

SocMon

Vulnerability and Perceptions in the Coastal Communities of Belize



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EAP Zamorano, Honduras
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Vulnerability and Perceptions in the Coastal
Communities of Belize:
Case Study of San Pedro, Placencia and Port
Loyola

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1 INTRODUCTION

With the recent development of the tourism industry and the heavy pressure on the natural resources, the use and conflicts around marine resources have significantly increased. Coastal legislation, institutional management, management structures and policy decisions are critical in the care of natura_l resources and well-being of population living in these areas. In this



light, Belize has made some progress in terms of Integrated Coastal Management, but which, considering that it has not been enforced for several years, has had many problems in the implementation of such measures. Considering all the aforementioned factors, coastal communities' vulnerability to changes in the climate can be expected to significantly increase in the coming years. Since these populations are the

most endangered, Integrated Coastal Management is critical for achieving reinforcement of local and institutional capacities and improving resilience capacity in the coastal zone.

The study, presented herein, is a comparative analysis of the situation within three Belizean coastal localities based on their socio-economic situation and vulnerability to climatic changes. The three study sites are San Pedro (Ambergris Caye), Port Loyola (Belize City), and Placencia (Stann Creek District). They represent very different situations in terms of livelihoods of the population and people's interaction with the coastal resources.

Subsequent to a brief introduction to the report, the current state of vulnerability to climatic change within Belize's coastal zones, the importance of local adaptive management, the Belizean coastal management situation over the last few years, and a brief review of the national context will be discussed. Livelihoods' patterns within the communities of interest will be discussed with respect to an analysis of the available capital through the theory of livelihoods. Finally, a discussion of the major conclusions and implications of proposed strategies identified through the study will be made.

2 CLIMATE CHANGE AND VULNERABILITY IN COAST COMMUNITIES

2.1 COASTAL LIVELIHOODS

Belize's coastal zone is one of the most socio-cultural and economically important areas of the country. It attracts both local populace and foreign visitors alike. The coastal resources contribute enormously to the national economy through industries such as fishing, tourism and agriculture. The barrier reef complex contributes significantly to Belize's GDP. According to Cho 2005, it contributes approximately 30% (). The reefs are also considered the most



vulnerable and likely the most endangered in terms of climate change.

The abundant and diverse resources within the coastal zone make it a prime attraction for human settlements. This region provides a good location to generate income from exisiting diverse economic

activities. At the same time, the major drive to migrate to coastal areas in order to capitalize on economic opportunities can essentially be problematic since it could increase conflicts among the multiple stakeholders over the rights and access to resources and living space. Belize's coastal zone is no exception. The interests of fishermen, coastal tourism operators, and agriculturalists and aquaculturalists in the interior of the country are in opposition. As a result of this, reaching a balance between so many users and a balance between the users and environmental protection requires a concerted effort at the institutional and political levels and communal cooperation. In order to conduct an analysis of the livelihoods of the populations within the three coastal communities of interest a livelihoods' theory was utilized and is summarized in the following paragraphs.

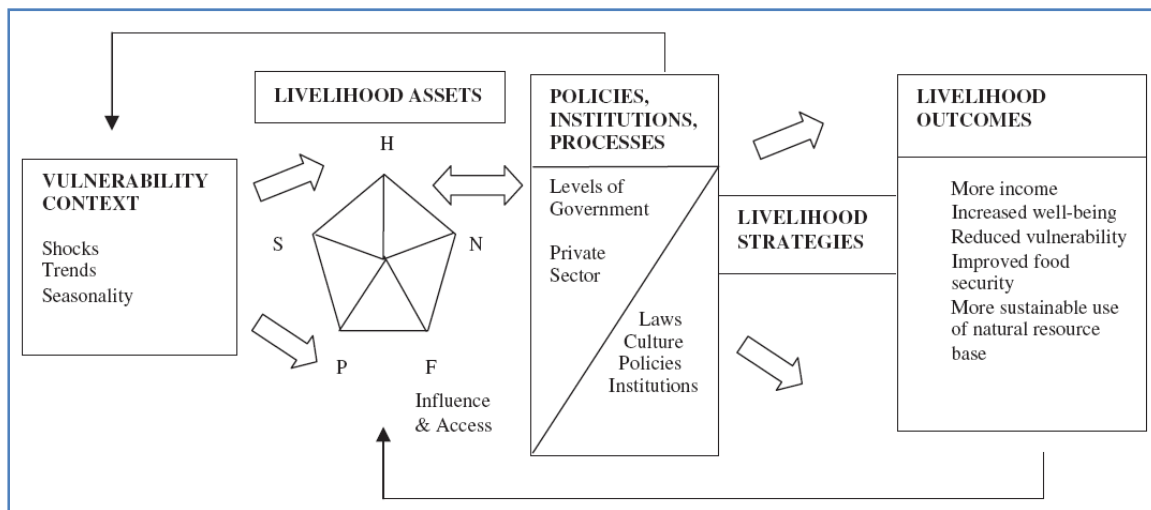
2.2 LIVELIHOODS APPROACH

The Livelihoods approach commenced with the work of Robert Chambers in the mid 80s and continued developing with Conway in the mid 90s (DFID, 2008). The adoption of this theory has represented for many institutions an improvement in their development programs, giving priority to the needs of the poor. The Department for International Development (DFID) bases the definition of capital (physical, social, natural, human and financial) within livelihoods, which permits one to identify the opportunities and threats facing a community to determine the strengths and the weakness of the area to confront the problems.

2.2.1 THE SUSTAINABILITY OF LIVELIHOODS

Sustainability is one of the essential characteristics in order to use the livelihood focus, and it is the key for the success of the theory. Sustainability implies a risk management factor and unexpected situations that enable availability of the resources for future generations. A sustainable system includes the conjugation of the economic, social, environmental and institutional aspects, and the management and adaptation to a vulnerability context such as climatic change. In coastal zones, the sustainability of natural capital is the base for development of other capitals. In this case, the productivity of the zone is based on the marine resources. The sustainability of the livelihoods may be affected by positive or negative externalities that are presented within the context of vulnerability (see Figure 1).

Figure 1: Approach of Sustainable Livelihoods



Source: DFID, 2008

2.3 CLIMATE CHANGE AND THE COASTAL COMMUNITIES

Climate plays an important role in all sectors of society and affects the cultural, social and economic well-being in all the communities of the world. It affects the hydrological resources, ecosystems, biodiversity, public health and food security (Farrow, 2008).

Climatic changes such as sea level rise and increased occurrence of higher intensity storms will increase the vulnerability of human settlements along the coast. But even with this fact settlements within the coastal zone are rapidly increasing in size and density. Frequently these settlements are built without a proper development plan and at a cost to the coastal resources (McGranahan *et al.*, 2008).

