ENTERPRISE STRATEGIES FOR COASTAL AND MARINE CONSERVATION

REVIEW OF BEST PRACTICES AND LESSONS LEARNED

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COASTAL RESOURCES CENTER
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Cover Photo: Women harvesters processing oysters in The Gambia. Credit: Brian Crawford

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Coastal Tanzanian woman carrying wares on her head walking home from market. Credit: Elin Torell

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ACRONYMS

BCN	Biodiversity Conservation Network
CBO	Community-based organization
CRC	Coastal Resources Center
CSP	Conservation Society of Pohnpei
FSPI	Foundation of the Peoples of the South Pacific International
ICM	Integrated Coastal Management
IMS	Institute for Marine Science
LMMA	Locally managed marine area
MCC	Millennium Challenge Corporation
MERIP	Marine and Environmental Research Institute of Pohnpei
MPA	Marine Protected Area
PL	Postlarvae
SLED	Sustainable Livelihoods Enhancement and Diversification
SUCCESS	Sustainable Coastal Communities and Ecosystems Program
UH-H	University of Hawaii-Hilo
URI	University of Rhode Island
USAID	United States Agency for International Development
WIOMSA	Western Indian Ocean Marine Science Association

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PREFACE

Coastal ecosystems are under pressure from population growth, habitat change, thermal stress, sea level rise, acidification, resource over-exploitation and degradation, pollution, and altered freshwater flows. Pressure on the coast is likely to increase with continuing climate change, population growth, urbanization trends, and the fact that most of the world's largest cities are located in the coastal zone. It is, therefore, critically important that everything possible be done to avoid and reduce the impacts of human activities on invaluable coastal ecosystems and to find alternatives to "business as usual."

One approach to minimize coastal ecosystem threats is to promote enterprise development that is compatible with natural resources management efforts. These are enterprises that depend on intact biodiversity, natural resources and the environment, and therefore motivate small enterprise operators to protect these resources from internal and external threats.

The purpose of this Review is to assist coastal practitioners and local government officials to promote enterprise strategies in coastal communities with the intent of simultaneously promoting biodiversity conservation and poverty alleviation, and to achieve both objectives on a sustainable (self-financing) basis. The Review assumes that the enterprise strategies are embedded in a systems approach to conservation that addresses the major structural barriers to conservation (e.g. open access, weak institutions, etc.). Such a systems approach begins with an assessment of biodiversity threats and conditions, followed by a limiting factors analysis, assessing the structural factors limiting conservation at the site level. Key limiting factors could be the management system, government policy and legislation (i.e. open access), institutional capacity, economic context, illegal activities, financial sustainability or stakeholder engagement. Mapping the driving factors behind biodiversity loss and the key structural/systematic factors that are barriers to conservation, helps practitioners and local government officials determine appropriate actions to abate the threats. Those actions will likely include actions to improve the management system, government policy, and other structural factors as well as "small doable actions" to strengthen coastal communities.

If such an analysis shows a clear causal linkage between conservation enterprises and threat abatement and a decision is made to support enterprise development, then this compendium can provide guidance for how to do that.

This Review builds from the field experience of the USAID-funded Sustainable Coastal Communities and Ecosystems (SUCCESS) Program and from other existing bodies of work on conservation enterprise. The SUCCESS Program, initiated in 2004, is a partnership between the United States Agency for International Development (USAID) and the University of Rhode Island Coastal Resources Center (URI-CRC), in association with the University of Hawaii/Hilo (UHH) and the Western Indian Ocean Marine Science Association (WIOMSA). The goal of the SUCCESS Program is to provide global leadership in integrated coastal management through innovative approaches in a participatory, issue-drive and results-oriented process to:

- Promote sustainable use of marine resources
- Conserve marine biodiversity
- Improve food and income security

During a five-year period (2004–2008), SUCCESS hosted a number of sustainable livelihood development initiatives in Tanzania, Ecuador, Nicaragua, and Thailand. Enterprises tied to coastal community poverty reduction and biodiversity conservation included seaweed farming, fish mariculture, oyster and cockle harvesting, shell jewelry crafts, ecotourism, beekeeping, small-scale agriculture, and small-scale bakeries. SUCCESS included a cross-site learning agenda focused on the factors that contribute to enterprise success.

A review of resources and case studies—and direct experience from the SUCCESS Program—indicates a dismal rate of success in livelihood development efforts. We found that despite the many resources currently available, there is a need for guidance on the process, strategies and good practices of environmentally sustainable enterprise development in coastal areas. The Review—prepared under the guidance of the USAID Water Team—is both a tool in itself and a link to other resources and case studies. The processes, good practices, resources and case studies presented in this Review are based on the inputs of numerous coastal practitioners and planners, conservation and enterprise experts, and other development professionals. The effective application of these processes, strategies and good practices and the sharing of approaches and lessons learned in enterprise development, will be critical to meeting the myriad challenges of a fast-evolving and vulnerable coastal landscape.

CHAPTER 1

INTRODUCTION

1.1 BACKGROUND

The world's coasts and oceans are crucial to life on Earth; they support livelihoods and are vital to the global economy in many ways. Coastal ecosystems exist at the interface between terrestrial and marine environments and include some of the most diverse and dynamic environments on earth. Over 40% of the world's population (2.7 billion people) currently lives in the coastal zone—and many coastal areas will likely become even more heavily populated as the number of people living on this planet moves past 10 billion before the end of the century. This narrow band of the earth's surface attracts human populations for many reasons, including the rich bounty of fish protein that can be harvested from the sea. Coastal ecosystems provide habitat and nurseries for the majority of commercially important marine fish and shellfish species, and provide food security and livelihoods for over one billion people.

Coastal ecosystems face a litany of problems associated with human-induced pressures. One way to minimize these pressures while promoting livelihoods is through conservation enterprise that is environmentally friendly and conserves biodiversity. Conservation enterprise is a commercial enterprise that generates profit and equitable benefits through promoting sustainable use in areas of high biodiversity. They are enterprises that depend on biodiversity, natural resources, and ecosystem goods and services, and therefore provide incentives to protect these resources from internal and external threats. Income generated from conservation enterprise motivates people to conscientiously protect biodiversity to maintain that income.

Examples of conservation enterprises include:

- Beekeeping in mangroves and other coastal areas
- Community-based ecotourism
- Shell jewelry crafts tied to marine conservation
- Sustainable aquaculture, including seaweed, sponge, and sea cucumber farming
- Agroforestry
- Mangrove crab grow-out
- Oyster and cockle collection in coastal wetlands tied to conservation actions
- Adding value to existing managed small-scale fisheries

The case studies presented in Section 4 of this Review provide examples of such enterprises, products and services. Common to all of them is that they are natural resource-based and as a consequence, have particular characteristics that differ from other enterprises. Being aware of these differences can help entrepreneurs overcome constraints.

The main characteristics are:

- The seasonal nature of growth and production may imply that collection and utilization of products are seasonal and dependent on variable and often long production cycles.
- The temporal element has many implications, such as financing periods and the need for stakeholder patience before revenue and profits are generated.
- Products are dependent on the integrity of the ecosystem goods and services. For example, oyster and cockle collection requires clean water and a healthy mangrove system, and as such their sustainable exploitation must be coupled with conservation.
- Trading of some products on a small-scale is usually informal, with many levels of unrecorded actors and transactions.
- Products produced in remote locations results in long distribution channels and high transportation costs.
- The poorest and most marginalized community members (including women, children, and elders) are often the most dependent on the harvesting of natural resource-based products and at the same time most

CONSERVATION ENTERPRISE FOR GREATER GENDER EQUITY

Enterprise development is often promoted as a way to encourage greater gender equity and allow women to acquire a monetary income. However, men and women have different problems, interests, needs, and priorities. This must be clearly understood if we want to target women in enterprise development. In coastal communities, there are often clear roles for men, women, old, young, rich and poor. There are differences in resource use, access to land, natural resources, equipment, labor, capital, income, and education. Gender relationships are determined by social structures and shaped by social relations such as class, caste, ethnicity, and religion. Gender relationships are dynamic and vary between cultures and societies. Men's and women's roles are different and often unequal. Women and men in fishing communities tend to engage in different work, sometimes in different parts of the land/seascape. Men may more often fish in offshore areas or major inland water bodies, whereas women tend to fish closer to shore. Women are more often involved in post-harvest activities than men, including both artisanal and commercial-scale post-harvest activities. Women more often engage in multiple livelihood activities, whereas men can often focus on one primary income-earning activity.

often have the fewest assets and the least technical, financial, and literacy skills.

- National infrastructure to support marketing efforts of natural resource-based products is often limited.

This Review also considers alternative income-producing technologies to be conservation enterprise if they are introduced to replace more environmentally destructive technologies. An example would be when a village food vendor employs a fuel-efficient stove for cooking instead an inefficient open wood fire. Conservation enterprise in coastal areas also includes enterprise development that helps people move from an activity that threatens biodiversity into other environmentally friendly livelihoods. An example would be promoting reduced fishing effort by supporting diversified or alternative enterprise activities. (But see caveat on page 14.)

When tied to integrated fisheries, coastal, or other types of ecosystem-based management efforts, successful conservation enterprise interventions can not only achieve goals of biodiversity conservation and poverty alleviation, but also enhance the success of other outcomes of the broader natural resource management (NRM) effort. Promoting income-generating businesses as part of community-based coastal management has been shown to improve community interest and participation in NRM. Several of the case studies in this Review show this connection—e.g., in Zanzibar, the jewelry-making enterprises fueled a no-take zoning process; and in The Gambia, activities to improve marketing and add value for existing oyster harvesters encouraged women of the TRY Oyster Women's Association to conserve mangroves and establish no-take zones.

There is an active debate about the role that enterprise development can play in biodiversity conservation. Is it the best use of funds? Is direct investment in protection a better use of funds for biodiversity conservation? Is conservation enterprise financially viable and sustainable? There is little quantitative data and analysis to answer these questions and this Review does not attempt to definitively answer these questions. However, it does provide anecdotal information from experience that illustrates lessons about what has worked and not worked.

The Review's primary purpose is to assist coastal practitioners and local government officials who currently use, or are interested in using, enterprise as a strategy for the conservation of biological diversity in rural coastal communities and to benefit local populations and their natural environment.

The objectives are to:

- Provide a framework for designing, implementing and monitoring conservation enterprise
- Provide examples of conservation enterprise and lessons learned
- Provide links to other resources and tools

The Review should be of value to projects that include a livelihoods development strategy, such as projects in coastal management, population and health, microenterprise development, or climate change adaptation. In communities along the coast throughout most of the developing world, artisanal capture fishing is a primary livelihood. Despite the importance of marine fishing and its own contributions to both biodiversity conservation and secure livelihoods, this Review does not address the larger topic of fisheries management and reform. That topic is addressed in a companion document. The Review does discuss one specific strategy that is used in many artisanal fisheries projects for reducing fishing effort, namely the diversification of livelihoods to help ease fishers away from fishing itself and into other activities (see box below).

BUILDING ON PAST EXPERIENCES FROM IMPLEMENTING CONSERVATION ENTERPRISES

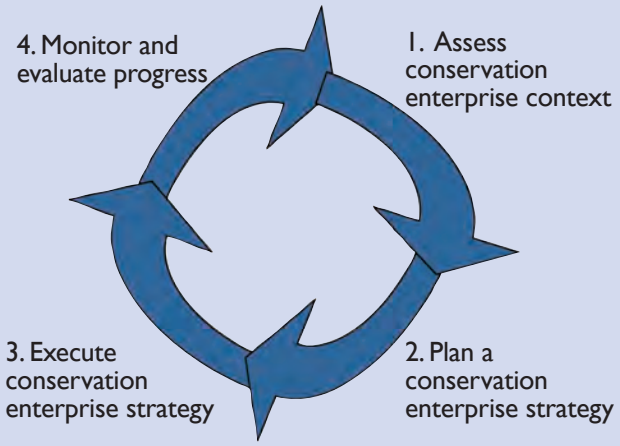
Over a four-year period (1995–1999), the Biodiversity Conservation Network (BCN) tested a hypothesis that if a viable enterprise is linked to the biodiversity of a site and generates benefits for a community of stakeholders who have sufficient capacity, then the stakeholders will act to counter the threats to the resource. Studying enterprise development and conservation in 38 sites in Asia and the Pacific, the BCN found that conservation enterprises did not lead to conservation by themselves. Rather, a range of factors including community participation, education and awareness, policy and advocacy, direct protection, management and restoration were equally or more important to conservation success. They concluded by forming a new (but untested) hypothesis that livelihood components (conservation-oriented or not) can lead to biodiversity conservation because they give the project staff an entry into the community. Further, education, awareness, trust, and confidence strengthened through the livelihood component may make stakeholders more willing to listen, plan, and take actions to counter internal and external threats to biodiversity.

International organizations and donors have continued supporting the development of conservation enterprises in the decade after BCN ended and the need for communications and outreach on past experience and good practices continues to be important to avoid the repetition of mistakes.

1.2 ROAD MAP TO THE CONSERVATION ENTERPRISE REVIEW

The Review follows a project cycle structure as presented in Figure 1. Step One focuses on assessing the conservation enterprise context. This involves assessing the local context for enterprise development, including human resource knowledge and skills, infrastructure, markets, sources of credit, the underlying business enabling environment, natural resources, and biodiversity condition and threats. At this step, stakeholders and their interests are also assessed, and the goals of conservation enterprise are defined. In Step Two, a conservation enterprise strategy is developed, implementing partners are selected, and baseline conditions are documented. Step Three is the execution of the conservation enterprise strategy. Step Four is to monitor and evaluate progress for adaptive management. The participation of all stakeholders at all stages of the conservation enterprise project cycle is a necessary condition for success.

FIGURE 1.
THE ENTERPRISE DEVELOPMENT CYCLE



1.3 USE OF THIS REVIEW

The project cycle framework, links to other resources and sources of information, and the Review's conservation enterprise examples can be used to direct the design and execution of new conservation enterprise initiatives, or to redesign existing efforts. The aim is to provide a strategic and structured approach to develop and monitor successful conservation enterprise interventions. The Review is based on several assumptions:

- Conservation enterprise and coastal management projects vary in the issues they address, the spatial scales they encompass, and the socio-economic, environmental and governance contexts in which they operate
- Despite differences in project situations, it is possible to identify principles and good practices that are central to successful enterprises and sustained progress towards coastal conservation and biodiversity goals
- It is possible to identify conditions in projects that may lead to sub-optimal performanceIdentifying potential performance problems is a first step in an adaptive learning process that leads to project adjustments

TERMINOLOGY

Conservation enterprise: a commercial enterprise that generates profit and equitable benefits through biodiversity conservation and sustainable use activities

Livelihood: the capabilities, assets, and activities required for a means of living

Strategy: a general plan of action for achieving specific goals and objectives

Sustainable livelihood: a livelihood that can be carried out over the foreseeable future without depleting the resources it depends upon and without depriving others of a livelihood

FISHERIES ENTERPRISES AND FISHERIES REFORM

Fishing is the largest extractive use of biodiversity in the world, the source of livelihoods for over 54 million coastal residents, and when well managed can reduce poverty. Fisheries products are the world's most widely traded foods, with commerce dominated by developing countries. The total value of world capture fisheries production in 2009 was US$93.9 billion. The net export value of fish was over US$25 billion in 2009, a value greater than the global combined net exports of rice, coffee, sugar, and tea. Fisheries are globally important sources of much-needed high quality animal protein– the primary protein source for 1.5 billion people worldwide and an important part of the diet of many more.

This Review does not highlight marine fisheries enterprises and fisheries management. There are other guides and reports that do, including the 2013 USAID Guidebook on Sustainable Fisheries and Responsible Aquaculture. While not a focus of this Handbook, it should be made clear that wild fisheries are very important and that to sustain the benefits from fisheries depends on making major reforms to both capture fisheries and aquaculture in order to improve sustainability, profitability, and responsibility.

An integrated approach to fisheries and aquaculture management is needed to ensure ecosystem integrity and conserve biodiversity. A systems approach can address the multiple dimensions of resource governance, including the enabling policies and laws, integrated coastal and water resources management, incentives to promote resource stewardship, spatial land and marine planning, land and sea tenure or access rights, and sound management at the seascape/landscape scale. Evidence shows that improving fisheries management, especially with the use of no-take reserves, can contribute to poverty reduction and conserve biodiversity.

OTHER SOURCES OF INFORMATION:

USAID (2013, in press) *Sustainable Fisheries and Responsible Aquaculture, A Guide for USAID Staff and Partners*

Leisher, C., M. Sanjayan, J. Blockhus, A. Kontoleon, and S. Neil Larsen (2010), *Does Conserving Biodiversity Work to Reduce Poverty? A State of Knowledge Review,* August 2010. http://povertyandconservation.info/docs/20100901-Does_Conserving_Biodiversity_Work_to_Reduce_Poverty.pdf

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The Sunken Billions: The Economic Justification for Fisheries Reform. http://siteresources.worldbank.org/EXTARD/Resources/336681-1224775570533/SunkenBillionsFinal.pdf

Managing Small-Scale Fisheries: Alternative directions and methods. Fikret Berkes, Robin Mahon, Patrick McConney, Richard Pollnac, and Robert Pomeroy. http://www.idrc.ca/openebooks/310-3/

Fish landing using a horse cart, Cayar, Senegal. Credit: Frederic Bambara

DIVERSIFIED LIVELIHOODS AND SUSTAINABLE FISHERIES MANAGEMENT

A key issue in sustainable fisheries management is the open access nature of fisheries. Open access means that anyone who would **like** to fish is **allowed** to fish—i.e., there are no restrictions on new entrants and there are no property rights associated with fisheries. This results in overcapacity—high numbers of fishermen and an excess of fishing boats and gear (too many fishermen chasing too few fish). In open access fisheries, resources typically become biologically overfished, meaning that the total yield harvested is less than what can be sustained with lower levels of fishing effort. Open access also means that fish can become economically overfished, and higher earnings could be generated from the fishery if effort is reduced. At the open access equilibrium, which is the point at which most small-scale fisheries currently find themselves, few if any profits are generated—and fishermen who are poor will remain poor. Open access often results in conflict among fishermen who compete with each other in a "race to catch the last fish." On the other hand, open access can act as a social welfare safety valve by employing large numbers of fishermen and providing access to food in times of food insecurity (e.g., when drought causes land-based crop failures). Fisheries also can provide a certain level of resilience for coastal households against economic and environmental shocks.

Alternative livelihoods are sometimes introduced to reduce pressure in open access fisheries. The rationale is that alternative livelihoods will allow fishermen to reduce effort or give up fishing for better economic options. However, worldwide experience has shown that few fishermen leave fishing. Small-scale fishermen live at the subsistence level and have a short-term survival strategy in which they prefer to earn wages on a daily basis. The fact that many enjoy fishing and feel that they do not have the appropriate skills for alternative occupations, contributes to making fishermen stay the course with fisheries as their primary livelihood for as long as they can obtain a positive return. Many fishermen that have tried alternatives return to fishing. There are other challenges to the project logic of alternative livelihoods for fishermen. In open access regimes, if several fishermen give up fishing for a living, profits will increase for those who remain. This then attracts additional people into fishing, increasing effort until all profits are again dissipated and earnings remain at the opportunity wage. Alternative livelihoods, therefore, only work as an effective strategy to reduce overfishing when they are coupled with incentive-blocking or adjusting instruments to control harvest and manage or restrict access in the fishery. Incentive-blocking instruments attempt to restrict fishing activity and include limited entry, buy-back schemes, gear and vessel restrictions, catch limits, and quotas. Incentive-adjusting instruments seek to provide some type of property right to the fishermen and include individual transferable quotas, taxes and royalties, group fishing rights, and territorial use rights.

Another strategy is to promote diversified livelihoods. This paradigm, which focuses on households rather than just fishermen, maintains that broadening the livelihood options available to households will make them more resilient to and better able to adjust to management measures that restrict fisheries access or reduce fishing efforts. Hence it can be viewed as a means of mitigating the socio-economic impacts that reductions in fishing effort or restricted access might have on households in the future. By providing access to savings and credit and training in technical and enterprise-related skills that help them diversify their income sources, fishermen and their households become less dependent on fishing. A diversified livelihoods approach can also be used as a conservation incentive, rewarding communities that create community-based marine protected areas and strictly enforce the no fishing rules, or communities that agree to stop bomb fishing and enforce the ban among their peers via social networks.

In brief, to reduce overcapacity in fisheries, conservation-based microenterprise development must be part of a coordinated and integrated approach that includes a mixed strategy of managing and/or restoring resources, strengthening access rights, conservation, and community development.

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Sievanen L., B. Crawford, *et al.* (2005). "Weeding through assumptions of livelihood approaches in ICM: Seaweed farming in the Philippines and Indonesia." *Ocean and Coastal Management 48:* 279–313.

Women collecting bivalves in the intertidal zone, Zanzibar.
Credit: Klaus Hartung

RESOURCES/TOOLS

Broader coastal management, community development, and biodiversity conservation manuals:

Asia Network for Sustainable Agriculture and Bioresources ANSAB (2007), A Manual for Organizing Natural Resource Management Groups for Resource Management Planning, Enterprise Development and Integration into Value Chains, 70 pp. http://www.ansab.org/wp-content/uploads/2010/07/report300731441.pdf

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U.S. Agency for International Development (USAID) Natural Products in Rural Enterprises Workshop Outlets: http://rmportal.net/library/content/frame/np-in-rural-enterprises-brief-final.pdf/view?searchterm=natural%20products

CHAPTER 2

ASSESS CONSERVATION ENTERPRISE CONTEXT

ASSESS CONSERVATION ENTERPRISE CONTEXT (STEP 1)

In order to design and tailor a conservation enterprise strategy, the first step is to evaluate the context of the site to determine opportunities for enterprise development and to determine if the conservation enterprise is a good option for achieving conservation goals and objectives. Understanding the context, including understanding people's existing livelihoods, is helpful in gauging people's likely reactions to new opportunities.

