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Alternative Livelihood Analysis in Padre Ramos Protected Area. El Viejo, Nicaragua



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Sustainable Coastal Communities and Ecosystems Program (SUCCESS)



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Cover Photos:

Left Upper, Don Juan farm's in Padre Ramos

Right Upper, Bread making

Left Bottom, Best management practices for shrimp farmers

Right Bottom, Jewelry making

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Abstract

A description of livelihood activities and results of the USAID-URI-SUCCESS Program implemented in several communities surrounding the Padre Ramos Nature Reserve in Nicaragua was analyzed in this report. In Padre Ramos Protected area were promoted or assisted the alternative livelihoods like making hammocks, jewelry making, bread making, and best management practices for small shrimp farmers and ecotourism. For all activities, field staff from Centro de Investigación de Ecosistemas Acuáticos (CIDEA) was interviewed in order to know which were their challenges and lessons learned during the implementation of these livelihoods. For SUCCESS Program to promote livelihood alternatives is a strategy to advance quality of life, improve ecosystem health and empower rural coastal communities living in a high degree of poverty. Additionally is a means to advance social justice among people living in unbalanced conditions. For CIDEA, the SUCCESS Program is the first experience working in alternative livelihoods in impoverished communities. CIDEA is emerging in Nicaragua as an Integrated Coastal Management (ICM) center and playing an important role building constituencies and empowering people among different groups in turn to improve their quality life promoting an ICM context in the country. CIDEA undertook livelihood strategies in Padre Ramos estuary mainly focused on training and field extension supported by small subsidies or grants that help to carry out these activities. One significant lesson pulled out from the experience is that without understanding the capacity, needs and aspirations of the groups, bad livelihood advice is given and success is highly unlikely. To work with communities who are business minded and have a leader nature can be a better method to reproduce livelihoods and allow to others join to the initiatives. Coastal rural communities living Padre Ramos estuary work day by day to obtain their incomes. This routine, sometimes, is an obstacle to initiate alternative livelihoods that are thought to get benefits in medium or long term, as is the case of ecotourism or hammocks in Padre Ramos Reserve. Frequent extension visits and training play a catalytic role. In impoverish communities such as Padre Ramos frequent visits construct more trust and open their mentality to cooperate and communicate their necessities and ideas and that is a crucial point to have success. Women play also a central role. Most of women are in charge of the education of their family and a profit that comes through an alternative livelihood promotes social justice and education for their children. Groups come with a preconceived and enthusiastic idea that not always has direct relation to ICM framework. To strengthen those links is something that is necessary to underpin for CIDEA. The selection of beneficiaries of the project may bring in some difficulties because in some cases among beneficiaries exist a project mentality that works against sustainability and project buy-in. This report finally concluded that create alternative livelihoods in communities with a low level of education and immense basic necessities is a challenge that requires understand the idiosyncrasy of the communities and deal with them with persistence, practice and sensible knowledge to understand their necessities and be capable to transmit a ICM model among them.

Resumen

En este trabajo se describen las actividades alternativas o modos de vida promovidos e implementados por el Programa USAID-URI-SUCCESS en varias comunidades la Reserva Natural Padre Ramos y las lecciones aprendidas en la experiencia de implementación. En el área protegida de Padre Ramos se han promovido o asistido modos de vida alternativos como fabricación de hamacas, fabricación de bisutería marina, panaderías, buenas practicas de manejo de cultivo de camarón para pequeños productores e iniciativas de ecoturismo. El personal de campo del Centro de Investigación de Ecosistemas Acuáticos (CIDEA) fue entrevistado en este análisis con la finalidad de conocer cuales fueron sus dificultades, retos y lecciones aprendidas en la implementación de los modos de vida mencionados. Promover nuevas alternativas de trabajo en lugares como Padre Ramos puede conducir a resultados muy positivos como mejoras en la calidad de vida de las comunidades, mejora de las condiciones del ecosistema y dar confianza a comunidades que viven en condiciones extremas de pobreza. Para CIDEA, el Programa

SUCCESS es la primera experiencia trabajando en modos de vida en comunidades viviendo en condiciones de pobreza. CIDEA esta emergiendo como un centro de gestión costera integrada en Nicaragua gracias a la realización de programas como SUCCESS y jugando un importante papel en desarrollar confianza en el futuro entre las comunidades de la costa noroeste del Pacifico, promoviendo las ideas de la gestion costera integrada y el desarrollo sostenible. CIDEA promovio los modos de vida alternativos en Padre Ramos con estrategias centradas en entrenamiento, labores de extension en campo y pequeñas ayudas o subsidios para poner en marcha las iniciativas. Una de las mas importantes lecciones aprendidas por CIDEA en este proceso es la necesidad de entender la idiosincrasia local y las aspiraciones de los grupos de beneficiarios. El trabajo con comunidades que tienen una vision de negocios y las personas con naturaleza de lideres es una de las claves para aumentar las posibilidades de éxito. Las comunidades costeras en Padre Ramos viven el día a día y en éste basan sus ingresos. Esta vision tan cortoplazista ha dificultado las iniciativas promovidas como es el caso de fabricación de hamacas o ecoturismo. Las visitas del personal de campo son cruciales para crear confianza y nuevas esperanzas de mejora entre las comunidades. Las mujeres en el estuario Padre Ramos tiene un papel importantísimo ya que están a cargo de la educación de sus hijos y cualquier mejora en el nivel de ingresos promueve la mejora en la educación de sus hijos y la justicia social en estos lugares tan deprimidos.

