species, and the knowledge of interaction is stored in the communities. An important issue is the different names for different species. Everything has its reason as Mr. Kenneth Garcia says.

“The different species that we manage are well known, because of their name and some history background given by our people in years gone by. Even though, now a days we don’t see much species that we known off; i.e Ruck-Ruck, is a fish which makes such a noise that you can here it clearly and they are cleaver. It is not easy to describe all fishes in the sea or lagoon, but one thing I can tell, our people know the name of every animal in the sea and on land. Such there is a different way we describe each island that I mention so is Man Over, it has it meaning in the old days and now, today it is well popular by everyone.”

Mr. Bernardo Y. says:

“I teach my children from early ages the importance of the sea and what it has in it; for example; when I catch a fish and I know it is a bad fish I address my son why I have to throw it away, I also taught them about the weather and how it works and the way we should look at it. One think I like any time I took my son to sea for harvesting I know he learnt something with just observing and asking question.”

Ms. Ninoska B. replies;

“I have few daughters, and each of them have a duty in the house. They will look at me and observe and then I will ask them to do the same thing the following day, and they will. They are quick learners, but sometimes they will go out to sea with their father this doesn't happen often because it is a men job.”

Table 4: Fish used as medicine in the communities, as part of their traditional healing rituals.

Common name	Place were obtain	Method of catch	Part uses	Preparation	Dose	Sickness	For whom
Turtle	Sea	gillnets	Turtle back	Fry the turtle back for 15mn.until it produces oil	One teaspoon daily	Asthma	Adults and kids. No restriction of uses
Turtle	Sea	gillnets	fat	Fry the fat, for 10 min and it produces oil	3 teaspoons daily.	Protect the skin, with it is burn and the heir, its help it to grow.	Adults
Shark	Sea	Gillnets or hand lines	liver	They are many ways. But you can fry it for 19 mn.	One tea spoon.	Asthma and coughs	Kids and adult. No restriction.

Traditional healing medicine in these communities is well recognised by all inhabitants. Some fish that are harvested is used for this purpose. This type of medicine is practiced mostly by bush doctors and midwives, that possess strong knowledge of what species that are used for the different sickness.

Many people in these communities will tell you that the bones of fishes is good for asthma, not specifying on a species. But you have to take good care in applying the dosage because overdoses can some times harm you. The fish called Kukale; according the inhabitants of Sandy Bay; will brings back luck if you catch it and if you eat it you go crazy. The best thing is return it back to the sea where it belongs and you can continue your day without fear. It is not good to eat jack fish; because

when you eat it, you get sleepy and when you awake, you feel drunk, like if you have been drinking alcohol, so the best thing is to avoid eating this species. There is a big fish that have a yellow tail. If there is any one in the family that is sick, and if he/she eat the fish they will die very fast because this fish is poisonous. Barracuda o Picudo; it is not good to eat this fish because this fish eat some sort of herb from the sea and the lagoon, and if you catch it and eat it you can die. The fish called Tunky is repulsive for the people that fish because it is very smelly. Many Bush doctors told us not to eat or fish Molith because it is not good for the family. Everyone will go crazy. The fish head is good for people who have nerve sickness. It is taken as tea. You just have to boil it, and also you will become very wise as the fish does.

Ms. Camela H. replies;

“I can identify a lot of animals on land and many in the sea. Most of the time my parents teach me about the environment. They don’t talk often about what it may contain in it totality, but I have faith in what I know and don’t know. I know the ecosystem means everything that is in it but it is hard to distinguish many things in it.”

Ms. Juana Ortiz. says:

“Faith is something strong especially when you believe in something, I believe in what I see. Faith moves mountains, but most of all; the little I know about species is because we see them everyday of our life. In our surroundings many birds, plants, animal fishes etc. but I can tell you my knowledge never fools me, that is my weapons in life, knowledge is obtained by my parents and what I know today because of them, showing and describing animals are hobbies for me, but to say everything that is in the air, sea, land is difficult.”

Mr. Hassin C. replies:

“I can mention a lot of species in the sea and land, I can recognize many, but how many in the ecosystem it is hard for me to say. My father taught me a lot bout plants, fish, natural factors (weather, rain et).”

The law is clear, as it refers to the exploitation in different areas or zones established by the institution, but the implementation is hard to accomplish. Rules may be given out to accomplish this decree, but the success is difficult to obtain. The ecosystem has reduced its value, as Mr. Ronald R. mentioned above; the scarcity of species and the altering of the ecosystem is a problem for the community to identify species in use at this time. There is a clear need to introduce immediate effective management plans, with incentives that encourage responsible fishery and sustainable marine ecosystems. This will benefit all communities on the Caribbean and in Nicaragua, including mechanisms for reducing the excessive fishing effort, in the communities' areas.

The reserved area contains a great number of ecosystems that possess a variety of species, most of which is embraced by the communities and are the basement of its economy. The interest of all sectors to adequately manage the resources, it is justified that once an important knowledge of it is obtained, it will be assimilated by the users of the natural resources. The yield will be more sustainable economically and ecologically. The majority of the resources available are in fresh aquatic coastal and marines waters. It has been the only reserve with a good portion of marine area. The knowledge of these communities of biodiversity and techniques to embrace it are of big interest to the institutions like MARENA and others, (i.e. Lobster, Turtle and other marine species).

4.6 Indigenous conservation methods

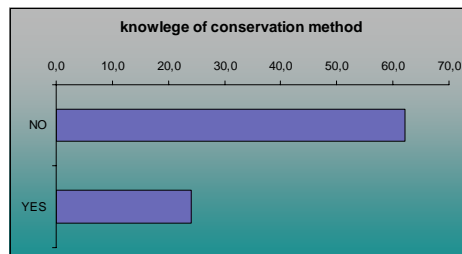
As recognized by the elders of the indigenous communities on the Atlantic coast, there exists traditional methods of conservation inherited from one generation to another. There are different views with respect to when to fish and not. There is the knowledge of the weather, including the change of climate which makes the species return to the fishing ground. Weather changes in different directions, and then they may know from the start, what kind of species' they can find at that certain time. The fishing; mostly use long lines of different types, depending on the season when fish will be abundant in the sea and the lagoon, the right and perfect time to catch is when the sky is clear.

What to use; just carry what is necessary, like dry bread and coffee, which will help you on your journey through the night and the rain. As the community's elders emphasizes:

“The majority of the population doesn't manage correctly the right method of conservation, because who goes to fish mostly is the young people and they have no interest in knowing, what is good and what is bad. But the elderly people in the community knows a lot but just don't like to talk that much.”

As shown in Figure 12, the majority of fishermen (64%) have no idea about conservation. The elders are more certain given their comments on why so few people have this knowledge.

Figure 12: Indigenous conservation method



This is due to the impact of the drug trafficking that always took place between the communities facing the open sea. Mostly young people don't go to fish, but to harvest drugs at open sea. Few people are trying to carry out the good work by teaching the new generation the importance of the fishing method and how to conserve the little that you have. As Mr. Eneil Coleman commented:

“ It is not good to say all what you know about conservation method, because that is part of our knowledge, and it is something that we cannot share with strangers, who we don't know, and we are not certain what it will be used for. It is something private and it will be no use to you to know about our way of live in fishing. Something that is yours you can not give away just easily, something that you posses from childhood, yes, that thing name knowledge that lives in you, it is yours, only yours and it hidden

inside each members of our community even if some may not realize the importance of having such knowledge, but is also a blessing.”