Impacts associated with climatic change include problems such as flooding, stronger currents, elevated water level as a consequence of rising sea levels, higher erosion rates, salt water intrusion, landslides, and biological effects that are especially noticeable along coastal area. The dangers to the coastal communities are accentuated due to poor planning, environmental degradation and poor and unequal economies.

In 2005, the National Oceanic and Atmospheric Administration (NOAA) established a strategy for understanding and evaluating the impact of climate change and its variations. The main objective of this strategy is to implement application of generated knowledge in sectors susceptible to climate change through decisions support system. .

An additional objective is the development of alliances in sectors where present and potential climatic changes and social vulnerability intersect, creating the necessity for information and consciousness. This is developed in the context of multiple environmental and socio-economic stresses and the necessity of associated tools and methods to facilitate the effective adaptation and increase in resilience of the coastal communities (Farrow, 2008).

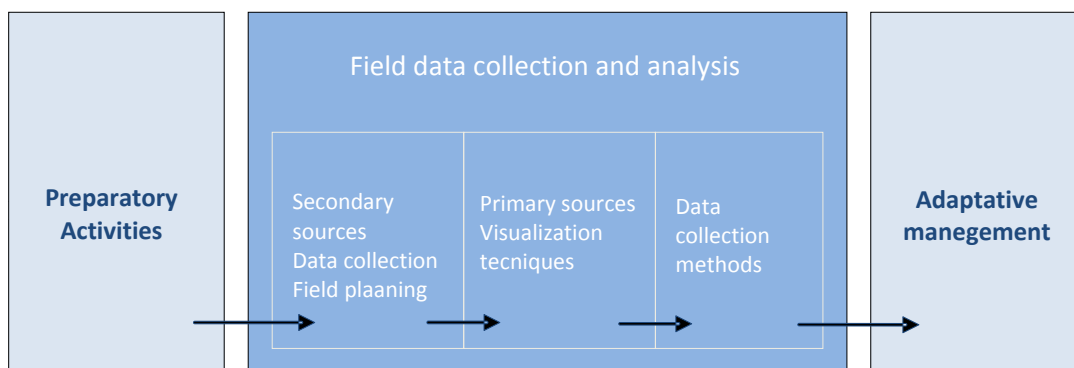
3 METODOLOGY APPLIED

3.1 SocMon

The SocMon methodology enforces the need to understand the human dimension in the management of coastal and marine resources. It provides simple guidelines and structures for monitoring that may be adapted to the needs of each study site. A SocMon monitoring, as explains within the “Socioeconomic Manual for Coral Reef Management”, includes three phases for understanding the weaknesses and strengths of the coastal marine resources that permit the creation of action mechanisms that give incentives to improve their conservation and management.

After undertaking preparative activities that include the elaboration of a proposal and its respective socialization with the included actors, primary and secondary data are collected. This phase is realized through household interviews that contain the following: socio-demographic data, social participation, migration, economic activities, climate change and finally a section of perceptions and attitudes.

Figure 2: SocMon Methodology



Source: Socioeconomic Manual for Coral Reef Management in the Caribbean.

Interviews were conducted in Placencia, Port Loyola and San Pedro, Belize, with a total of 177 interviews within the three areas of study. The zones were prioritized according to criteria such as accessibility, time, good representation, and work objectives for WWF-Belize. The data gathering includes, data obtained through observation of the component and interaction of the community with its resources and the physical state of the zone, as well as relevant data that could be obtained from community organizations as well as organizations outside the community.

Part of the methodology is the development of communal workshops that complemented the information gathered in the interviews. The workshops took place within each study site, and the principal objective was the triangulation of the field information as well as to add value and focus to some informational aspects that were previously lacking or poorly understood.

The data was process and analyzed for this phase, and then validated and transferred to analysis spreadsheets. A statistical analysis program SPSS (Statistical Package for the Social Sciences) was employed to produce statistical data such as frequencies or correlations for each variable of interest.

The investigation process employed allowed for the identification of the potential strength and weaknesses of each one of the livelihood capitals. Underlining the strengths will help the communities identify those characteristics that will support them. For the development of the report the vulnerability to climate change is analyzed in terms of the physical, social, natural, human and financial capital to evaluate the capacity of a community to reduce its risk, shorten its response time to natural disasters and adapt to the adverse changing conditions within the coast.

4 CASE STUDIES

4.1 THE BELIZEAN CONTEXT

Belize is an underdeveloped country with a small, but open, economy. As a result of its rich natural resources and a relatively small population, (approximately 370,000 inhabitants), the socioeconomic conditions in Belize are much better than in neighboring countries.

Belize traditionally has derived economic benefit from the extraction of wood, agriculture and fishing. But tourism is the item that has increased most in the last few years. Belize has, for more than 20 years, generated a policy for the protection of its natural resources. Diverse factors, however, have limited the correct performance and application of this legal framework.

The focus on the control of coastal development is rooted in the widely held belief that urbanization initiatives and tourists developments constitute the major pressures in the coastal zone. Coastal management in Belize is critical since more than half its perimeter is Caribbean coastline. The Belizean coast also forms part of the Mesoamerican Reef, the longest in the northwestern hemisphere.



Protected areas safeguard the resources of an area so that they are not overexploited, but management plans for these areas rarely include actions for the conservation of the resources from external factors like contamination or erosion. For this reason the areas are frequently degraded by such external factors.

4.2 ADAPTIVE MANAGEMENT AT THE LOCAL LEVEL

A great number of decision makers at all levels are interested in the identification of vulnerability to climate change and adaptive measures to confront these changes in coastal zones.

Many forms of adaptation have been proposed for climate change, above all for the coastal communities that are the most vulnerable. Adaptation to variability in the present climate has

been proposed as a form of adapting to climate change in the long term. In fact, adaptation to the present climate is the first step in adapting to climate change (Burton, 2005).

Knowing that it is very difficult for third world countries to do something to prevent climate change, the latest tendencies have been oriented towards reducing vulnerability of coastal communities to climate change. Some tendencies for confronting the coastal risks have been to increase and improve the response capacity prior to disaster occurrences, contingency plans and strengthening of local organizations for a comprehensive prevention. In this manner unexpected changes can be absorbed more rapidly and disaster scenarios can be evaded.

In Belize, the management of marine resources has been more oriented toward the protection of the resources with traditional measures like legal restrictions. In order to ensure that all the elements for vulnerability reduction are considered, , the planning process must allow for the necessary consultations with relevant stakeholders to guarantee a suitable balance for the implementation of appropriate programs and projects and those that will be more easily implemented.