En ocasiones los grupos se han acercado a CIDEA con ideas preconcebidas y entusiastas que no siempre están relacionadas con las ideas de gestion costera integrada. Reforzar esas conexiones es vital para trabajar en gestion costera integrada. Otra lección aprendida por CIDEA en Padre Ramos es acerca de la selección de beneficiarios del proyecto, la cual debe ser cuidadosamente estudiada para evitar que personas que no esten realmente interesadas se beneficien del mismo. Finalmente concluir resaltando que la creación de nuevos modos de vida en lugares con bajos niveles de educación y donde existen grandes necesidades básicas para las comunidades es un gran reto que requiere comprender la idiosincrasia de las comunidades y trabajar con persistencia, sensibilidad y sabio conocimiento para comprender mejor y ser capaz de transmitir un modelo de gestion costera integrada y sostenibilidad.

1. Introduction: SUCCESS goals in the current Nicaraguan economic context

The SUCCESS Program is intended to benefit communities surrounding the Padre Ramos Protected Area in Nicaragua. These communities live in extreme poverty and depend on natural resource and extraction. Yet, there is a growing deterioration of these natural resources. SUCCESS Program in Nicaragua is working with the communities to develop alternative livelihoods. The Program is also raising the communities' sense of awareness of their environment and their capacity to manage it in a sustainable way. Through the development of alternative livelihoods and voluntary adoption of good management practices for shrimp farmers, the Program seeks to improve the communities' quality of life (i.e. food security, health, education), diminishing pressure in natural resources, and promoting economic independence through small business and creating the ability to access markets.

SUCCESS Program is running separately from a Nicaraguan National Integrated Coastal Management Program. Currently there is not a National Coastal Policy approved that advices and regulates on how should be coastal management in coastal areas. SUCCESS Program is implemented in Nicaragua through the Centro de Investigación de Ecosistemas Acuaticos (CIDEA) and the Universidad Centroamericana (UCA).

SUCCESS Program focus its implementation in Padre Ramos protected area and its rural population. Padre Ramos was declared by the government in 1983 to protect the wetlands and mangrove forest and its fauna and flora associated. Important to be considered that this area was not pristine and formerly to its declaration it had been used mainly for agriculture and fisheries uses. Communities within this area lived there previously its declaration.

The existing legal tools to protect Padre Ramos have not stopped the degradation and exploitation of these ecosystems. Communities living in these places are working in fisheries, shrimp farms and cutting mangrove wood. Livelihood communities are linked with the existence of mangrove ecosystem. To manage natural resources in a sustainable way it is necessary to look for other livelihood alternatives and strategies in order to balance use with conservation.

One of the main important goals in SUCCESS Program in Nicaragua has been to work with rural coastal communities. In the context of USAID Biodiversity Earmark, CIDEA has encouraged alternative livelihoods in extreme poverty communities as a way to support small economies and promoted sustainable uses for natural resources within Padre Ramos protected area.

In a country where coastal policy is scarce and rural communities live in extreme poverty, mechanisms to improve biodiversity should be joined to new livelihood strategies in turn to improve the wellbeing of coastal rural communities.

To understand better the economic and social context where SUCCESS Program is working it is important to point out that Nicaragua remains the second-poorest nation in the American continent. Unemployment is officially estimated at 5% of the economically active population; however, an estimated 60% of workers belong to the informal sector. Nicaragua suffers from persistent trade and budget deficits and a high internal debt-service burden. Foreign assistance totaled 26% of the budget in 2006. Nicaragua also depends heavily on remittances from Nicaraguans living abroad, which totaled \$655.5 million in 2006.

Exports have been one of the key engines of economic growth in these recent years. Although traditional export products such as coffee, meat, and sugar continue to lead the list, shipments of non-traditional exports such as vegetables, tobacco products, gold, and free trade zone products (textiles and electrical harnesses) increased markedly in recent years. Nicaragua is primarily an agricultural country, but light industry (maquila), tourism, banking, mining, fisheries, and general commerce are expanding.

Nicaragua faces a number of political and infrastructure challenges in achieving sustainable economic growth. Long-term success at attracting investment, creating jobs, and reducing poverty depend on its ability to comply with a new International Monetary Fund (IMF) program, resolve the thousands of Sandinista-era property confiscation cases, and promote a positive investment climate. In July 2007 the government successfully negotiated a new IMF agreement which requires implementation of free-market policies and includes targets linked to energy, pensions, fiscal discipline, and spending on poverty.

1.1 Place

Nicaragua is a country decentralized administratively and divided in Departments and Municipalities. El Viejo is one of the six municipalities that form the Department of Chinandega. Padre Ramos Natural Reserve was declared a Natural Reserve in 1983 by national decree and is one of the most important natural protected areas in El Viejo municipality (see Figure 1).

Padre Ramos Natural Reserve is an estuary located on the northwest Nicaraguan coast within the El Viejo municipality. It is important to point out the historic past of this Reserve. The territory that is now the Padre Ramos Reserve was used in the 50's and 60's as an intensive agriculture and livestock area following the exportation policy model of Nicaragua in those years.