In many cases, forest and marine resource conservation method is simply the underline of indigenous farming and marine methods. People live in some undefined condition of harmony with nature, engaged in environmentally benign ways of exploiting resources which either could not or would not have allowed people to alter what nature provides. Protecting the natural resource with old indigenous methods now seems positive to keep the balance of exploitation. Even though indigenous people may not know the importance of management as a negative word because of the lack of literature in their culture, but have a great view of different conservation methods to apply to nature in different circumstances.

It is not easy to make a lobster pot, it takes time, and all the material is obtained in the wood land. Traditionally it is the effective way to catch lobster, but not as effective as diving. The divers emerge themselves down to 40 meters below the sea level and remain for more than 20 minutes without the use of scuba gear.

Figure 13: Men carrying a lobster trop



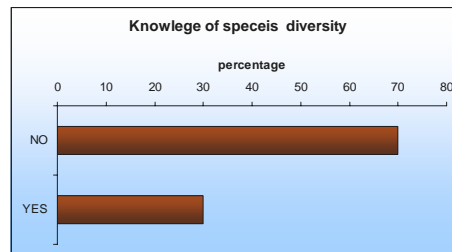
According to the communities this method is well known by everyone, and also the material what pots are made out of. They make up to 300 pots, and set out on open sea. They have never doubted their traditional methods. A trap may catch from 24 to 25 lobsters, which for the community is very good, despite when other communities steal their traps, they have enough to recover from the loss.

More and more knowledge is being lost as a result of the disruption of traditional channels of oral communication. Neither children nor adults spend as much time in their communities anymore. Some people travel to the city on a daily basis to go to school, to look for work, or to sell farm produce; many young people are no longer interested in, or do not have the opportunity to learn traditional methods.

The marine ecosystem is one of the main resources for the communities on the Caribbean coast of Nicaragua. The diversity of species in the ecosystem has been reduced to its limit, caused by the different fishing activities that take place in the region. As the different species have been reduced to its limit, indigenous people claim that it is hard to identify any species that earlier was well known. As the ecosystem is altered, the effect of it is perceived in the different settlements, where you find indigenous people. As Mr. Ronald Rigby says:

“I can not tell you much about the different species that you can find in the sea and lagoon, as days goes by more and more intruders comes into to the sea, lagoon and land; but what I can say is that I don’t have that much knowledge anymore, about what you can find and what you can not finding in the sea. Once the ecosystem is altered everything is lost. That effect we are feeling now, as we go out to fish, everything is uncertainty.”

Figure 14: Species diversity



In the figure above we can see that 70% of the populations, including the two communities are not aware of how to manage the species diversity, while 30% believe they have such knowledge. This is due to many factors: The intensive trawling of the different vessels, intruders on the fishing ground, and the conflict of concision by the government to different institutions, given outside the fishery law. The littoral of the Atlantic used to be rich in marine resources, the lack of infrastructure, capacity of finance and a right optimum yield of the fishery resource in the marine ecosystem, has been uncontrollable in the communities territory. The reasons for this, according to MARENA read as follows:

The general law of the Environment and Natural Resources, decree 9-96 establishes in its article 53, when it refers to the protected area, “The fishery or use of subsistence in such ecological environments, can be used by the different ethnic communities, but only in the zone of use that MARENA has stipulated for such marine ecosystems and with the conformity and regulations which is established for hydrobiology resources“ (Translated from Spanish).

4.7 Ritual and beliefs

Tradition is not only beliefs, but following the rules and integrating it into your daily life. Many fishermen and women who fish in the community believe in certain rituals and the use of some species for medicinal purposes. Indigenous knowledge can be expressed in different ways, such as premonition, features of nature activities and its link to each indigenous belief.

The fishing activity for these communities starts early, between 3 or 5 the morning before the sun rise. Many say, “Don’t make the sun get over your head before you awaken, because your energy will leave before you start facing the day”. The inhabitants believe that many fishes in the sea are recognized also by their healing ability; “June fish also called KUHA” is mostly caught during the month of June and only by hand lines, because of its healing. The bone of the fish is used for “asthma” combined with certain herbs named “Cachibel”. They are ground together to obtain its powder. Many attribute this belief to its effect which was proven after many accidents, for instance when a man was bitten by a snake and the remedy proved effective. Other inhabitants discuss that there are many beliefs and rituals towards perfect healing in the Miskito and Rama community of the Atlantic; “If you really believe in it, you will be healed at once, but if you do not, everything will be in vain”.

People in both communities, used to hunt and fish with traditional beliefs and methods, but they don’t actually do these activities often anymore. People in both communities hunt with rifle, but they used to hunt with cross-bow in the past. The men cover themselves with ‘achote²⁰’ when they go hunting because it is supposed to bring good luck. The number of animals is diminishing because of agricultural activities. The division between the men and women is referred to different activities. Temporally they all fish during the month of September to November. The men use harpoons, while the women use lines with bait when they fish.

The fishers in these communities believe, as they sail to the open ocean that first of all they must wash their face with the salt water, to call on the fish and the abundance of catch. At sea fishers will not curse the sea or the weather because it causes damage to the communities, meaning that they will suffer and there will be a lack of marine products. They should always gives thanks to God even if the harvest was bad or good and this implies that they must keep their faith and beliefs intact. In these communities the inhabitants believes that when you walk on the road, never look back, because your faith will be weakened. In the community of Sandy Bay, different religion is

²⁰ The achote is a fruit which is used by these communities. It is a small tree which fruits grows in bunches. They crabs the fruit to gtet the color which is red and they mark their fce with it as a meaning to go hunting.

preached. The Adventist church prevents the communities to do any activities on Saturdays, because that's the day of the Lord. It is also prohibited to eat certain fish and also shrimp (which for them it's damned). Meanwhile in the Punta Aguila community it is different. They don't have a Sabbath day. In this community anything that comes from the sea and land is a blessing from God.

Ideas may be shared between communities, but people also have different perceptions and beliefs of different methods. The conservation done by these communities is a success, because it enhances power. Their rituals and beliefs is something no one can doubt, but it is important to maintain, conserve, preserve and respect the way of life that these communities have to offer.

Ms. Alicia says:

“We don't eat cat fish, because it don't have scales. It is to slimy and because the mouth is to big, when ever you catch a cat fish return it back to the lagoon or the sea if not when ever you have baby, probable it may comes out with big mouth. The Tapom, is also very bad for some people, they say it has “suquia” or sunthin” they may call it, it means that if you eat the fish the suquia may go away”.

“We people says; that if you eat to much of fish during the Easter and any other season of the year, your baby also will comes out with his feet looking like scale fish on it, this is also through, I know many people with scaly foot in this community, some people says it is a curse from a bad person.”

