"Shrimp Aquaculture and Urban Growth in Madagascar: Sustaining Societies and Conserving Coasts?"

Written Report

&

"Sakalava Shrimp"

Documentary Film

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December 2005

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"Shrimp Aquaculture and Urban Growth in Madagascar: Sustaining Societies and Conserving Coasts?"

Abstract

Faced with the crisis of overfished seas, many fisheries companies and entrepreneurs are looking to aquaculture to supply seafood to the ever-increasing demand of the world's population. Madagascar is one east African country that has the biodiverse, pristine mangrove shorelines ideal for shrimp aquaculture. Production ponds and accompanying infrastructure are being placed in remote landscapes, drawing immigration to new towns that have more wealth than otherwise found in the region. Some if not all of the aquaculture companies in Madagascar consider the welfare of their business dependent upon the social health of their employees and these new and fast-growing towns. What effort in the areas of community development programming, town planning, partnership-building, and international and domestic policy frameworks, are guiding Madagascar toward a shrimp aquaculture practice that can be considered sustainable with respect to reducing the environmental footprint, sustaining domestic economies into the long term and providing local populations with poverty-alleviation opportunities that don't compromise culture and heritage?

Introduction: Shrimp Aquaculture and Sustainability

Faced with the crisis of overfished seas, many fisheries companies and entrepreneurs are looking to aquaculture to supply seafood to the ever-increasing demand of the world's population. The marine creature easiest to cultivate based on available science is shrimp, and in the last few decades, Latin American and Asian countries such as Ecuador, Thailand and India have witnessed shrimp aquaculture transform their tropical, mangrove shores. Meanwhile, coasts of East African nations from Egypt to Kenya to Mozambique have been subject to speculation by investors in the last ten years. Biodiverse, pristine shorelines of developing countries not only provide the required large expanses of coastal land at low cost, but offer ecosystem services such as clean water that reduce the risk of environmental pollution and disease. Governments of developing nations are often eager for the economic opportunities of shrimp aquaculture, but are also frequently powerless to protect their natural and human capital from abuse by mismanaged or irresponsible industry.

Madagascar is an island whose tropical waters and mangrove coastline are ideal for aquaculture of the Black Tiger Shrimp, *Penaeus monodon*, a large and market-popular species of shrimp that is naturally plentiful in the Indian Ocean. As of 2005, six shrimp aquaculture companies exist in Madagascar. Each is an industrial fishery business that has elected to expand into aquaculture, based on the profitability of the aquaculture and the inability to increase net catches of wild shrimp lest the resource collapse. Madagascar is also considered one of the most economically poor nations of the world, subject to many development programs as well as conservation efforts to preserve the country's endemic biodiversity.

In Madagascar, industrial shrimp aquaculture ponds and accompanying infrastructure are being placed in remote landscapes, often far from existing anthropogenic activity. Production facilities, electricity and potable water infrastructure, transportation systems, and hundreds of manmade, one-hectare aquaculture ponds, are just some of the major capital improvements necessary to farm shrimp. The isolation brings many advantages to the companies in Madagascar that desire distance from sources of water pollution, human disease, shrimp disease, and thievery of product. Meanwhile, the towns that house resident farm workers are growing. Secondary economies are developing to provide goods and services to the employees with disposable income and increasing needs as families grow. Holding more wealth than otherwise found in the region, these new towns have the potential to develop into small cities in coming years.

Some if not all of the aquaculture companies in Madagascar consider the welfare of their business dependent upon the social health of their employees and the towns. Therefore there is concerted effort in the areas of community development programming, town planning, infrastructure development and environmental education. To make efforts successful, partnerships are formed with government agencies, non-government organizations (NGOs) and community associations.

The companies also share an overarching goal of harvesting a product that can be eco-labeled as "sustainable". Town planning initiatives are just some of the actions of an industry that aims to reduce the environmental footprint of their activities; maintain the natural resource wealth of the country; sustain domestic economies into the long term; and provide local populations with poverty-alleviation opportunities that don't compromise culture and heritage.