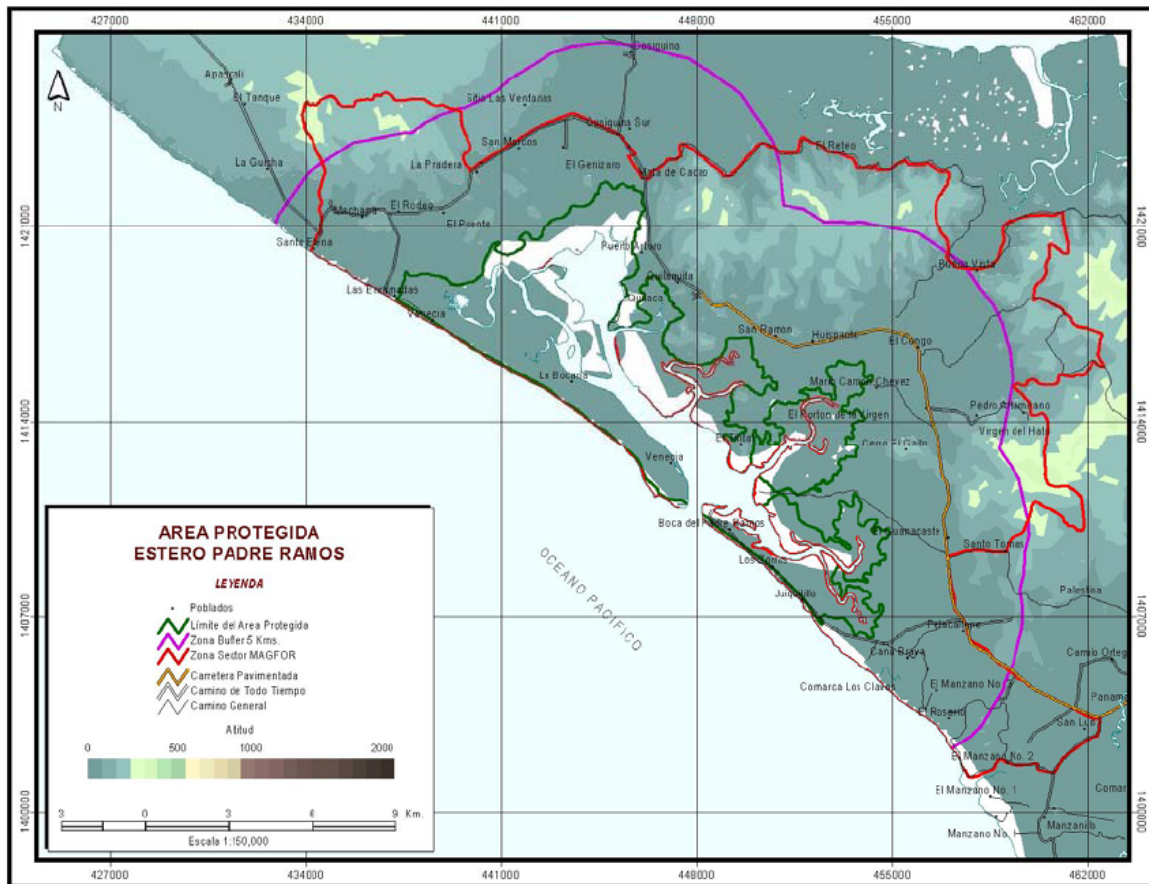


Fig. 1: Natural Reserve Estero Padre Ramos. Análisis y Diagnóstico Socio-Económico de Áreas Protegidas. Jirón J. Aldén, 2005

The area that now occupies the Reserve was used to cultivate cotton and sugar cane, and extensive development of livestock herds. Many of the areas that are named as ‘Natural Reserves’ in Nicaragua have been deforested. Parts of its native environment – including its fauna and flora - were damaged. The 1981 Agrarian Reform transformed the way to cultivate the lands. The large owners disappeared and the lands were given to small farmers and cooperatives.

The Padre Ramos protected area is an estuary which extended toward the interior part of El Viejo Municipality forming channels and ramifications. The Padre Ramos Reserve is characterized by a Sabana Tropical Climate which consists of a dry and wet season. The common vegetation is Subtropical Dry Forest, and the rain is seasonal between May and October, with average rainfall of 2020 mm annually. The rainfall in the Reserve has a torrential character provoked by the orography. The average temperature varies based on the location due to the existence of microclimates. According to Alden 2006, the temperature in the Reserve ranges between 24°C and 32°C annually.

Within the estuary the ramifications and channels are covered by mangrove forests in its banks. The most abundant mangrove species are *Rizophora mangle*, *R. racemosa* and *Avicenia spp*, among others less abundant. Mangrove forest are an especially important habitat since they offer protection to numerous species such as cockles, larvae shrimp and fishes which play an essential role in the local economy. The mangroves in Padre Ramos are also a stop for migratory birds and other bird species and a reproductive area for numerous marine and estuarine species.

Numerous species have been identified in the Padre Ramos estuary: 156 species of birds (48 migratory), 21 mammals, 20 amphibious and reptiles and 45 aquatic species (among them, 7 crustaceans, 3 mollusks and 35 fishes). Some of these species are threatened or are listed in CITES list such is the case of reptiles like *Crocodylus acutus* or *Ctenosarura similes* and *I. Iguana* used by local population as a source of proteins. Such fauna and animal biodiversity can be used in other sustainable ways by the local population in order to avoid overexploitation.

The marine ecosystems are not very well known in this area because there is an insufficient knowledge and studies in this area and furthermore there are not enough qualified professionals dedicated to these topics. However, it is recognized that the Padre Ramos marine ecosystems are very rich and consist of reefs and sandy ecosystems. It is believed that these ecosystems are seriously affected by the anthropogenic effects (dynamite fishing, pollution, sedimentation).

1.2. People

The Estero Padre Ramos is populated by several rural communities that depend on fishing, cockle gathering and related activities. Although the area is officially under a co-management scheme, it faces serious environmental threats and its communities are impoverished with little access to services, markets or other opportunities.

Most of the population is concentrated in coastal areas such as the communities of Jiquillo, Venecia, Los Zorros or Padre Ramos. Other communities are scattered around the buffer and border areas of the Reserve such as Mata de Cacao, El Congo, Cosiguinia or Santo Tomas. Whereas coastal communities are dedicated to fisheries and gather shellfish at the estuary banks, disperse communities located in the buffer area work in farming, livestock and aquaculture (shrimp farming).