This thesis gives a general overview of the indigenous knowledge of marine ecosystems; consumption, commercialization and management, in the communities of Punta Aguila (Rama) and Sandy Bay (Miskito). It is fundamental to know how indigenous people interact with nature, and the importance of the transmission of this knowledge to the future generations.. It is relevant to know if these communities have acquired detailed knowledge of the marine ecosystem, and and whether they are ale manage the resources in their surroundings in a balanced and sustainable way. To what extent does such knowledge contain ideas about the whole ecosystem and how species

interact? How do people understand and explain resource abundance or scarcity? To what extent is indigenous knowledge focused on conservation and the need for such. Do people have any sense of carrying capacity; if so, what measures of conservation do they perceive as being needed,?

4.8 Ecosystem and species interaction

Maurstad (1998) discusses how fishers' knowledge of local marine environments is seen as a means to improve and complement the scientific knowledge, based on fisheries management. Fishers are regarded as being able to successfully negotiate the complex nature/culture-relationship of harvesting. In relation to these two communities, fishers clearly express, their knowledge concerning the sea and the lagoon. The interaction that they have with those components of the natural environment is very important because it gives a better picture of how fishermen relate to the ecosystem and the species. That knowledge contains descriptions of species and how to interact with the ecosystem. Mr. Edwin observes:

“In the years gone by, traveling on the lagoon was a pleasure because, as you will see the bottom of the lagoon a lot of fish such, as drummer, snook, tapom and other fish diving together as family, them no fight with one another as people does. As my great grandfather says; we should take knowledge from the fish, how they lives in peace with out fighting.”

In regard to experiencing the interaction of species Mr. Patricio says:

“As my grand mother will say, it is a lesson, when you sit on the lagoon shore, and put your feet into the water, a lot of fish will come near you, to clean you dirty toe nails. But know in this generation such a difference you see; for example, the fish will run from you now, because they know that you will killed them and first we use to lives in harmony with them, it's a shame, but this problem occurred because everyone looking out how to survived.”

The experience of fishermen is unique in these communities, because they have gathered great knowledge by living in nature with their surrounding despite the tragedy of the overexploitation. In a surprising way Mr. Eran G. insists:

“People think we are stupid when we talk about fish and how they will smile at you. Listen; fish wise, and have different ways of seeing us, they can perceive when something is not right with the person (poor), I remember my mom says once a fish show her money. But the other saying is that when you dream with fish is a blessing because it brings health and money to the family.”

The ecosystems of these communities are rich in different types of species, and the fishing ground is one of the most prone of the Caribbean coast. But as intruders invade their properties, things become hard for the people in these communities and make it difficult to achieve or rebuild the ecosystem’s loss of species. As demonstrated in chapter IV, the ecosystems are fragile and the identification of species has become a problem.

During the personal interview, some people responded to the behavior of species:

“When the community had few houses, the environment with the nature was at peace. Marine resource that have lobster and fishes, so abundant, for example; Lobster and snook used to walk hand in hand, as you go to the river, you will see the lobster antenna, and we will recognize it at once. Lobster and shrimps says my mother use to have a lot of conversation under the water because they are one family eat the same thing, because both have the same antenna and comes from the same mama. The different is that one bigger than the other. People never use to bother with them because you use to have a lot of resource land and sea.”

It is important to know the behavior of the different species in the lagoon and at sea. Having that interaction brings knowledge and comprehension of how the ecosystem works within the environment. As Ms. Maria M, responded:

“I am an old lady, but what I remember, is that when I used to go to the lagoon to wash my clothes, I used to see a lot of sprat in the water hiding under my foot, yes some small ones, so I use to ask what is going on here. But when I realized they was just having fun.”

Mr. Bernardo made a point between the lagoon and the sea; he responds:

“I am an old fishermen, the sea have good fish and bad fish. The sea possess all kind of fish, I know what kind. But what I like is fishing time. As I go to set my nets at sea, the weather may look calm but that mean that you must be under alert because something below the sea is not working good. The shark we call the father(Papa shark) of fish because it is strong and ugly, but it don't eat any fish, and it don't bother with us, so many times shark comes right up to my boat just to alert me that if I fell in the sea I am a dead man.”

In rural subsistence communities in particular, traditional knowledge is a central concern for the regulation and balance of exploitative pressures that permit an ecosystem to maintain stability and regenerative capacity (Ruddle 1993).

4.9 How do people understand resource abundance and scarcity?

Living and growing up in indigenous communities is a way of inheriting knowledge and to believe in what you see and you do not see. However, this knowledge is threatened by the growing conflicts with the different fisheries firms on the Atlantic, invaders from other communities and the colonizers. As the resources become scarce, it is not easy to find any species in the same abundance as before. You can fish from early morning, sailing at 3 or 5 the morning, but still find it hard to catch any fish; in previous times it wasn't that necessary to go out so early in the morning. As Alex William observes:

“ when you put your line in the sea or river not a second before you have fish and in lest than an hour you will have up to 10 pounds; now I cannot say the same, disaster is near with the fish, and this imply money and greediness' of the government and

vessels, the main factor the trawling that take place 3 miles inshore, taking away everything pelagic species, and what so ever in their way.”

Mr. Harry L. emphasizes on fish movement:

“Many people don’t understand that fish moves in groups from one place to another, so if you don’t find much fish today, come back tomorrow to the same place and you will see the difference. Fish will never be exterminated by man, no matter what they do.”

In Punta Aguila and in Sandy Bay, the inhabitant’s fish at sea for the main purpose of creating a steady income, but they also exchange some species with vessels that use trawl gear; this can be agricultural product for ice, fish, lobster etc. The different seasons of the year imply a lot of knowledge of these communities. The month of September is a good month for landing, because the fishing ground becomes prone during that month. The Nicaraguan governmental institutions are struggling to find solutions for these communities, implementing a management plan in consensus, which makes it difficult because of their beliefs in tradition in nature. Contamination is one issue which leads to species scarcity, even though they do not fish as regularly in the lagoon as in the sea. In this case long line for fish is mostly used, which is a practice typical of the inhabitants of both communities.

Mr. Reynaldo Mc. emphasizes on Punta Gorda reserved; as he responded:

“Actually we are gathering to meet with all the rest of the communities that belong to Punta Gorda, Monkey Point and Punta Aguila, Why? It is because we notice that the fish is getting scares in the area. Many times the people from Bluefields come to have meeting with us but it is often no use; meeting and meeting, the more you tell them to stop fish in the lagoon the more they come, the creek peel that’s why no fish in it and we fighting hard to preserve it and the land worse, the same thing happen with the sea, but they cannot finish the fish in the sea, even though we find little fish and is because to much fishing boat from different company such from; Corn Island,

Bluefields and other communities. Punta Gorda creek feeds all the rest of creek in the community from old days till now, but now emerge this problem with the invaders.”

He continues:

In times gone by Punta Gorda used to be fresh with fish and no one touched it, then now Costa Rican men comes and fishing in Punta Gorda. Can you go to Costa Rica territory and do the same they will kick you out before you reach to them. The government is slow to act, But who are suffering the consequence of all this mess, we the communities, only who feels it knows it.”