4.2.1 PRESENT MANAGEMENT PRACTICES IN BELIZE

The administrative structure is crucial for coastal management. Belize has a complex administrative structure with many management organizations in charge of the coastal marine resources. Also the central government plays an important role in management and legislation, as well as the involvement of many governmental and non-governmental organizations (NGO's).

In Belize, the form of protection of the natural resources has been based in the creation of protected areas. This management mode ought to be a co-management between non-governmental organizations and the government, and NGO's with the local communities.

According to Young and Horwich (2006), the protected areas in Belize started a long time ago. Since the nineteenth century,when Belize was still a colony. Protected areas were established to lessen the exploitation of wood that was at that moment a very important economic activity.

Presently, the situation has not changed much as a result of origination of the coastal management context with the development of many theoretical and legal frameworks for

facilitating Integrated Coastal Zone Management. Cho (2005) reflects on efforts that have been made in Belize to realize a better coastal management and this will be summarized in the following paragraphs.

The concept of protected areas utilization for preserving important marine ecosystems was conceived for the first time in 1980 with the designation of the Half Moon Caye Natural Monument. Later, in the same decade, the knowledge of the importance of protected areas as a tool for the management of coastal and marine resources was strengthened in the national conscience. The local communities in San Pedro helped in the designation of the Hol Chan Marine Reserve to preserve the degraded marine resources of Ambergris Caye.

The process of Integrated Coastal Management began in Belize in 1989 through an initiative of the Fisheries Department and with participation from the government and NGO's involved in management of the coastal zone. The goals were to ensure proper management of fisheries and tourism developments, and the control of the potential impacts of other activities such as agriculture and aquaculture. This led to the formation of the Coastal Zone Management Unit (CZMU) that was located within the Fisheries Department. The CZMU counted on the support of the Coastal Zone Management Project (CZMP) financed by the United Nations Development Project (UNDP/GEP) from 1993 to 1998.

Due to difficulties generated in the management by the Fisheries Department, a more permanent and integrated structure was sought. This led to the formation of the Coastal Zone Management Authority and Institute (CZMA/I) in 1998. With the help of a second project financed by UNDP/GEF and implemented by CZMA/I, a network of protected areas has been developed for the integrated management of the resources. The Protected Areas Conservation Trust (PACT) is a key organization in this process. This group receives 20% of the gross income from the protected areas. The remainder is directed towards a Marine Protected Areas Fund and will be used for covering the expenses of the MPAs (Pomeroy and Goetze, 2003).

PACT is an environmental fund to improve and empower environmental management, preservation and improvement of the natural resources in the protected areas of Belize. The PACT program was established in 1997 as a small program that has presently converted itself into one of the largest grant programs in Belize, financing diverse areas such as research and education.

The key participants in this process were CZMA/I, the Ministry of Natural Resources, the Ministry of Tourism, fisheries cooperatives, conservation NGO's, community based organizations (CBOs) and international agencies such as World Wildlife Fund, The Nature Conservancy and Wildlife Conservation Society.

During the process, fishermen presented the most opposition because they sensed that they would not benefit from the changes, so education plans and public forums were necessary to complete the process (Cho, 2005). Management initiatives at the community level were financed by the Global Environmental Fund and the Protected Areas Conservation Trust (Pomeroy and Goetze, 2003)

Although a number of organizations are involved in the management of marine protected areas, communication between organizations is very limited. There is no true entity that coordinates and regulates all the organizations nor are there public accounts to ensure transparency at the community and national levels.

4.3 LIVELIHOODS

San Pedro is a small town located on Ambergris Caye, northern Belize, whose principal economic activity is tourism. Placencia is located on the peninsula to the south of Belize City and tourism is slightly less developed. That is to say that it is in a period of transition between fishing and tourism. Port Loyola presents a completely different situation. It is located in Belize City and is a marginal community badly placed a mangrove area. It is a mainly urban locality with salaried economic activities and an almost forced contact with nature because of the nearness of the mangrove forest.

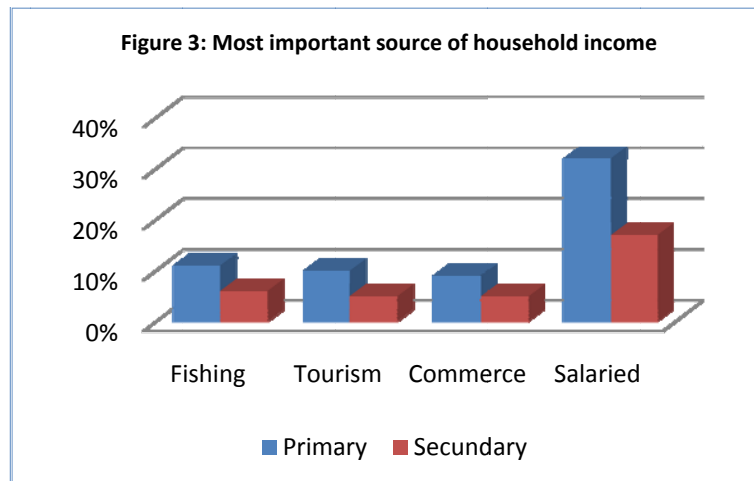
There is a marine reserve southeast of Ambergris Caye called Hol Chan. This reserve has been in existence since 2 May 1987 and is one of the first marine protected areas formed in Belize. The reserve was formed, as part of a community initiative to halt reef destruction owed to uncontrolled fishing and aquatic sports (Hol Chan Marine Reserve, on line).

In Placencia the institution in charge of co-management is Friends of Nature (FON). This organization is in charge of the co-management of the Gladden Spit and Silk Cayes marine reserves together with the Belize Fisheries Department. FON co-manages Laughing Bird Caye National Park with the Forestry Department (Friends of Nature, on line).

4.3.1 HUMAN CAPITAL

There has been a significant change in occupations since the 1980s; prior to the creation of many protected areas. Many people have changed occupations, from fishing to tourism. Many older fishermen have not change activity and are still dedicated to traditional fishing and, in general, fill the needs of the local market.

The number of salaried people is higher. This is because many people derive their main source of income indirectly from tourism such as security guards, waiters and cleaners. They capitalize off the good economic conditions provided by the tourism industry. People that live directly from tourism are tour guides and other similar occupations. Many people who previously were dedicated to fishing are presently salaried (see Figure 3).