The coastal areas of the Reserve have artisanal fisheries as a main economic activity. The communities gather shellfish, lobsters and shrimp larvae. However, overexploited fish and bivalve stocks, removal of mangroves by shrimp farms and increased pressures by immigrants from elsewhere have combined with rapid local population growth to make income generation and food security increasingly tenuous in the area. Fishermen from El Salvador and Honduras seriously operate in Padre Ramos Estuary and its marine area extracting shellfish and fisheries in an illicit way.

Some members of the communities work in farming and aquaculture at farms located in the buffer area of the Reserve. Coastal communities carry out an incipient tourist activity that is rising in a disorganized way and without sufficient regulations. Tourism activities and retirement settlements are growing rapidly along the Nicaraguan coast creating possible opportunities for the smaller communities, but also some pressures.

Most of the families are living in undeveloped housing made with mangrove wood, plastics or zinc roofs. For the most part there is a lack of sanitary systems, electricity or potable water. In addition, the houses are particularly vulnerable to natural disasters such as storms or hurricanes.

Social conditions are also poor. The number of teachers in the region is not sufficient, and many children in school age cannot actually attend to the school as they work to support their parents, sometimes providing the income for the whole family. A substantial percentage of women are in poor conditions, with a large number of single women ill-treated without resources and with children in their care. Men also have educational and cultural challenges which manifest in alcoholism and family abandonment.

2. Tourism Development at Community Level in Padre Ramos Protected Area

The Association Finca Mar is a group dedicated to fostering alternative tourism in Padre Ramos Protected Area. They are located in the Chinandega Department within El Viejo Municipality, along the coast of the Padre Ramos Estuary. This area covers 245 hectares, of which 40 ha are dedicated to shrimp culture. The membership of Finca Mar consists of various cooperatives, small and medium-scale agriculturists, cattle farmers, shrimp farmers, craftsmen, restaurants and boatmen—all brought together with the vision of starting alternative tourism. The groups that make up Finca Mar are organized in various forms—cooperatives, associations and collectives—representing 67 families.

One of the most well-preserved mangrove forests in Nicaragua is situated in the Padre Ramos Estuary. The Reserve is located in a coastal area of immense aesthetic beauty, which spurred the concept of alternative economic activities, oriented towards ecotourism. CIDEA supports the ideas of Finca Mar about how implement ecotourism activity within the Padre Ramos Reserve. Among their ideas, they proposed to design a terrestrial and an aquatic route through the estuary combining the tourist routes with visits to the places where families work, such as shrimp or livestock farms. Members of Finca Mar chose Padre Ramos buffer area compound by a small rural community for this tourist activity and other coastal communities. Within Padre Ramos buffer area there is a scattered population approximately of 816 inhabitants with lack of infrastructure, potable water or electricity. Most population in Padre Ramos buffer area work in farms and collecting shrimp larvae seasonally. Finca Mar had already started a process to promote their ideas when CIDEA offered its support to the group. Finca Mar had worked with national institutions searching for support such as the Millennium Account, Nicaraguan Tourism Institute (INTUR) and European Programs operating in Nicaragua.

A series of studies and community exercises were conducted to evaluate the feasibility of alternative tourism and to identify resources, sites and personnel for tourism. Training in entrepreneurial vision was also given to members of Finca Mar to prepare for the development of tourism. The feasibility and viability of alternative tourism in Finca Mar was being assessed by faculty and students from the UCA Tourism Faculty. A study was conducted on the potential for tourism in Finca Mar and identification of possible products. Tourist trails were defined and developed, and interpretative materials and sign posting were created (see Fig. 2 y 3). Local tour guides were trained and began to practice how to serve as a guide along an aquatic trail within the Padre Ramos area. Tour guide training has been conducted in coordination with bird specialists. The area proposed for the aquatic trail is rich in natural displays, such as bird life and nesting areas, mangroves, and dry tropical forests. In addition, the trail has interesting activities to examine such as shrimp farming and cattle ranching.



Fig. 2: Entrance to Finca Mar



Fig. 3: Finca Mar Terrestrial tour

Due to the fact that CIDEA has been dedicated mainly to aquaculture, the center looked for support in other university schools such as Tourism, Economics or Engineering to help promote alternative tourism in the area. Ecotourism development continues at Finca Mar –working with the community and tourism specialists to develop marketing strategies, including development and pricing of tourist packages, make contacts with embassies and NGOs to encourage tourism among their personnel, establishing links on popular tourism web pages, and development of strategies that Finca Mar can implement once SUCCESS Program (2004-2009) has ended.

While ecotourism in this area can be an opportunity for economic group and environmental conservation, it is necessary to take into consideration that some places from Padre Ramos protected area have huge deficiencies in infrastructures and their communities are not prepared to confront this challenge. Most of the people live without vision of how to improve their own situation; the lack of education in the region augments the problem.

Meanwhile, tourism and retirement settlements are rapidly growing on the Nicaraguan coast and developing opportunities for the smaller communities. New roads constructions will allow open access to places where typically was very difficult to get in and foreign real estates investments are buying lands very rapidly in the middle of an undefined situation regards to the ownership of the land in the country. This situation can be a risk for alternatives like ecotourism.

Lack of definition and poor policies about land ownership or scarcity of scientific studies in coastal areas make difficult to undertake initiatives such coastal ecotourism. It is common to observe in places like Padre Ramos Protected area that because of a lack of regularization about land ownership, foreign realties are buying properties to local owners living in rural communities by an inexpensive cost and relocating communities in other places.