TIP: A systematic knowledge of the economic, social and ecological dynamics of the place is essential to selecting conservation enterprise support actions that recognize the inter-relationships between people and the environment.

2.1 ASSESS EXISTING LIVELIHOODS

Coastal communities in the developing world are highly dependent on natural resources for their sustenance. Households often adopt two to four different livelihood activities as a way to make ends meet and to reduce vulnerability to stresses and shocks. People's choices depend on the diversity of livelihoods available, existing incentives (property rights, rules governing resource use, access to micro credit) and household vulnerability. The Sustainable Livelihoods Framework was developed to understand the linkages between poor people's livelihoods and the factors, challenges, and macro-level issues that affect them. The concept is built on four principles:

1. People-centered: respond to people rather than re sources or services
2. Participatory and responsive: listen and respond to the poor. Sustainable in all four dimensions—economic, institutional, environmental, and social.
3. Based on livelihoods that provide a living and ensure the natural resource base is maintained
4. Empowering: increase the voice and well-being of the poor

The Sustainable Livelihoods Framework maintains that a range of factors influence the livelihood strategies that individuals adopt:

- **Individual characteristics** (e.g., gender, age, class)
- **Available resources or assets** that are social (support from families and community), human (an individual's own strengths, skills, and capabilities), natural (available natural resources), physical (available infrastructure, such as roads and water supply), and financial (money; access to savings and credit).
- **Direct influencing factors** that affect the ability to use the resources at hand and which are difficult, but not impossible, for coastal poor to control include social norms, policies, laws, markets, governance structures, and access to resources.
- **Indirect influencing factors** are generally beyond the short-term control of coastal residents; can be individual or societal; and include social, economic, environmental, and health-related trends and shocks (e.g. hurricanes, wars, stock market crash, AIDS crisis, and declining fish-stocks)—resilient communities or households are better able to withstand these types of pressures.

People develop livelihood strategies based on the resources at hand and the context of their lives. Poor people often lack the assets necessary to access new technologies and have the lowest capacity to adapt to indirect trends and respond to new opportunities. Livelihood strategies will also be determined by people's aspirations—i.e., their hopes for themselves and their families. Applying the Sustainable Livelihoods Framework can help in understanding the context within which the conservation-based enterprises will be developed and in assessing the feasibility of specific conservation enterprise options.

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2.2 IDENTIFY BIODIVERSITY CONDITION AND THREATS

The target area must be defined and the biodiversity threats to the ecosystem identified. If the conservation enterprise activity is part of a coastal management or other biodiversity conservation effort, information on biodiversity and threats is likely already known. If not, a common approach is to first collect and review existing information, followed by consultations with stakeholders regarding threats. Consultations may use the focus group approach, key informant interviews, or both. Regardless the approach used, these are semi-structured conversations with people who are knowledgeable about the site.

This process aims to define and prioritize critical ecosystem components (e.g. coral reefs, estuarine systems, mangrove wetlands) and the direct and indirect threats to those assets. Priority ecosystem components become the conservation targets for conservation enterprise, and the identification of direct and indirect threats helps to define how an enterprise could assist in relieving or eliminating threats.

For a simple example of direct and indirect threats, consider a marine protected area (MPA) where the biggest direct threat is illegal subsistence fishing inside the MPA by local people. The indirect threat, poverty, drives local fishers to engage in this illegal activity. Contributing factors may be a lack of community member awareness of the MPA boundaries and legal restrictions; the lack of a sense of community ownership of the MPA; or a lack of understanding by community members of the benefits of the MPA.

From a rights-based perspective, it is essential from the outset that MPAs are designed in a way that increases the chances that they will generate fishery benefits for local fishers in the long run. Equally important is that local resource users perceive there are clear benefits that will accrue to them. When resource improvements are not immediately visible, enterprise activities that generate income within a shorter time frame can provide incentives to protect the MPA. Hence, conservation-based enterprises can contribute to protecting the biodiversity of the MPA, eliminate the threat of illegal fishing, and increase awareness of the MPA. For example, if an MPA had attractive coral reef systems, permitted diving and/or snorkeling, and there were tourists in the area, then establishing an underwater ecotourism enterprise that employed community residents could be a viable approach. In another example, in a site area where there are people already engaged in harvesting bivalves, a value-adding strategy might be to teach them to also produce jewelry crafts for additional income. Combining co-management of the MPA with jewelry-making enterprises could address biodiversity threats. Instead of simply harvesting bivalves solely for their low-value meat, community members can craft the discarded shells into jewelry they can then sell for income. Section 4 of this Review includes three examples of community-based marine no-take areas that have introduced value-added strategies for marine resource harvests.

There are numerous ways to prioritize biodiversity threats. One is a preference ranking in which key informants or focus groups identify and rank the main problems or threats in a given site. For each threat, respondent scores are added up and then ranked in order of perceived importance. An alternative approach is to rank threats based on criteria such as:

- **Political feasibility of addressing the threat.** Some threats may not be easily addressed given a country's political situation. For example, the industrial fishing fleet may be too powerful to stop them from poaching close to the coastline and trawling in or around MPAs.
- **Cultural, social, and economic feasibility of addressing the threat.** How dependent are local communities on the activities that fuel the biodiversity threat? For example, in an area experiencing rapid decline of mangroves—are there any alternatives to using mangrove wood/poles for construction materials and as fuel?
- **Urgency, duration, and time frame.** Does the threat need to be dealt with now because of the potentially irreversible damage, or is it only likely to be important some years from now?
- **Geographic scope.** How wide is the threatened area? Conservation enterprise may not be capable of addressing a threat that affects a large area.

After identifying the biodiversity conditions and threats, the next step is to assess the impact of key threats on local livelihoods. A few questions to ask are these:

- Who is most affected by the biodiversity threats?
- How are people responding to the biodiversity threats?
- How are institutions responding to the changes brought about by biodiversity threats?
- What effects have the changes had on people's attitudes and perceptions?

Looking at how people and institutions have responded to the changes—and understanding what they perceive as opportunities and threats—will be helpful in identifying entry points for conservation enterprise development. Once potential entry points are identified, it is important to conduct environmental impact assessments to ensure that the enterprises—even if intentions are good—do not have an adverse effect on the environment.

RESOURCES/TOOLS

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USAID (2005), Biodiversity Conservation: a Guide for USAID Staff and Partners, 206 pp. Available online at: http://pdf.usaid.gov/pdf_docs/Pnade258.pdf

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2.3 ASSESS THE BUSINESS, SOCIAL, AND GOVERNANCE CONTEXT

This stage begins with reviewing the setting in which the enterprise seeks to operate. It includes reviewing the socio-economic and enabling conditions that are/are not in place. This step builds an understanding of critical barriers to success and helps in eliminating enterprise products and services that will not meet conservation targets or that will not form the basis of a viable, sustainable and marketable enterprise. This includes not only looking at viability of and market for the potential product, but also the availability of the inputs necessary to bring the product to market.

MICROENTERPRISE DEVELOPMENT AS A CLIMATE CHANGE ADAPTATION TOOL

Ideally, conservation-based enterprise development can make coastal communities more resilient and able to adapt to climate change. Research has shown that diversifying people's livelihoods makes them more resilient to stresses and shocks; if one livelihood fails, having access to alternative sources of income and food is critical. However, efforts to expand subsistence-scale livelihoods or small enterprises may be encouraging poor coastal residents to engage in activities that are sensitive to climate impacts. Livelihood activities that depend on ecosystem functions may be highly exposed and sensitive to either or both climate and non-climate stresses. For example, seaweed production might involve temperature-sensitive species that fail to thrive if exposed to a 1 or 2 degree centigrade increase in water temperature. Shellfish culture and half-pearl farming, useful in fostering conservation in MPAs, may be adversely impacted by ocean acidification as well as by changes in seawater temperature. Artisanal fisheries or tourism that depend on coral reef conditions may be diminished or lost due to coral bleaching, disease and ocean acidification. Migrating as well as local fish stocks may shift their patterns and no longer be abundant within the distance fishers are able to reach from ports and landing sites. Coastal and river flooding in low coastal areas can overwhelm small-scale fish farms by breaching walls and overtopping, allowing fish to escape. Livelihoods such as mollusk harvesting, or livelihoods that depend on mangrove forests, e.g., beekeeping and crab-fattening , will be negatively impacted if sea level rise reduces the area of mangrove forest and coastal wetlands. Drought and salinization of ground water can make coastal farming less viable. Indirect climate impacts can also create problems for coastal people. Competition for fresh water in coastal watersheds, combined with drought, may reduce environmentally required flows to estuaries and coastal lowlands. Deteriorating conditions in interior and upland locations can accelerate human migration to the coast in search of food and income. Increasing demand for energy in locations where fuel costs are high or where there is overdependence on hydro-power (which, in turn, is affected by rainfall patterns and hydrological patterns), may lead to accelerated coastal habitat destruction. For example, families might switch to burning charcoal, produced from wood cut from mangrove forests or other protected areas, as their alternative fuel. Hence, when assessing biodiversity conditions and threats, it is also important to consider potential future changes in biodiversity—and the impacts they might have on potential conservation-based microenterprises.

TIP: The tool *Building on what we have for a better life: Asking the right questions to improve livelihoods. Workbook,* by Hugh Govan includes a number of useful worksheets to use when identifying conservation-based enterprises.

Exploring the business context involves an evaluation of existing economic activity and livelihoods in the target areas and an analysis of potential conservation enterprise opportunities based on the availability of skills and resources. It is critical to conduct feasibility studies to ensure the proposed enterprise is viable. For example, in the Ecuador case study, presented in Section 4.9, people living in the Cojimies Estuary had access to estuarine pools, but lacked the skills and resources to run shrimp aquaculture farms. A careful assessment, however, found they did have the necessary skills and resources to use the ponds for Chame cultivation, a native species of delicate, white-fleshed finfish increasingly popular with consumers. Whether or not a conservation enterprise will prosper depends primarily on business and financial criteria. A profit must eventually be made if the enterprise is to be sustained and grown. In the example of the crab cage cultivation enterprises in Section 4.6, some of these enterprises were unable to survive after donor-funded support ended simply because they lacked crab feed and access to a nearby market. On this last point, a critical success factor in any conservation enterprise is identifying—prior to starting the enterprise—viable markets for its products or services.

- What is the extent and type of economic activity in the area? How do people earn an income?Are income generating opportunities equal or are certain groups (e.g., women) disadvantaged?
- What resources are available for operating a business?
- What are people's expectations about income to be generated from the enterprise?
- What are the available sources of credit for a conservation enterprise (family, friends, village savings and loan, savings and credit cooperative, commercial bank)? How accessible and well-functioning is each?
- What are the characteristics and dynamics of target markets? Possible questions include:
  - Is there an existing market for conservation-based products?
  - What are the value-added or marketing opportunities for existing natural resource-based livelihoods?
  - What is the level of competition between current entrepreneurs? Is there room for growth?

VALUE CHAIN APPROACH

Value chain analysis is a tool to create equitable economic growth in small enterprise sub-sectors. The analysis includes reviewing the business enabling environment, competitiveness, horizontal and vertical relationships between firms, firm-level upgrading, and end markets. It provides a systems perspective of the business, governance and social context from input supply to production, processing, and end markets.

For more information: USAID Microlinks Value Chain Wiki http://microlinks.kdid.org/good-practice-center/value-chain-wiki

Understanding the local social and cultural conditions can help in understanding how people are likely to respond to new opportunities. It can be useful to examine past experiences of enterprise development in a community in order to assess the factors that have helped or inhibited livelihood change. For example, it is important to understand if there is a culture of entrepreneurship in the community. There are wide differences in entrepreneurship history, interest and skills across countries and even in different parts of the same country. Communities that have been involved in conservation or entrepreneurship activities might be better prepared to engage once again, as they already have learned many of the skills needed to develop conservation-based enterprises. In Madagascar, engaging community members in establishing a locally managed marine area (LMMA) helped build local management skills. This, in turn, made locals better prepared for entrepreneurship. In The Gambia the skills that individuals gained through entrepreneurship training and organizational strengthening interventions were equally useful in the conservation enterprise activities. There are other cases, where enterprise assistance projects expect the participants to all be budding entrepreneurs, but where in fact only few of the participants have the interests and skills necessary to run an enterprise—resulting in a lower level of success than hoped for. It is also important to assess stakeholder support and level of interest in conservation. Because conservation-based enterprises may not be the easiest enterprise option, it is often helpful if the entrepreneurs are already active in conservation. Questions useful in understanding the social conditions include:

- What factors influence people's ability to change their income-generation activities? Are there gender differences related to access to education, capital, technical

skills, and other assets necessary for many income-generating activities? Is there local leadership for enterprise development? Is there stakeholder homogeneity? Are there resource-related or other conflicts between stakeholders?

- How do these factors influence the potential for entrepreneurship development?
- Who is affected by these factors?
- How can you support positive influences and address negative factors?

TIP: An assessment of the environmental, social, and economic context can include establishing a baseline to measure enterprise and conservation success. Guidelines on how to conduct a baseline are described in more detail in Section 5.1

It is important to identify and secure the support of the enterprise enablers, i.e., leaders/decision-makers (those who establish formal and informal rules) and service providers (e.g., training centers, providers of raw materials or inputs, and product markets). Identifying the relationships between these groups—who benefits and who is affected by the power, politics, local culture, market arrangements, and other dynamics—will assist in understanding how to better work within and improve current enabling networks. As explained in Section 4.6, the chances of success for a crab-growing project in Tanzania were greatly enhanced by collaborating with a local frozen seafood producer (service provider) to access feed for the caged crabs. In The Gambia (Section 4.7), a strong leader and good institutional structure powered the TRY Oyster Women's Association to grow to include 500 members from 15 communities.

Useful questions to assess the enabling conditions are:

- What is the enabling environment for business in terms of policies, regulations, fees, availability of credit and markets, land tenure, zoning, and supporting institutions (e.g., vocational extension and training)? Are there national policies or politics that may impact the success of new conservation enterprises?
- What are the prospects for institutional reform that could improve the enabling environment?
- What is the attitude of local government towards the enterprise development idea?
- What decision-makers and institutions will affect the success of conservation enterprise?
- What private sector interests are present and how can the entrepreneurs link up with them?

RESOURCES/TOOLS

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2.4 IDENTIFY MAJOR STAKEHOLDER GROUPS AND THEIR INTERESTS

Economic development, natural resources management (NRM), and other public concerns encompass or affect numerous people, groups, and organizations. Taking the many stakeholder groups and their interests into account, understanding their livelihoods, the problems they face, and what solutions might work is a crucial aspect of developing conservation-based enterprises.

TIP: Fostering positive, self-reinforcing linkages across government, the private sector, and civil society organizations is essential to successful integration and long-term sustainability.

There may be a variety of stakeholder interests, often in conflict, and not necessarily located in the same geographic site. Resolving conflicting interests can be time consuming. Problems can often be reduced or avoided if identified early on. In Ghana, establishing internal procedures, including creating an arbitration committee within the Mangrove Planters and Fishmongers Association of Anyanui, has reduced conflicts and increased trust in the leadership and

among the Association members. Customary agreements between the Association and local chiefs have made clear the definition of access rights, and this has only further reduced the potential for conflict.

One characteristic of coastal areas with high biodiversity is the large amount of public land (such as mangrove wetlands, estuaries, and the marine ecosystem) used with or without permission by individuals, groups and the private sector. This means that stakeholders must include not only the communities in and around the sites, but also environmental NGOs, and the local, sub-national and national level agencies with legal authority to manage the public resources.

There are no hard and fast rules for identifying and involving stakeholders. Each case is unique. Successful strategies are usually context-specific and based on a stakeholder assessment. The Internet offers a range of methods for conducting stakeholder assessments and most can be adapted for conservation enterprise project planning. However, there are two important points to consider:

1. Local institutions and leaders often have special interests, and might support a particular group for political reasons (or because of some sort of kinship). It is a delicate process to work with such leaders to ensure their collaboration, but at the same time avoid fueling local power structures or falling into the trap known as "elite capture"—a situation where the "elite" rather than the intended beneficiaries are the ones who reap the benefits.
2. To properly identify the entrepreneurs who should initially participate in the project, it is important to be clear about the goal. If it is to change the behavior of a certain group (e.g., people who cut mangroves for charcoal), that is the group to target. If the goal is to reach the poorest in the community, then they are the target group but may require a significant level of support. If the goal is to show quick enterprise success so as to encourage others to adopt the same methods, the target should be innovators or early adopters within the community.

QUESTIONS TO CONSIDER WHEN DEFINING STAKEHOLDER GROUPS

- Who will be directly affected (positively or negatively) by the conservation-based enterprise?
- Who are the leaders or representatives of those who will be affected?
- Who are the "voiceless" stakeholders that should be heard or encouraged to participate?
- Who are the "innovators" or "early adopters" in the community (entrepreneurial individuals who might be more likely to pick up a new enterprise idea than others)?
- Who are the stakeholders in government agencies or businesses?
- Who can make the enterprises more effective through their support or less effective by their non-participation or outright opposition?
- Who can contribute financial and technical resources?
- Whose behavior must change in order for the project to succeed?

It is important to use a gender lens when asking these questions.

RESOURCES/TOOLS

Bryson, J. (2004), "What to do when Stakeholders Matter: Stakeholder Identification and Analysis Techniques," Public Management Review, Vol. 6, No. 1, pp. 21–53. http://www.hhh.umn.edu/people/jmbryson.pdf/stakeholder_identification_analysis_techniques.pdf

FAO, Stakeholder Analysis Course. http://www.fao.org/participation/english_web_new/content_en/stakehold.html?ID=3361

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USAID (1991), "Stakeholder Analysis: A Vital Tool for Strategic Managers," 6 pp. http://www.usaid.gov/our work/democracy_and_governance/publications/ipc/tn-2.pdf

FAO, Participation Web site: http://www.fao.org/Participation/ft_find.jsp

2.4.1 ASSESS AND MAINSTREAM GENDER

Gender mainstreaming creates an environment wherein women and men are better able to participate as equals in the enterprise development process. Gender mainstreaming focuses on both women and men — integrating the voices of both genders as well as of the young and old in decision-making. However, in some instances where

there are inequities in opportunities and vulnerabilities, woman-centered efforts can make a difference. It is also important to be sensitive to the social diversity and complexity among women—including but not limited to differences in roles, income-levels, age, and marital status. Important gender terms are:

Gender Relations: Ways in which a culture or society prescribes rights, roles, responsibilities and identities of women and men in relation to one another.

Gender Mainstreaming: Refers to strategies that project staff and partners employ to ensure that women's as well as men's attitudes, roles, responsibilities, concerns and experiences are an integral dimension of the design, implementation, monitoring and evaluation of policies and programs. Differences are recognized and routinely addressed for all activities.

Gender-Sensitive: Recognizing the differences and inequities between women's and men's needs, roles, responsibilities and identities.

Gender Equality: Refers to norms, values, attitudes and perceptions required to attain equal status between women and men without neutralizing the biological differences between women and men.

Gender Equity: Refers to fairness in women's and men's access to socio-economic, natural and other resources (e.g., political resources, extension services, credit, etc.).

Gender Analysis: evaluates the impact of a project on men and women, and on the economic and social relationship between them.

Gender mainstreaming needs to be based on the context of a place and can include the following types of activities:

- Conduct **gender analyses** to make enterprise development more efficient and relevant by understanding women's and men's resource use patterns, responsibilities, and their access to resources and decision-making.
- Establish and strengthen gender-sensitive **policies and programs.**
- Modify **legal and regulatory frameworks** that prevent women from participating in planning, decision-making and economic development.
- Build **institutional capacity** to implement program for advancing gender equity through staff training and advancing women to leadership positions.
- **Educate** girls and provide adult training for women and men on gender and reproductive health.

GENDER EQUALITY ISSUES

- Women and men tend to do different work.
- Women tend to have less access than men to formal decision-making authorities and are less involved in local decision-making structures.
- Women and men generally have different access to and control over land and water.
- Women and men often use different landscape spaces.
- Women and men often have different spheres of traditional knowledge.
- Women and men often have different coping strategies for drought and disasters.
- Women and men tend to have different domestic responsibilities, including responsibilities regarding financial expenditures.

- Increase **funding** for the education, training and microfinance needs of girls and women.
- Increase **participation** in decision-making, such as establishing minimum levels of women's participation in committees and appointing women to chair organizations.
- Develop **gender-sensitive indicators** for tracking the results and impacts of conservation-based enterprises.
- Create **practical tools** to build gender equality into enterprise development initiatives.

RESOURCES/TOOLS

Diamond, N. K., L. Squillante, *et al.* (2003). "Cross currents: navigating gender and population linkages for integrated coastal management." *Marine Policy* 27: 325–333.

Guijt, I. and M. K. Shah (1998). "The Myth of Community: Gender Issues in Participatory Development." London, Intermediate Technology Publications.

Horemans, B.W, and Jallow, A.M eds (1997) "Workshop on gender roles and issues in artisanal fisheries in West Africa." DANIDA and FAO, http://www.fao.org/DOCREP/x0205e/x0205e00.htm

Squillante, L. J., E.C. Torell, N.K. Diamond, (2004), "Teaching Cases: The Population and Gender Dimensions of Coastal Management," Coastal Resources Center, University of Rhode Island, Narragansett, RI USA, 195 pp. http://www.crc.uri.edu/download/Entire_Book.pdf

Williams, M.J.,M.C. Nandeesha and P.S. Choo (2005),"Changing Traditions: First Global Look at the Gender Dimensions of Fisheries". NAGA, WorldFish

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United Nations Development Programme (2001). "Gender Analysis–Learning and Information Pack." New York, UNDP. http://www.dgrc.org/gender/mainstreaming/index.html

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UNDP (2010). "Gender, Climate Change and Community-Based Adaptation, A guidebook for designing and implementing gender sensitive community based adaptation programs and projects," UNDP, New York.