As Mr. Reynaldo continues:

“This man call Magdonal used to give permission to the Ticos (Costa Rican) to fish in his area and they used to take out tones and tones of fish of the lagoons and sea, and now this same man is crying that there is no fish in the lagoon, even though he says that he only gives permission for few days sometimes, but what happen these people are professional and them know what they are doing.”

The increasing fleet of the Atlantic has a drastic impact on the marine resources, leading to a decrease in stocks in fisheries with open access. During the workshop a respondent replies:

“The way we do our practices of fishing is different than any other community or vessels in the region. Now it is hard, because we have to buy more material which is impossible for us because of our income, to increase our catch.”

It is hard for the communities to achieve a better way of improving their fishing gear, due to many irregularities and laws by the government. As many of the inhabitants have requested that; knowing the parameters of fishing make them owners of the sea and the lagoon, their fishing practices has always been the best, because they have never complained about scarcity of marine species or certain favorite species. As Harold Rigby says:

“The idea of been on indigenous man is a great honor for every Indian or ethnic people. Everyone here mostly fishes for many reason, fish by tradition, income, and most of all making your own nets. In these time, time is hard more than ever, because ; for instance, our fishing method is decreasing, hard to catch fish or lobster sometimes, buying materials, wasting money and time is hard for us, specially when we go to sea and we don’t harvest that much, that we expected become very depressing for many.”

As discussed in a workshop, many inhabitants exclaim that they know about their fishing practices, which as been inherited from one family to another. At first everyone liked fishing because it was easier to fish; no effort was needed to improve any kind of gears or special method to catch fishes in the sea. Later catches reduced drastically. Not by the way they implemented their fishing activities, but because others adopted a greedy way. 20 years ago, fishing was a delight according to the communities. That they caught up to 50 pounds of fish in just few hours was common. They would fish for a few days, go back on land for another few days, not returning to the sea until it was necessary.

Mr. Ruben C. responds to a question of resource abundance and scarcity:

“When I was a child this old men here; I use to go to fish out at sea, to fish turtle no one use to fish lobster. On the shore of the sea sometimes you will see lobster looking for food, some people carry pine woods then burst it to make fire (torch), to see clear in the dark to catch lobster and fish on the shore and they will bring a lot of lobster just for eat, now fish is scare and the boats are coming close to the shore to fish.”

Believing in what they have and what they know made them better fishers, despite the disadvantage of not having access to new technology. It is unusual for the community now to adopt new methods for increasing landing or harvest, even though workshops by different institutions and universities carried out different activities concerning the fishing issue in these communities. But the result is uncertain because no one can give you a response of improvement or how applying such knowledge should be transmitted to the communities in their fishing activities. This issue leads us to think

that communities are still aware of the importance of their fishing practices and ideas about resources scarcity or abundance in different areas of their fishing grounds.

Mr. Ipolito G, responded to the scarcity of the resource:

“In our old days, a lot of fish and lobster used to be playing in the sea and lagoon, we used to catch lobster with our hand without any kind of effort as you see today, big boat, all kind of equipment, gears, gillnets etc. in this decade big boats from different companies started wrecking the lobster small and big no matter the size of it, what have the size it is good for them. Now to catch a lobster you have to work hard. The lobster and fish ending now, where the lobster them go no one knows”.

Mr. Kenneth G, emphasizes on the issue:

“The government has the blame why the resource is finishing, now if you put a net to the shore of the sea it is difficult for you to catch anything, your net will remain there until it is rotten. Plenty foreign boat comes in Nicaragua water to fish and that is what is finishing the resource. We finishing it and them also, in few years from now their will be no lobster I assure that.”

Ms. Maria M, replies;

I am a lady and I fish also, from childhood I practice the fishing activities, very nice to ride the sea and travel on the lagoon. Things are different now: the lagoon changes and the sea also. I travel in my canoes during the early morning, as I throw my line for fish, it is impossible to catch any. The sun maybe hot and I will still be out there fishing, sometimes it irritates me because I may sit for hours desperately waiting for a fish to pick my line and not even one. Returning back home with an empty canoe is a shame for me, now fish are all gone.

4.10 Is indigenous ecological knowledge focused on conservation?

The traditional beliefs have existed in the indigenous communities of the Atlantic of Nicaragua for a long time. The conservation of the different species has become the indigenous people's main priority, in a world that is changing towards new technology. As indigenous people have knowledge of different management applications, and have seen the necessity of a good management plan, due to the scarcity of species and the over exploitation of the natural resources, a curiosity emerge between communities. They are curious to see how their ecological knowledge can prevent the overexploitation and to balance the natural resources; Mr Harold M says:

“We need more effective method because the one we use have no effect actually on the management of the resources, its not that we doubt our beliefs and knowledge, but yes all new technology left us without a good plan.”

Due to the loss of control of resources, the breakdown of land and the use knowledge systems, population growth, commercialization, and technology change, many traditional rural peoples of the world cannot be considered conservationist (Berkes 1999). Mr. Jim ,Chow replies on the needs of conservation methods in the area:

“We as leaders and as a community, we see that the government have a self interest in the resource. As I can see more and more fisher divers existing actually from all side, the increase is going up and the decrease of the resource with the effect of these divers each year. Every year more divers go to the sea to fish lobster, and it is because the price of the lobster is better than the fish, so now we have an invasion of divers in the area. So we need some kind of methods to restrict the exploitation of the lobster, because the one we use have good effectiveness but the one the government put that's the problem. For example; during this year few fishers sign an working sheet for a company, them don't give them any material to catch lobsters, so we make the trap out of papta and strip, which is good because the material it smelly and it attract the lobster, we don't catch small one only big one, but the company we work for says, big and small is ok, and we know that is not right for the lobster.”

Mr. Victor M. replies on the issue of conservation reply:

“We never use rifles for no purpose in the community, in old days time Sandy Bay, have no idea about rifles or other instrument our rifles was harpoon and cross-bow. We use to condemn people who fish in the lagoon or on the sea on a specific day such as Sunday or Saturday or a holy day. We catch any one doing an illegal activity we put them to work in the woods land for a week and until they burn black, then we explain to them why we do that. Now this method is hard to apply to the youth and the government doesn’t understand this rules that’s why we need something more effective in the area for everyone.”

Nietschmann (2000) discusses;

The coastal Miskito use a wide variety of overlapping cultural, social and political institutions and methods to manage their marine environments. They recognize and practice environmental management (wakanka), responsibility (wirihka), defense (was tasbaia kan kahbaya), customary regulation (kaku laka), limited access (customary marine tenure), regulated resource distribution (pana pana), cultural restrictions (i.e Lih Yapti), and a vast body of traditional knowledge (diera tanka). Miskito marine management methods are recognized to manage Miskito community use of sea and reef resources. The biggest threats to their reefs, however, do not come from people in their communities, but from outsiders who have come to the reefs for profit and power.”

As the interview and workshop was conducted among the fishermen and others, very few of the inhabitants knew the term carrying capacity as such.. They do however they refer to the term as “Plenty or a lot”. Community life depends on a healthy ecosystem which supplies life-sustaining resources and absorbs waste, but current growth and consumption patterns are placing increasing stress on the ecosystem. While my findings suggests that communities are not aware of the importance of carrying capacity, they recognize the importance of an abundance of mature fish (spawners) and the production of new replacement fish (recruitment). .