Families in these communities have lived from other activities like agriculture, fisheries or livestock and ecotourism seems difficult to implement in a population without experience and with scarce education level. Additionally lack of infrastructure make more difficult to put in place an activity such ecotourism. Padre Ramos buffer area rural area lacks of electricity, potable water or roads in good condition. Others communities have better conditions to promote ecotourism such as Jiquilillo or Padre Ramos communities along the coast. The Millenium Development Account is promoted and building infrastructures to gain better access to these communities. This seems a good opportunity but also a threat to promote big tourist investments in the area due to lack of regulation in coastal policies in the country. Coastal communities like Padre Ramos or Jiquilillo seem to have an unorganized development where tourism initiatives only benefit to a few people, creating isolated islands of richness inside of poor communities.

Ecotourism is a step ahead of traditional tourism and brings awareness about the value of natural resources for the future. Nevertheless, communities in Padre Ramos are not totally ready for ecotourism because they have a short-term vision that only enables them to see their basic and daily necessities and they are very susceptible to follow tourism occidental models that are looking for profits based on short term investments only. Ecotourism in Nicaragua is a big challenge for the coastal communities and the starting point is raising awareness and training to those that are interested in this activity and about the benefits that can bring to their communities.

3. New Livelihoods as an Alternative to Unsustainable Fisheries

CIDEA has worked with three groups represented mainly by women's (all included in Finca Mar association) to identify and establish opportunities for small business attached to the ecotourism initiative.

Three new enterprises were developed or supported: bread-making, hammock manufacture and jewelry-making. Entrepreneurship training, development of business plans and feasibility studies contributed to creation of small businesses and entrepreneurial capacity in poor coastal communities.

3.1 Hammocks

In Padre Ramos buffer area, a group of women showed interest to undertake a small business making hammocks. The women's group Cooperative Altagracia (a subgroup of Finca Mar) received training in hammock-making and was provided with materials to make their first hammocks. In addition, training in entrepreneurial vision (small business training) was provided to this group.

Hammock-making generates sporadic income which proved to be of less interest for the women's group than their regular incomes (collecting post-larvae, for example). Difficulties were also encountered in sourcing materials that were of sufficiently low cost so as to make their efforts profitable. A feasibility study was conducted with the women's group who were trained to make hammocks. The findings of the study confirmed that costs of the first materials used for hammocks were too high to allow for a profit and recommended that less expensive materials should be used to produce saleable hammocks in the area. The hammocks initiative did not progress, not only because of the cost of the materials but also because the women's group were not joined and organized which contributed to poor functioning of the group.

In Padre Ramos buffer area communities are accustomed to obtaining their income on daily basis, but in hammock making several weeks are required to make and sell a hammock in the local market. The women realized that this activity did not provide incomes on a daily basis, internal problems and lack of vision contributed to bring to an end the hammocks making.

3.2 Bread Making

Since bread making represents a steadier stream of income for the group, the initial feasibility analysis was positive. Members of the women's group Cooperative Altagracia that had been in the hammock-making group received training in bread making and how to improve their production and marketing. Materials were also provided to cover an existing outdoor bread oven (see Fig. 4 and 5). A feasibility study was conducted. The outcomes showed a positive

analysis since bread making represents a steadier stream of income for the group on a daily basis. In all cases, the focus was to move women from making their living from natural resource extraction activities (illegal collection of shrimp post-larvae) to an alternative livelihood, with the expectation of gaining confidence while obtaining sufficient income.

Though the bread baking activity has been a partial success, the women's dependence on illegal resource harvest practices continues. Despite the fact that the baking program benefits the local community, the women's group has not completely substituted illegal collection of shrimp post-larvae with the bakery activity. One possible explanation is the higher prices of the flour, which is a critical component in the baking process. In addition, the group has been shrinking in number due to internal problems, mainly of an organizational kind. Additionally, some of the members have migrated as labor workers to other countries of the region looking for improvements in their livelihoods.

Despite of these small improvements, the women's group Cooperative Altagracia continues harvesting shrimp post-larvae, and the bakery is not working on a full-time basis. The group needs to strength its organization in order to make a better use of their equipment and furthermore open the group to other women interested to work in this activity.



Fig. 4: Bakery in Padre Ramos Protected Area



Fig. 5: Making Bread in the Realejo (close to Padre Ramos Protected Area)

Bakeries seem a good alternative to improve quality of life in communities like in Padre Ramos buffer area. Bread is a basic component of the diet and there is always a demand for the product although prices continue to increase. However it is important to take into account issues like the integrity and organization of the target group and look into their own visions to assure that the group makes progress increasing their benefits and leaving other harvesting practices. Other concerns arise because of the fact that bakeries in these depressing areas are using wood that probably has their origin in mangrove forest within the Reserve.

3.3 Jewelry Making

Padre Ramos and Jiquilillo are small coastal communities within Padre Ramos Protected Area with around 800 inhabitants; the main economic activity is based on fisheries. Most of the population in these places is involved in fisheries activities in one or another way. CIDEA identified a jewelry-making group of women and offered them support for improving this activity. The group was already set up it had had some support by *Save The Children*. This organization trained and gave them the necessary equipment to start making jewelry. CIDEA continued working with the group in training activities in other to improve its product and additionally show them how sell it in a market. However, support for this group was suspended due to internal problems.

Jewelry making was functioning and it was successful as a small business however, it is important to point out that leadership in the group was a matter because only a leader person supported the whole group and when problems appeared, they were not able to continue with the activity without her leader.

4. Introduction Best Management Practices (BMPs) for Sustainable mariculture to small-scale farms

The Nicaragua and Central American coastline provides tremendous potential for sustainable mariculture activities that can both raise incomes of households in coastal communities as well as increase food security.