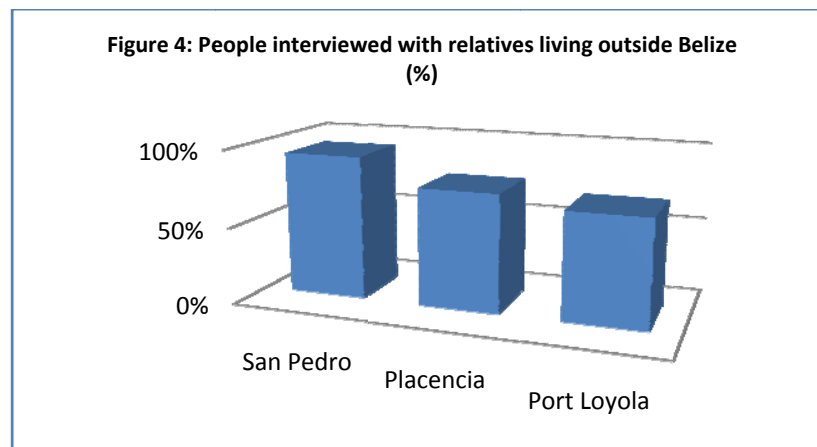


In Placencia and Port Loyola for mosts household's migration to the Unidtes States is an important strategy to generate income. The migration networks that they maintain in these localities are very wide spread. San Pedro also has its wide networks of migration, but 93% of people interviewed said that they did not receive any money (remittances) although 76% of them have family members in the United States or outside of Belize.

The migration dynamic functions in a different way in San Pedro than it does in the other communities. San Pedro is a place with a well-developed industrial tourism, and for this reason there is a high demand for labor. Many people migrate from mainland Belize or Central American countries like Guatemala, Honduras and El Salvador to take advantage of the employment opportunities. This migration is usually damaging to the environment,

because immigrant settlements are often located within mangrove forest zones. These areas are, for the most part, the only public lands; not under private ownership.

This type of migration makes it difficult to capture people's perceptions about natural resources, the presence of organizations, and how the community and its surrounding areas have changed over the last few years. Recent immigrants are not connected to their community. In Figure 4, one can appreciate that in San Pedro almost every family has relatives that are living in the United States of America, or neighboring countries.



Access to education is relatively good in the three communities, although many parents complain about the quality of the educational system. Another limitation in respect to education is that many children of immigrants are not accepted easily into schools for reasons of language as well as culture.

For all communities, twenty-five percent of the households are led by women. Seven percent of the family heads do not know how to read and write. In the three communities studied, the majority of the heads of household are young (between 18 and 35 years). The major difference between localities is in the level of education. Placencia is the best in terms of education.

Table 1: Characteristics of the Family Heads of Households				
Sex of head of family				
	San Pedro	Placencia	Port Loyola	Total
Male	78	72	76	75
Female	23	28	24	25
Literacy level of head of family				
No	8	7	7	7
Yes	93	93	93	93
Occupation of head of family				
Fisherman	10	12	10	11
Unemployed	48	16	44	25
Small Business	3	19	10	12
Tourism	23	35	12	25
Other	18	17	25	23
Age of head of family				
Youth (18-35 years)	67	45	40	49
Adult (35-60 years)	23	41	53	40
Senior (60 and above)	10	14	7	11
Educational level of head of family				
Without education	8	0	0	2
Primary (incomplete)	24	1	12	10
Primary (complete)	37	57	57	52
Secondary (complete)	32	24	19	25
University studies	0	18	12	12

4.3.2 PHYSICAL CAPITAL

Within the three study sites, inhabitants live under rural to urban living conditions. All localities have electrical power, schools, potable water, rapid access to paved roads *etc.*

In all houses the predominant roof is aluminum (69%), with wooden walls (59%). The remaining houses are half concrete and half prefabricated materials. Fifty-seven percent of the houses have wood floors, another 15% have concrete floors, and a few houses have dirt floors. Some of these houses are not inhabitable since they are poorly contracted (weak) and vulnerable to hurricanes, especially in the case of Port Loyola.

In terms of basic services, 70% of the people use butanegas for cooking and only 10% use firewood. Eighty-two percent of interviewees have water connection within homes (from many different sources), and 77% have access to public water services. In Placencia the water system is managed at the local level by a water service committee. Forty-three percent of the interviewed people have access to sanitary system connected to a sewage system and 23%



are connected to a septic tank. The remainder is divided between latrines and those that have no sanitary service.

Adequate drainage system is the major infrastructure limitation in Port Loyola. Free flow of rain run-offs is not possible, which often results in stagnant water remaining on streets and within shallow canals along streets..

Community members believe that the lack of free flow is partially due to the development of a tourist project near the Port Authority. Construction of the tourist facility led to filling-in of mangrove drainage canals that used to function as natural drainage of run-offs to the sea. With the lost of these natural drainage systems, water has nowhere to flow, thereby remaining stagnant in people's yard and on streets.

This stagnant water, in addition to the inconvenience that it creates, has been the reason for the rapid spread of diseases related to vectors and contaminated waters. Of all the social and environmental problems, this is a major concern of the community members and the situations that they would most like to resolve according the interviews.

In the communities of Placencia and San Pedro, the development of infrastructure has been very intense lately and generally it has caused the destruction of natural resources. This development rarely has a social or environmental counterpart. Generally it is geared towards large hotels construction with with little respect for environmental norms and requirements, and little interest in community development.

Another implication of infrastructure development is that people have less and less control over their territory. In San Pedro the majority of the properties that line the beach are owned by foreigners. It is nearly impossible for a local person to buy land locally because the prices are geared towards the foreign market.

Placencia is following along a similar path. Many young people and families complain about the difficulty of obtaining a piece of land. Many youths opt to live in apartments constructed in the yards of their parents, who in another era had the opportunity to purchase land. It is sad that many of the inhabitants of Placencia are selling their properties to foreign investors, in the same manner that has occurred in San Pedro.

The influence of foreign investors has affected property ownership. The majority of the population (60%) is not owners of the house within which they live. Most live in rented houses. Of the remainder, only 27% have a title to their property, while 12% live in their own house with no title to the property or with the title being processed. The majority of people, particularly those of San Pedro and more frequently in Placencia, remark that land prices have increased so much as a result of tourism that it is nearly impossible to purchase land or property because foreigners can offer a better price.

In addition, infrastructure development does not take into consideration the important fact that the ecological conditions have reached their limit. Presently Placencia does not have a sewage system and households rely on septic tanks. The general preoccupation is the present high rate of hotel developments that do not consider a sewage system capable of meeting the increasing demand. For the aforementioned reasons, people do not consider infrastructure development in these localities as being of any great social benefit, and less so a benefit to the environment.