The abundance of species in the sea has been reduced drastically as the communities are well aware. During the workshop the community responded:

“We have no absolute idea about what you talking about, that carrying capacity thing, is something we don’t manage, but according to my knowledge is means a lot of what so ever you have, in the sea or in the lagoon. For sure we know the abundance of fish in the sea and when they are lest. If you don’t fish for a time of course you will have more.”

On how many fish there can be in the sea Mr. Edgar B, replies;

“When I go to fish and I harvest a lot of fish, it made me happy. One thing I recognizes, any time I cut open a fish I usually find a lot of small fish in the stomach of the fish, and that means that there are abundant of fish, so as they are many them just eaten one to another, I mostly think that is because, some may be fighting to servive so the big one eat the little one. I like that because then I can assure that they are a lot of fish in the sea and the lagoon as well.”

Mr. Edgar G, continue;

“At first I didn’t know why fish ate each other, but as time goes by I could understand the importance of it, because I used to ask my neighbors and fishers also. My neighbors will reply, that when ever you catch a fish and it has small one in it stomach, it because we have a lot of fish and we can fish now, without problem at all. for me it was very curios to understand that”.

As traditional knowledge is transmitted form generation to generation it has been coming, fishers acquired more information about the marine resource. As Mr. Leonard W, says:

“I remember when I was young, it wasn’t necessary to put a lot of effort to fish, it was enough a small canoe and net, and before the sun set you will have a lot of fish in your net, it was pretty to see so many fish, all kind all type and size, now things change now, it is hard now to catch any amount of fish”.

Mr. Patricio G. responds;

“Fishing is fun when there is a lot of fish in the sea, but now there are not much left. The difference now is that; when fish used to be in abundance, you will see them jumping out of the sea like calling us to catch and that was fun with all kind of stile they will do that activity, sometimes they will jump in your canoes and it wasn’t necessary to throw a line sometimes. In this new decade you will waste your time setting your nets in the sea. I think all this problem is because everyone wanted to fish as much as they can.”

As this suggests, the local members of these communities have only rudimentary ideas of conservation and management. Whereas they certainly have knowledge about their own traditional practices of harvesting, and perhaps also of traditional conservative methods, the influence of new technologies and market access is making such knowledge less useful for them. Subsistence fishing still forms is important in these communities, even though there has been a decline in traditional customs. One factor can be that the locals now are more oriented towards the urban life, making their traditional knowledge seem less important.

Mr. Kenneth observes with regard to conservation methods;

“We as community need to update our conservation methods to preserve more the little we have as we have seen everything is going down such is the natural resources (shrimp, fish, lobster) so we need to put out a drastic method.”

Mr. Johavanie B. responds:

“I remember fishing with gillnets that have 6 to 7 inches and I don’t know if it is the right method, not to catch small fish, some times it becomes a problem for me, why? Because so many fishers have different fishing method and I think all of us should have the same and that way we would not effect the resources in the sea.”

Says Mr. Kenneth G.:

We usually fish lobster with pot (lobster trop) for the big lobster but the method we use is different than what the industrial use, many times we don’t catch anything in the trop, the reason sometimes many factors such as; the kind of trap you put, or the size of hold for the lobsters. For us is more effective to fish lobster with harpoon it is more effective than trop, because we can see them and catch them easier, even it is a risk for us. For the turtle we use some huge gillnet no matter the size, the thing is that we catch all size but depends if the turtle pregnant we let them go. Anyhow, I think we as community should improve the nets and gillnets.”

Mr. Alejandro G. responds:

“I use chain on the beach but it is no use now, materials are hard to get, and that method I do not use anymore is not that effective as these new method and sophisticated one.”

Mr. Ruben C. also says:

“Until this day I use shrimp net and it is very good, even when I throw the net in the lagoon all kind of fish comes up, like sprat and others. I don’t use the sprat so I give it back to the sea or lagoon because it is no use for me.”

Mr. Abraham comments on what kind of conservation methods are needed:

“First of all we needed a management plan in reference to the fishery because there is a lot to do. We need to develop new rules and conservation methods. Such as selectivity type of gears, gillnets, shrimp net, fishing lines (nilon etc) these factor are important to know and this way we will conserve some species in extinction. Different workshop is needed within us (management for conservation). For instance we have been receiving some workshop on the responsibility of fishing that says; they had taught us how to conserve certain resources in times of veda. Bu we also needed a law that or a special veda that indicate different species we can fish and not only turtle or lobster.”

As Mr. Abraham continue arguing;

“To implement a law which the community will see that it benefits them as community and a consensus within us, and also a workshop about new technology. I think that will help us understand many things in our community and in the fishing area.”

The stock of knowledge among the inhabitants in these communities determines their need to improve a method in the community and has become a debate. In consensus with these communities and identify their needs was to know the more effective way of catch, to try to develop more effective fishing gears and this way improve their incomes. Upgrade their knowledge base through workshops about the natural environment. In a world that is changing drastically, technology has becomes more effective and the need to improve a better way of life. One of my respondents during workshop expressed:

“It is not that we don’t believe in our method of harvesting, the problem is what they do to improve their method, is curiosity, because as time changes everything changes, and the more you live the more you know, it is never too late for us to adopt sophisticated methods. We use for as conservation method the uses of harpoons, long lines, bow and arrow in the lagoon which now have no effect on species which seems like they are wiser than ever.”

The change in beliefs and perceptions may occur as indigenous people focus on improving different methods behind their own traditional way of harvesting or hunting that has been part of their life until this day. The relevance is a conservation method for medicinal species which is used for different diseases in the communities and now is facing extinction. In a traditional way of conservation, these communities prohibit fishing on Sundays in the lagoons. If one does fish one will be punished by the communities. The month of April is sacred; everyone should only eat salted fish, mostly captured from the sea in remembrance of sorrows. This tradition is unique in these communities which will more be a religious remembrance.

Mr. Cesar E. responds;

“If we implement any law we wouldn’t lose our tradition. The government should allow us responsibility in checking out all those fishing vessels next our fishing grounds so we can make a census, and know exactly what they catch and what they don’t, and that way give a follow up, to establish certain rules to these fishing boats and firm. In this way I think we will conserve more than what we have. One point can be put into practice our tradition with these boat, and observe how they manage with our law, I think it is time to do these kind of things and not only talking about it.”

4.11 Ecosystem and species interaction

Maurstad (1998) discusses how fishers’ knowledge of local marine environments is seen as a means to improve and complement the scientific knowledge, based on fisheries management. Fishers are regarded as being able to successfully negotiate the complex nature/culture-relationship of harvesting. In relation to these two communities, fishers clearly express, their knowledge concerning the sea and the lagoon. The interaction that they have with those components of the natural environment is very important because it gives a better picture of how fishermen relate to the ecosystem and the species. That knowledge contains descriptions of species and how to interact with the ecosystem. Mr. Edwin observes:

“In the years gone by, traveling on the lagoon was a pleasure because, as you will see the bottom of the lagoon a lot of fish such, as drummer, snook, tapom and other fish diving together as family, them no fight with one another as people does. As my great grandfather says; we should take knowledge from the fish, how they lives in peace with out fighting.”