Incentives to Sustainability

The aquaculture companies profiled do not make socially and environmentally responsible contributions without financial incentive. The shrimp aquaculture industry can be a risky venture and generous levels of planning can reduce vulnerability.

Shrimp aquaculture requires the creation and maintenance of dozens if not hundreds of production ponds usually located alongside river mouths. The ponds can be a hectare in size each, requiring vast hydrological engineering systems to pass river water through the artificial ponds. The quality of the shrimp product, or the health of the shrimp, is sensitive to water quality, including levels of salinity, nutrient load, opacity and bacterial load. The stability of these levels are threatened by changes in tidal cycles, soil runoff due to riverbank destabilization or deforestation, bacterial loads due to human presence or altered marine ecology, and storms such as hurricanes that can alter the direction of river flow. Anthropogenic activity therefore can play a large role in altering the conditions favorable for shrimp rearing and must be closely monitored and controlled.

Social stability is also important to running a healthy business. Illness, disease including AIDS, lawlessness, and alcoholism amongst employees can damage the profitability and success of the shrimp business just as much as land erosion and water pollution. All of the above are very real threats in any community in Madagascar or beyond that require planning and foresight.

For some shrimp aquaculture companies in Madagascar, there has been a larger population presence preceding the arrival of the industry than elsewhere. The pre-existing community may feel it has a stronger commitment to the land and place than the newcomers, or simply want to exert territoriality over the landscape. Disrespecting those indigenous people can result in dangerous, deconstructive conflict with the population and regional kings. Social and environmentally responsible agenda therefore can contribute to regional support and stability that has a high value in the long-term presence and profitability of the business.

Poorly defined land and water rights make the placement of human settlements challenging in the northwest of Madagascar, as well as in most developing countries. In Madagascar, many if not all lands are owned by the government and leased to users. But there are also many user groups with self-imposed rights to land and water. There are local tribes with cultural traditions and taboos surrounding trees, lakes and land use; territories in the possession of tribal, regional kings; rogue local mayors exercising unofficial powers; or fishermen with oral rights over traditional fishing grounds. While there may be a legal framework that dissolves such land claims, it was clear to aquaculture companies in Madagascar that unwritten laws must be respected to avoid costly and violent social conflicts.[1] Recognizing not only the immoral standing of violating traditions, but its long-term costs, and the benefits of community support, are critical to social sustainability. Therefore communications with local communities, understanding local taboos and their influence over placement of town infrastructure, and foresight into the land claims of a sprawling urban community into the future, were all taken into consideration. It becomes apparent that respect for environment and culture are not altruistic endeavors but necessary steps for the survival of the shrimp aquaculture companies in Madagascar.

[1] Author's notes, interview with Mr. Rao, Unima Group, Mahajunga, Madagascar. July 2005.

Frontier Town Planning: Historical Context

To investigate the evolution of town centers emerging alongside shrimp aquaculture ventures in Madagascar can be a very diverse study of all that makes up urban planning and design in a "frontier" environment. There are a plethora of historic precedents throughout the histories of now-industrialized countries from which to learn of the emergence of factory towns in the frontier. There are plenty of utopian models where economic expansion, good governance and civil order have been considered the result of good design and management. And the subject is certainly globally relevant today. Urban influx in developing countries is high today, and possibly higher than currently industrialized countries experienced in the last centuries. Shaping the infrastructure in advance of foreseen immigration and predicting population growth levels may be critical to the future development of such countries.

"Boom towns" and "frontier towns" are not new to Madagascar. The mining and cultivation of resources, and rapid migration of persons is not a new experience for the country, and one that could be reviewed at length. A sapphire boomtown with a high level of lawlessness was encountered by the author in southern Madagascar in 2003. The town had no planning and sprawled along the sides of the national highway that bisected it. Roadside was a strip of cement-block merchant stands, stores, sapphire shops and a medical office. An alley system meandered from there back amongst tin-roofed, dirt-floor dwellings. On the outskirts of the sprawl were structures of lesser permanency, teepee-like tents of thatched grass. A proliferation of guns and prevalence of violence gave the town its reputation of lawlessness. One narrow river ran through the town, where families bathed, washed clothes, collected drinking water, and sifted soil for sapphires together. Unlikely was the presence of electricity, a sanitation system, safe drinking water, policing, or a school.