4.3.3 NATURAL CAPITAL

The natural richness in the three study localities is undeniable. Resources like mangrove, coral, wild animals and general coastal marine resources are abundant. San Pedro and Placencia possess a natural beauty that is directly taken advantage of through tourism and fishing. It helps that local population (i.e. San Pedro and Placencia) appreciate their natural resources. In the case of Port Loyola, the locals do not perceive the eco-systematic service that mangrove forests offers and for this reason the resource is not highly appreciated.

The economic activities of San Pedro and Placencia are based exclusively on natural capital in a direct or indirect form. These two regions are oriented specifically towards the exploitation



of natural capital through industrial tourism.

The increase in tourism, although in many ways positive, is viewed by the local population with negative implications because of the marine resources for which they depend. Tourism related to scuba diving is seen as a way to increase people's consciousness of the beauty and importance of the natural resources.

Also there are types of tourism, like the cruise tourism, that are damaging to the environment because of the low environmental consciousness of the tourists and the small economic gain to the local economy due to the lack of 'over-nighting' by such tourists within the communities.

The case of Port Loyola is different, considering that it has mangrove resources, in that the population is more oriented to urban activities. It has the economic activities of salaried people that do not depend on the exploitation of natural resources and do not directly depend on the natural resources within the area. Although they are in constant contact with the resources, they do not have a relation of exploitation and dependence on natural resources. For this reason they do not sense the need and preoccupation to protect them. Many people consider them a hindrance; living so close to the mangroves create an easy propagation of certain diseases.

Placencia is the community that is best informed over the management of its natural resources. An indicator of this is their higher level of knowledge over regulations. Port Loyola is behind in this sense, probably because of the little relation that the residents have with the natural resources (see Table 2).

Table 2: Knowledge of regulations				
Activity	San Pedro	Placencia	Port Loyola	Total
Fishing	82%	96%	67%	81%
Tourism	69%	96%	42%	69%
Mangrove	44%	81%	20%	48%
Marine Transportation	26%	81%	40%	49%

The mangrove areas are particularly vulnerable to exploitation because they occupy coastal areas that are easily converted for other uses and contain valuable wood and fish. The most common reason for the loss of mangrove forests in Belize has been the pressure over construction sites. The economic and ecological losses of the deforestation of mangrove forests have still not been calculated.

Many laws exist that regulate cutting mangrove, however the control of illegal logging on local level is weak (social fencing), mangrove clearance has been on the rise during the last years. The problem does not appear to be in the local consciousness concerning the importance of mangrove. People, in general, know the importance of mangrove for soil retention, fish reproduction, bird habitat *etc*; but the economic pressure for tourism developments does not register with the preoccupation of the people.

Coral reefs are primarily endangered by eroded sediments associated with loss of mangrove and the contaminants linked to agricultural activities and shrimp farms along the Peninsula. Coral reefs are also one of the resources most at risk from climate change due to the fragility of this marine ecosystem. In general, if mangrove forests are endangered, other associated resources will also be endangered due to the multiple ecological functions that mangroves serve.

4.3.4 SOCIAL CAPITAL

Placencia is the community with the highest grade of communal participation. Also, inhabitants are more conscious of the important need to protect the natural resources and also have more organizations working towards promoting this; probably due to the fact that Placencia is a small community in which the social relations are easy to maintain.

Important organizations like the Fishing Cooperative have become weakened due to diverse external factors like the diminishment of fish resources over time, and the establishment of regulations. Fishermen complain that today there is not the same support, such as monetary advances, to purchase combustibles and the cooperative market is not secure.

In San Pedro, participation in organizations is mostly as a prerequisite for operating as a tour guide or to be able to practice commercial fishing. In general, the level of satisfaction with

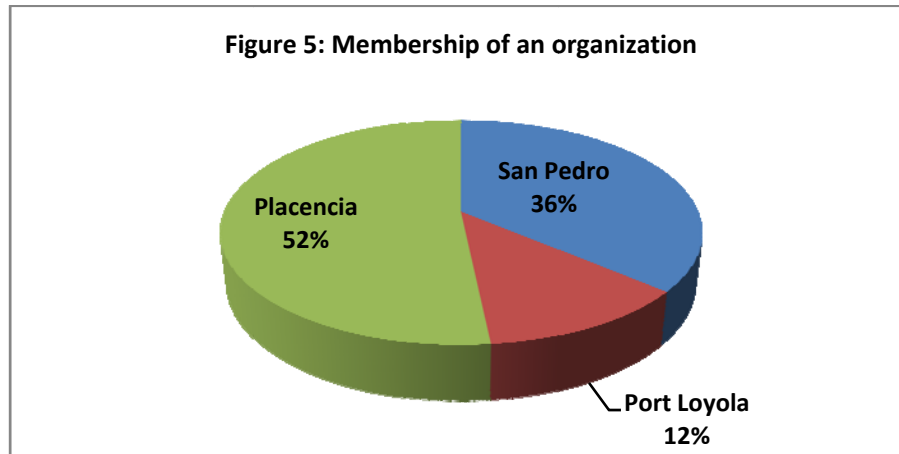


respect to these organizations is not very high. The majority of people complain about the level of transparency in the utilization of funds that result from the monthly dues that they pay in order to operate, whether it is as fishermen or tour operators.

Institutions geared towards protection of natural resources are practically non-existent in Port

Loyola. There are not many communal initiatives in this locality. One of the factors that have most influenced the inactiveness of the people is a paternal culture that has been formed over the years. Port Loyola is a densely inhabited zone with people of low incomes. They are influenced by the political campaigns that offer bribery for election votes. This practice has slowed local initiatives by promoting the idea that the fact that they are poor obliges politicians to give them support. This situation makes it difficult to do the work that could be done with the people of this community.

As can be observed in the following table, nearly half the people in Placencia belong to some type of organization. Port Loyola is where one encounters less membership in organizations; possibly due to the fact that they are closer to the urban rather than the rural area and the social relations have less value. San Pedro is found in an intermediate point. In the three localities the low level of participation of the community in organizations is troubling.



In general the NGOs that are in charge of co-management of protected areas (e.g. Friends of Nature (Placencia) and Hol Chan (San Pedro)), according to the people interviewed, have not involved the communities in the conservation activities. Inhabitants do not feel any association or ties with these organizations and are reluctant to cooperate.

San Pedro and Port Loyola, although they are small places, are more oriented toward the urban lifestyle in many of their activities and for this the social capital is not too strong. Tourism has weakened the social networks and as a result, brought about the promotion of some social problems such as delinquency and drug use. These problems have destroyed some households and have led other people to do only the minimum necessary in this respect, leading to a lack of establishment of social relations. Placencia is still categorized as a Village, and the social relations remain strong.