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2.5 IDENTIFY CONSERVATION ENTERPRISE TARGETS AND OBJECTIVES

As with any other initiative, planning for conservation enterprise must begin with sharing objectives and expectations, creating a shared vision of stakeholders, and clearly understanding the motivation of different participants. Goals and objectives must be defined through a participatory process in which local stakeholders feel ownership. This usually requires establishing a stakeholder group that will move the process forward. This is particularly important when dealing with a broad base of stakeholders and communities that will be critical to the long-term sustainability of the enterprise. Examples from Ecuador, The Gambia and Ghana illustrate that creating some sort of charter or agreement between the members can help in setting goals and objectives. In these cases, such agreements created ownership and helped frame what could be expected from participating in the three associations.

There are many reasons to support small enterprise development in coastal developing areas. These reasons include poverty alleviation, diversifying livelihoods to enhance community resilience, disaster recovery, reducing gender inequality, and biodiversity conservation. Small enterprises can be an instrument for both conserving biodiversity and providing an income for the coastal poor. Within this general goal, it is necessary to set specific biodiversity objectives and the timeframe for change. Biodiversity conservation targets in coastal areas will focus on functioning and healthy coastal and marine ecosystems and may include the protection of:

- Coral reef systems
- Marine fisheries
- Mangrove areas
- Seagrass beds
- Estuarine ecosystems
- Beach systems and shorefront habitat

Goals identify the desired endpoint. In the case of addressing biodiversity threats, the goal should state the desired changes that would lead to an improved quality of ecological conditions. On the socio-economic side, it should also state the hoped-for changes in income-level, revenue generation, or other variables that contribute to an improved quality of life for entrepreneurs and their fellow community members. Valuation studies of resources can be a useful tool when drafting enterprise goals. For example, understanding how much a live shark is worth for tourism versus a dead shark can sometimes be persuasive, as can helping future entrepreneurs calculate the difference in economic value of harvesting a pearl oyster to eat immediately versus allowing it to grow long enough to produce both meat and also two half pearls.

Objectives provide the specific achievements that must be met in order to reach the goals. The most successful projects teach the importance of setting objectives that are unambiguous and time-bound. If a conservation enterprise activity is developed under a donor-funded project, it is important that the objective include a sustainability or transition plan. Many donor-driven enterprise development projects fail because the enterprises become dependent on outside technical assistance and other support, and lack a transition strategy for how to move to greater self-sufficiency and sustainability.

Both the goal and objectives should be grounded in two things: 1) a realistic assessment of the potential impact of conservation enterprise activities; and 2) an understanding of biodiversity conditions, threats and the local enterprise context. Research suggests that sustainable livelihoods, which is broader than but may include microenterprise development, must fulfill a number of criteria:

GOAL AND OBJECTIVES

Goal: A general statement of the desired long-term outcome or impact of a project. A goal statement does not imply that the project, by itself, will be sufficient to attain this goal. Rather, the project activities may contribute to reach the goal.

Objectives: Specific statements of the desired accomplishments or outcomes of a project. Project objectives are quantifiable and time-limited.

1. Relate to the needs and aspirations of the poor
2. Be economically, environmentally, institutionally, socially, and culturally viable
3. Be economically, environmentally, institutionally, socially, and culturally sustainable
4. Have a market large enough to accommodate the number of people concerned
5. Have a risk level that is acceptable to the entrepreneurs
6. Maintain or strengthen resilience (i.e., the ability to adapt and bounce back when encountering significant adversity, trauma, tragedy, or other sources of stress)
7. Build on existing strengths and be in harmony with existing livelihood strategies
8. Accommodate gender differences and strengthen equity
9. Conform with local and national policies and legislation
10. Enhance the independence and rights of the poor
11. Enhance the innovative capacity, vision, and adaptability of the poor

Conservation enterprise projects may be nested within broader coastal management or conservation efforts with a variety of activities in capacity building, training, research, community actions, and planning and policy. In such cases, enterprise development may be one intervention in a suite of other interventions all working toward the same goal. As such, it may be difficult to ascribe the contribution of conservation enterprise to the overall goal. Below are two examples of conservation enterprise goals and objectives:

EXAMPLE 1

Goal:
Marine fish communities are healthy and overfishing and destructive fishing is reduced, while the income of fishing communities is at least maintained, if not increased.

Objective:
Artisanal fishing effort is reduced 20 percent in five years.

Objective:
Fishermen diversify their incomes by leading snorkeling tours to nearby protected coral reefs.

EXAMPLE 2

Goal:
The mangrove wetland ecosystem is functioning and healthy, providing habitat for the bees that produce honey for local entrepreneurs.

Objective:
The number of beekeepers in the village beekeepers association is increased by 75 people in two years.

Objective:
The output of honey is increased by 30 percent in four years.

The goal and objectives can provide the basis for a strategic plan of action in support of conservation enterprises. The strategic plan is a broader document that in addition defines the inputs, activities, type(s) of enterprise, partners, and roles and responsibilities.

TIP: When the site conditions, stakeholder groups, and opportunities for conservation enterprise have been assessed and the conservation enterprise goals and objectives have been established, it is time to begin developing an enterprise strategy.

CHAPTER 3

PLANNING A CONSERVATION ENTERPRISE STRATEGY

PLANNING A CONSERVATION ENTERPRISE STRATEGY (STEP 2)

3.1 CONSIDERATIONS IN SELECTING ENTERPRISE(S)

Strategy defines the inputs and actions to pursue the goals and objectives of conservation enterprise. This section of the Review outlines important considerations when choosing a conservation enterprise, and presents an implementation strategy aimed at maximizing the probability for enterprise success.

The first question is: "What is the current mix of threats to livelihoods and biodiversity in the target communities, what type of enterprises are feasible and what is the causal theory that links the enterprise with the resolution of biodiversity threats, conservation, and quality of life goals?" In Ghana, while the entrepreneurs did not stop selling mangrove poles, they were able to stop the uncontrolled harvesting of mangroves and turn their livelihood into a controlled agro-forestry enterprise.

Selection criteria and a process to refine the list of potential conservation enterprises and their products and services are needed in order to eliminate non-viable options and to select the specific enterprise. Considerations should include:

- Fundamental gaps, constraints, and factors outside the influence of the enterprise
- Potential synergies with other enterprises and products and opportunities for livelihoods diversification
- Strength of causal links between the enterprise and conservation targets

Another consideration is whether or not engaging in the new enterprise will change the current suite of livelihoods implemented by households. For example, it is sometimes thought that expanding seaweed farming encourages fishermen to leave fishing and thus reduces pressure on artisanal fisheries. However, this is usually not the case. In East Africa, seaweed farming is primarily a women-dominated enterprise and investing in seaweed farming has little or no impact on the male-dominated fisheries. In North Sulawesi, Indonesia, seaweed farming is a household enterprise where women and children prepare the seaweed lines and men help set and harvest the seaweed lines on the floating farms. While this was originally considered to be a good alternative livelihood for fishermen, women and children did most of the tedious labor and men's involvement was insignificant enough that it did not reduce fishing effort. In this scenario, while seaweed farming contributed to improving household incomes, it did not lead to fishermen leaving fishing. Further, anecdotal evidence suggested that profits from seaweed fishing were reinvested into fishing capital, only leading to increased fishing effort and more overfishing.

A common mistake when selecting conservation enterprises is failing to determine whether or not there are markets for the goods and services that will be produced—or failing to properly train the entrepreneurs in marketing and sales. It is easier to develop enterprises for which there is already an established but not too competitive market. For example, in the Biodiversity Conservation Network's assessment of a number of conservation-based enterprises implemented in the 1990s, there is an example of an ecotourism project where a guest house was constructed, but very few guests found their way there. "When are the tourists coming?" the entrepreneurs asked the project staff, who realized that the entrepreneurs lacked the necessary marketing skills to promote the guest house. In The Gambia, increasing access to markets is one of the major success factors for the TRY Association. In Zanzibar, marketing training was important to help the women entrepreneurs package and price their products and reach the large tourism market on Zanzibar.

TIP: DEVELOPING AN ENTERPRISE USUALLY GOES HAND-IN-HAND WITH CONDUCTING A NUMBER OF STUDIES:

- Livelihoods assessment (what are the current livelihoods, stakeholder characteristics, and available assets and factors influencing current and future enterprise development?)
- Feasibility study (is the enterprise viable?)
- Environmental impact assessment (is the enterprise environmentally sound?)
- Social analysis (what are the community expectations of and who will benefit from the enterprise?)

AND CREATING PLANS:

- A business plan (including goals, objectives, financial/budget plan, etc.)
- A marketing plan (defining the market, your niche, pricing, etc.)

Useful questions to assess market access are:

- What makes the product or service unique?
- Why should people buy the product or service?
- Who are the prospective customers?
- What are the customers' expectations for the product or service?
- Where do these customers currently buy these same or similar products and services?
- Why would customers want to switch over and instead buy these products/services from this new provider?
- What can the producers offer that is unique in terms of price, quality, or convenience?

It is also important to match the scale of enterprise development to the market size. Do not start a business unless there is sufficient demand for the product or service. There is a delicate balance between creating economies of scale—where for example, the numbers of entrepreneurs are large enough to negotiate sales with a large buyer—and over-saturating the market. For example, there are too many producers of Spinosum seaweed for the world market today and in Tanzania the income for Spinosum entrepreneurs is so low that it is no longer a viable enterprise for expansion to other individuals, and expansion could contribute to even lower prices due to overproduction. When combining conservation and enterprise development, it is also better to start small. Focus on a small number of communities and establish good conservation and enterprise systems there first and only then scale-up to new areas. This approach was used by Blue Ventures in Madagascar. On Zanzibar (Section 4.3), the original four communities became learning sites, where the entrepreneurs acted as peer educators for scale-up communities.

Eight additional rules of thumb are useful in selecting conservation enterprises, with examples of how they played out given in Section 4:

1. Enhance and add value to existing livelihoods where possible. An alliance with an existing production or service enterprise is less risky. That enterprise already has some level of capacity and its operators are already committed to making the enterprise successful. Because the enterprise is already established, it is also easier to scale-up more quickly.

2. Consider enterprises that require low levels of capital investment as these are more feasible for poor rural communities. Lack of access to microcredit and other sources of capital is a problem in many poor rural coastal communities. Manufacturing activities that depend on a constant supply of materials and fluctuating costs are particularly difficult, except in cases where the materials are found in the natural environment and the stakeholders either have control or access to those resources.

TIP: Focus on non-perishable commodities unless there are markets nearby—or excellent transportation infrastructure and good logistical development. Target international markets ONLY if there is a world-class resource in demand and available in few other places.

3. Recognize that while new forms of livelihoods are sometimes necessary, they may also demand a certain level of funding and time commitment(e.g. Sections 4.4 and 4.9). Starting a new enterprise has the advantage of introducing new technologies and opportunities to a community. However, working with new versus existing enterprises can also come with greater challenges and higher risk. The risk can be implied simply because it is an untried activity with inexperienced entrepreneurs. Failure rates can be high and from a business development perspective, new enterprises can consume many resources, require extensive training, and must provide the community with start-up demonstrations and technical assistance. Finally, a new enterprise is unlikely to be successful and achieve significant scale in a short time. When possible, and before launching new livelihoods in rural communities, it is best to establish a research and demonstration site, such as within a university or government extension center. This allows for both working out the "kinks," and providing the venue for demonstrating the new technologies to future entrepreneurs.

4. Build on existing diversity. In coastal areas of developing countries, many have adopted a livelihoods strategy that includes several income streams—as a way to reduce individuals' vulnerability to stresses and shocks. Where possible, build on this strategy when establishing the conservation enterprise.

5. Build on people's strengths and entrepreneurial capacity. It is easier to achieve results if the focus is on simple enterprises that use local skills rather than complex enterprises that require new skills. Also, those involved must have the desire and interest to become entrepreneurs. Business planning and entrepreneurship training will only do so much. For example, some people might be more comfortable engaging in beekeeping and selling their honey to local restaurants or shops than marketing themselves as tour guides for local tourists.

6. Ground the enterprise on a feasibility study and a sound business plan. This will help avoid embarking on enterprises bound to fail, and will help the entrepreneurs in thinking through their product development, financial, and marketing plan. The business plan can also lay out the steps for how the enterprise will cooperate with various enablers, but operate independently from donor support.

7. Generate early benefits (e.g. Sections 4.4 and 4.6). For community members to continue supporting conservation and stick with the conservation enterprise, it is important that the enterprises produce some tangible benefit(s), at least within the first year. Many community members become impatient if they do not see benefits in the short term, especially if they are used to engaging in livelihoods, such as fisheries, that provide them with a daily income. For many poor fishing households, experimenting with entrepreneurship can be intimidating, especially if they stand to lose time or money in the process and/or if benefits are slow in coming.

8. Acknowledge that family or individually-owned enterprises often work better than group enterprises. Group enterprises tend to attract free-riders and create resentment that can lead enterprises to dissolve. However, as in the cases of Tanzania, Ghana, and The Gambia, sales cooperatives in which the entrepreneurs grow or prepare their own products, which they then sell to a cooperative, can be successful. In this model, the entrepreneurs are in a better position to negotiate price with the buyers, giving their product/services a stronger position in the market.

Conservation enterprise assistance needs to be commensurate with the realities of time, funding, personnel, local leadership, and institutional capacity. Small enterprises will grow with time, experience, and the positive reinforcement that comes with success.

There are several enterprise development checklists available (e.g. IMM 2008, Salafsky et al. 1999, and FSPI 2007) and one that is simple and user friendly is that of Salafsky et al. (1999).

The purpose of the following checklist is to assess the viability of an enterprise given its characteristics and the conditions of the place where the enterprise will be implemented. For other checklists or for a more detailed explanation of the Salafsky et al. checklist, see the RESOURCES/TOOLS section below.

RESOURCES/TOOLS

Aspen Institute (2005), Branding and Marketing Toolkit: Community-Based Businesses and Products, 142 pp. http://www.aspeninstitute.org/sites/default/files/content/docs/TOOLKIT10-18.pdf

Food and Agriculture Organization (2000), Market Analysis and Development Training Materials. http://www.fao.org/forestry/enterprises/25499/en/

IMM (2008), Systematic approaches to livelihoods enhancement and diversification: A Review of Global Experiences. IUCN, Gland, Switzerland and Colombo, Sri Lanka; Cordio, Kalmar, Sweden; and ICRAN, Cambridge, UK. http://cmsdata.iucn.org/downloads/global_review.pdf

Koontz, A. 2008. The Conservation Marketing Equation, Enterprise Works/VITA and USAID: http://rmportal.net/library/content/translinks-2008/enterpriseworks-vita-relief-international/ConservationMarketingEquation _Manual_EWV_2008.pdf

Minnesota Institute for Sustainable Agriculture (2003), Building a Sustainable Business: A Guide to Developing a Business Plan for Farms and Rural Businesses, 280 pp. http://agmarketing.extensions.psu.edu/Business/PDFs/build_sust_business.pdf

Pacific Aquaculture and Coastal Resources Center (2006), Marketing your Product: A Trainer's Guide for Marketing Aquaculture, Agriculture and other Natural Products. http://pdf.usaid.gov/pdf_docs/PNADK669.pdf

Office of Sustainable Development, Bureau for Africa (1996), Environmental Guidelines for

Small-Scale Activities in Africa, 217 pp. http://www.afr-sd.org/publications/18ngo.pdf

FACTOR	CONDITIONS AT YOUR SITE				
Enterprise	**Forget It !**	**Think Hard**	**Maybe If…**	**Go For It !**	**Comment on "Maybe If…" Column**
Potential profitability	< variable costs	< fix costs	> fix costs	Costs+profit	…if have management subsidy
Market demand	None	Low	High	Medium	…if overharvesting can be controlled
Infrastructure	Poor	Marginal	Okay	Good	…if low weight, high value product
Local enterprise	None	Few	Some	Lots	…if people skills can be hired and trained
Complexity	Extreme	High	Medium	Low	…if sufficient support is available
Linkage to conservation	None	Low	Medium	High	…if community perceives linkage
Benefits					
Cash benefits	None	Few	High	Moderate	…if they do not cause conflict
Non-cash benefits	None	Few	Some	High	…if they are meaningful to community
Timing	Long wait	Unknown	Short	Immediate	…if at least some initial quick benefits
Distribution	Very wide	Elites only	Limited	Targeted	…if to resource use decision-makers
Stakeholder					
Stakeholder group	Not present	Very new	Present	Established	…if groups shows interest
Leadership	None	Weak	Strong	Balanced	…if leader is respected by people
Resource access	None	Ill-defined	Some	Full	…if not clear how important
Enforceability	None	Limited	Some	Strong	…if community can defend their rights
Stakeholder	Low	Minimal	Moderate	Complete	…if homogeneity can compartmentalize business
Conflict	Constant	Frequent	Occasional	Rare	…if enterprise/project not involved
Threat source	All internal	Most internal	Most external	All external	…if external threat pays cash
Other					
Chaos	Constant	Frequent	Some	Unlikely	…if you roll with it
Project alliance	Unwieldy	None	Strategic	Experienced	…if alliance has complementary skills

Source: Salafsky, N., B. Cordes, J. Parks, and C. Hochman (1999), Evaluating Linkages Between Business, the Environment, and Local Communities: Final Analytical Results from the Biodiversity Conservation Network. Biodiversity Support Program, Washington, D.C., USA.

3.2 CONSIDERATIONS IN SELECTING EXTENSION ACTIVITIES

In deciding the best forms of enterprise assistance within a local context, coastal practitioners and local government officials can use a range of criteria:

- **Costs.** What are the resources available for conservation enterprise assistance? If budgets are constrained, the scale and form of assistance must be consistent with the level of resources. For example, while there may be interest and opportunity to promote large-scale ecotouism in a coastal region over the longer term, at the start it might be necessary to begin piloting small doable actions related to ecotourism in just one, or a small number of, villages.
- **Benefits to biodiversity.** What are the direct and indirect biodiversity-related benefits of the enterprise? Can the enterprise help protect ecosystem functioning and create public awareness?
- **Implementation considerations**. In selecting the type, complexity, and scale of the enterprise, consider the level of skill required of the entrepreneur, the amount of information needed to get started, the availability of inputs to the production or services, ease of transportation of the product or service, and the ease and level of access to markets and sales.

  -Some conservation enterprise operations require skill and knowledge that are not available (e.g., dive tourism, black pearl culture, and shell jewelry-making)

  -An enterprise based on the sustainable collection of wild oysters and cockles for processing and sale may be simple as compared with an aquaculture enterprise that involves collecting wild seedlings and growing them out over nine to 12 months on collector strings.

  -Working with a diverse and conflicting group of operators (e.g., dolphin sightseeing, hotels, boat owners, and beach hustlers) may be more challenging than working with a uniform group of operators (e.g., a beekeeping group).

Some forms of conservation enterprise assistance may require changes in behavior for which it is difficult to predict the likelihood of such change. For example, to add value to some conservation enterprise activities it might be necessary for the operator to market the product differently and be more aggressive in their sales techniques. Yet, these are not skills that come easily, if at all, to some individuals and groups.

In selecting enterprise development actions, or interventions, in most cases a bundle of interventions will be more effective than a single stand-alone intervention. We group conservation development interventions in three broad strategies, listed below.

Enterprise development services (business planning, training and extension, peer exchange, marketing and sales, value chain assessment)

Financial instruments (micro-credit, start-up grants, small incentive grants)

Strengthening the enabling environment (resource centers, institutional development of conservation enterprise associations, strengthening public-private partnerships, and influencing national policy)

> **TIP:** Making micro-credit available in local communities (through established micro-credit schemes or creating community-led savings and credit associations) can be a way for women, who otherwise have few sources of income and capital, to access capital. In The Gambia, a microfinance scheme and related trainings enabled women to start-up and manage their business better.

In selecting the best combination of interventions, it is important to acknowledge differences among countries and across sites. What is the community's pre-existing degree of knowledge and skills for the particular enterprise? What is the level of awareness of the natural environment and biodiversity? Different contexts drive the need to tailor conservation enterprise interventions to local conditions.

It is also important to consider the appropriate length/timeframe of the extension support. What support will be provided during the enterprise start-up phase? When will the extension support be phased out? In some cases, it may be necessary to provide periodic assistance (or at least access to assistance) to address technical or marketing issues over a longer timeframe to address problems that arise after the businesses get off the ground. However, it is important that the enterprises do not become dependent on extension support to survive over time.

As part of the development of a course of action, it is helpful to make explicit the principles that will underpin technical assistance to a conservation enterprise

These may include the following:

• *Ensure equitable and broad participation.* Promote stakeholder participation—including women and disadvantaged groups—in planning, decision-making, and implementation.

• *Promote local ownership.* It is essential that the process by which a conservation enterprise is developed and refined is "owned" by the operators, community, and government, of the particular site.

• *Move from open access to managed access and secure tenure.* Transition from uncontrolled open access to forms of limited entry and user rights. Likewise, move from reliance on external enforcement of conservation rules to compliance, community co-management, and self-management.

• *Promote social responsibility and equity as key objectives.* Protect subsistence needs and promote fair treatment of labor—fair prices, no child labor, and safe working conditions. Create resilient and diversified livelihoods for communities that are highly dependent on capture fisheries.

• *Promote adaptive management.* Structure conservation enterprise support to allow for monitoring progress and generating timely information that can inform needed adaptations.

• *Foster sustainability.* Focus on the financial viability of conservation enterprise to sustain conservation achievements beyond the end of the activity lifetime. Enable access to longer-term technical assistance for troubleshooting and problems related to business and marketing.

• *Strengthen in-country capacity* at both the human and institutional levels—the latter including both government agencies and NGOs.

• *Focus on results.* Articulate underlying assumptions, rationale, and methods for achieving results; and how impacts of the activity on biodiversity will be measured and monitored.

• *Foster learning.* Analysis of results and dissemination of lessons learned should be part of conservation enterprise activities.