In regard to experiencing the interaction of species Mr. Patricio says:

“As my grand mother will say, it is a lesson, when you sit on the lagoon shore, and put your feet into the water, a lot of fish will come near you, to clean you dirty toe nails. But know in this generation such a difference you see; for example, the fish will run from you now, because they know that you will killed them and first we use to lives in harmony with them, it’s a shame, but this problem occurred because everyone looking out how to survived.”

The experience of fishermen is unique in these communities, because they have gathered great knowledge by living in nature with their surrounding despite the tragedy of the overexploitation In a surprising way Mr. Eran G. insists:

“People think we are stupid when we talk about fish and how they will smile at you. Listen; fish wise, and have different ways of seeing us, they can perceive when something is not right with the person (poor), I remember my mom says once a fish show her money. But the other saying is that when you dream with fish is a blessing because it brings health and money to the family.”

The ecosystems of these communities are rich in different types of species, and the fishing ground is one of the most prone of the Caribbean coast. But as intruders invade their properties, things become hard for the people in these communities and make it difficult to achieve or rebuild the ecosystem’s loss of species. As demonstrated in chapter IV, the ecosystems are fragile and the identification of species has become a problem.

During the personal interview, some people responded to the behavior of species:

“When the community had few houses, the environment with the nature was at peace. Marine resource that have lobster and fishes, so abundant, for example; Lobster and snook used to walk hand in hand, as you go to the river, you will see the lobster antenna, and we will recognize it at once. Lobster and shrimps says my mother use to have a lot of conversation under the water because they are one family eat the same thing, because both have the same antenna and comes from the same mama. The different is that one bigger than the other. People never use to bother with them because you use to have a lot of resource land and sea.”

It is important to know the behavior of the different species in the lagoon and at sea. Having that interaction brings knowledge and comprehension of how the ecosystem works within the environment. As Ms. Maria M, responded:

“I am an old lady, but what I remember, is that when I used to go to the lagoon to wash my clothes, I used to see a lot of sprat in the water hiding under my foot, yes some small ones, so I use to ask what is going on here. But when I realized they was just having fun.”

Mr. Bernardo made a point between the lagoon and the sea; he responds:

“I am an old fishermen, the sea have good fish and bad fish. The sea possess all kind of fish, I know what kind. But what I like is fishing time. As I go to set my nets at sea, the weather may look calm but that mean that you must be under alert because something below the sea is not working good. The shark we call the father(Papa shark) of fish because it is strong and ugly, but it don't eat any fish, and it don't bother with us, so many times shark comes right up to my boat just to alert me that if I fell in the sea I am a dead man.”

In rural subsistence communities in particular, traditional knowledge is a central concern for the regulation and balance of exploitative pressures that permit an ecosystem to maintain stability and regenerative capacity (Ruddle 1993).

4.12 What are the perceptions of the governmental regulations?

Indigenous communities are aware of the need of some regulation in order to protect species that are threatened by extinction. One important point that has come up in my interviews has been the traditional way of fishing. It is argued that people could shift the attention from threatened species to species that currently are not commercialized.

To adopt any regulation in the communities, the fisheries law should include the vision of the communities. The rules should be made properly and imposed on all. It means that communities and the fishing sector in the region should formulate solutions in agreement in with the communities, in which both sides will compromise to create a law, but also find other alternatives for employment. During the workshop one of my respondents expressed:

“The fishery law is incomplete, we having seen priorities on the indigenous people for the administration of the resources and what we should have is a national indigenous commission and a institution for indigenous development, establish a indigenous fund for the implementation of economics activities in the communities.”

The demand for a better consensus and understanding between the government and these communities have a legal tendency in the autonomy law 28 and law 445, which gives all authority to these communities to administrate the natural resources and preserve the right management. This has been incomplete. No one in these communities abide with the fishery law and regulations, until they are heard by the government and given a better solution to their needs.

Mr. Estrada G. observes:

“These governments are corrupt in all terms. These institution and government makes law and regulations, but without any agreement with the communities or any leaders here. Our leaders they don’t even know about what is taken place sometimes when you ask them about laws from the government. First time it wasn’t necessary any law

because my people have the art of how to fish and when to fish I mostly think these laws is for these new people (invaders, firms, and divers), not for us but on my side I don't abide with any I have my own law which is to look out for my family and my income is the fish.”

As Mr. Escobar argues;

“Do they have any plan to see the problem of the divers and fishers, they don't think what are they going to do with us (fishers), first of all the fishers don't even have a health insurance, for me that's situation they should resolve first. The people that fish is from the community and work for the government also, but what the government don't want to sit with us and talk about our needs as fishers, and the importance of a health insurance, all them bother is to put their law and see that it is comply.”

Mr. Rito H. responds;

“They are discriminating now in our territory from the government, they give permission to exploit our resources with this foolish law. What I did was demand MARENA to put a stop to it, I investigated these problems. Certain government such as the regional council gives permission to people to take out timbers and fish as they wish.”

If there were to be agreement between the government and the communities, one should emphasize that rules must be carried out under strict surveillance, including sanctions to any illegal activities in fishing sector during the off season. This will mean a sacrifice for each inhabitant. The crisis of these communities is constantly increasing and they are obligated to uphold the government's rules, which brings more poverty to them. As the community is poverty stricken and no institutional solutions are clear, it is difficult for the inhabitants to accept certain laws or regulations.

Mr. Jose C. says:

“I am not against the regulation from the government no not at all, but I think there are many factors that bother my people such as, how can they say we over exploiting the resources when they give out all kind of concession to foreign company to fish in the area. At this moment we are facing problem with the famous fishery law I read it but that law it seems like it benefited certain sector.”

Mr Edwin R, answered;

“Those laws for forestry and fishery I don’t like them at all, first of all, I don’t understand them. To abide with a law I think we have to see other alternative for the people, even some institution says that the law benefit everyone, well I don’t know I think it mostly benefited the companies in the region and the government.”

I think it is important for all indigenous peoples to know the importance of their knowledge and to share of it with institutions that can help bring sustainability to the natural resources without excluding them from any decision making. Indigenous knowledge is a power element or instrument because it enhances the knowledge base in terms of conservation methods and management. Despite all confrontation, consensus is definitely needed to improve the knowledge between parties and communities in different areas of the Caribbean and coast of Nicaragua. These communities composed by indigenous people, are living under extreme poverty, and the only way to rescue their traditions is by taking it into consideration as an important tool that will help them overcome many necessities in this world.

Mr: Leonardo W. observes:

“These regulations and law of course in some terms are good, but in other are not; this is what I think; if we have laws that benefit only one party it is not good, as we have seen government have different thinking about the indigenous national resources, and we have different thinking about our resources which make it difficult to

implement any law with different ideas and visions. Most of all, I think that the government should forget about their personal interest in making law that benefited one person, but most of all look for consensus within all parties and specially in reference to the communities which have all right to be partaker in any planning and decision making.”