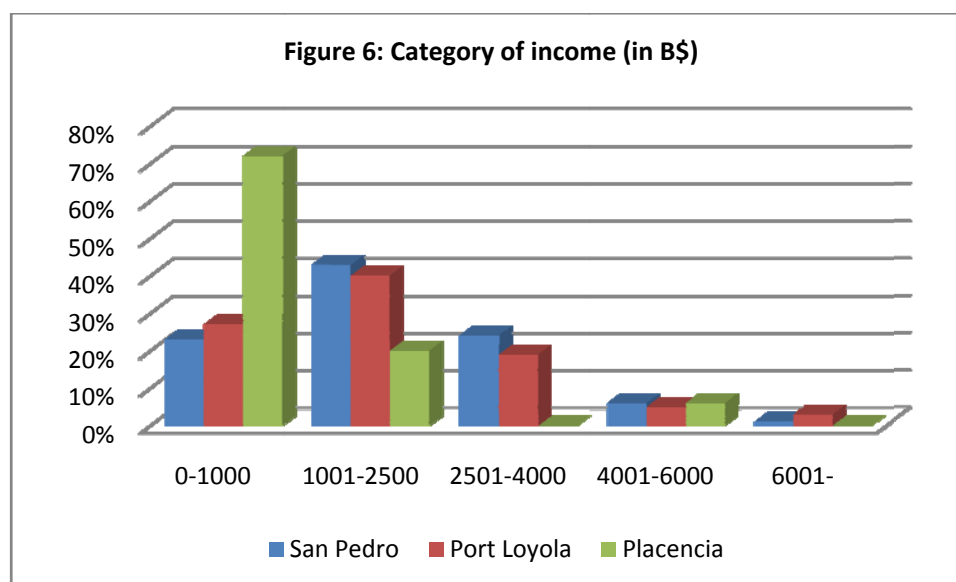
4.3.5 FINANCIAL CAPITAL

The growing tourism sector in San Pedro and Placencia has attracted the most of the banks. Although these services are very close to the inhabitants, the access to financial services, especially credit loans, is restrained for most of the local people. The lack of guarantee, short term conditions, and the high transaction costs, including interest rates and red tape costs, make it almost impossible for most of the inhabitants of both communities to get a loan for a reasonable price.

Table 3: Access to Loans and Savings Accounts (%)					
Question		Community			
		San Pedro	Placencia	Port Loyola	Total
If you need an urgent loan of \$1000, do you have access to an institution or person that could provide this amount of money?	Yes	69	90	47	72
In the last few months have you asked of a formal or informal loan?	Yes	30	27	24	27
Do you have a savings account?	Yes	66	81	58	68

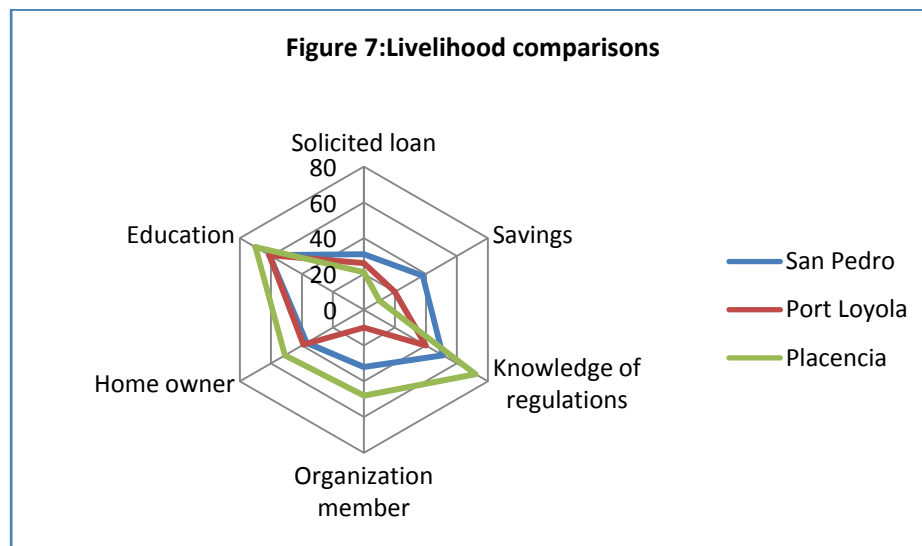
It is for this reason that the majority of the people are not accustomed to seeking loans and very few of them have savings accounts. The investment of the locals with the support of these sources of finance is not possible because the savings of the local inhabitants is very low.

Tourism is the economic activity most important, but the income is seasonal. The monthly income of the inhabitants of Placencia and San Pedro (BZ\$ 1000 – 2500), is above average for the countries within the region but this does not signify that they have a better standard-of-living because the cost-of-living is much higher. The increase in living costs is one of the principal reasons that the people complain (see Figure 6).



A weak factor for people of San Pedro is the difficulty in saving; in particular individuals that live indirectly from tourism like security guards and waiters who generally have a minimum salary. During the high period they are able to save some of their income but generally these salaries are spent in confronting the hurricane season when announcements of hurricane dangers oblige them to leave the island. Costs or spendings associated with evacuation reduce their savings. The constant vulnerability to hurricanes makes it difficult to accumulation savings in the households and consequently eliminates the opportunities of investment.

In Figure 7 depicts a summary of the capitals previously discussed that shows the weaknesses that each community has. As we can observe, the differences in terms of education and financial capital are not very different between communities. The major differences are in respect to social capital with the membership in organizations and knowledge about regulations. Placencia clearly leads in these areas.



4.4 ATTITUDES AND PERCEPTIONS

Attitudes and perceptions are principally oriented to the activities of management of natural resources and the present situation of the natural resources as well as the changes observed in the surrounding environment. The most negative and marked perceptions are always towards the government, which they consider the major threat to the natural resources.