TIP: EXTENSION SUPPORT BEYOND THE ENTERPRISE

To ensure the long-term success of livelihood implementation and conservation—and as part of a larger community development package—it is useful to provide training and extension support on:

- Conflict resolution
- HIV awareness
- Family planning
- Alcoholism treatment
- Domestic abuse

Sometimes the best plans for livelihoods development can be scuttled by other critical social issues

TIP: TAILOR TO LOCAL CONDITIONS

Each location has different circumstances—climate, natural resources, infrastructure, technological state, economy, governance, etc.—so, the appropriate type and scale of enterprise development may vary. Assistance in conservation enterprise development must be "tailored" to the local context through an inclusive process that matches the biodiversity issues and form of enterprise with the technical capabilities and the capacity of the institutions and community stakeholders of the place.

RESOURCES/TOOLS

Food and Agriculture Organization (2009), *Plan Enterprises for Sustainable Development,* 111 pp. ftp://ftp.fao.org/docrep/fao/005/x7455e/x7455e00.pdf

Food and Agriculture Organization (2009), *Assessing the Existing Situation,* 49 pp. ftp://ftp.fao.org/docrep/fao/005/x7453e/x7453e00.pdf

IMM (2008), *Sustainable Livelihoods Enhancement and Diversification (SLED) – A Manual for Practitioners.* IUCN, Gland, Switzerland and Colombo, Sri Lanka; Cordio, Kalmar, Sweden; and ICRAN, Cambridge, UK. Available online: http://cmsdata.iucn.org/downloads/sled_final_1.pd

Salafsky, N., B. Cordes, J. Parks, and C. Hochman (1999), *Evaluating Linkages Between Business, the Environment, and Local Communities: Final Analytical Results from the Biodiversity Conservation Network.* Biodiversity Support Program, Washington, D.C., USA. Available online at: http://pdf.usaid.gov/pdf_docs/PNACG146.pdf

3.3 IDENTIFY IMPLEMENTING PARTNERS AND LEVERAGE STRATEGIC PARTNERSHIPS

Building conservation enterprises requires leveraging strategic partnerships with enterprise enablers: leaders/decision-makers, service providers, and outside technical assistants (including peer organizations that can facilitate peer-to-peer learning and transfer of knowledge). For example, service providers often provide access to expertise that is not available in rural communities—expertise related to production or service, marketing and sales, resource conservation and environmental management, and legal or policy issues. Several studies of microenterprise projects around the world found that a key success factor is identifying private businesses that are willing to partner with the local entrepreneurs.

The challenge is to identify appropriate partners in a position to contribute to the development of a sustainable enterprise and engage in potential strategic partnerships with government, universities, the private sector, technical support providers, credit and financial institutions, and buyers. To implement conservation enterprises, the participants need organizational and management capacity, technical skills, market knowledge, and they must know how to access and use information and how to influence decision-making. As the enterprise project assesses the entrepreneurs' skills, knowledge, and capacity it will identify where there are gaps. Especially when working with the poorest, and most marginal and vulnerable groups in any community, it is likely necessary to form partnerships with both decision-makers and external service providers. In identifying and engaging potential partners, the project needs to:

- Identify the main strengths, skill sets and constraints associated with the potential enterprise
- Identify the shared interests of each group
- Clarify how committed the different partners are and how each partner can benefit from collaborating
- List the areas where external assistance is most critical
- Assess the nature of existing relationships and if/how they need to be changed
- Identify institutions or individuals that can help to improve the enabling environment for the enterprise
- Consider opportunities for strategic marketing and sales alliances

When forming partnerships, it is important to manage the expectations of everyone involved. Decision-makers, private sector partners, and community members who might have a long history of development initiatives that have assessed communities' needs and have delivered services to address those needs, often develop expectations that are too high. Good conservation enterprise partnerships have a clear definition of shared interests, roles and principles of partnership. This includes the responsibilities of both the enterprise enablers (often NGO and private sector partners) and community members.

Partnerships can be formal or informal. For example, in the crab-cage cultivation project described in Section 4, a local frozen seafood producer agreed to provide feed to the crab cultivators free of charge. There was no formal contract between the growers and the company, because the seafood producer simply believed that by providing the feed to the growers he would automatically benefit by receiving a supply of crabs for sale. At the heart of the agreement was a shared interest in increasing the local production of crabs. An example of a more formal partnership is presented in Section 4.9, where the AsoMache Association entered into an agreement with EcoCostas. A written contract between the two parties outlined the roles and responsibilities of each party—something that can be useful in maintaining the commitment and expectations of those involved.

It is important to identify and leverage partnerships before implementing a conservation enterprise. Where negative influences are detected (e.g., private sector interests are wary of competition or decision-makers are reluctant to support an enterprise where they do not see any benefit to themselves or their families), it allows time for the project implementers to address the "disabling factors." It also makes clear from the outset the roles of various players and helps ensure the project does not lose time on the "wrong" activities-for example, spending time in forging marketing linkages when they already have a product to sell.

Conservation enterprises might also benefit from organizing the entrepreneurs into cooperatives. Experience has shown that group enterprises often fail because some entrepreneurs end up working more while others become "free riders." This leads to demoralization and failure of the enterprise. However, organizing the entrepreneurs into marketing groups, where each member is responsible for their own production but other business management-related activities are conducted jointly, has proven to be a successful model. For instance, in a post-tsunami relief project in Thailand, each entrepreneur designed and sewed the headscarves they would sell, but the purchase of the raw materials and the sales of the scarves were coordinated through a cooperative-like group. This model has also been successfully used by crab cultivators, seaweed farmers, and beekeepers in East Africa.

CHAPTER 4

EXECUTING A CONSERVATION ENTERPRISE STRATGY: IMPLEMENTATION EXAMPLES AND FINDINGS

This section presents the cases of seven conservation enterprises from Africa, Latin America, and the South Pacific. It also includes a short synthesis of lessons learned from implementing ecotourism (based on a broad literature review). Five of the cases (Ghana, The Gambia, Zanzibar, Ecuador, and Nicaragua) are related to conservation enterprise activities implemented or related to the USAID-funded Sustainable Coastal Communities and Ecosystems (SUCCESS) Program and its Associate Awards. The cases are short synopses of the initiatives, and the experiences and lessons learned from each. For more information about a case, contact its primary author(s).

4.1 MANGROVE PLANTING AND MARINE CONSERVATION IN GHANA

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INTRODUCTION

In West Africa, there are very few examples of successful community-based income generating ventures or microfinance schemes established within the scope of coastal resources conservation programs. However, community-based management of mangroves in Anyanui, one of the villages lying within the catchment area of the Volta Estuary in Ghana, provides a good demonstration of the feasibility of small-scale enterprise development alongside marine biodiversity conservation at a local scale. Community-based management of mangroves in Anyanui has been in place for nearly two decades. It is motivated by its economic viability and also for some other historically compelling reasons. In the past, inhabitants of Anyanui relied predominantly on food crop production for their subsistence needs. However, the damming of the Volta River as part of a large hydropower development project in Ghana in the 1960s resulted in a significant reduction of water flow to farmlands in the area. As a consequence, there was a huge decline in the yield of major food crops with attendant loss of livelihoods for the majority of the rural population. In the face of economic hardships and rising poverty, most of the village inhabitants shifted to commercial harvesting of mangrove wood for their livelihood. However, the mangroves were being harvested faster than they could be replaced through natural regeneration or through the piecemeal restoration efforts undertaken by a few individuals. The situation only worsened as harvesting continued and the mangrove forests dwindled even more.

THE INITIATIVE

In 1991, a group of community leaders comprising mainly fishers, farmers and fuel wood gatherers formed the Mangrove Planters and Fishmongers Association in Anyanui. These leaders were motivated to act collectively to halt unsustainable exploitation of the mangrove forests, while fostering strong social ties at the community level. Consequently, the leaders had the Association registered as a community-based organization (CBO) at the Keta District Assembly. At the time of formation, membership of the Association comprised seven females and 13 males. Through voting, leaders are selected to manage the affairs of the Association for a four-year term. These leaders include a Chairman, Vice Chairman, Secretary, Assistant Secretary, Treasurer, Organizer, and a Deputy Organizer. A five-member Arbitration Committee is also appointed to ensure compliance, set rules, and manage conflict- related issues.

By 1992, the Association had commenced systematic restoration of mangrove forests in the area. Restoration was only possible after a series of land tenure negotiations between the Association leadership on the one hand, and land owners and local Chiefs on the other. The Association initially secured access to approximately six acres (2.5 hectares), based on a 12-year leasehold agreement that is automatically renewed. The areas acquired by the Association for mangrove re-planting are located close to the banks of the Volta Estuary, thereby guaranteeing a water flow regime that is conducive for growth of the mangroves. The entire Association membership assists with the collection of seedlings from the wild and with the planting. Each Association member receives a financial incentive in the equivalent of US$3.50 for participating in collecting seeds, planting and weeding. Non-participants are not penalized. However, they simply do not receive payment. This is an "incentive" model that avoids the "free riding" situation.

Over the years, the Association has strengthened its internal procedures. For instance, the arbitration committee has, in a consistent manner, settled disputes amicably within their ranks. The result has been greater trust not only for the leadership, but also among the membership of the Association. Increasingly, the Association has gained credibility in the village and beyond. Customary agreements reached between the Association, land owners and Chiefs gives the Association the

Mangrove wood market at Anyanui along the Volta estuary of Ghana. The wood is used for construction and cooking.
Credit: Stephen Kankam

exclusive rights of access to the replanted mangrove forests. Noteworthy, is the agreement reached on benefits-sharing between the Association and Chiefs on one hand and land owners on the other. Within this framework, the total mangrove harvested from an acre of land is divided into three parts-calculated in cash or number of stumps with one part accruing to the Chief/land owner and two remaining parts accruing to the Association.

This mechanism for benefits-sharing has clarified ownership of mangroves replanted by the Association. Currently, non-members are excluded from ownership through traditional laws established by the Association. In addition to mangrove forests collectively owned and managed, members of the Association are encouraged to individually acquire additional mangrove forested areas. As part of its stewardship of mangrove forests, the Association networks effectively with other local institutions such as the Bush Fire Control Association to prevent and control forest fires. Furthermore, the good work of the Association has earned its members extensive market

networks for trade in mangrove products in Ghana and some neighboring West African countries. Currently, the Mangrove Planters Association has 43 members. In addition to the six acres owned by the Association collectively, each Association member has tenure rights to an additional one to two acres. This brings the total area replanted in mangrove woodlots to approximately 79 acres.

RESULTS

An initial survey of Association members and of buyers of mangrove wood from the community indicates significant income benefits accruing from the restoration of mangrove forests along the Volta river estuary. According Vincent Akpasu, an Association member, mangrove restoration is a livelihood practice that requires minimal capital investment, but that generates significantly high financial outputs.

> *"I invest about GH¢ 295 in re-planting an acre of mangrove forest. However, I sell it at about GH¢ 433. So I gain over GH¢ 138 (US $97.80) per acre after harvesting."*

Further, Association members recognize how mangrove planting has empowered women to offer loans to each other as needed. As aptly put by participant Naomi Agorkpo,

> *"Through mangrove planting, harvesting and selling, women are able to grant loans to themselves."*

Mangrove restoration also provides a reliable supply of wood for supporting other livelihood activities such as bread-baking, biscuit-making, and fish-smoking, as well as providing the materials for constructing houses in Anyanui and surrounding communities. For most Association members, participation in mangrove restoration has markedly transformed the social status of their families. As noted by Amos Ametefe,

> *"In the early years, we did not believe we could afford our children's education, but now through this mangrove business, some of us have children pursuing courses at the university level."*

Association members are allowed to harvest the mangroves only once they have reached maturity, which takes approximately nine to 12 years. Replanting is staggered so that different mangrove areas are maturing at different times, helping ensure a continual supply of the wood. The Association and its members sell off their mature mangrove trees to intermediaries who transport it for sale in the larger mangrove markets. The mangrove traders do well financially, as told by Mansa Sokpe:

> "*I spend nearly GH¢ 2,057 to buy, cut, bundle and transport an acre of mangrove wood products to the wood market. However, I receive about GH¢ 3,830 after selling. Therefore, I make a profit of about GH¢ 1,779 (an equivalent of US $1,250) after selling all my wood."*

Furthermore, by sharing the benefits with land owners and Chiefs, the Association has fostered equity in terms of access to coastal resources and, in turn, has gained secured tenure rights to land and clear ownership of replanted mangroves. The support of Chiefs and land owners for mangrove restoration has reinforced the wider community's strict adherence to local laws preventing illegal harvesting of the mangroves replanted by the Association or its individuals. In the words of Atsu Lolome:

> *"In the past, community folks were cutting and destroying mangrove areas because there was free access. But now, you need to plant mangroves before you can harvest at commercial scale. As enshrined in the rules, illegal harvesting not only attracts hefty fines to be imposed by land owners and traditional authorities, but also violators are arrested and prosecuted in court."*

BEST PRACTICES

Gaining commitment of traditional authorities. The commitment of traditional authorities and land owners is necessary for achieving workable institutional arrangements for conservation of coastal mangrove forests. In the case of Anyanui, the Mangrove Planters and Fishmongers Association gained commitment of the custodians of the land by not only engaging them in negotiations for land tenure security, but also taking their interests into account in the ensuing benefits-sharing scheme. For their part, traditional authorities showed their commitment for community-based management of mangroves by supporting the application of local norms and customs to deter illegal mangrove harvesting. Often,

overt commitment by traditional authorities towards coastal resources management processes enhances legitimacy at the local level and reinforces the conservation of coastal resources.

Collective recognition of resource use problems and demonstration of leadership. In coastal areas where local communities depend directly on coastal resources for their livelihoods, resource users can be spurred into collective action when they see these resources being depleted or degraded, as they recognize this threatens their very livelihoods. Problem recognition alone, however, is not sufficient to guarantee effective community based management. It also requires conservation leadership. In the case of Anyanui, it was interesting to note that leadership for restoring the mangrove forests did not reside in traditional authorities nor land owners, but rather in "ordinary" fishers and fuel wood gatherers who saw their livelihoods threatened by relentless over-exploitation of the mangroves.

Clear definition of ownership and access rights. Achieving clarity on the ownership of and the rights of access to coastal resources is crucial for effective resource management through local institutional arrangements. This allows regulated access to coastal resources and promotes exploitation patterns that are beneficial to both livelihoods and the environment. In the case of Anyanui, ownership of mangrove forests by the Association serves as an incentive to conserve mangroves, which provide the major source of income for its members.

Conservation of biodiversity. Besides the planting of three native species of mangroves, namely red (Rhizophora sp.), white (Avicennia sp.) and black mangroves (Laguncularia sp.), mangrove-forested areas are also good grounds for the continued supply of fisheries resources including crabs, oysters, clams and tilapias, most of which are exploited by local inhabitants and nearby communities for livelihood and food security. ■

Pile of mangrove poles for sale at market. Credit: Stephen Kankam

4.2 ALTERNATIVE LIVELIHOOD DEVELOPMENT ON THE PACIFIC COASTS OF NICARAGUA AND ECUADOR

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Poor coastal residents are highly dependent upon extraction of natural resources, often in the form of fisheries resources. In 2006, the USAID-funded SUCCESS project began providing technical support to several coastal communities on the Pacific Coasts of Nicaragua and Ecuador to evaluate the feasibility of, and to implement promising livelihoods. Aside from the economic development aspects, an essential rationale was to help reduce dependence on natural resources or to minimally increase direct revenues accruing to villagers from extractive activities. An additional priority in both country sites was to lessen or avoid environmental impacts from already existing activities. The work sites were in the Chinandega area in Nicaragua and Cojimies in Ecuador.

Chinandega is a rapidly developing area of the Nicaraguan Pacific Coast. However, many coastal residents are marginalized by this rapid development, which is the result of several factors: large-scale agriculture and shrimp farming, the Millennium Challenge Corporation (MCC)-sponsored highway development that has significantly improved transportation within Central America, and a booming real estate market. Most residents of Chinandega work in agriculture, animal husbandry, fishing and small-scale shrimp culture. Fishing is in decline due to overfishing. As for small-scale shrimp culture, many small cooperatives have gone (and continue to go) out of business due to the increasingly higher and higher input costs. The situation is similar in Cojimies. Many residents there are first or second generation immigrants from inland areas attracted to the coast by the availability of land and the previously-rich fishing resources. While shrimp farming, in both large-scale and smaller-scale artisanal forms, is a major economic driver, in the last 10 years this industry's productivity has been highly cyclic due to repeated

Women's bakery in Chinandega, Nicaragua. The bakery is part of an initiative to reduce dependence on and extraction of natural resources. Credit: Maria Haws

epidemics of shrimp disease. Located close to the Colombian border, Cojimies has also felt the affects of the drug trade and immigration from that country.

One characteristic shared between the Chinandega and Cojimies sites was the presence of communities that were particularly impoverished and appeared to be trapped in poverty. Despite repeated and numerous attempts by donors, local governments and agencies, both sites had few previous successful experiences with economic development.

INITIATIVES

After a year-long phase of evaluation and preliminary feasibility studies, an array of alternative or supplementary economic activities were selected as having potential for improvement or creation.

Small-scale shrimp farming and chame fish aquaculture

Small-scale shrimp farming is a common occupation in both sites. Major challenges faced by small farmers are the rising costs of inputs, epidemic diseases and limited access to markets. In the case of Nicaragua, many farmers were still using wild-caught shrimp postlarvae (PL) to stock their ponds. In Ecuador, this was done to a lesser extent. Although capture of wild PL has not been scientifically documented to cause environmental impacts, in Nicaragua PL-fishing was being done in protected areas where it was illegal. Moreover, use of wild PL can introduce shrimp diseases and wild PL are often of lower quality than hatchery-produced PL due to poor handling and the uncontrolled genetics of the wild PL. In both sites, poor management practices were affecting production and threatening the already slim profit margin of the small farmers and cooperatives.
Strategies were developed to address the issues facing small shrimp farmers: 1) provide the farmers with training in best management practices to improve production, reduce costs and prevent impacts; and 2) explore the use of a polyculture of fish and shrimp. The latter was conducted using a native fish species prized in Ecuador, the Pacific Fat Sleeper *(Dormitator latifrons)*, referred to as "chame" in that country. Likewise in Nicaragua, the experimentation was with growing tilapia in brackish water as tilapia culture was booming in Central America, and in Nicaragua was actually demanding even higher prices than shrimp.

The training in best management practices proved to be a success in both locations, particularly in Nicaragua where most small farmers did not routinely use the most basic of "standard" practices such as providing feed and fertilizing their ponds. The success with integrating fish into shrimp culture failed in Nicaragua. While the tilapia initially grew well in brackish water, at the experimental site, the high bacteria levels in the water killed the fish. Also, given the very basic practices of the farmers and their struggles to improve their shrimp culture, introducing the more complex polyculture methods seemed beyond their capability at the time. On the other hand, in Ecuador, the integration of chame was very successful. This in part owed to the fact that the shrimp farmers had adequate basic aquaculture skills and because the chame is highly prized as a delicacy in that region of Ecuador. Shrimp farmers also believed that since chame will eat dead shrimp, the incidence of shrimp diseases was reduced in ponds where the fish were present.

In fact, the chame aquaculture work was so successful in demonstrating that this species had tremendous aquaculture potential, it is now the focus of another USAID-sponsored project in Mexico. If researchers are successful in closing the life cycle of this species, it could become a widely cultured species throughout the Latin and Central America region. The only constraint encountered in chame aquaculture was the limited supply of fingerlings, which are obtained from natural reproduction in shrimp ponds or wetlands. Hatchery production of chame has been unsuccessful in Ecuador despite over 30 years of sporadic attempts.

Livelihoods for women and youth

Several forms of alternative livelihoods were tested with women's groups. The first attempt, to implement a small cottage industry revolving around hammock-making, failed. Although the women were provided with training and materials, the production process was too time consuming, there were no long-term financing options for buying materials, it proved difficult to break into what was an already-established market for hammocks, and profit margins were small.

A second attempt was made in Nicaragua, where there was a strong interest in bread-baking. The reasons were several. There had been some experiences with bread-baking, there was high local demand for bread, and buying bread brought in from the nearest cities was a considerable expense for families. Three women's groups did eventually begin small bread-making businesses after struggling to build wood-fired ovens and learning large-scale bread-making. Developing the infrastructure was particularly challenging since the project required the women's group to provide some matching costs and

Man holding a small chame fish. Credit Maria Haws

contribute their time to building the structures. Although appearing simple, building or repairing existing ovens and building coverings for the ovens/baking areas was more time consuming and costly than expected. Initially, all the groups were able to regularly bake wheat bread and sold it with some success and profit. Problems began, however, when flour prices rose drastically and the women could no longer afford to buy flour, particularly since the only did not have access to credit. All groups eventually reverted to making bread using corn meal.

Jewelry-making using natural materials and shells was also a rather successful enterprise in Nicaragua, although the first group involved in this dissolved over issues related to fiscal responsibility. However, after an interlude of approximately one year, the group reformed and is still making jewelry. The group did struggle with financing materials and tools, but had the advantage of being located in a booming tourism beach town with a ready market.

In the case of Ecuador, no attempts were made to focus specifically on women, but work was done with family groups or youth groups. One effort that was particularly successful was the creation of a community plant nursery, where youths provided most of the labor to begin offering ornamental plants, and seedlings of a valuable hardwood tree and medicinal plants. Another successful effort involved planting cacao and passion fruit on degraded agricultural lands. Passion fruit provided quick returns while waiting for the cacao to grow. In both cases, the existing agricultural skills of the stakeholders were easily turned to new, related activities.