Small-scale shrimp culture is economically important in Nicaragua. Benefits from this small-holder activity build up to cooperatives - women's groups and artisanal fishers who also culture shrimp - but the profitability of this important activity has been decreasing as small-scale producers are acutely affected by increasing costs of inputs (e.g. fuel and feed), lower farm gate prices due to consolidation of the regional industry and continued farm management issues such as diseases. In the 1980's, when shrimp farming took off in Nicaragua, small-scale farmers produced nearly 90% of the shrimp; they now account for only 5% (Saborio, 2007).

The SUCCESS Program in sustainable mariculture in Nicaragua is based mainly in implementation of best management practices for shrimp culture that address a wide range of management practices which affect environmental quality and operational efficiency.

Since the mid-1980's, shrimp aquaculture has grown to be one of the most important sources of income in the Gulf region of Nicaragua. By 2002, approximately 9,000 hectares from estuarine areas were used for shrimp aquaculture - with approximately 4,000 hectares operated by large producers

and about 5,000 hectares operated by 130 shrimp cooperatives. On average, there are 13 associates in each cooperative with a total involvement of approximately 1,200 families.

Regardless of CIDEA's efforts to assist small-scale shrimp producers, a growing number of issues have made it clear that shrimp farming at the artisanal scale has significant difficulties. Small shrimp farmers have difficulty accessing loans, often face high interest rates, and have limited financial management capacity, high input costs, and excessive fees for bringing shrimp to the sole processing facility that sets the local price for shrimp. These factors, combined with falling prices for shrimp on world markets, have made the cooperative shrimp farms unprofitable. Therefore, farms are being sold to the foreign-owned, large-scale operators or are being abandoned. CIDEA has concluded that a diversified mariculture industry for small pond holders that is less dependent on shrimp farming is necessary.

CIDEA-UCA has a long history of working with the shrimp sector in Nicaragua and leading regional efforts to implement shrimp farming best management practices (BMPs) with the goal of reducing risks of all types (i.e. environmental, economic) and increasing production efficiency to improve the competitiveness of the small-scale farms in particular. Implementation of BMPs is more important to the small-scale producers than ever, given the recent national adoption of a Code of Good Practice by the National Association of Aquaculture (ANDA) and the approval of the Code by the Nicaraguan Government, increased stringency of US Food and Drug Administration regulations for shrimp imports and certification efforts at the processing plant level. Unless small-scale producers can conform to new, more rigorous standards, the remaining producers are likely to go out of business. CIDEA-UCA has continued to work with small-scale farmers to improve their management and improve their competitiveness on a national and international scale. CIDEA also continues to support the national industry by providing technical support to ANDA and the government. CIDEA is uniquely qualified to do this given their accredited laboratories, extension program and personnel who have been accredited by the Accreditation Committee of the Aquaculture Certification Council to certify shrimp farms.

CIDEA has been working to develop the capacity and infrastructure to support development of alternative livelihoods. Contributions to the profitability and competitiveness of the small-scale shrimp sector were made through training and implementation of best management practices (e.g. lowering water exchange rates) and contributions to development of a National Code of Conduct, which was adopted by the industry (see Fig. 6 and 7). The Code of Conduct is now adopted as a national policy.

Finca Mar and Agropesca are large associations of cooperatives, collectives, family farms and small businesses in the Padre Ramos estuary area. Shrimp culture is a major economic activity in the area. The implementation of BMPs at Finca Mar and Agropesca is based on good management practices developed and promoted by various international organizations including the World Bank, the Network of Aquaculture Centers in the Asia-Pacific/NACA, WWF and the Food and Agriculture Organization (FAO). These BMPs are intended to address a wide range of issues associated with the sustainability of shrimp farming.

The goal of these good management practices is to prevent, mitigate or compensate for negative environmental impacts caused by shrimp farms or hatcheries so that operations are developed in a manner that is environmentally and socially responsible. Sustainable shrimp culture can thereby continue to make a significant contribution to food security, economic development and help improve the quality of life for small-scale shrimp producers and their communities.



Fig. 6: CIDEA Technical visit in shrimp farm



Fig. 7: Sampling in shrimp ponds

CIDEA has been working with two large associations of small-scale farmers that have shown commitment to implement the BMPs despite their financial limitations. Efforts have been focused on building technical capacity for improved methods in shrimp culture. Best management practices are intended to lower environmental, economic and production risks of all types. Many BMPs may resolve several types of problems simultaneously. For example, precise adjustments of feeding rates and lowering protein content of feeds help reduce water effluent quality, improve water and soil within ponds (thereby, perhaps lowering risk of disease, and reduce feed costs). A key part of implementing BMPs is the requirement that the farmer be capable of routinely monitoring a variety of biological and physiochemical parameters to obtain the information needed to prevent problems and accurately make management decisions such as when and how much to pump water, feed, fertilizer and treat diseases.

As mentioned previously, one important consideration is the economic limitations of the small-scale shrimp farmers—economics which constrain small farmers' abilities to implement and fully adopt these practices. For example,

adjusting feeding rates costs little to implement and relies mainly on the technical capacity of the farmer. However, some other BMPs that benefit the environment (e.g., constructing settling basins to reduce sediments in pond effluents entering the ecosystem) have high costs with little if any financial benefit for the farmer. CIDEA works with the farmers to seek additional funding that would enable them to implement the costlier BMPs to further improve production and reduce environmental risks.