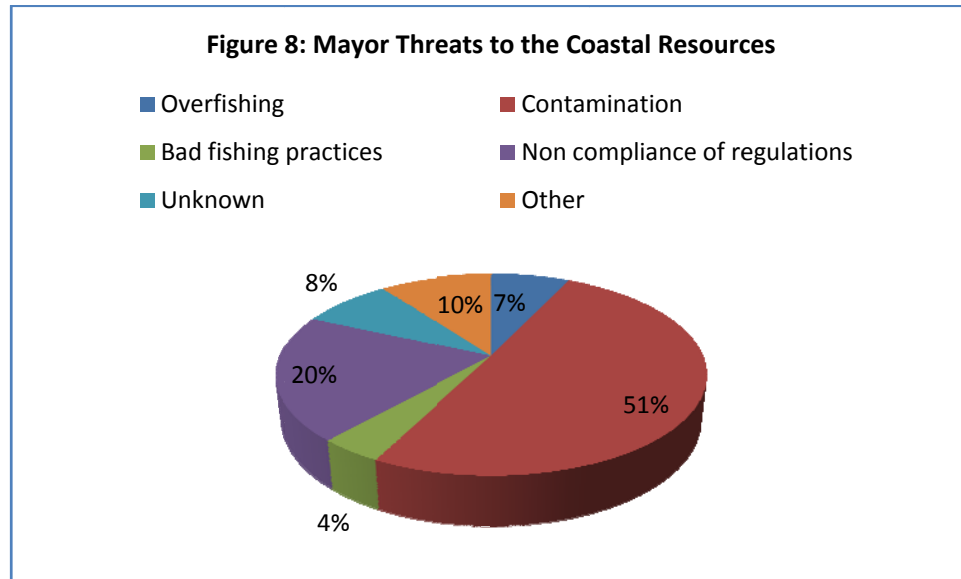
The level of preoccupation in terms of the destruction of the marine resources varies widely among communities. Seventy-six percent of the people in Placencia feel that their life is endangered by the loss of the natural resources in the region. This contrasts with only 33% in San Pedro and 62% in Port Loyola.

The perceptions in terms of the management organizations are likewise not very positive. Of the people who know the institution(s) that protects the natural resources, 25% in Placencia and 44% in San Pedro feel that the present management organizations have improved the conditions of the community. In Port Loyola, there is no organization that manages the resources, and for this reason there are no opinions for this question.

The perception of the fishermen is that the protected areas are only for the benefit of the tourism industry and that they had not been taken into consideration by anyone. For this reason many of them consider that their condition of life has not bettered much as a result of the management organization and on the contrary they had been affected negatively.

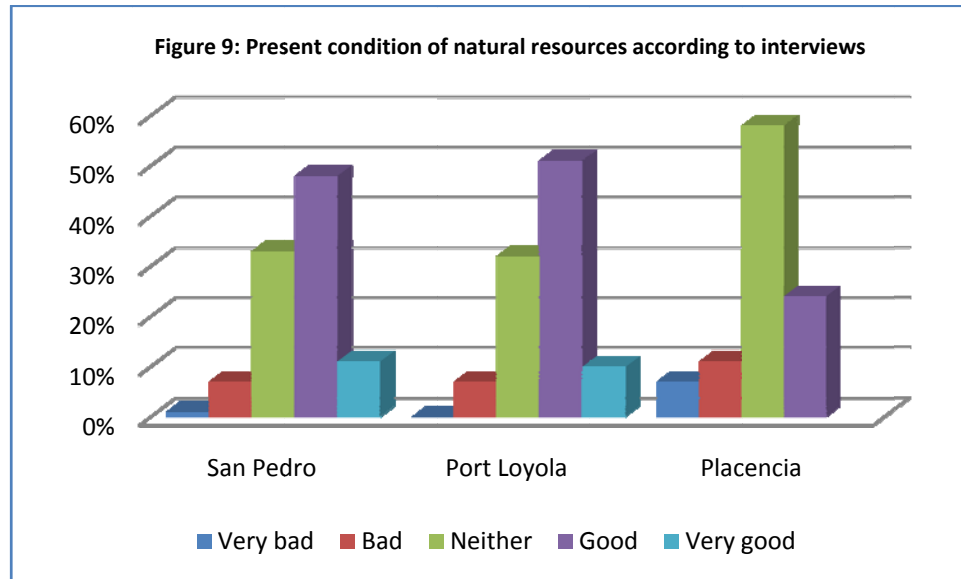
Some of the people interviewed stated that they had observed changes in the movement of fish in particular tour operators since their job entails taking tourists to specific sites to observe certain species of fish. Many of these fish had migrated and not returned.

It is worrisome that contamination is seen as the greatest threat to natural resources. Contamination is primarily considered owed to the release of waste water or effluents from shrimp farms to adjacent lagoons and the sea; especially in the case of Placencia. The lack of complying with regulations is also an important reason, above all the regulations related to fishing. The majority of people do not consider fishing as a destructive practice even with the low regulation compliance.



In San Pedro 48% of people interviewed agree that available resources have diminished in recent years. This compares to 81% and 83% in Placencia and Port Loyola respectively. It must be stressed, however, that mangroves are the resource that people miss the most due to the fact that the sea has been eroding the mangrove zones and the people have noted smaller birds populations. The loss of mangroves was more often mentioned than the bleaching of coral. On the other hand, seagrass is a resource that was only mentioned by 2% of the people interviewed. Seagrass is not a resource that people have identified with nor do they know its function. For this reason it is a resource that is more vulnerable to degradation, which makes it necessary for public education with respect to these natural ecosystems.

In terms of the general perception on the present condition of the natural resources, it is encouraging to note that in Placencia and San Pedro the dominant opinion is that the resources are in good condition. The answers of “very bad” and “bad” are less selected. In Port Loyola the most selected option is “neither good nor bad”. This could denote an indifference towards the natural resources on the part of the respondents.



In terms of the opportunity for community members to participate actively in resourcemanagement, Placencia got the highest percentage of participation with 34%, followed by San Pedro with 30% and 18% in Port Loyola. This percentage is low for all study sites. The higher percentages of the answers were received in the option of “Neither agree nor disagree” that denotes in part the disinterest of the people in this activity.

For compliance with regulations, the highest percentage is in Placencia with 69%. The majority of the people in the community generally comply with the regulations. In San Pedro only 28% of those interviewed believe that they do not comply with the regulations; particularly for people not living On the Island like fishermen from the mainland and foreign investors. In Port Loyola, only 22%, believe that there is a lack on compliance and principally owed to urban activities like driving an automobile, construction in the mangrove *etc.*

In terms of fishing regulations, the level of acceptance of the temporary restrictions is much greater than for the permanent prohibitions, like in the case of the protected areas that do not permit any type of fishing. Concerning the temporary fishing restrictions, the majority of people agree that these are necessary to assure the growth and reproduction of the fish; about 75% of the people interviewed. Although many people agree, they also are of the opinion that many people do not respect the closed season. The regulations that present the most

problems are in places that never permit fishing. Only about 40% (see Annex 1) of the local population think that there are places that always should have restricted fishing.

Climate change is a term that majority of people in San Pedro and Port Loyola did not recognize, and they have little understanding of the possible effects of this phenomenon. Although they do not associate the absence of birds to climate change, the majority of the people believe that the movement of the birds is due to habitat loss; mangrove forest as an example.

In general, in San Pedro and Placencia the majority of the people agree that the coastal resources are important and it is necessary to protect them. In addition they show a certain level of consideration for the natural resources. In Port Loyola, due to a lower relation with the natural resources because they do not depend directly on them, people do not pay attention to the tendencies, and many have not noticed the changes in the behavior of birds and other wild animals. The changes that are most felt are related to the increase in the intensity of the rains, and it is particularly worrisome since they are already vulnerable to flooding and increase rain will increase flooding.