Ecotourism

Both coastal sites were experiencing rapid growth in tourism. In Nicaragua, several cooperatives that were based in the protected area, Padre Ramos, expressed interest in creating a tourism trail that highlighted some of the natural attractions of the reserve and some of their economic livelihoods (e.g. shrimp farming, agriculture, and horseback riding). These stakeholders overlapped with the women's groups involved in the hammock- and bread-making enterprises. The process of designing the tourist trail, which had multiple attractions along the way, was quite challenging. Particularly since the tourists would have been mobilized from a neighboring beach town, transported in boats to the reserve, would hike through natural and farm trails, and would then need to be returned by land transportation back to the beach town. Thus the effort had multiple logistical aspects and required the involvement of several different community groups, making coordination quite difficult. Also, operating in a reserve led to some unanticipated costs and challenges. For example, it was decided early on that the terrestrial part of the tourist trail would have signage to guide tourists, but also to mark native plant species. As it turns out, Nicaragua has legal standards related to signage in reserves, so the signage became much more expensive and complicated to produce since the villagers could not make it themselves as originally intended. Additionally, because eco-tourism is so multi-faceted in terms of the natural attractions, unforeseen high levels of effort had to be dedicated to bringing in multiple partners to provide expertise in areas in which the extension agents did not have experience. For example, two ornithologists were brought in to identify the birds in the area and helped develop a bird guide for the tourists. Food services and sanitary accommodations also had to be introduced and the residents trained in these aspects. Overall, the ecotourism trail in Padre Ramos proved to be one of the most difficult challenges of the four-year project due to the complexity of organizing so many disparate elements in a remote area. Yet of the various livelihoods introduced in Nicaragua, this one appears to be the most successful and long-lasting.

There was also an attempt to derive more benefits from ecotourism in Ecuador. A developing beach/surfing village, Mompiche, requested help in handling the rapid development that was occurring there and finding ways that local people could participate more in the growing tourist trade. In this case, the project began working with the municipality on shoreline planning. Also, training was provided to villagers in how to be a tourism guide, and a lookout tower for bird and monkey observations as constrructed. Again, although these efforts were successful, the complexities involved were unforeseen. The costs and time required to execute these efforts were significantly more than originally expected. In retrospect, one lesson learned from this is that ecotourism can be highly complex: it requires a wide range of expertise in various subjects: and is costly and time-consuming.

Lessons Learned

Several valuable lessons were learned through the work in Ecuador and Nicaragua:

Livelihoods that derive much of their value from ecosystems goods and services did better than those which did not. For example, the plant nursery and fish culture enterprises were successful because they relied on ecosystem goods and services and required very low levels of capital investment. The stakeholders had either control of or access to the resources. In addition, the activities were closely related to natural resources-based activities they already were performing.

Introducing manufacturing activities such as hammock-making and bread-baking were not highly successful, even on a very small scale. This was most likely due to two factors: 1) the lack of control and access that the women had over the essential input materials required for these activities, and 2) fluctuating costs. In the absence of micro-credit and long-term business development support, these types of activities are unlikely to be successful. The jewelry-making was a rare exception, and success here was in part due to two factors. Many of the materials were found naturally, so there were low input costs; and there was an immediate, high price local market in the form of the growing number of tourists in the area.

Extreme poverty made cost-sharing very difficult. Although the project attempted to increase stakeholder engagement and commitment by requiring the groups to provide matching costs or in-kind match, this proved difficult due to the extreme poverty of the groups. Even obtaining firewood for the bread-making ovens was very difficult as the women's groups did not have access to wooded areas. Although the bread-making groups did eventually manage to secure the resources and time to meet the matching/in-kind requirements, this considerably slowed the project's progress. Given a longer time frame, this matching requirement might have been wise. However, donors are increasingly shortening the time frame for project deliverables, while at the same time increasing what they expect for results. These realities need to be weighed carefully by all involved in the effort.

Ecotourism appeared to be deceptively simple, but in reality was very complex. The difficulty of coordinating multiple groups in a remote area contributed to the complexity of implementation. While ecotourism has the advantage that it depends largely upon "free" natural resources, the human aspects of this business were very complicated. Stakeholders needed to learn how to offer services and to meet the high standards expected by most international tourists. There is often a clear mismatch between the level of service that rural stakeholders can provide, regardless of serious effort to provide good service, and the high level of expectations by tourists even when these same tourists believe they have lowered their expectations to recognize the services or products are provided by local, not international, entrepreneurs. Further, when ecotourism involves multiple sites or activities, complications can rapidly spiral out of control. In retrospect, although the ecotourism activities at both sites were successful, most technical assistance providers agree that obtaining such successes is challenging and should be approached cautiously. ■

4.3 ADDING VALUE TO EXISTING INCOME SOURCES MOTIVATES WOMEN IN MENAI BAY, ZANZIBAR

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INTRODUCTION

The women of Fumba Peninsula, on the island of Zanzibar, have always depended on oysters and other bivalves for food and protein. For ages, women have gleaned them from the shallow waters around the Menai Bay Conservation Area. Over time, however, an open access regime and uncontrolled harvesting have sent stocks into decline. In an effort to rebuild the resource, in 2003, scientists from the Institute of Marine Science (IMS) in Zanzibar town began training women from the coastal villages how to build artisanal impoundment pens on the reef flats, place the bivalves they collected in these pens, and grow them out to a larger size before harvesting. While results were initially mixed and many bivalves died because they needed deeper water to thrive, the women were encouraged by the experiment. It was the first time they had participated in conservation-based enterprise development and their interest was piqued.

THE INITIATIVE

A technical assistance team from the USAID SUCCESS project comprised of team members from URI-CRC, UHH and IMS worked with the Fumba communities to pilot a new strategy—promoting community-based marine conservation by "adding value" to the Menai Bay natural resources, including pearl oysters.

When not harvested for food, the Bay's black-lip pearl oysters can be used for half-pearl (mabe) culture and shellcraft jewelry-making. To be successful in the long-term, it would be necessary to have a stable source of black-lip pearl oysters. This meant there needed to be a community and ecosystem-based approach to biodiversity conservation. This became the second component of the pilot initiative. Menai Bay stakeholders established four "no-take zones"—areas where no extractive activities are allowed. These no-take zones are co-managed by the communities through an approved management plan and village bylaws.

A cut, polished and finished mabe sells for US$10-$40 and a polished shell jewelry piece for US$2-$10, with price determined by the quality and setting of the piece. In a place where few individuals earn more than US$50 per month—and women earn on average US $15-20 dollars per month—producing and selling mabe or jewelry pieces could significantly improve income levels. Yet, communities realized they needed to conserve the resources if they were to increase the number of oysters available over the longer term to use in their mabe culture and shell jewelry-making.

RESULTS

Research on the impact of combining entrepreneurship and conservation revealed that individuals involved in mabe farming and shellcraft jewelry-making have been sufficiently motivated by the successful sales of the product to assume stewardship of the inter-tidal resources. For the women engaged in shellcraft jewelry-making, their earnings have tripled to on average US$60 per month and during peak sales events, even up to US$70 in one day alone. Two particularly successful women, Bi Rahma, a shell jewelry-maker, and Bi Safia a jewelry-maker and half-pearl farmer, are now earning hundreds of dollars every month. The money these women earn goes straight to household needs such as paying for food, electrical bills, and school fees. Some of the women who have been able to save larger amounts from big sales and events have even bought land and started building houses.

Women have been empowered by this approach of combined black-lip pearl and shell jewelry-making and marine conservation efforts.

"Before I started making jewelry, I did nothing. I just stayed at home after finishing school" said Ikiwa Abdalla Ali, a shellcraft jewelry-maker. For Ikiwa, it is not just learning about jewelry-making that is important. Equally important, she has learned to be an entrepreneur and gained business skills such as how to add value to her products and how to market and price them.

"I've learned how to recognize a customer and how to negotiate a good price." The jewelry-making need not be a full time job. Since it is a high profit undertaking, women can combine it with other income generating activities or household chores. For many women, turning entrepreneur has brought them personal growth.

"When we started, I was very shy and would never talk in a group. Now I am confident—I speak with my customers and even educate and train others in jewelry-making," says Ikiwa. Unlike in the past—when only men worked to

Women collecting bivalves in the intertidal zone of the Menai Bay Conservation Area, Zanzibar. Credit: Klaus Hartung

support the family—today in Tanzania it is not uncommon to find men and women sharing responsibility for earning money. "The money I bring in makes a difference to the family. I support my brothers with school fees. Now, my stature in the family has changed," Ikiwa reflected.

That said, some women continue to be culturally inhibited from becoming full-fledged entrepreneurs. While it may be culturally acceptable for women to make shellcraft jewelry, many are reluctant to leave the village to market their products in the main town or in tourist resorts. As a result, some women produce few pieces of jewelry per year (because their sales are low) and others choose to sell their jewelry through the women who are willing to venture outside the villages.

An example of an entrepreneurial woman who has seen her stature in her community change is the young woman Mkasi Kombo. Before becoming a shellcraft jewelry entrepreneur, Mkasi was not recognized as a leader. Now, she has been appointed leader of a group that manages a new windmill producing electricity for the Fumba Mzambarauni village.

Since 2005, over 200 individuals, of which approximately 90% are women, have been trained in shellcraft jewelry-making. Of these, 37 are active entrepreneurs whose businesses are likely to be sustained and grow. A smaller subset of about 10 women have become para-extension officers, providing training and technical assistance to aspiring entrepreneurs in other coastal communities on Zanzibar and on the mainland. When asked for key messages to share with aspiring entrepreneurs, Ikiwa says "Don't be afraid to take risks, don't be scared, and overcome your shyness!"

BEST PRACTICES

Adding value to current resource use. When you can take an existing resource, product, or service and add value to it, the chances for success and profit can be significant. In the case of Fumba, the meat of the bivalves and gastropods was eaten and the shells discarded. Adding value meant teaching the women to turn what they would otherwise have thrown away and create a saleable jewelry product. The income from these sales in turn provided an incentive to conserve the intertidal resources, without which they could not produce this new value-added product.

Community involvement. Involving both women and men in all aspects of the livelihoods-conservation effort is essential to its long-term success and sustainability. In Fumba, this included involving women in monitoring and enforcement of the no-take areas. Seeing improved biodiversity inside and adjacent to these areas encourages further conservation, since the women know that they need to maintain a good stock of oysters for their businesses to sustain.

Peer education and training. The project also involved mabe farmers and shellcraft makers as "para-extension agents", who then trained their fellow villagers—an approach that contributes to rapid diffusion of innovation and helps limit the need for outside technical assistance and mentoring. On an individual level, the para-extension agents benefited by a gain in their social and economic status.

Training on marketing and business planning. Not everyone is qualified or interested in being an entrepreneur. However, for those who are, it is essential to provide training on not only the technical aspects of the livelihood (in the case of Fumba, mabe farming or shellcraft jewelry-making), but training in business planning and marketing. It is these latter skills that can be "spun off" to benefit other livelihoods/businesses the individual might engage in as well.

Assess the cultural feasibility of the enterprise. The lack of willingness among many of the shell-craft makers to market their products outside the village was a puzzle to the technical assistants supporting the entrepreneurs, until we understood the cultural barriers. In afterthought, that was something that should have been assessed as part of the enterprise feasibility study. As a result, the marketing strategy had to be rethought, now focusing on: 1) building a marketing outlet in the main village, and 2) relying on a smaller set of women selling jewelry for the whole group.

REPLICATION

Through a new USAID Tanzania-funded project, Conservation of Coastal Eco-Systems in Tanzania: the Pwani Project, the University of Rhode Island and the University of Dar es Salaam's Institute of Marine Science are continuing to provide support to women in the Menai Bay area. The model of community no-take reserves combined with pearl grow-out and jewelry-making is being expanded to new villages and marine sites. The women spearhead the capacity building in craftsmanship and entrepreneurship skills that are provided to the new sites. As of mid-2010, the group of female para-extension officers had already trained women and men in a neighboring village and in communities on the mainland. The women are also busily planning a half-pearl and shellcraft resource center, which will be on a centrally located plot of land recently donated to the women by the Zanzibar government. Once completed, the center will be a place for para-extension officers to produce jewelry and train others. It will also include a showroom, where the entrepreneurs can sell their products to tourists visiting the area. ■

Entrepreneur polishing an oyster shell that will be turned into a piece of shell craft jewelry and marketed to tourists on Zanzibar. Credit: Klaus Hartung

4.4 CONSERVATION ENTERPRISE DEVELOPMENT IN THE VELONDRIAKE LOCALLY MANAGED MARINE AREA, MADAGASCAR

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Along the southwest coast of Madagascar lies the world's fourth largest coral reef system where some of the most extensive and biodiverse marine and coastal ecosystems of the Western Indian Ocean can be found. This coast is also home to many isolated communities of the semi-nomadic, sea-faring Vezo people. Blue Ventures, a marine conservation NGO, has been working in this area since 2003 to empower the local communities to conserve these important natural resources and to help ensure the continuation of the marine-based Vezo lifestyle. Blue Ventures' integrated programs are addressing livelihood needs by encouraging long-term sustainability of fish stocks, supporting alternative income sources, and helping to increase overall family welfare, all crucial in communities heavily dependent on natural resources. An award-winning social enterprise, Blue Ventures' integrated programs are funded by the NGO's own ecotourism programs, as well as through donor support from the MacArthur Foundation, PROGECO, NorgesVel, USAID, UNFPA and UNICEF.

With nearly all households relying almost entirely on direct use of coastal and marine resources for their livelihoods, a sustainable harvest from reef fisheries and other key habitats such as mangroves is crucial to safeguarding these communities' futures. However, due to a combination of destructive fishing practices, local and commercial over-exploitation, hyper-sedimentation, and climate change, the health of the local marine and coastal ecosystems is in decline. In response to locally observed changes, Blue Ventures helped 24 communities join forces to develop a locally managed marine area (LMMA) called Velondriake (literally "to live with the sea" in the local Vezo dialect). Encompassing all 24 villages, this LMMA restricts destructive fishing practices such as beach seine netting and poison fishing and includes seasonal and permanent coral reef and mangrove reserves, which contribute to restoration and conservation of marine and coastal health critical to local livelihoods and daily food security and to mitigate future man-made and climatic pressures.

CONSERVATION ENTERPRISE INITIATIVES

Octopus enclosures

One of the most effective management approaches pioneered in Velondriake has been the use of temporary 3-4 month closures of shallow reef flats to octopus fishing—the most economically important fishery in this region. These seasonal restrictions allow the target species (Octopus cyanea) to increase rapidly in size and number. Fisheries research conducted by Blue Ventures over the last seven years has shown that villages observing these closures see a significant increase in total landings after the reserve opening and no significant change in landings during the closure, as well as demonstrating lasting economic and social benefits to communities. The successful results seen here have inspired extensive replication of similar octopus closures along the coasts both north and south of Velondriake, with well over 150 closures to date across hundreds of kilometers of coastline.

Aquaculture

In addition to the long-term conservation of fisheries, a key component of Blue Ventures' work in Velondriake is a sustainable aquaculture program that works with community groups and families to farm seaweed (Kappaphycus alvarezii) and grow sea cucumbers (Holothuria scabra) for international export. Once abundant in the wild, sea cucumber numbers have dropped dramatically in the last decade as a result of unsustainable overharvesting driven by the high price these animals fetch on international markets. Southwest Madagascar's extensive seagrass lagoons provide an ideal spot for raising sea cucumbers, and the nearby city of Toliara is home to one of the only commercial hatcheries in the world, as well as a local seafood export company working with Blue Ventures and local farmers to ensure the purchase of market-ready adults.

With Blue Ventures' technical support, sea cucumbers are reared in the inter-tidal zone of several villages, one of the first attempts worldwide to raise these ecologically important animals in enclosures within their natural habitat. Research pens are being used to experiment with new pen and net designs, as well as to better understand the ideal size of juveniles for release from hatchery to pen, and the optimum stocking density within each pen. Improvements in all these areas since

Traditional Vezo pirogue boat used for small scale fisheries in Madagascar. Credit: Blue Ventures

the first "holothuriculture" trials in 2007 have greatly increased survival rates, with the mortality rate of sea cucumbers dropping from approximately 90% to 30% (and less than 10% in the research pens); a highly significant decrease which makes rearing much more profitable for local families and provides a clear economic incentive to communities to take up this ecologically-beneficial form of aquaculture.

Similarly, seaweed is grown on lines in shallow inter-tidal zones off the coasts of several villages within Velondriake. The crop is harvested after six weeks, dried, and sold to the export company. Unlike sea cucumbers, the process of raising seaweed is well understood throughout the world, and therefore technical support and problem solving is much more straightforward.

Ecotourism

Blue Ventures is in itself a conservation enterprise, designed as a field-based training site for paying international volunteers. Throughout the year, these volunteers travel from around the world to join Blue Ventures' expeditions where they receive intensive training in marine science, scuba diving, and applied community-based marine conservation. Funds raised from this enterprise directly contribute to the organization's conservation and development programs, while underwater data collected by volunteers are used to inform management of the LMMA. This model has achieved great success, with Blue Ventures garnering numerous international awards for responsible tourism, as well as being the first European-based organization to win the SEED award (United Nations Environment Programme, United Nations Development Programme, International Union for Conservation of Nature) in recognition of innovative entrepreneurial solutions for sustainable development.

Having established a strong tourism draw to this region, Blue Ventures is now looking to broaden its local economic impact through construction of a locally owned and managed Ecolodge that will cater initially to Blue Ventures volunteers and staff, and eventually to other tourists. The Ecolodge will provide hotel and restaurant jobs to local people, a classroom for community meetings and educational activities, and a base for Blue Ventures' volunteers to conduct ecological monitoring of the LMMA. Revenue from the bungalows and restaurant will go directly into continued funding for Velondriake, thereby ensuring a medium to long-term financing mechanism for conservation activities. Blue Ventures estimates profits from the Ecolodge could reach 2,000 Euros per month.

Addressing an enterprise barrier via family planning and community health services and providing access to education

Man-made pressures on the region's marine and coastal resources are growing due to changes in fishing methods and an increase in the number of people dependent on these resources. Women in the Velondriake area average nearly seven children each. This, in addition to immigration, means the local population is growing at a rate likely to outpace the recovery rates of fisheries stocks, as well as the region's ability to generate alternative livelihoods. Responding to the unmet need for reproductive health services, Blue Ventures has initiated a family planning and community health program, which provides family planning services and supplies to the Velondriake villages, allowing them to choose when and how many children to have. Not only do smaller, healthier families reduce the growing pressure on the area's fragile natural resources, but practicing family planning and improving household sanitation can also increase family welfare. For example, mothers with healthy families may have more time to contribute to generating household income through alternative livelihood projects such as aquaculture.

Diversifying coastal sources of income through fisheries management, aquaculture, and by introducing non-fishing jobs helps reduce pressure on overexploited coral reefs, improving ecological sustainability within the LMMA. Addressing family planning and community health needs further reduces pressure on natural resources, and allows households to take part in alternative livelihood programs. These activities directly contribute to local economic development, helping families supplement traditional household income and reducing the number of people solely reliant on daily fishing.

BEST PRACTICES

Several best practices have emerged through Blue Ventures' work over the last decade:

Limit the geographical scope. While far-reaching, broad-scale conservation and development can only be achieved at large levels, scaling-up from a successful pilot too quickly can be dangerous and costly. In its last

Seaweed harvest. Credit: Garth Cripps

eight years of work in Velondriake, Blue Ventures has focused on the area's 24 villages and their coastal and marine environment in order to understand what works well in this place. A number of successful models developed at this pilot demonstration site—ranging from fisheries management to holothurian aquaculture and integrated reproductive health service provision—are now being replicated by partner organizations nationally and regionally in the Western Indian Ocean, providing a compelling testament to the value of the Blue Ventures' approach in inspiring change.

Understand what works and does not work before scaling up. Blue Ventures has paid great attention to successes and challenges over time, and has prioritized understanding how and why challenges exist. Being patient to get things right, it was not until late 2009 that Blue Ventures looked towards replicating the marine management successes seen in Velondriake to a second site further north, and in 2011 to a third site. Over the last two years, Blue Ventures staff have been working with villages in the coastal regions of Belo-sur-Mer and Maintirano taking the first steps towards empowering local fishing communities for coastal resource management. Similarly, the family planning and community health program is now expanding outside Velondriake villages, but again, only after several years of close observation development. Likewise, the expansion of sea cucumber and seaweed aquaculture to other villages will happen only after the model has been refined to a truly replicable form.

Organize frequent stakeholder meetings. Because the community-based sea cucumber rearing project is globally unique, Blue Ventures technicians have found it useful to organize frequent meetings to discuss challenges, successes, and lessons learned with partners and regional fisheries stakeholders. These meetings include local government authorities, private fisheries export and collection companies, funders, researchers and NGOs. They have served to both encourage critical information exchanges and to foster cooperation and synergy between the numerous sectors engaged in Blue Ventures' aquaculture work. The success of these meetings has inspired Blue Ventures to form a similar stakeholder group that focuses on short-term octopus closures.

Stay in communities over the long term and avoid predefined "project end dates." Importantly, Blue Ventures is investing long-term in the communities of the Velondriake and their integrated conservation and development programs. Because the organization receives funding from ecotourism, there is a vested interest and ability to continue work in the region even if external funding declines or ends. This means there is no fateful predefined project end date. With nearly a decade of presence in the area, and plans to support these communities long in the future, Blue Ventures can be assured that when the time does come for it to leave, the work there will have a good chance of being sustained because it is program-driven, not donor-driven.