CIDEA continues to support the Nicaraguan government to assist in dissemination of the Code of Practice and associated BMPs to shrimp farmers throughout Nicaragua. Additionally CIDEA has been working to develop an accessible publication on mangroves and their management. This is of relevance to shrimp farmers whose farms are located near mangroves, and other users such as fishers, fire-wood gatherers and those beginning ecotourism efforts.

Two shrimp farms working with CIDEA in the Padre Ramos protected area has adopted BMPs as far as possible given their financial limitations. Practices such as routine record-keeping, improved use of feeds and fertilizers, and the ability to calculate proper stocking densities have yielded multiple benefits – improved revenues, reduced threats to natural resources, and the lowered risks. Farmers are on a stable and sustainable footing, but they will continue to receive limited technical support to ensure that adoption of these practices continues.

5. Enterprise Innovation Extension Attributes

In Padre Ramos Protected area were promoted or assisted the following livelihood: hammocks, jewelry, bakery, best management practices for small shrimp farmers and ecotourism. For all activities, supported field staff from CIDEA was interviewed in order to know their opinion about the following extensions attributes:

Complexity as the degree of difficulty & new skills needed to carry out the enterprise

Compatibility as the ability to integrate enterprise into existing livelihood mix

Advantage as the potential household benefits to be obtained from the enterprise

Trialability as the ease to experiment with enterprise with minimal risk

Observability as the degree and speed at which benefits will be derived

For each type of enterprise promoted/assisted by SUCCESS Program, CIDEA staff ranked it on a scale of 1-5 (1 being poor/low and 5 being excellent/high) on the following extension dimensions in Table 1:

NEW Enterprise type	Complexity	Compatibility	Advantage	Trialability	Observability
Hammocks	4	3	1	2	2
Jewelry	4	4	3	4	4
Bakery	3	4	3	4	4
Best Management Practices (shrimp farmers)	1	4	4	4	3
Ecotourism	4	4	4	4	3

Table 1: CIDEA rank opinion field staff in every livelihood promoted

Hammocks were a livelihood with a big grade of complexity. To make hammocks was a different skill to learn for target group. The group did not have the knowledge to make this type of craft despite of the fact that is a common object that is used in the area and sell it in different places. Make hammock is a repetitive activity for people that are getting use to work outdoors in fisheries, agriculture or livestock .CIDEA had not difficulty to organize the activity and the group. Still, staff needs additional support with the adequate trainers because making hammocks is not an activity that CIDEA had worked before. The main challenges for the group of women were to learn and activity that was completely new. People get bored easily. CIDEA was assisted by good trainers that can instruct to the women group, but the group did not respond as CIDEA waited. Additional, women group could not see this activity as something that can be retributive with prompt incomes given the fact of the wide cover of hammocks at the market. CIDEA worked in a cost-benefit analysis to inform them about the type of material that can be better for them in order to get down

the costs and make competitive hammocks. This livelihood could be compatible with other activities but it was discarded because of problems within the group. The cost of the materials was high and the group did not feel motivated to continue because they are getting used to have their incomes in daily basis. However, this activity can be compatible with other livelihoods.

For this particular group of women there is not advantage working with hammocks because the cost of materials was very high and their necessity to have daily incomes was not satisfied by this means. Supplies have a high cost and it is difficult to find a market because hammocks are already offered near the rural community.

Jewelry making is an activity also new for rural communities in Estero Padre Ramos Reserve. The group responded confidently to CIDEA support. Formerly the group had been trained by Save the Children, a NGO operating in this area. Group had been organized when CIDEA arrived to Padre Ramos beach area and women energized with the project. CIDEA improved their techniques to get better product quality.

Problems in this group were self-discipline and keep pace working in a constant manner to be able to request an order. Culturally group lacked of constant dedication to any activity and they are not used to work with repetitive and steady work. The main problem was originated by the own difficulties of the group leader in which the rest of women relied on. Group was having benefits and market in Padre Ramos and outside of this rural area.

SUCCESS Program has helped them to improve their techniques and products. The compatibility to work in other kind of livelihoods depends on the group organization. The group leader has also a restaurant where she exhibits the jewelry stuff, so this activity can be totally compatible with other livelihoods.

Jewelry is a profitable activity because there is market and with enough training, they can improve more their product quality and awareness about natural resources that they use. The cost of the materials is low but it may be a risk for the conservation of endangers species in this area due to women sometimes use shells from animals that may be endangering species. They need more knowledge about species that can be used for making jewelry. For this activity, it is necessary training and knowledge but it has a high degree of trialability.

Bread Making is an activity with less complexity than Jewelry or Hammock. There was more capacity; the difficult was in the organizational skills of the group though. Group organization was one of the weakest points and additionally their level of education was extremely low. The group also lack of essential business logic. Additional problems came out when group had disagreements and they split in two groups. Trainers were good and had the capacity to teach them. Nevertheless trainers could not connect with the group personality or women group did not connect with the trainers. Like in the

hammocks or Jewelry group, women were not used to work in daily basis with a timesheet or shift, fact that also damage group organization.

A bakery set up as an organized group can have compatibility with other activities and is a livelihood very compatible with their daily basis income. The most difficult part in this livelihood is to make compatible its organization as a group. Before they started the bakery, women were dedicated half part of the day to collect shrimp larvae which is not compatible with having a bakery and less compatible with the conservation of the protected area. There is always a demand for bread in rural places, so this livelihood can be an improvement to obtain benefits. Other problem came out due to the high cost of the flour or the use of mangrove wood as a combustible, which does not contribute, to integrated coastal management practices and sustainability for the protected area. Other challenge is the lack of entrepreneurs or lack of business vision of these rural and poor communities which impede work efficiently. There is a high trialability to experiment with bakeries. Bread is a product with a steady demand in the market, so it is ease to sell the product and obtain profit with this livelihood. In other rural communities such as the case of El Realejo and Puerto Morazan, other bakeries are being established.