Town planning must be addressed in any industrial venture, especially in Madagascar where economic opportunities are rare and job opportunity can attract many from great distances. Madagascar has much that is culturally and biologically endemic to the island nation--much that is precious and at risk. Madagascar has regions of undisturbed landscape where globally rare plants and animals live. In the northwest of Madagascar where the shrimp aquaculture production plants are located, many of Madagascar's national preserves can be found, including the world-famous Ankarana.

Roads

At the heart of an investigation into the evolution of frontier towns is also the subject of road infrastructure. Roads play a critical role in opening up previously inaccessible regions to irreversible development. The northwest of Madagascar is currently witnessing the paving of a new national highway that connects the western city of Mahajanga to the northern city of Anstiranana. Therefore the region could significantly change in coming years, and the shrimp aquaculture towns could become more accessible. The shrimp aquaculture companies must foresee this possible growth, and take pre-emptive measures to either isolate their communities from the growth, or direct and plan for it. Their towns of a few thousand today could possibly be semi-urban settlements in the next decade.

The role of roads and arteries to these areas is controversial. They are beneficial as the key to trade, access to markets, and fairer valuation of a product. But a road also marks the advent of a great migration of not just persons, goods, and vehicles, but traffic, disease and all the challenges of human population density. Roads are the key to economic opportunity, but they also open up a region to development that, if not planned in advance, can be the environmental and even social downfall of the region. A key to the sustainable management of shrimp aquaculture is addressing the satellite developments that emerge as a result of the industry's arrival in an otherwise isolated region.

Shrimp Aquaculture as Development Tool

Some environmentalists believe that shrimp aquaculture is more flexible than shrimp trawling to meeting criteria of environmental sustainability. Environmentalists are therefore focusing on influencing this emerging industry toward environmental and social responsibility. The United Nations Food and Agriculture Organization (FAO) has even authored reports envisioning shrimp aquaculture as a tool for the creation of employment, alleviation of poverty and eradication of hunger in developing countries.[2] The FAO conducted studies in Madagascar in the late 1980s evaluating the potential for shrimp aquaculture there, including the identification of favorable sites.[3] In order to achieve long-term benefits for the economy and society of a developing country such as Madagascar, the FAO believes that the shrimp aquaculture industry must be a long-term investment. Town planning and community development are necessary components of this strategy of permanence.

A problem with shrimp aquaculture is that it can be an anti-development tool if mismanaged, which has been the case in many countries thus far. The aquaculture companies have frequently abandoned their large-scale infrastructure and manmade ponds once a short-term profit is made and disease control becomes too costly. A crash in employment opportunity for the communities that have migrated to the region is damaging; so is the physical impact on the landscape such as mangrove destruction and water pollution—the result of both industrial activity and the introduced human settlements. Companies are not held responsible for the social, economic and environmental damages because governments are often not transparent and powerful enough to hold them accountable.

The shrimp aquaculture infrastructure includes production facilities, electricity and potable water infrastructure, transportation systems and more for both production facilities and the adjacent towns. Shrimp aquaculture's high investment cost therefore often requires loans from foreign sources. Today, international financial institutions and loaning agencies are developing environmental and social criteria to be met by the projects in which they invest. More and more they are using the leverage of international

[2] Nathanael Hishamunda and Peter Manning. Promotion of Sustainable Commercial Aquaculture in Sub-Saharan Africa, Volume 2: Investment and Economic Feasibility. FAO Fisheries Technical Paper 408/2. Food and Agriculture Organization of the United Nations. Rome, 2002.

[3] Etude Du Schema d'Aménagement de l'Aquaculture de Crevettes de Mer à Madagascar & Rapport Final Document de Synthèse des Phases Un et Deux. Ministère de la Pêche et Des Ressources Halieutiques, Direction de l'Aquaculture. June 2001. p.8.

laws to force governments and companies to take accountability for meeting such criteria, which includes both implementation and long-term management of human settlements.