Octopus fisheries management gave quick economic benefits, paving the way for community support. Finally, much of Blue Ventures' success in community-based marine conservation may be attributed to the organization's early focus on octopus fisheries management, which enabled communities to see first-hand (and, importantly, over a short time frame of three to four months) the fisheries and economic benefits of closures. These early successes helped local people understand that management actions can have a positive effect on both their own financial bottom line and on the environment; and that they are in a position to alter the future of their marine resources. This paved the way towards community support for the permanent coral reef and mangrove reserves. The idea of octopus closures to spur conservation has inspired Blue Ventures, at a different conservation site in western Madagascar, to begin management efforts by piloting temporary crab closures in mangrove forests. Again, the hope is that more ambitious and longer-term conservation initiatives will follow once communities feel empowered by these initial demonstrations. ■

4.5 LIVELIHOOD DIVERSIFICATION THROUGH SMALL MARICULTURE VENTURES IN POHNPEI, FEDERATED STATES OF MICRONESIA, HELPS TO SUPPLEMENT INCOME AND PROMOTE CONSERVATION

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Pohnpei is a small mountainous island, located slightly north of the equator in the western Pacific Ocean. While only 335 km^2 in area and 20-24 km in diameter, it is the largest of the Federated States of Micronesia (FSM) archipelago, and the third largest island in Micronesia. The FSM is a sovereign nation with an Exclusive Economic Zone of 2 million km^2 and a population of only 110,000 people. Pohnpei, like many areas of Micronesia, is economically depressed, with very few income-earning or export opportunities for its rural communities other than farming and fishing. Fifty-four percent of Pohnpei's population is unemployed, while 11.1% of the total workforce (15+ years of age) is involved in agriculture or fishing. Minimum wage, for those who can find work, is US$1.35 per hour. It is estimated that there are 756 commercial and 1,408 subsistence farmers and fishers on the island out of a total population of approximately 35,000.

Overfishing of Pohnpei's large, sheltered and easily accessible lagoon has long been a concern, but until recently the problem has not been well documented. According to recent studies, unsustainable fishing practices are threatening the local commercial coral reef fisheries and a substantial portion of many species enter Pohnpei markets at immature sizes. Fishing is mainly done at night using spears, which is difficult to regulate and causes selective pressure on certain species. Starting in 2001, the Conservation Society of Pohnpei (CSP) began working with coastal communities to establish marine protected areas (MPAs), and building community consensus for conservation in existing MPAs as a means of conserving fishery stocks. Four MPAs have been established since that time, bringing the total in Pohnpei to 11 with a further two in progress. Once established, these MPAs are protected by Pohnpei State Law as no-take zones. However, enforcement and compliance remains primarily the responsibility of the local communities.

THE INITIATIVE

Starting in 2005, the Marine and Environmental Research Institute of Pohnpei (MERIP) began working with MPA communities to develop sponge and coral farming as income-generating opportunities. Some sponge farms already existed around Pohnpei, but extension efforts had been limited and because markets were not well established, there was very limited production. Both methods of farming take advantage of cloning, also called fragmentation, where a piece of sponge or coral is removed from a parent colony and planted to start a new colony. Mariculture of these species has significant benefits:

- Very simple fragmentation technology for easy adoption by community-based farmers
- Products have no edible or local value, so theft or farm interference is minimal
- Few or no predators and pests, so cleaning and maintenance is minimal
- High value species suitable for export
- Low labor input, which allows time for other cultural and/or subsistence activities
- Sustainable technologies with extremely low environmental impact
- Filter feeding and/or photosynthetic symbioses, so no feed inputs necessary

MERIP supports farmers by providing initial inputs of materials and extension assistance to farmers. MERIP also works on finding local and export markets for products and offers to buy the harvest from farmers if they wish. MERIP also maintains central farms to conduct research on new species, guarantee through-put to buyers and to provide parent colonies for starting new farms. Farmers are selected from the more impoverished lagoon island communities of Pohnpei, where there is a strong reliance on fishing and farming for food and income. The criteria for farmer selection are based mainly on their proximity to the coast and their willingness to engage in farming.

Two species of sponge are grown in Pohnpei, the Micronesian wool sponge (Cosinoderma matthewsi) and a smaller species, Spongia matamata. The wool sponge is sold for bathing, while S. matamata is a smaller, softer, more delicate sponge used for facial exfoliation. Both sponges are farmed on lines submerged in mid-water. Grow-out time for wool sponges is two to three years while S. matamata farmers must maintain the lines on their farms and keep the sponges clean. There is a small local market for sponges

of less than 1,000 pieces per annum. Most processed and packaged sponges are currently exported via a local wholesaler to Hawaii, and by MERIP to an organization called Trade Aid New Zealand, a fair trade store with approximately 30 locations in New Zealand.

Coral farming uses fragmentation techniques similar to those used in sponge farming, however farms are laid out on metal trestles. All products are exported by MERIP for the marine ornamental trade (home aquariums) in the USA, the European Union and developed Asia, via air freight through regional wholesalers in Kosrae, FSM and Majuro, Republic of the Marshall Islands. The corals are then consolidated with other marine ornamental products and re-exported. The expansion of this industry is heavily dependent on having a variety of species to export. In consideration of this fact, MERIP has focused on developing a new species for export.

RESULTS

The introduction of sponge and coral farming projects has been successful in several respects, but has also met with challenges. Sponge farming in particular has been difficult to establish. Villagers have been reluctant to take up farming or to expand production beyond current low levels and the number of farmers has remained fairly static between 14 and 20. Because of this, finished sponge production by farmers between 2005 and 2010 grew quite slowly. The main issue is the long time interval between establishing a farm and receiving payments from harvest. To try cope with this consideration, MERIP has developed an alternative system where anyone can work as a day laborer on a central sponge farm and receive a wage. This has permitted more people to benefit from sponge farming and receive immediate payment, and has also helped to identify and train new farmers. Existing farmers are also bene-

Typical coral farm in Pohnpei, with Goniopora coral growing on a metal mesh table. Credit: Simon Ellis

fiting from a pro-rated payment plan where they receive six monthly payments based on their standing stock of sponges. Production is now showing signs of expanding due to these changes.

Coral farming has been significantly more successful due mainly to the short grow-out time of only three to six months. The number of farmers has steadily grown to 13 in 2010 from an original four in 2005. The number of export species has grown from one in 2005 to nine in 2010. Similarly, the number of corals produced and exported by farmers has grown almost exponentially.

At present, it would appear that sponge and coral farming provides only a supplemental income for farmers, but that the situation is starting to change. The average fisher in Pohnpei has an estimated annual net income of US$500-700 after accounting for the cost of being engaged in the activity. Sponge and coral farming has no intrinsic cost to the farmer other than "sweat equity," as MERIP provides nearly all the necessary materials to start farming. In 2010, the top coral farmers were able to make US$600-$650 per year., while top sponge farmers made US$240-$255. With the average time spent farming of only two to three days per month per farmer, these figures indicate that with very little effort these activities could provide more than supplemental income to serious farmers, and could, in fact, replace fishing as a primary livelihood. The estimated maximum number of farmers that sponge and coral farming can sustain is 130, which could make a significant impact on the fishing population if it came to fruition, and assuming new entrants could be restricted.

Although coral and sponge farming offer low-impact, potentially profitable strategies for income generation, their link to marine conservation has not been as successful as first hoped. Despite increasing evidence of overfishing in Pohnpei, fishing still remains a viable income source, and current livelihood options are sufficient for meeting most needs, particularly since healthcare and education are provided by the State. These facts, combined with the relatively small number of people involved in coral and sponge farming, means the impact of these activities on conservation should not be overstated. That said, in a recent socio-economic survey conducted by MERIP, 75% of farmers said they fished less than before and almost all farmers showed increased awareness of the environment and conservation. Therefore, it can be assumed that some momentum is being gained through better marine resource management (less fishing) and MPA compliance (conservation awareness).

BEST PRACTICES

Strong private sector involvement: MERIP has sought to make strong linkages with private sector wholesalers and buyers. This has helped the development and long-term sustainability of sponge and coral farming because prices obtained for products are realistic and based on world market prices. This gives the farming operations a much better chance of long-term viability. Marketing is probably the most challenging aspect of the initiatives, and requires repeated, often disappointing efforts to develop a stable client base that understands some of the constraints to doing business in remote parts of the world.

Local extension agents/expatriate technical expertise: Micronesia for many years suffered from a lack of trained local extension agents and local technical specialists. Over the last 10 years, however, considerable progress has been made to train local people as extension agents and progressively turn over to them more of the institutional operations. Several institutions, not only MERIP, have taken this approach with considerable, albeit slow, success. Out-migration by educated young people is one of the main impediments to making further progress along these lines. At the same time, the need for trained expatriate specialists has not completely been eliminated. This is in part due to the need for concurrent research to continually improve production methods and develop new aquaculture species. Until larger numbers of young people advance to at least the MS degree level, expatriates will continue to play an important role. Given this fact, it is important that expatriates have good skills in extension, and cultural sensitivity, and can work well in multi-cultural, multi-institutional teams to successfully contribute to the long-term efforts.

Long-term support by a local NGO: There is strong evidence that livelihood diversification initiatives that are successful require a long time to achieve profitability and eventual profits are characteristically modest rather than spectacular. MERIP has sought to not treat the development of coral and sponge farming as a "project," but rather as a long-term investment toward a more sustainable future. The future of MERIP's support for the activity is not linked to a finite funding cycle, but is ongoing. Additionally, MERIP plays the role of an "honest broker" between private sector interests and the communities. Businesses are generally better than fisheries departments or NGOs at identifying and/or developing opportunities, but often have difficulties in distributing benefits and in community relations. Because of this, there is a need for someone to smooth the interface between business and community.

Sponges hung on submerged lines to grow out to marketable size. Credit: Simon Ellis

Community training, awareness and education: Constant involvement of community members is essential to the long-term success of livelihood development. Without this, farmers will not be able to increase farm effectiveness, understand their business better, and/or make the link between their own activities and conservation. This is an area in which MERIP has been less successful than it had hoped and efforts are underway to improve communications with the farming communities. Constant communication also helps dispel any mistrust the community may have regarding the intentions of outside assistance providers.

Sustainability and continuity: Heavily subsidized livelihood diversification activities run the risk of failing once the subsidy is reduced or removed. Livelihoods that lack a plan from the outset for transitioning activities into a local business structure run this same risk. It is critical to design interventions focused on just such transitions (i.e., away from subsidies and into local business structures). This has been something of a problem in Pohnpei, where MERIP subsidizes farmers heavily at the outset by providing materials to start their farms. On the positive side, because MERIP is a locally-based corporation, it can provide both long-term extension and export support to ensure farmers transition smoothly to self-sufficiency over an appropriate time frame. ■

4.6 CRAB CAGE CULTURE PILOT IN TANZANIA

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Mud crabs (also called mangrove crabs) are a delicacy, equal in popularity to the North American lobster. Until recently, the mud crab business in Tanzania relied on wild capture and immediate sale.; although there is potential in cage grow-outs. These factors meant there was not a reliable and steady supply of these crabs for domestic and export markets. Crab culture has been negligible in Tanzania, but experiences from Asia and the Far East have shown that mud crab production is economically feasible. Crab cultivation provides an incentive for mangrove conservation because mud crabs live in mangroves and as long as the wild crabs are not overharvested, a protected mangrove ecosystem will ensure a sustainable supply of crablets.

In 2005, the group Agricultural Cooperative Development International/Volunteers in Overseas Cooperative Assistance (ACDI/VOCA), as part of its Sustainable Environmental Management through Mariculture Activities (SEMMA) Project, conducted a value chain analysis of mud crabs in the Tanga region. The analysis identified a local market for crabs (tourist hotels and restaurants), an export market for live crabs destined for Asia, and an export market for frozen crabs destined for Europe and South Africa. Based on this, SEMMA initiated the first crab cage culture pilot in Tanzania. One stumbling block for crab culture enterprises in other parts of the world has been in the securing of a steady supply of protein feed for the crabs. In Tanga, this problem was solved by linking up with a local seafood export company, which volunteered to give the crab farmers fish discards from its processing plant. The seafood company did not ask for a "first right" to purchase the crabs, nor did they monitor whether crabs from the cages were sold to the company. That is because they knew that the top quality crabs would be sold automatically to the live-crab trade that services the Far East. Frozen crab does not fetch the same prices as live crab, and the frozen seafood exporter only expected crabs that were rejected by the live crab trade, and was aware this would be a minority of the overall crab production. However, it was still a win-win situation, because it remained an inexpensive way for the exporter to dispose of the processing plant fish discards.

INITIATIVE

The SEMMA Project worked with nine crab cultivation groups in the Tanga region. While initially the producers grew the crabs as a group, they soon had the problem of "free riders"—i.e., individual members who did not participate equally in the production, but still wanted an equal share of the profits from the crab sales. For example, female producers did most of the actual up-keep of the crabs (feeding, cleaning, etc.), but the male members still expected half the profit. To address the free rider problem, the producers tried a different approach. Each producer took care of his/her own cages and crabs, but sold their crabs as a collaborative. This type of "sales cooperative" model has also been successfully used in other natural resource-based enterprises such as seaweed farming.

The model piloted in Tanga was based on a crab grow-out farm size of at least 100 crabs. The average fattening period for juvenile crabs (250gms) is 45 days. The life of the cage is approximately one year, and producers can produce crabs for a total of eight cycles per year. An economic analysis of production costs and income showed that the average net earnings per crab producer is Tshs. 182,000 (US$121 at 1,500 Tshs/US$) for 45 days. This is a monthly return significantly higher than Tanzania's monthly minimum income (US$56 in June 2010). When beginning the crab cultivation pilot, SEMMA provides growers with extension support to ensure that they followed four procedures:

1. Adhere to a feeding regime—daily feed equivalent of 10 percent of the crab's body (weighing the crabs after molting)
2. Keep the crab cage clean at all times
3. Take extra care during molting (shedding of the shell), to protect the crabs from pests
4. Fill burrows in the cages regularly with sand as they accumulate water and become hot during the day, which damages the crab

RESULTS

Between 2006 and 2009, crab production rose remarkably from 238 kg (valued at US$483) to 8,208 kg (valued at US$36,112). This was the output of nine production groups, and members of each group tended their own cages. This US$36,112 equates to US$785/year for each of the 46 producers who participated in the fattening operations. A main reason to pilot mud crab production was to provide alternative sources of income versus seaweed culture, the largest mariculture activity in Tanzania and one that generates long-term income. In villages where the mud crab pilot took place, incomes were nearly triple what these communities had earned from seaweed farming alone in 2008 and 2009. This result is despite the fact that mud crab production stood at only 65% of the maximum

capacity modeled by the project (based on farm size of 100 crabs). As the chairperson of WAKAPA, a crab fattening group in Pangani said:

"Being a crab trader who started the crab business early before this fattening technique was introduced, I have seen an increase in my earning through fattening. Though it takes a little more time to fatten the crabs, I can earn more than double my previous income"

The SEMMA project ended in 2009 and despite the growth rate and economic feasibility in Tanga, five out of the nine groups stopped growing crabs. After working with the coastal communities over the course of four years, the SEMMA team believes that some of the key reasons why producers are not continuing the livelihood after the end of the project include the following:

- Finding a good source of protein feed became a problem for some of the groups. Groups not serviced by the Tanga-based seafood producer were dependent on collecting snails in the mangroves to feed their crabs. Collecting and crushing the snails was time-consuming and as the snails were overharvested in some places, it took more and more effort to collect them. In addition, the snail shells created a good deal of waste in the cages, which made it more cumbersome to keep the cages clean.
- It was difficult to find a steady supply of crablets for the cages. It is not clear if the wild crab abundance declined because of overharvesting, or if the group members just found it difficult to regularly go out to collect crablets in the mangrove swamps. Like fishing, a person cannot be guaranteed to reap a good harvest every time he or she goes out to collect. The lack of crab feed and wild crablets were both significant shortcomings in the microenterprise design.
- Producers need some degree of continued technical assistance support if they are to sustain their commitment to the cleaning, feeding, and other daily maintenance tasks. Coastal fishing communities have a historic culture of

Signboard for the Pangani West crab farming group, which grows crabs for local and international markets. Credit: Elin Torell

immediate (daily) return (i.e., catch and sell immediately). It is difficult to find individuals who are willing and able to change this behavior and to commit to a much longer business cycle. Continual extension visits can help in providing the encouragement and support that can build this commitment in producers.

- Producers often lack the means or capacity to bring the crabs to market and to negotiate with buyers. Some form of external marketing assistance or a formal connection with a buyer is needed either permanently, or until the producers gain the self-confidence and experience to market themselves as a collective group. The producer group closest to Pangani town has been the most successful because: 1) it has an established relationship with the seafood producer in Tanga, and 2) local hotels provide a near-at-hand additional market for fresh crabs.
- Women are constrained in the time they can dedicate to the maintenance aspects of crab culture enterprise due to the demands of other household duties (farming, child care, cooking, laundry, gathering fuel wood and water). As a consequence, the women that participate in crab cage culture are most often limited to those that are younger, and /or unmarried, and elderly women who do not have the burden of these other responsibilities.

While the Tanga experiment was not sustained at the same level it had reached by the project's end, crab fattening as a livelihood has been continued by many of the original adopters in the area. Because the activity proved itself feasible, it is now being tested in other coastal areas of Tanzania, including the Rufiji Delta, Kilwa, Mafia Island, Mtwara and Zanzibar, under the support of other projects.

Crab harvest. Credit: James Tobey

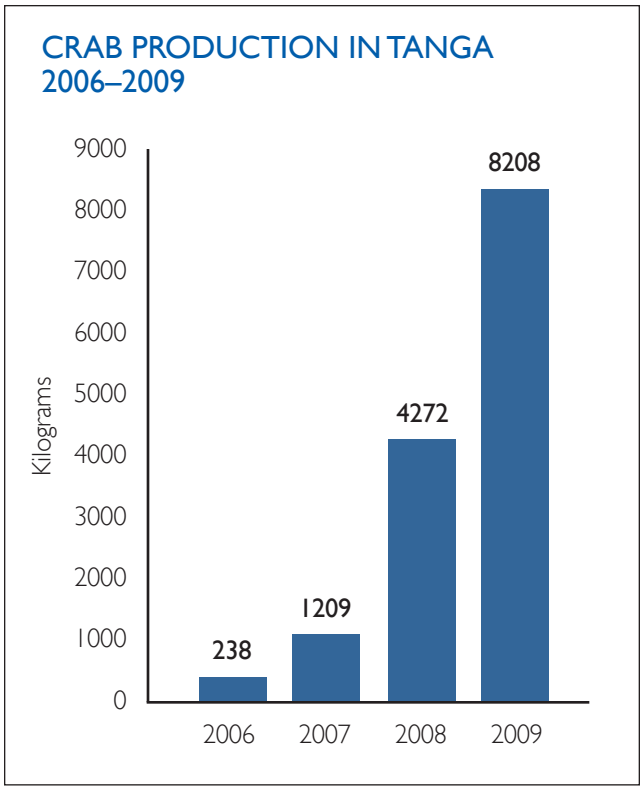

FIGURE 2. Crab production among 46 producers between 2006 and 2009

BEST PRACTICES AND LESSONS LEARNED

Market linkages. One of the main reasons why the crab cultivation project was able to take hold so quickly in certain areas was the formal link and support established with the seafood producer in Tanga. This producer provided crab feed (waste from the processing plant), which saved the crab farmers the extra step of collecting feed. It also connected the crab cultivators to a buyer, saving them the step of marketing their products. This is similar to the case of seaweed, where the buyers support the producers, providing everything from farm supplies, extensions support, and a guaranteed market. In this model the private sector involvement and support gave the crab cultivators an extra "push." For those crab cultivators not connected to the seafood producer, those who were most successful were the producers who farmed in a concentrated area with easy access to urban markets where they could oversee the sales themselves. Those crab farmers who dropped out from the enterprise were those who lived too far away and/or produced too few crabs to justify buyers making the trip to their farms to purchase the crabs.

Conservation of mangroves. The crab culture enterprise has encouraged mangrove conservation, with clear evidence that illegal cutting of mangroves has decreased in all the crab fattening sites. The simple fact that farmers spend

Mangroves provide excellent habitat for crab farming. Credit: Elin Torell

a lot of time in their farms is, in and of itself, a deterrent to illegal cutters. And, because farmers now better understand how important the mangrove shade is to their crab cages, they are ever more encouraged to protect the mangrove forests—by replanting and by taking action to prevent illegal cutting.

Beware of relying on wild stocks. Relying on wild crablets—which were also under pressure from capture by individuals who bring adult crabs straight to the market—to stock the cages was a flaw in the project design. It led to overharvesting of the resources. It also caused the farmers to become discouraged by the increasing amount of time they had to spend in collecting crablets. Despite encouraging the farmers to use alternative protein such as discarded fish, some continued relying on wild snails for food. This only added to the labor intensity of the enterprise and discouraged some farmers from continuing. Although the enterprises had a positive impact on the mangrove stocks, they had a negative impact on the wild crab and snail stocks. Establishing a carrying capacity and limiting the number of crab fattening enterprises at the beginning of the project could have helped prevent this situation as it scaled-up in the areas.

Mainstreaming the crab fattening livelihood with district development plans. With decentralization in Tanzania, responsibilities for governance at the local district level have increased without parallel increases in budget. There is very little core support for district extension officers. Unless an activity is in the annual district development plan with a budget line item, it will generally not be given public support. Thus, crab fattening production needs to enter into district level action plans as it did during the life of the project. This had a positive impact on the success of crab fattening activities, especially in Pangani. District assistance in identifying demonstration sites for crab fattening is also critical to the successful implementation of this activity with producer groups. However, continued district involvement is only one of many sustainability factors. If the enterprises were profitable and benefits were amply accrued and shared, the enterprise model should be successful and sustainable on its own.

Education and awareness. Continuing extension, education and awareness with producers in coastal communities is critical in order to increase the number of producers and to increase the level of production per individual to a minimum of 100 crabs. ■

4.7 IMPROVING LIVELIHOODS AND PROTECTING MANGROVE FORESTS THROUGH ENTERPRISE DEVELOPMENT IN THE GAMBIA: FEMALE OYSTER HARVESTERS WORK TOGETHER TO IMPROVE THE QUALITY OF THEIR PRODUCTS AND PROMOTE SUSTAINABLE RESOURCE USE

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Women in the Banjul area of The Gambia have collected oysters and other bivalves from the Tanbi wetlands for generations. This wetland is a National Park and a RAMSAR site. The women working in the wetlands typically use rudimentary technologies to harvest and process the oysters, and the open access nature of the wetlands has led to intense pressures to harvest immature oysters and destroy mangrove habitat. In 2007, 50 oyster harvesters joined together to form a new association to improve the livelihoods of female oyster harvesters in the area and sustainably manage the resource. The TRY Oyster Women's Association (herein referred to as TRY) came into being with the goal for oyster harvesters to become self-sufficient by improving cultivation and marketing techniques for oysters. Since its founding, TRY has undertaken several steps toward realizing their goals, including institutional development, training workshops, business planning, and study tours. Two years later, the organization now includes 500 women in 15 different villages who work together to manage the Tanbi wetlands, and subsequently, their own futures.