CHAPTER V: THE ROLE OF KNOWLEDGE

The peoples of Sandy Bay and Punta Aguila harvest marine and forestry products for subsistence and trade. As the world changes, their lives are changing too. Integrating their traditional ways with regulations for resource management is becoming one of the main issues in the communities. In this chapter I will discuss my findings in view of the theories of indigenous knowledge presented in chapter 1. I will discuss how well the theory fit my findings.

5.1 Commercialization.

Fishing has always been a main activity and source of living for these communities on the Caribbean coast of Nicaragua. The commercialization has become a focus; as the fisheries begin to become overexploited, threatening these communities. Such commercialization is done in Corn Island, Bluefields and Pear Lagoon which have high demands for the exotic species mentioned above. There is little doubt of the over exploitation of these species. Each firm on the Caribbean paid different prices for the species and thus makes it appear more luxurious for fishers to go after certain species. The price for the different species such as Turtle may be around C\$ 300.00 per pound. Despite the law of prohibition to commercialize this species, it is mainly sold in Bluefields. The volume can reach up to 1500 turtles sold during the week and by different communities. According to interviews, divers and fishers that focus on lobster can earn approximately \$ 2500 per month or more, depending on catch and season for lobster. Even though individuals that possess their own equipment (out board engine, lobster trap etc), set out at sea approximately 150 to 200 lobster traps. These groups possess their own boats and material.

The shrimp is sold in the communities at C\$ 10 to 15 a pound, which is well seen by the communities because it is too cheap. The firm also buy shrimp for a lower price, as the demand is not as high as for the lobster. As Munnereau (2003) discuss, the development of the fishery has been greatly influenced by the political turmoil of the

government. Changing fishing policies have continuously influenced the fishery, and led to an increasing industrial sector both nationally and internationally. The various fleets that operate: the industrial and small scale fleets, employ different fishing techniques, and fishing areas. Their fishing efficiency differs a lot as well. Illegal and unreported fishing has become a serious issue.

The Costa Rican, Colombian and Jamaican fleets are causing conflicts as they harvest in Nicaraguan continental waters and sell the products in their countries. The drug trafficking also leads the community to forget their own traditions. When men fish on open sea, they often encounter drugs drifting which makes it tempting for the communities. The surveillance of the navy makes it difficult for the communities to fish without fear of being mistaken as drugs dealers.

Most of the communities use the sea to catch species for commercialization as one of their main incomes. This has been done for years, but now it seems hard because of the competition by other firms and communities. However not all species are commercialized, those species that are not commercialized have other uses i.e. dry fish, which is sold within the communities, because it isn't in demand. Species such as Snook, is very abundant during the year. The lagoon is used as apart of reserve to the community and which the law from the community elders prohibits the commercialization of the species from the lagoon.

5.2 Consumption

It is important to people to separate consumption and commercialization. As people also use the lagoon for personal necessities, different rules are applied. Mr. Kenneth G, discusses why other communities ask the question of why reserve the lagoon only for consumption. He argued that it is important to conserve for tomorrow for our children's children. Many see this as something crazy, but working with nature and realizing the importance of what is happening gives us a different vision. The extraction of marine resources is not a problem for the communities, but it is a problem for other communities that don't know the parameters of conservation. Even though many communities have access to the extraction of the resources they are all

vulnerable to implement a law that all communities can abide, and where each one has different ideas and visions. Some communities consume all species in the lagoon, some don't, and others do it for sport.

The lagoons are often contaminated by outdoor toilets and since the communities share the lagoons, the leaders often disagree on how to manage this matter of contamination.. Consciousness is needed among the inhabitants of these communities and the importance of conservation methods to improve a better quality of environment. The need is not for one, but of all.

5.3 Management and Local Knowledge

Fishing continues to be the main activity in these communities for economic income. The open access system of the fisheries means a drastic over exploitation of the resources. As a consequence, there is a great need for management plans imposed by the government. Nevertheless, as I observed in chapter IV, people in the communities disagree strongly with regulations imposed by the government, mostly because they are not acquainted with these regulations and have not been involved in their making. As a result, the communities still cling to their own traditional ways, despite their ineffectiveness. For example, many inhabitants of the communities fish during the entire year, harvest of turtle for commercial purposes and fish lobster during the veda. While the locals may realize that these practices will not help the situation as it is, it is difficult for them to do otherwise because of factors beyond their control.

The most effective fisheries management is based on knowledge. While such knowledge may not hold instant fices, it would be unwise to ignore it. From ancient times, communities like those of the Rama and Miskito have been living in harmony with nature, as Ruddle et al (2004) points out. I believe that integrating traditional management systems in indigenous knowledge and modern management would bring better results and achievements in management. We cannot ignore the beliefs and traditions of these communities. Today, however, the local people are radically alienated from the management process. They are not allowed to participate in any decision making.

Many institutions express that they do not want to prohibit the communities to exercise their own will. In general, they seem to agree that allowing people to participate in regulating access to the marine resources will ensure better management. However, Nicaragua doesn't have a management plan for the Caribbean coast, making things difficult for all involved. Although MARENA has negotiated several agreements with the communities, the results have been disappointing. People in the communities maintain, as we have seen, that they are not aware of regulations concerning the environment and natural resources. MARENA, on its side, claims that they do know these regulations, but that they prefer to ignore them for practical reasons. Corruption is frequently mentioned as a factor here, implying that privileges tend to end up in the firms with most resources.

The Nicaraguan constitution grants to the ethnic and indigenous communities of the Atlantic coast generous formal rights to preserve their languages, religions, arts, and culture, and to use and enjoy the communal waters, forest and lands. However, these principles remain words on paper, and have never been applied in practice. People in the communities I visited felt completely abandoned by the Nicaraguan government.

The veda is a good management idea, but other alternatives are needed to safeguard the income of the communities. This proposal for a 4 month veda during 2005 will have a high impact on the community's living standards. One of the main problems is that when the veda is in operation, all firms shut down, leaving the inhabitants of the communities without work. People therefore fish in order to have an income for the family. This is a challenge to the implementation of the veda which concerns everyone, not just the community. Here, co-management can be the right tool, since that would improve the involvement of people in the communities and establish the possibility for equal opportunity for all.

The communities of the Caribbean Coast of Nicaragua are facing strong challenges with regard to property rights and access to natural resources, During this decade these communities have been in a constant battle for to protect their traditional ways, As the

agriculture front-ier move forward to the indigenous land confrontation has emerged with the colonizers. The Nicaraguan government hasn't focused its attention towards this issue, leaving the communities undefended, with no hope to recover from the loss of their land. In recent cases the indigenous people had won the awas tigni battle, which gave all credit to the indigenous people, the right to an access to their natural resources, and the land demarcation:

“The Indigenous person of the Caribbean coast of Nicaragua rarely possesses formal titles for their ancestral communal land. The land, waters, and the resources they harbor, are simply used in the supposition that they belong to them. However in many instances old titles have been proven to exist, often without the local people awareness, their title are owned by people who often live abroad.” (Jentoft 2004)

The knowledge of the colonizers about the management for natural resources is scarce, Few of them participate in workshops concerning the importance of management and the damage the agriculture front-ier is doing to the indigenous land. Beside the fact of surviving, other cultural factors existed which also have an impact on the economic practices of the colonizers. First of all the system for agriculture which they apply is a traditional way for them. This system has its background from the Pacific coast of Nicaragua. Even though, the colonizers have the vision that the agriculture front-ier brings a better way of living for them.