5 CONCLUSIONS AND POLICY IMPLICATIONS

5.1 CONCLUSIONS

This study illustrates the livelihood situation within three different coastal communities in Belize. Through the application of the SocMon methodology and with the help of the Theory of Sustainable Livelihoods it has been possible to determine some important factors to take into account when making interventions within the study areas, to reduce the vulnerability to adverse changes in the climate.

Since the effects of climate change, for different reasons, affect some zones or regions more than others, the perspectives of resource management should be more focused on local based management procedures (from the local environs). To achieve this, it is necessary that communal participation in the management and conservation of resources within all three study areas be increased. Placencia is the community that participates with the most frequency, they also feel the most involved, and they have the highest degree of consciousness over the danger that the destruction of the natural resources has for them.

The interest to make money leads, with frequency, to take decisions that increase the vulnerability not only of these development projects but also the entire country. In Belize City, the fact that they have blocked the natural mangrove drainage canals is a time bomb. As the intensity of hurricanes increases and drainage of water run-offs continue to be a problem, there is a potential major flooding problem.

We observed that in the three cases, the development of infrastructure has not had a social or an environmental counterpart. In addition, it has generated unconformity with the inhabitants of neighboring regions and also reduces the health and integrity of adjacent ecological habitats. Weighing the diverse efforts that Belize has carried out to try to promote an integrated management of land use activities and the conservation of the coral reefs, the general perception received is that integrated management has not been reached due to few regulations for citrus cultivation and aquaculture and weak enforcement with respect to development activities. Marine protected areas do not include within their management plan activities taking place on land. Although conflicts of interests are very great, and the situation is not easy to manage, efforts to integrate these activities that have been done in the past should be taken.

Placencia presents goods conditions for more efficient interventions due to the strong local capacities, higher consciousness over the importance of the natural resources and higher educational level. The situation in San Pedro is made difficult by the larger tourism development that increases the economic interest of various sectors. The intense migration makes it difficult for the development of local capacities relating the people with their territory, one of the factors of major intervention.

In Port Loyola, strengthening of local capacities has been affected by the culture of paternalism that will be difficult to break. Preoccupation of the population for socioeconomic factors like poverty, disease and drainage, makes it difficult to increase the interest of the people for the protection of the natural resources.

5.2 Policy Implications

As can be observed in the three case studies, livelihood conditions are very different for the three localities. This means that specific actions need to be elaborated for each intervention area. Adaptive management confronts the theme of vulnerability from the perspective of increasing the resilience of the present systems in a given territory.

Adaptation is not new. It recognizes the best planning and the use of different information is based on the people and in the recognition that the future will be different from the past and that populations should be prepared for these changes.

Strengthening the social organizational structure to improve the social capital in the three communities is critical for helping the communities develop local solutions to reduce their vulnerability to climate change and other adverse situations through the development of adaptive management. Since the management of coastal resources is clearly one of the risk sectors, it must be seen as a priority.

It is necessary to work with the organizations charged with the co-management of the protected areas so that they involve, to a greater degree, the communities in the management of the local resources. The transparency and inclusion are key factors in gaining the confidence and support of the communities. This action will facilitate the implementation of the management plans and the protection of the resources.

It is necessary to intensify the work in Port Loyola and propose that efforts, made in order to improve conditions, are not given as gifts by the government or other institutions. In Port Loyola, the principal factors of vulnerability to climatic effects are inadequate drainage system and the poor management of garbage. These two situations, although not related to climate change directly, reduce the resilience of this place. In the same way, it is recommended to identify solutions together so that they are not only oriented to the themes of climate change, but also to themes of specific interest for the community like socioeconomic problems.

In San Pedro and Placencia, work should be done specifically with the community to allow development of capacities that permit the population to generate solutions that are local initiatives and made through consensus. Working with the people is indispensable because they are the only ones that know in depth the situation in their community. They know changes in their territory that permit the formulation of change scenarios and proposed solutions.

After deciding the necessity of an adaptive measure, each adaptive action needs to consider the relation between adaptation and mitigation, and if the adaptation will make the mitigation difficult or easy to attain. We should know the local conditions to know if the interventions are adequate, and that they will not aggravate the problem.

A mapping of the possible future changes in the climate and a mapping of vulnerabilities that is done in conjunction with the community will help to plan where to start to attain adaptation options and insure that the inhabitants are part of the process.

This and other considerations need to be taken into account to reach a significant level of planning before doing any implementation plan of any adaptation decision. The feedback could be the evaluation of the present success of the different actions of adaptive management and the continuation of these evaluations in the future.

It is important that actions to be taken offer a “win-win” negotiation. There needs to be a balance between all the interest groups and mutual agreement that considers not only benefits to present generation but also the future generations.

ANNEX A

Perceptions of Management and Use of Natural Resources (in %)				
Aspect	Options with percentage by community	San Pedro	Placencia	Port Loyola
Your quality of life is endangered by the loss of natural resources.	Strongly disagree	8	2	2
	Disagree	12	9	25
	Neither agree nor disagree	47	12	11
	Agree	14	38	55
	Strongly agree	19	38	7
Fishing should be restricted in certain areas, although no one ever fishes in these areas.	Strongly disagree	8	3	2
	Disagree	8	16	36
	Neither agree nor disagree	13	22	29
	Agree	46	27	18
	Strongly agree	25	31	16
The temporary restrictions of fishing help fish reproduction.	Strongly disagree	7	0	2
	Disagree	2	4	20
	Neither agree nor disagree	13	3	18
	Agree	50	31	47
	Strongly agree	28	60	13
People comply with the rules and regulations.	Strongly disagree	15	0	7
	Disagree	26	13	47
	Neither agree nor disagree	31	18	24
	Agree	23	60	18
	Strongly agree	5	9	4
People have the opportunity to participate in the taking of management decisions.	Strongly disagree	8	3	11
	Disagree	15	40	62
	Neither agree nor disagree	46	31	9
	Agree	25	15	11
	Strongly agree	5	9	7
The living conditions within the community have been improved through the support of the organization in charge of the protected area.	Strongly disagree	9	3	24
	Disagree	19	16	58
	Neither agree nor disagree	28	55	13
	Agree	30	21	2
	Strongly agree	14	4	2
The availability of natural resources has diminished in the recent years.	Strongly disagree	4	3	2
	Disagree	8	3	2
	Neither agree nor disagree	40	13	13
	Agree	33	39	56
	Strongly agree	15	42	27

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