INITIATIVE

The TRY Association has teamed up with the USAID supported Gambia-Senegal Sustainable Fisheries Project, known locally as "Ba Nafaa," to provide training to women on culturing and marketing oysters. The USAID/Ba-Nafaa project and TRY work together to organize the women and guide them in the drive to improve the situation for them and their families. TRY members have been provided aquaculture, microfinance, literacy and business training so that they may learn how to properly harvest, process, and sell oysters. The Association also offers skills training classes for the daughters of oyster harvesters, teaching them practical and lucrative business skills, such as sewing, cooking, computer literacy, and marketing. TRY was also provided alternative livelihoods training and support for product and marketing development and mangrove reforestation.

RESULTS

The TRY Association's Executive Director, Fatou Janha Mboob, described the greatest challenge to TRY saying, "The biggest obstacle has been to bring together, under the umbrella of TRY Association, 500 women from 15 different communities to work together." To overcome this obstacle, TRY established a center strictly devoted to the organization and created an institutional structure to guide the Association's efforts. Ms. Janga-Mboob noted that the Association has also elected an executive committee and established a board of directors. A Business Plan for TRY was developed with USAID/ Ba Nafaa project technical assistance. TRY has initiated its microfinance scheme and loans have been issued to members to help them engage in supplemental livelihood activities so that they can earn money during the closed oyster season.

Microfinance training for TRY members is intended to encourage a well-defined organizational set-up for the women and to build the capacity of participants to enhance their leadership and managerial skills. The training covers business and family separation; business planning; pricing and cost analysis; savings and credit; and record keeping. A total of 250 women from the 15 communities have benefitted from the training. After successfully completing the training, the women received individual loans to start their own businesses outside of oyster harvesting. Each woman was offered a loan of D1,000 (US$35) for investment in various small business enterprises. The goal was for all participants to repay their loans within six months and to establish the practice of saving. So far, the project has been a success, and one woman has already saved over D11,000 (US$385). According to the Association's Executive Director, "From the micro-finance scheme and training in small business management, the women are realizing the benefits of savings and credit, and are managing their businesses better." The repayment rate for the loans was 98%, and 60% of the women were able to save D500 (about $17) or more. The importance of savings is emphasized in the second round of loans, which are provided on a sliding scale based on the amount of savings achieved in the first round. Greater savings means access to a larger loan.

Efforts to improve marketing and access to customers have also been successful. Market space is difficult to come by in the area. Until only recently, almost all oyster harvesters were forced to sell their oysters on the side of the highway. Thanks to the coordinated efforts of TRY, the Association has acquired space for its members at the Serrekunda market place. This was a momentous occasion as the lack of market space to access customers and sell their product had been a major problem. TRY has also instituted an annual oyster festival/fundraising and awareness-raising event. In 2011, media covered the widely attended event, which broadened TRY's market and support network. The Gambia's President donated D100,000 (about $3,500) and the Minister of Education pledged 17 scholarships for children of TRY members. Also, a loan from the Women's Bureau allowed TRY to purchase freezers, making it possible to market frozen oysters during the closed season.

The USAID/Ba Nafaa Project has also provided oyster harvesters with training workshops that include participation in oyster research studies. These studies teach women about the spawning, growth and mortality of the mangrove oysters and give women the opportunity to test their own ideas through action research. The women also received training in how to maintain the aquaculture racks and how to conduct their own pilot studies on different aquaculture methods. As part of community-based co-management meetings, community-based committees have been formalized and the roles and responsibilities for members and government agencies defined. In addition, some communities have conducted conflict-resolution meetings and others have held microfinance training workshops to teach soap-making as an alternative livelihood for oyster and cockle harvesters.

To reduce harvesting pressures on wild oyster stocks, TRY members from nine communities within Tanbi National Park have organized themselves into six groups for training on oyster aquaculture. Following the training, a demonstration aquaculture rack was constructed in each community. At the conclusion of the pilot, it was clear that oyster culture would be helpful in both protecting the wild mature oysters as a source of spat and in protecting the mangroves from damage during harvest time. The communities have agreed to work with the Department of Fisheries on the development of environmentally friendly oyster aquaculture in the Tanbi wetlands. Supported by the USAID/Ba Nafaa project, TRY and the Department of Fisheries have also engaged in a two year collaborative process to develop an Oyster and Cockle Co-Management Plan. This plan, signed in January 2012, gives the TRY Women's Oyster Association exclusive rights to oyster harvesting in the Tanbi Wetland National Park—the first case in sub-Saharan Africa of women being legally granted exclusive rights to a fishery resource. In addition to its work with TRY, the project supported the co-management stakeholder process involving the Department of Parks and Wildlife, the Department of Forestry and the National Environment Agency. Technical contributions included Oyster Value Chain Analysis, Water Quality Testing and Shoreline Sanitation Survey work in the Tanbi.

Gambian TRY Oyster Women's Association member showing cultivated oysters. Credit: Fatou Janha

TRY has also made inroads with mangrove reforestation and other conservation efforts. According to the Executive Director of TRY, "The women are now also in tune with nature, filled with the realization that the conservation of mangroves on which their livelihood depends is of paramount importance. Harvesting methods have been improved, [and there is] no more chopping down of mangroves." TRY women from the Lamin community have so far replanted some six hectares of mangroves. In return, they were given 28 boats by The Gambia's National Environment Agency for their oyster collection activities.

BEST PRACTICES

Institutional development. A significant challenge facing the TRY Association was coordinating and fostering cooperation among members who had little or no experience with formal organizations and enterprise development. To overcome this challenge, TRY took multiple steps to begin institutionalizing the Association. This included creating an environment that was impartial and strictly devoted to the goals of the Association. TRY has established a formal center for its operations, conducts regular meetings, and has created an institutional structure with leaders and clearly defined roles. This has helped reduce internal conflict. Further, the Association maintains a strict policy of transparency in all its actions. The fact that members of TRY have seen short and medium-term benefits from coming together as an institution has been an important factor in building trust and engaging members.

Marketing and value addition. Several steps have been taken to improve both the quality of the oysters and their marketing. First, TRY has trained many of its members to prepare oysters in a way that increases their shelf-life and value. When placed in jars, oysters can last as long as six months, instead of only one or several days. A longer shelf-life means the oysters being cultivated can be left to grow longer and become larger and fetch much higher prices (up to 30% more) at the market than do small oysters. As for adding value, the Association is experimenting with freezing and smoking the oysters. Second, by working together, Association members have accessed an important market. During workshops, the women learned the importance of keeping their stalls clean and orderly in order to attract customers. For purposes of hygiene and as a way to identify themselves and differentiate their product, the TRY members now wear uniform aprons when selling their oysters. They have also undertaken a marketing campaign to attract new customers. This includes labeling the TRY oysters and posting fliers that extoll the oysters' high quality.

TRY member meeting to discuss how to develop an Oyster and Cockle Co-Management Plan in the Tanbi Wetlands. Credit: Fatou Janha

Study tours and knowledge exchange. Sharing knowledge is an important aspect of enterprise development. Study tours are one way to foster the exchange of ideas. In 2009, 24 members of TRY and two officials from the Department of Fisheries traveled to neighboring Senegal where they learned new techniques for raising oysters and processing them—techniques that could bring them additional social and economic benefits. The Senegalese and Gambian delegations shared many of the same concerns and realized that joint research activities could be used to develop products and techniques that would be mutually beneficial. In the following year, the TRY Executive Director visited oyster communities in Tanzania, and in 2011 four TRY members again traveled to Senegal to visit an oyster processing facility. In too many study tours, the tendency is to include a plethora of activities in an attempt to maximize the amount of information that participants can gain. However, it is equally, if not more, critical to include sufficient time in the tour for participants to digest the experience and absorb what they are seeing and hearing. ■

4.8 BEST PRACTICES TO INCREASE THE LIKELIHOOD THAT ECOTOURISM CONTRIBUTES TO IMPROVING THE TRIPLE BOTTOM LINE

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Ecotourism is "responsible travel to natural areas that conserves the environment and improves the well-being of local people" according to the the International Ecotourism Society 1990. The premise is that helping communities earn income from ecotourism, which depends upon a rich array of attractions, simultaneously provides an economic alternative to destructive, unsustainable activities and an incentive for biodiversity conservation (Kiss 2004). However, to date, projects achieving success on the three fronts of conservation, development, and profitability have been limited (Wunder 2000, Salfsky et al., 2001, Kiss 2004, Garnett 2007, Ohl-Schacherer et al. 2008). This short synthesis draws upon peer-reviewed literature and case studies from around the world and extracts lessons learned from previous ecotourism projects. The goal is to offer insights and recommendations on best practices that may increase the likelihood of success in future initiatives.

1. Ecotourism only works if you have a suitable ecosystem (and protect it)! Ecotourism requires unique landscapes and/or the presence of charismatic fauna that are easy for tourists to access, view, and enjoy. That means that some types of ecosystems are better suited to ecotourism than others. Savannahs and coral reefs are popular destinations and have hosted a number of ecotourism initiatives. Other biologically rich habitats are less suitable for ecotourism because they are difficult to access (e.g., closed tropical forests) or because they have lower carrying capacities to support tourism (e.g., mountain regions and islands). To achieve long-term conservation objectives, it is important to protect the habitat, flora, and fauna upon which the ecotourism initiative relies. This can be done by taking measures to limit the environmental impacts of ecotourism facilities (e.g., by setting up sewage treatment systems,

View of the Ushongo Beach—a popular eco-tourism spot in Tanzania. Credit: Elin Torell

solar energy, efficient water usage), preventing the creation of artificial water points and feeding, controlling guide and visitor behavior, and decreasing the likelihood of introducing exotic species and/or disease. One example of a place that failed to protect the ecosystem is the Galapagos Islands. Although actions are being taken to ameliorate the situation, excess levels of tourism and a large influx of non-residents that came to work in the ecotourism industry caused degradation and destruction of the very ecosystems that underpinned the ecotourism operations.

2. Involving local communities is an important predictor of ecotourism sustainability. Local communities can influence the conservation outcomes of ecotourism projects both positively and negatively. It was found that involving local communities through labor recruitment, revenue-sharing, and/or decision power, is an important predictor of ecotourism sustainability. He noted that the levels of resource extraction in the target ecosystems were higher when local communities were not included in the ecotourism affairs. The reason being that when local communities do not benefit economically from conservation (and they do not see any indirect benefits), they will not have the incentive to protect the environment. However, ecotourism can become an incentive for communities to adopt and implement conservation schemes. A good example is the Posada Amazonas in Peru, where communities benefited both economically and socially from the conservation scheme. Approximately 25 families receive direct income from the ecotourism initiative while the community-at-large benefits through monetary payments, improvements in community infrastructure, and the provision of social services. For example, in 2006, the community received approximately US$500,000 in profit from Posada Amazonas. Seventy to 80% of that money was split among the 150 households while the remaining revenue was dedicated to building roads, a potable water well and tank system, a secondary school, and a computer facility, and establishing a health emergency fund, elderly care, and higher education loans.

Community members also take an active role in decision-making and management, and they have become more proactive in securing their land from the government due to increased feelings of empowerment. To meet conservation goals, ecotourism needs to be an economically viable livelihood for a considerable segment of the local population. That will help deter broad-scale consumptive land use and unsustainable harvest of natural resources. However, it may be prudent to initially limit the number of local community participants to those with a genuine interest and willingness to participate in order to ensure adequate levels of income generation to create a conservation incentive before engaging the broader community.

Each place is unique and how communities are involved will depend on the site-specific conditions, but commonly ecotourism draws upon existing local businesses for goods and services and/or developing new business ventures to take advantage of the tourist demand and markets. It is important to remember that communities are heterogeneous, and often it is the elite and already established entrepreneurs who are in a position to grow ecotourism livelihoods. If the objective is to engage poorer and more marginalized residents, an ecotourism project might need to provide training and technical assistance to help them get involved. Profit sharing (e.g. setting aside a portion of a park fee for community development) is another way to distribute benefits to the whole community. There are several examples of marine protected areas and national parks using some of the revenue to provide services such as schools and healthcare facilities. Regardless of the specific approaches adopted, in order to prevent conflict, it is critical that the decision-making process for determining how benefits are to be dispersed is transparent and perceived as fair and equitable (Spenceley 2008). It is also important to build local capacity to manage the funds that flow into the community.

3. Build capacity and moderate expectations. It is extremely important that expectations not be set too high or that potential benefits are not be overstated. Otherwise, local communities might be disappointed or disenfranchised. Experiences show that it takes time and requires patience, training, and capacity building. Dedicating time, effort, and resources to provide local communities with the skill set for meaningful versus menial

positions and preparing them for visitor expectations, especially if hosting international travelers, can increase the likelihood of success. Apprenticeship programs with hands-on experience and/or the involvement of members of other comparable communities with experience in ecotourism have been useful in building capacity.

While providing training and education opportunities for the local communities are important, it is equally important to educate the visiting ecotourists about the local communities' culture and customs. This reduces the possible negative impacts of the visitors on the hosts. For example, upon arrival at Kapawi in Ecuador, ecotourists are given a detailed briefing on the customs and cultural beliefs of the Achuar and advised on appropriate behavior prior to community visits. Other ecotourism projects have developed codes of conduct for scheduled home visits as well as created specific zones to delineate trails for locals versus trails for tourists, and to demarcate specific areas such as sacred sites that tourists cannot visit.

4. Conducting feasibility and market studies to assess profitability is critical, because without profitability it is not possible to graduate from external funding and support. Ecotourism projects need to be financially profitable so that their long-term sustainability is not dependent upon a continuous source of external funding). There is little value in establishing community-based tourism enterprises which tourists do not know about (because of poor promotion); cannot reach (because of poor infrastructure); where the establishment is product- rather than demand-led (because no market research was done); where a low level of service is given (because of poor training); and which does not make a profit (because expectations remained unrealized, and third parties have to subsidize the operation in the long-term). Therefore, before commencing a project, it is critical to conduct a feasibility analysis and develop a business plan to assess the overall commercial viability. Factors such as political stability, accessibility (i.e., infrastructure and reliable transport), market access, linkages to other parts of the tourism sector, and advertising should all be considered as they can influence tourism.

5. Local community, NGOs, and private sector partnerships leverage resources and capacity. Finally, it is worthwhile to recognize the importance of partnerships between local communities, the private sector, and NGOs. Successful partnerships draw upon the expertise, experience, and resources that each group brings to the table (Stronza and Gordillo 2008). The local communities can provide land, a workforce, and the authenticity and local knowledge that are highly valued by ecotourists (Durham 2008b). The private sector can contribute business and marketing knowledge, initial capital, and possibly a client base, while NGOs can assist with planning, capacity building, and mediating negotiations. When partnerships are formed, it is important to treat everyone equally, clearly define at the outset the role and responsibilities of each partner, and stipulate what happens if the agreed upon terms are not upheld by any of the parties (Biodiversity Conservation Network 1999b). Moreover, throughout the tenure of the project it is essential for the partners to communicate frequently and openly with one another. This will help cultivate relationships built on transparency, mutual respect, and trust (Gordillo Jordan et al., 2008, Simpson 2008).

SUMMARY

It is important to remember that ecotourism can only be an effective conservation and community development tool under certain conditions. It will not work everywhere and should not be viewed as a panacea. However, conducting rigorous feasibility assessments that consider a number of factors before embarking on an ecotourism initiative can increase the likelihood of achieving success in delivering long-term conservation and development benefits. As described above, critical factors to consider include: long-term financial viability; the presence of unique landscapes and/or charismatic flora and fauna; sufficient income generation and equitable distribution of benefits; realistic expectations and meaningful community participation; and proactive planning, monitoring and adaptive management measures to control tourism levels and minimize ecological impacts. In situations where ecotourism looks to be a viable option, it should be complemented with other community development strategies to create or maintain a diversified economy. ■

4.9 CHAME *(Dormitator latifrons)* AQUACULTURE IN COJIMIES ESTUARY: AN OPTION FOR LIVELIHOOD DIVERSIFICATION IN RURAL ECUADOR

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INTRODUCTION

Poverty and population growth threaten the biodiversity of the Cojimies Estuary and its watershed. Within the estuary lies the Mache-Chindul Reserve, where people live almost exclusively on fishing, shellfishing, subsistence agriculture shrimp farming, wood cutting and breeding livestock. People here have few alternatives for income generation, lack basic services and infrastructure, and have low levels of education. Combined, these factors lead people to worry more about meeting basic needs than about how their livelihoods impact biodiversity. Meanwhile, open access fishing, mangrove-cutting and illegal logging of tropical forests have led to widespread biodiversity loss.

As natural resources decline, many coastal residents have increasingly relied on shrimp culture for income. Shrimp culture is a short-cycle crop (three to four months) and generates a higher profit margin than most other income-generating activities available to these communities. Ponds provide important capital for the coastal poor, so it is important to find ways to sustainably and profitably utilize existing ponds and when it is necessary to construct new ponds, to use construction that does not damage valuable habitats. Ponds not only can contribute to conservation and sustainable livelihoods, but also serve other important functions—e.g., water storage, species habitat creation, and flood and erosion control.

While no longer the primary cause of mangrove-cutting in the Cojimies, shrimp culture can have other environmental impacts such as pollution from effluents, as well as socioeconomic impacts. Shrimp farming follows a boom-and-bust cycle largely influenced by periodic epidemic diseases, which may shut down the Ecuador industry every two to three years. When small-scale shrimp farmers lose their crop, or when large farms close, local residents may have no alternative but to exploit natural resources through overfishing/shellfishing and cutting mangroves for firewood. Small-scale shrimp farmers need alternative livelihoods for such times when the shrimp crop fails or when the price that buyers will pay for the shrimp is so low it leaves little profit for the farmer.

Piloting chame aquaculture was one such alternative livelihood that offered potential in Ecuador. In addition to offering a livelihood option, it also provided a way to engage the community in environmental education and efforts to preserve biodiversity—efforts that otherwise might not be attractive to villagers primarily concerned with making a living.

WHY CHAME CULTIVATION?

Dormitator latifrons, commonly called chame, is a native fish that inhabits floodplains and lakes near estuaries. It has a wide geographic distribution along the Pacific Coast of Latin America, ranging from southern California to northern Peru. It can tolerate variations in salinity and temperature and is resistant to conditions of low dissolved oxygen. It is biologically unusual as it is a facultative air breather. These traits contribute to its hardiness, and may prove useful as aquaculture shifts, in the face of climate change, to more heat-and drought-resistant species. Chame has cultural importance as an important food source for indigenous people in much of Latin America, especially in northern Ecuador. It has been cultivated around the Chone estuary and there is small production in isolated areas of the Guayas, Los Rios and Esmeraldas Regions. In most areas, it is either considered an emergency food (when other fish are not available), or is consumed by indigenous groups. In some areas, it is harvested as a bait fish. Despite its biological and cultural importance, chame is disappearing as its native freshwater and brackish water wetland habitats are being lost to development and reduced freshwater flows. In some areas, it may be considered as locally rare or perhaps even endangered.

Hence, the interest in chame culture was two-fold—as an alternative for small-scale shrimp farmers and others, and as an economic incentive to conserve this unusual fish and its wetland habitats. If methods for chame aquaculture can be developed, this species could become a major culture species in Latin America. Chame possesses many of the same attributes (i.e. high quality flesh, fast growth rate, low protein requirements) that made tilapia the most cultured species in the world.

The potential for chame aquaculture had long been recognized in Ecuador. However, there have been few systematic efforts to develop the species. This includes conducting applied research to determine its culture requirements and developing low-tech, low-cost pro-

Chame harvesting in the Cojimies estuary, Ecuador. Credit: EcoCostas

duction systems that could be adopted by poor coastal residents. Regional adoption of chame culture methods, however, could provide a much needed source of food protein and alternative livelihoods option in the Latin American countries with chame.

THE ASOMACHE ASSOCIATION

The AsoMache Association consists of a few dozen, poor families—only a few with small plots of cultivatable land—engaged mainly in subsistence farming and to a lesser extent in the extraction of natural resources. They live along the strip of land between the eastern bank of the Cojimies estuary and the Mache-Chindul Reserve. The AsoMache members, along with other groups of cockle collectors and small farmers, are well organized. Working with well organized groups tends to be more effective than working with a large number of non-affiliated individual farmers. Moreover, very limited funding for the extension work that would be needed in the chame culture activity made this the only viable way to proceed in this isolated coastal area.

Shrimp farming is the main activity in the Cojimies estuary and its watershed. AsoMache members own a few ponds. Until 2005, however, and because they lacked capital, equipment, and knowledge, they leased these ponds to shrimp growers rather than cultivating them themselves. While five members had experience as shrimp farm laborers, many dreamed about managing their own shrimp pond. These shrimp ponds or pools, however, were also suitable for growing chame and at certain times shrimp farmers found chame growing naturally in the pools located close to the estuaries of Chone, Jama, Muisne and Cojimíes.

THE INITIATIVE

In early 2005, the local NGO EcoCostas and URI-CRC started the USAID/Washington funded SUCCESS Program, which began piloting chame aquaculture in the Cojimies estuary. An additional grant from USAID/Ecuador funded a chame production center in the estuary.

EcoCostas signed an agreement with the Association of El Carmen (later called AsoMache) to jointly promote cultivation of chame in the area, with the goal of improving the living conditions of the small community by promoting an economically sustainable liveli-

hood with low environmental impact. It experimented with growing chame both as a monoculture and as a polyculture with shrimp. According to the agreement, AsoMache would build the necessary infrastructure, and capture, transport, and stock the fingerlings. They also agreed to ensure some profits were reinvested to allow the enterprises to grow. EcoCostas provided technical recommendations for monitoring the fish growth and on pond safety.