It is a great challenge to introduce a management plan which will be considered legitimate by these communities. There are ancestral conflicts in the community, caused by the property rights issue. Many people wishes to avoid confrontation over resources with other groups on the Caribbean coast. The conflict over natural resources is characterized by different visions. In the case of the agriculture front-ier indigenous communities, colonizers, farmers, and the government take very different positions. Implementing a management plan will need consensus between these parties.

There is a lot of controversy between institutions, regional government and indigenous people concerning the right management and implementation of different rules, regulations and law concerning the environment and natural resources. As the different institutions are very concerned about the well being of the indigenous people on the Caribbean, the implementation of a right management is needed towards development in these different communities. Some rules may be welcomed, but some may be rejected.

As different confrontations emerge between institutions, there is no clear vision of a management plan from any institution towards the development in these communities. The extreme poverty is conducted to an over exploitation of natural resources. Nicaragua does not possess any rules on open access; every one is free to fish. Institutions are struggling to maintain the balance of the resources. The centralization of power, leads to no management of their own resources as Mr. Chang says, decentralization and a political stability is needed.

In rural communities it is hard for people to create their own rules without assistance from the government. Institutions have the resources to assist these communities with their needs. But these are complex issues, and many factors which will have to be taken into consideration. For centuries the communities of the Atlantic coast have had a close relationship with nature through hunting, fishing, agriculture, crafts, etc. The revolution of 1980s was in many ways a catastrophe for the indigenous people, leading to their expulsion from their lands, war, abuse of power, corruption, etc. Some Miskito communities were torn apart by the Sandinistas. Many of these indigenous people fled to Honduras, Costa Rica and other neighboring countries and have never returned.

During this revolution, formal titles were given out to colonizers that had a good relationship with the Sandinistas. On the other hand the Somoza regime in the 1970s, had an impact on these communities when they gave out land titles to their supporters. With all these troubles in their recent past, these communities are now facing a different set of problems in the form of colonization and overexploitation of resources. Many colonizers believe that the indigenous people are lazy and don't like to work.

“So we took the land and did something good with it”. They clear the forest for pastures and broings in cattle. This is, in the eyes of the indigenous people, the way colonizers live. When the soil is barren, they go out looking for more virgin land..

As Kurniawan and Hanafi (2004) observe, indigenous communities’ rights of the lands and natural resources are based on inheritance. The right is not for the state to give. Instead, it is a right the indigenous people have, and which the state must observe. In Nicaragua’s case, the government has formally accepted the communities rights to natural resources. This law is recognized by the National Assemble of Nicaragua. However, no real progress has been seen, as the invasion of colonizers increases to the Atlantic clearly shows.

5.4 Concluding Remarks

This thesis has given an overview of the indigenous knowledge relating to marine ecosystems in the communities of Punta Aguila and Sandy Bay. During the tesis, I have struggled to understand how indigenous people interact with nature, what they know and how they get to know it. The Caribbean coast possesses rich but vulnerable marine ecosystems. As the communities recognizes, these ecosystems need to be protected from overexploitation. As the massive exploitation continues, the ecosystem is becoming fragile, causing problems for and poverty in the indigenous communities. Indigenous peoples are sensitive to the different changes occurring with their resources. While the indigenous knowledge contains ideas about conservation methods, it is hardly fit as a basis for conservation in its own right. New technology becomes an issue in communities to improve their harvest, but they are still not abandoning their tradition. The indigenous ecological knowledge contains a vast idea of conservation methods, and the different description of species has been an essential part of peoples harvesting practices. The pressure on the resources and increasing poverty problem are leading some people to adopt new harvesting methods and technologies. This is not always accepted in the communities, but looked upon with curiosity among inhabitants. While the communities may not forget their own traditional ways, they are under pressure as ecosystem are changing and species brought close to extinction. The different

regulations introduced in these communities are not accepted and hence not abided by. Decision making concerning the natural resources should therefore include indigenous people's rights to express their priorities for including certain methods which they themselves think is crucial, and not what is imposed by the government. Certain agreements between both parties are vital, for a better sustainable management.

Communities with such abundance of resources make other communities and firms operating on the Caribbean Coast of Nicaragua envious. As fishing has been one of the main activities of these communities, it is now becoming more and more difficult to access the resources. The commercialization of the different species on the Caribbean coast of Nicaragua is causing a race for fish, which is damaging to the natural resources and scarcity of species in the region. Since some species are very luxurious for commercialization, all firms and communities' activities are directed to the species that are in higher demand on the market. Even though the law had established the prohibition of exploiting certain species threatened by extinction, the commercialization still carry on, in Bluefields and elsewhere.

As different laws emerge, the need for sustainable resource management increases. Communities are not abiding with the law, because of their need to survive. These two communities that I have been studying use the lagoons for subsistence harvesting and different fishing strategies are applied; such as not to fish on Sundays and to fish with hand lines. The most effective fishery management is based on indigenous knowledge. Integrating traditional knowledge systems brings a better achievement of management rules. These local rules are not to prohibit the indigenous to fish, but to regulate the fishing activities. Fish is not only used for consumption or commercialization, but also for rituals, where the inhabitants give thanks to God by praying that they were a good fisherman and since they have eaten rosefish. The fish is used for curing different illnesses. Once you believe in it, it will happen.

For centuries these communities used the natural resources for different activities hunting, fishing, crafts etc. Conflicts of land and sea tenure have emerged as the colonizers move to virgin land possessed by these communities, which has led into

battle and killings. Nicaraguan law gives all rights to these communities when it comes to taking care of their resources and administrating it for their uses; but nothing of this has been accomplished as the colonizers still exclaim that they also are part of Nicaragua, and as such have rights to share the natural resources.

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APENDIX.

LIST OF RESPONDENCE

Sandy bay

Edgar Sinclair
Cesar Julius
Jerman Flores
Jovanie Britton
Alejandro Garden
Alex Williams
Hassin Chow
Harry Loury H.
Victor Martin
Jim Chow
Adela Chow
Elovia Davis
Estrada Gadea
Edgar Baptist
Ruben Colleman
Patricio Gutierrez
Harold Molina
Keneth Garcia
Bernardo Young
Ipolito Garcia
Eran Garcia
Leonardo McDonald
Leonardo Wialot
Ninoska Britton

Punta Aguila

Juana Ortiz
Edwin Rigby
Camela Hodgson
Ronald Rigby
Leonel Benjamin
Rito Hodgson
Alicia Belice
Elvira Mc Crea
Maria Martinez
Jose Castillo

Other respondents

Cesar Escobar (Tasba Pouny)
Elva Davis (Karawala)
Reynaldo Mc Crea (Cane Creek)
Ernesto Archibold (Corn Island)

Lampson Abraham (Kara)
Arnulfo Abraham (old leader in Kara)