Best Management Practices in Shrimp aquaculture. This activity has not complexity for CIDEA. The Center has large experience with shrimp aquaculture so implementing good practices among cooperative shrimp farmers have a low level of complexity. Shrimp farmers in general are aware of the importance of quality means for their product. CIDEA support them through different funds and through SUCCESS program. Shrimp farmers are assisted with technical equipment and training to measure and control the product and water quality in their farms. Difficulties are in having a data control of the parameters and systematize information by the own farmers plus to improve their technical skills. It can be a livelihood compatible with other activities. It is important though, to carry out good practices in order to improve the product quality and a sustainable environment. Some uses or activities would be in conflict with shrimp farms like livestock close to shrimp farms, others like ecotourism may be a livelihood compatible with shrimp farming.

Shrimp farms are working since several decades in the region. It is a business well established, however, there is a high risk because of natural hazards and changes in the natural environment may provoke big loss and economic damages. Small shrimp farmer have now more knowledge and equipment to improve quality product but yet benefits are small and far from big farms which have less risk, because they have big investments in technology and bigger number of hectares in production. Small producers should improve infrastructures in order to have more production. To carry out best management practices in shrimp farms is necessary a considerable investment, which is not

possible to assume by the small shrimp farm producers. CIDEA support to the Nicaragua Government to propose a code of management practices for shrimp farmers that currently is binding for the whole sector. However, small farmers have more difficult to implement due to lack of investment in their farms.

Ecotourism. The challenge in ecotourism is to achieve a balance among investment, knowledge and organization. This activity required partnership with other institutions within the University of Central America and other Universities and private organizations. CIDEA worked with Tourism Faculty to design terrestrial and aquatic trails and identify different species of birds and animals through the routes. A challenge in this activity was the lack of knowledge; the group did not have any kind of sense of how to provide a public service like ecotourism and the knowledge transference need to be done at a pace that the group could understand. It can be an activity compatible with other livelihoods because it has seasonal characteristics and additionally farm activities can be integrated within ecotourism activities such is the case presented to SUCCESS Program by Finca Mar (bakery, jewelry, shrimp farms, etc). It has a potential to obtain benefits, however is a livelihood that cost time to launch. Many aspects need to be considered in any ecotourism activity, so this activity should be thought to get incomes in medium term and requires a big cooperation among different stakeholders.

This livelihood depends on many aspects: potential of the place and beauty but also service quality and infrastructures. It is not an ease livelihood to trial and it has some important risks. Some type of ecotourism seems to have more trialability than other, for instance aquatic routes can be more successful than terrestrial in the protected area because partially the infrastructure that is needed is incorporated from other livelihoods such as fisheries (boats).

Livelihoods such as jewelry or bakery have a high degree of observability because benefits are done in daily basis and they are ease to implement. Tourism and best management practices have more risk and the speed at which benefits are derived is slower.

6. Overarching Lessons and Conclusions

Promoting livelihood alternatives is a strategy to advance quality of life, improve ecosystem health and empower rural coastal communities living in a high degree of poverty. Additionally is a means to advance social justice among people living in unbalanced conditions.

Livelihoods may increase the success of Integrated Coastal Management if tangible benefits for the communities arise. However, tangible benefits are not sufficient condition to sustain success of conservation or ICM programs.

Padre Ramos Protected Area undertook livelihood strategies mainly focused on training and field extension with small subsidies or grants that help to carry out these activities. So far, the success of these alternative livelihoods has been partial.

For CIDEA, the SUCCESS Program is the first experience working in alternative livelihoods in impoverished communities. CIDEA is emerging in Nicaragua as an ICM center and playing an important role building constituencies and empowering people among different groups in order to improve their quality life promoting an ICM context. Throughout SUCCESS Program CIDEA has arisen with important lessons to work with coastal poor communities.

One significant lesson to consider is that without understanding the capacity, needs and aspirations of the groups, bad livelihood advice is given and success is highly unlikely. Additional to this, work with larger groups may be controversial and very unproductive; work with those in the communities who are business minded and have a leader nature can be a better method to reproduce livelihoods and allow to other people to work in the same way.

Coastal rural communities living in this particular area of Nicaragua are used to work to obtain earnings day by day. This is an obstacle to initiate alternative livelihoods that are thought to get benefits in medium or long term, as is the case of tourism or hammocks in Padre Ramos Reserve. It is easier building on existing livelihoods than establishing new ones.

Frequent extension visits and training play a catalytic role. In impoverished communities such as Padre Ramos frequent visits construct more trust and open their mentality to cooperate and communicate their necessities and ideas and that is a crucial point to have success.

Women in these coastal communities play also a central role. Most of women are in charge of the education of their family and a profit that comes through an alternative livelihood promotes social justice and education for their children. Most household income controlled by women encourages more children and girls educated.

Diversification improves household security and reduces fishing pressure but there is a difficulty to predict how communities will take advantage of new opportunities over time because rural people are naturally resilient.

Another lesson learnt by CIDEA is that sometimes it is difficult to make links among livelihoods and ICM. Groups come with a preconceived and enthusiastic idea that not always has direct relation to ICM framework. To make strength those links is something that is necessary to reinforce for CIDEA. The selection of beneficiaries of the project may bring in some difficulties because in some cases among beneficiaries exist a project mentality that works against sustainability and project buy-in.

Finally CIDEA come up with the conclusion that is important do not narrowly define livelihood outcomes and success (e.g. measuring just incomes). Many times we see other important outcomes - empowerment, entrance/buy-in for ICM, etc.

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