Chame cultivation began in late 2005 by stocking a 2.6 hectare pond near the River Mache—one of three rivers in the area with constant flow into the estuary—with 33,000 fingerlings.

RESULTS

Development of culture methods. The chame thrived and grew rapidly on a variety of foods ranging from commercial shrimp feeds to inexpensive, locally sourced foods such as mashed plantains or corn. The trials confirmed the recognized fact that chame partially feed on the natural primary productivity in ponds, hence reducing the need to provide feed. Growth and survival were similar to what would have been expected for tilapia—with market-sized fish produced in six to eight months.

Profitability and food security. Between May and December 2006, the group harvested over 2,600 pounds of chame that sold for US$1,750. Approximately 150 pounds were distributed to the Association for domestic consumption. The price was low as most chame were sold directly off the pond banks to poor villagers or passing travelers. Association members perceived the chame production alleviated their poverty, improved their business skills, and diversified their livelihoods. Since the average local cash income is a few hundred dollars annually, even small cash infusions from fish sales can have significant impacts. Participants tended to use the additional cash for items unavailable through local barter—e.g., school fees and household necessities such as clothes. Fish can also provide high quality protein for local diets, which otherwise rely on wild game or a scarce supply of locally produced livestock.

Marketing. All the chame was sold locally and the group did not create marketing channels beyond the Cojimies area. One reason was the lack of support from local government. Only Pedernales, a nearby town, showed initial interest in chame—but did not follow through. The main obstacle to marketing was a lack of ability to transport the fish to larger, distant markets. There is a high demand for chame throughout the northern areas of Ecuador and as far south as Guayaquil, and chame. Chame—which can survive after harvesting by breathing air—are capable of arriving at these distant markets alive if the transportation issue were addressed.

Required capacity and financial inputs. Chame is easier and cheaper to grow than shrimp, primarily because it can grow on local, low-protein feeds. In contrast, shrimp farming is often cost-prohibitive for small-scale farmers since semi-intensive farming requires high protein (~30% protein) feed as an input. It should be noted, however, that if properly managed, extensive shrimp culture—potentially in tandem with chame culture—could be feasible since shrimp will also feed on a pond's primary productivity.

However, both shrimp and chame culture face a similar bottleneck. Farmers must purchase shrimp postlarvae to stock their ponds. However, it is very expensive to purchase high quality shrimp postlarve from hatcheries on a small-scale. While less expensive to fish for postlarvae in estuaries, these do not grow as well and may carry disease. While it is also possible to purchase chame fingerlings relatively inexpensively, fingerlings are not readily available since much of the chame's natural breeding grounds—the extensive wetland areas of northern Ecuador—have been destroyed. This led to an international research effort to develop hatchery methods for chame in order to produce a more abundant supply of fingerlings, and perhaps develop a second alternative livelihood of chame fingerling production. This research is now supported by the USAID-funded AquaFish Collaborative Research Support Program.

Community organization. The chame experience helped improve the organization and skills of the AsoMache Association members—teaching them to analyze issues and make decisions, and how to integrate conservation into productive activities. Routines were created for the division of labor, fulfillment of responsibilities, accountability and planning required to continue with group activities. Additionally, since chame culture initiatives were related to shrimp farming, this was a good opportunity to also train the farmers in best management practices for shrimp farming, as best management practices have been demonstrated repeatedly to improve production, lower risk and reduce environmental impacts.

Environmental awareness. Cultivating chame increased members' awareness of the need to protect the environment to support their livelihoods. The group helped reforest the tropical forest in the Mache-Chindul Re-

Chame fish. Credit: EcoCostas

serve— realizing that for the river to flow continuously throughout the year (i.e. supply enough freshwater to cultivate chame) they needed to maintain the tropical forest. Association members also received environmental education and were introduced to livelihoods related to improved use of natural resources—e.g., 1) improved use of degraded rain forest slopes to plant passion fruit and cacao, which eventually led to reforestation, and hence stabilization, of the slopes with cacao trees, which also attract birds and wildlife; 2) research on the indigenous use of local medicinal plants, leading to development of both tree and medicinal plant nurseries; and 3) planting of tree nurseries to reforest several areas, including the main highway corridor in the area. Youth and school children were involved with these efforts, which will hopefully create a more pro-conservation next generation.

The chame culture pilot lasted two years and while it takes longer to realize tangible impacts on conservation or particular habitats, these pilot activities were largely successful and formed a solid basis for longer term efforts.

Chame cultivation continues to expand. The interest in growing chame increased and in the middle of 2008 cultivation was expanded to 10 additional locations. By the end of 2008, there were 16 new farmers, excluding the AsoMache Association. In late October 2010, the Association bought 20,000 fingerlings in the community of Maldonado (Esmeraldas) and the fry were stocked in one large and one small pond. Currently, a commission within the Association is in charge of chame cultivation—controlling activities, and conducting periodic surveillance, monitoring harvests, and maintaining the ponds.

BEST PRACTICES

Best practices in extension, social organization and applied research led to the success of this pilot effort.

Documenting improvements in technologies and practices. The various stages of chame cultivation were refined and documented, including: handling and transport of fingerlings, production stages, and harvest and post-harvest monitoring. The management and organizational capacity of the target group was enhanced. These experiences were incorporated into a manual on chame cultivation that was developed and distributed to communities in the area. Piloting and documenting the process was essential to successfully training new groups to cultivate chame. These findings are now being used in other Latin American locations to begin similar chame culture efforts.

Establishment of agreements and monitoring. To help the group understand their roles and responsibilities—including the results expected from them—a short agreement was signed between the Association and EcoCostas. As many farmers cannot read and have only a very basic level of education, the agreement used simple and direct language, avoiding technical jargon and scientific vocabulary.

Distribution of materials and funds. AsoMache only received materials and supplies listed in a schedule and in accordance with the recommendations of the extension staff. EcoCostas approved the supply of material according to periodic review by the extension staff.

Continuous extension support. Extension staff worked with the group throughout the chame cultivation process, advising and assisting in the performance of all chame cultivation activities—action planning, pond preparation, acquisition, mobilization and stocking of fingerlings, monitoring the crop, harvesting and marketing. Extension support is usually required to make efforts of this type successful. One indicator of success was that even after two years of USAID funding ended, the Association continued to fulfill these functions. ■

4.10 SUMMARY OF GOOD PRACTICES AND SUCCESS FACTORS

Below is a summary of good practices and success factors for decision-makers and practitioners embarking on developing conservation-based enterprises. The good practices and success factors have been gleaned from the case studies presented in this section, research conducted to understand success factors related to coastal microenterprise development, and other literature.

GOOD PRACTICES

1. Start by assessing the current livelihoods, the range of activities households take to cope financially, the assets and incentives they rely on, and the root causes of vulnerability (including gender inequities)
2. Conduct a thorough feasibility assessment to ensure that the enterprise idea is viable
3. There needs to be a clear direct or indirect causal relationship between the enterprise activity and biodiversity conservation targets
4. Work with enterprise operators that have an entrepreneurial and for-profit mentality
5. Provide assistance based on a written agreement between the enterprise and the provider of assistance. There should be a clear understanding of what the enterprise is responsible for and what the project should support
6. The enterprise operators and the project have agreed on the performance indicators for business performance and conservation impact
7. Education and awareness building are important because they encourage stakeholders to take action to counter biodiversity threats
8. An enterprise on its own will generally not achieve conservation goals in a region; the overall plan for conservation, of which the conservation enterprise is a component, will in large part determine its success

SUCCESS FACTORS

1. **Leadership:** The commitment and continuity (able to sustain involvement for the long haul) of one or two individuals to lead and coordinate the enterprise is essential.
2. **Partnerships:** The ability to negotiate and maintain a core set of relationships, including with the private sector, for the benefit of the enterprise is important for growing the enterprise and ensuring equitable benefits.
3. **Business planning and marketing:** Either the leaders of the enterprise have business and marketing skills, or they have access to those skills in their key partners; or they have ready access to training to attain these skills.
4. **Existing market:** There must be an existing market for the products and/or services produced by the conservation enterprise, and considerable knowledge of that market should be obtained in advance.
5. **Keep expectations realistic:** Be clear about the roles and responsibilities of all involved—and set up realistic expectations of the time and effort it will take to develop and reap the benefits of the conservation enterprise. If the expectations are too high, the enterprises will fail.
6. **Triple bottom line planning:** The conscious and deliberate alignment of economic benefits with social and environmental benefits is an important element of achieving sustainable development.
7. **Short and long-term benefits management:** The enterprise should demonstrate how it is planning to deliver not only longer term benefits for its stakeholders (including how those benefits will be shared), but the short-term benefits that will keep stakeholders engaged and committed to the enterprise. Initiatives need to produce early benefits to entrepreneurs/communities to encourage them over the long haul.
8. **Organization and community engagement:** Long-term success and sustainability lies with the successful organization and engagement of local stakeholders and beneficiaries. Heavily subsidized livelihoods run the risk of failing once the subsidy is removed.
9. **Access and tenure (or control) of natural resources.** Livelihoods that derive their value from ecosystem goods and series that the entrepreneurs control do better than those that do not.
10. **Enabling conditions:** A supportive government role is necessary to provide the appropriate enabling conditions for conservation enterprise to succeed (policies, laws, regulations, extension services)

Once conservation enterprise strategies are implemented there will likely be considerable interest in how they perform. Coastal professionals and local government will be keen to show that the enterprise is beneficial for biodiversity conservation and for successful microenterprise development. The conservation enterprise strategy may need to be adjusted if it does not perform according to expectations. Monitoring, evaluation and adaptive management can help address these concerns. ■

CHAPTER 5

MONITORING, EVALUATION AND ADAPTIVE MANAGEMENT

5.1 MONITORING IMPACT

The first step in establishing a solid monitoring process is documenting the baseline conditions—something that should be done when assessing the environmental and socio-economic context, as described in Sections 2.1 and 2.2. Baselines should measure the impact of interventions in support of conservation enterprise and address two fundamental questions:

1. What is the status of current societal, economic, and environmental conditions that impact conservation-based enterprises?
2. What aspects of current societal, economic, and environmental conditions or behaviors do we aspire to modify?

A baseline is designed to engage all the members of a project team and local stakeholders in a collaborative exercise of analysis and strategic thinking. The baseline conditions of interest will depend on the project's causal theory and goals and objectives. But, in general they should provide a snapshot of the current conditions and behaviors from which to measure the impact of project activities and should assist in developing a shared understanding of the need for change. In the case of Zanzibar's Menai Bay, a few participatory rural appraisal workshops were held to provide a baseline on perceptions and awareness of marine conservation, and a physical survey of the area to determine the abundance of cockles and spat prior to project implementation.

A baseline can be simple or complex and can be based on either quantitative or qualitative information—or both. It could be as simple as a day or two of participatory rural appraisal activities with the targeted communities (see below). In some cases, it might be built into the site assessment, described in Section 2. The result may be a lengthy and detailed analysis or a compilation of tables and short statements. In the case of a project that seeks to strengthen and expand an existing enterprise, the baseline should include information on the monthly and yearly level of production or services, sales and financial returns prior to project implementation.

Examples of what can be included in a baseline survey including household or individual level questionnaires are:

1. General survey information (date, respondent number, interviewer)
2. Village information (village name, population density, growth rate, etc.)
3. Household information (number of members, age, etc.)
4. Material style of life (household wealth indicator—determined by looking at house construction, facilities and appliances)
5. Current household productive activities (rank importance of fishing, aquaculture, farming, livestock, tourism, etc. to household)
6. Household income (disaggregated per livelihood activity)
7. Enterprise information (information on infrastructure available for current enterprises, including microloans, technical assistance, grants etc.)
8. Community empowerment and livelihood security (questions designed for the participants to rank their perception of current status)
9. Perceptions regarding biodiversity indicators (e.g., abundance of key species)
10. Perceptions related to biodiversity conservation (e.g., knowledge of conservation rules, involvement in conservation, and perceived benefits of conservation) and the perceived status of threatened/economically important species.

From the baseline, the project can select a smaller set of indicators to periodically monitor. Together with larger updates of the baseline and "one off" evaluations, continuous monitoring fulfills two primary objectives: to measure the effectiveness of supporting the conservation enterprise implemented under the project, and to provide essential information that can be used to redirect and refocus efforts. If you do not monitor and evaluate your project's interventions, you have no way of determining if you are achieving your goals and objectives or what you might need to do to improve the project.

MONITORING, EVALUATION, AND ADAPTIVE MANAGEMENT

- What has the project accomplished?
- How has the context changed since the project was started?
  - -Priority biodiversity threats
  - -Business and enterprise development context
- Are observed changes the result of the project or other factors?
- What has been learned?
- How can the project make further improvements through revised strategies and actions?

Quantitative baseline indicators are an efficient way to track and summarize what is happening in a program. Qualitative information is useful in conveying why or how things happened—or didn't happen.

FIGURE 3. Perceptions of changes in catch and effort of oysters as revealed from participatory appraisals with communities in the Tanbi wetlands, The Gambia

A well-designed monitoring plan developed in tandem with the conservation enterprise plan is an effective tool for tracking the achievement (or lack of achievement) of project goals and objectives. A good monitoring plan takes into consideration the following elements:

- Determine the audience for the results of the monitoring and the specific information needs of that audience. This may be the project team, conservation enterprise operators, local community members with whom the project is working, and other stakeholders in the project. For example, engaging the shell-craft jewelry entrepreneurs on Zanzibar in the monitoring of no-take zones (Section 4.2) made the women realize that the no-take zones helped sustain the supply of bivalves that they needed for their businesses to thrive.
- Determine indicators and their definitions, data sources and the data collection strategy. Who will collect the data? What resources and staff time are required for monitoring? How frequently are data on indicators collected? How can you ensure high-quality data and build in ways to verify data?
- Regularly review the monitoring data to compare results with expectations. If performance is not as strong as expected, identify flaws in the design and/or implementation of the conservation enterprise strategy.

RESOURCES/TOOLS

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EXAMPLE: INDICATORS FOR BEEKEEPING CONSERVATION ENTERPRISE

Individual enterprise performance
- Number of beehives per entrepreneur colonized before the project
- Volume of raw honey produced per entrepreneur before the project (kg)
- Volume of production of raw honey per entrepreneur in each season of the project (kg)
- Volume of sieved honey delivered per entrepreneur to collection center and to other buyers in each season (kg)
- Sales of raw honey per entrepreneur to each buyer before the project intervention ($)
- Sales of raw honey per entrepreneur to each buyer in each season of the project ($)

Sustainable management of natural resources
- Number of community forestry groups formed
- Development of environmental management plans with stakeholders in the area
- Hectares of forest land where exclusive use rights were provided to farmers by government

Enterprise development
- Number of enterprise development plans prepared
- Number of men and women enterprise group members

5.2 EVALUATION OF CONSERVATION ENTERPRISE INITIATIVES

A baseline and monitoring data on indicators allows the project to track progress and alert the project team to potential problems, but it is not as information-rich as quantitative and qualitative project evaluations. Quantitative indicator monitoring contributes to performance evaluations that aim to assess the extent to which a project or activity is progressing towards its intended outputs and results. Impact evaluations, which are often done at the mid-point or end of a project, focus on the outcomes and impacts of a project. They are usually more qualitative in nature, and may help in understanding the changes brought about by a project, and what worked, did not work, and why.

There are many types of evaluations, and they all involve similar steps and have a similar basic goal—to assess the performance of the conservation enterprise efforts in terms of their design and implementation. The steps of evaluation include:

1. Specify evaluation questions. The purpose of the evaluation is to help determine if the conservation enterprise approach is working as it was intended. The evaluation should include questions that help answer whether or not the conservation enterprise project logic and hence, project design, were sound in terms of reaching the enterprise and conservation goals and/or whether adjustments are needed.

2. Elaborate an evaluation plan. The evaluation plan should clearly state the evaluation methodology and the tools required to answer the evaluation questions. What is the timeline and who will be responsible?

3. Conduct the evaluation. The evaluation may be conducted by independent external evaluators, or as an internal self-assessment that may involve structured surveys, focus groups, semi-structured interviews, and individual key informant discussions.

4. Analyze and Communicate the results. Where appropriate, perform data analysis and interpret the findings. Disseminating evaluation results to the appropriate audiences is very important.

BENEFITS OF EVALUATION

- Gauge project success
- Compile lessons learned
- Replicate project design
- Communicate performance
- Adjust design of conservation enterprise strategies
- Guide design and implementation of new conservation enterprise strategies

Some conservation enterprise strategies may not immediately produce direct employment, income, and biodiversity impacts. This means certain evaluation questions can only be answered over time.

One of the key challenges in evaluation, particularly when project interventions and results occur over a long timeframe, is to filter out the "noise" in order to determine if the interventions are really attributed with observed changes. Where possible, evaluations should look for (and/or rule out) alternative explanations for changes that occurred during the course of the project—i.e., are there changes that have nothing to do with the intervention or may be outside of the control of the implementers? With that in mind, the following factors can contribute to both good and poor evaluation results:

- Clearly specify project theories. Conservation enterprise in a coastal project can be a complex endeavor designed to sustain or improve coastal biodiversity and the well-being of enterprise operators through an assemblage of multiple strategies and activities. Focusing on the outcomes of conservation enterprise reveals what happened—i.e., whether intended impacts were realized. But learning and adaptation also requires information about why and how biodiversity and enterprise outcomes changed. Focusing on the "why" and "how" of a conservation enterprise project requires a detailed understanding of the project theory, logic or assumptions about how program activities are intended to result in desired outcomes.
- Implementation strategy—The conservation enterprise strategy may be appropriate, but poorly implemented. Staff resources and skills may be insufficient, the need for financial resources may have been underestimated, or assumptions about partner support and engagement may have been invalid.

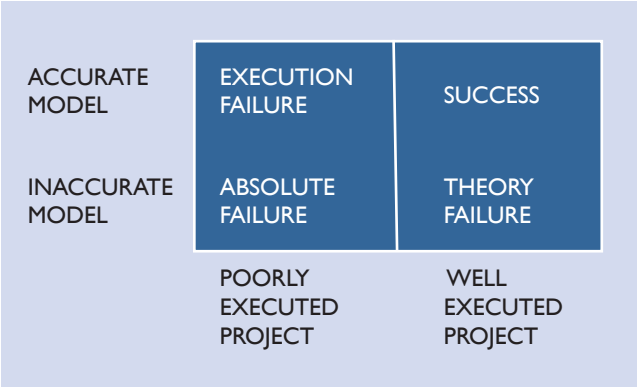

FIGURE 4. Detecting execution and theory failures

A project may need "corrections" if its project model is inaccurate, or if execution is poor. A typology of theory and execution failures is depicted in the figure above.

Changes in local conditions make some projects fail, even though the model was accurate and the execution well done. A variety of factors can affect the performance of conservation enterprise strategies. These include greater or lesser community and political support, growing pressures on conservation targets, major changes in key input supplies and prices, or changes in policies or enforcement of policies on biodiversity and conservation.

Attributing change to the relevant factors is critical in reaching the correct conclusions about performance, understanding how and why observed outcomes came to pass, and determining whether changes are needed in the conservation enterprise strategy or the way it is implemented.

5.3 ADAPTIVE MANAGEMENT

In order to be successful in the face of complexity, uncertainty, and interconnectedness associated with natural resource and human development systems, enterprise support initiatives need to be flexible, adaptive, and have the capacity to learn. The process of developing and implementing actions in support of conservation enterprise entails mutual learning on the part of all involved. The selection of strategies is based on information that may change in the future. It will expand to include information on the performance of the conservation enterprise strategy. Also included will be information on the factors listed in the previous section. Meanwhile, time and changing contexts may also alter the stated goals, objectives, and the expected results of conservation enterprise interventions.

Thus, as monitoring and evaluation results become available, the project and its implementing partners and participants may be motivated to press for changes in the choice of conservation enterprise interventions, their design, or their implementation. The process of reflecting on these changes based on monitoring and evaluation results is referred to as adaptive management.

The results of monitoring may indicate the project is going as planned and only a few changes or adaptations are needed to keep it on track. Or, it may indicate the enterprise is not going as expected and big changes are needed. If conservation results and enterprise performance do not meet expectations, it is possible the causal theory and project assumptions about behavior change were inaccurate, or other contextual factors in the world may simply have changed. Regardless the problem, it must be fully understood before the plan for enterprise support can be altered to fix it.

One example of adaptive management comes from Zanzibar. There only some of the no-take areas that were set up to protect bivalves and service the conservation enterprises with oysters that grow outside the no-take areas as part of a "spill-over" effect were effective. A careful review found that successful sites are usually those that are: 1) sufficiently large, 2) located in bivalve-conducive environments, and 3) close enough to the villages to monitor for poaching. Some sites were not ideal from an ecological standpoint and positive changes in bivalve density were found only in those sites that did meet all three criteria. As a result, the extension team initiated a dialogue with the communities to rethink the size and location of the no-take zones. They also suggested that if the communities were uncomfortable expanding the no-take zones, there were other management options available such as catch size limits or seasonal closures. Since the communities were active in both monitoring and management—and because they were seeing the benefits of protecting the resources as their enterprises were quite successful—it was not contentious to adapt the conservation strategy to better protect the resources.

The BCN Program took an explicit adaptive management approach, testing the hypothesis that "if local people directly benefit from a business that depends on the biodiversity in a given site, they should have the incentive to act to protect it against both internal and external threats to its destruction." The BCN program tested this hypothesis with the aim to learn how to better implement effective projects and learn from experiences.

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CHAPTER 6

RESOURCES FOR MORE INFORMATION

The resources cited below highlight a small number of those particularly relevant to conservation enterprise and coastal management.

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Tanzanian women fish gleaners emptying their net after a morning of fishing nearshore as the tide comes in. Credit: Elin Torell