Partnerships & Case Study: Besakoa

Planning must be the responsibility of the country government and the company that catalyzes or directly contributes to the growth of a new town. But while there is top-down imposition of infrastructure requirements, development guidelines, conservation, and land zoning, it must all also be well-connected to grassroots efforts. Understanding the needs of the local people, their value systems, and encouraging pride of place by validating and respecting local traditions and customs are all critical to development programs. The aquaculture companies in Madagascar recognize that they must encourage ground-up efforts and local partnerships, so that the larger ideas and goals get executed by a committed and motivated group of people. Without partnerships and grassroots efforts, there is not enough manpower to enact a vision of sustainable development.

Environmental responsibility and sustainability can mean low impact on the environment, replenishing the natural resources consumed, reducing waste streams, and recycling and reusing materials, byproducts, and waste materials. Over time, such sustainable efforts lead to communities with physically and socially healthier populations, which enables these town centers and companies to endure into the future as well. One shrimp aquaculture company in Madagascar, Aqualma, envisions social sustainability as job creation, housing, food and nutrition, and access to healthcare; and environmental sustainability as regeneration of local materials, reduced waste stream, energy efficiency, limited human footprint, existence of a greenbelt and conservation lands, and clean water outputs.

Besakoa is one town where Aqualma has experimented in how to meet such criteria. The population of Besakoa went from 10 households upon the arrival of Aqualma in the late 1990s to 3,000 inhabitants in 2004, 95% of which were directly or indirectly employed by the company. The town infrastructure first laid out was the airplane runway, school, hospital, drinking water access, a police post, and the formation of associations.[4]

Partnerships and associations were formed to establish all the facilities and resources. The hospital doctor and midwife are paid for by Aqualma, but an association was specifically formed called "The Association of Friends of Health"[5] to co-manage the hospital and its resources.[6] The catholic mission from the nearest large city was invited to manage and teach in the twelve-classroom school that was built by Aqualma funds and the labor of the townspeople. In 2004 the school had 450 students enrolled. There is a small affordable fee to be paid by a family to enroll a child but scholarships are also available, paid for by Aqualma. The library is stocked by the Alliance Française based in the closest city, Mahajanga.

Potable water fountains were installed through a UNICEF program. The donation of manpower was requested of the villagers. If they built the well hole, Aqualma and

[4] Aqualma: Les Actions de Developpement Communautaire, Mai 2004. p. 1

[5] *Association des Amis de la Santé*

[6] Aqualma: Les Actions de Developpement Communautaire, Mai 2004. p. 2

UNICEF would donate the cement cylinders to top off the well. There is an affordable monthly tax to be paid for the water service, but the fee for this, just like the school fee, is considered more a symbolic gesture to ensure that the value of the service is appreciated than a source of revenue to cover costs. Aqualma is responsible for quality control on the water.

Town beautification is considered key to pride of place and social wellbeing, as well as environmental health. The felling of trees in the Besakoa was prohibited without permission, while flower planting and house painting were encouraged. Garbage cans were placed throughout the town and garbage collection occurred regularly, paid for by Aqualma. The garbage was separated, recycled and composted in a designated area by volunteers and associations. The compost was mixed with shrimp organic refuse from the farm and became free fertilizer for agricultural activities located in another designated area. An NGO named "GREEN" was stationed in Besakoa and trained individuals and women's associations in agricultural practices, while Aqualma was in contract to regularly purchase a certain portion of the vegetable produce for its own canteens. It was said that the women appreciated having an activity that released them from the obligations of the house, while produce sold at the local market provided a valuable supplement the household income.

A home ownership program and loans for the purchase of building materials were developed by Aqualma. Brick building techniques were encouraged--structures that are more fire resistant than thatch construction. Fire is one of the largest threats to towns such as Besakoa and had already afflicted some of the shrimp aquaculture communities visited. In July 2005 roads were being widened so that fire-suppression vehicles could pass through. This of course, raised the question of what vehicular traffic should be allowed in the town, versus preserving the more intimate, pedestrian scale of the town. Small parks were placed throughout the town with park benches. Shipping containers bringing in supplies and equipment were converted into housing and laboratories.

On the outskirts of town was located a plantation where indigenous species of trees were being planted in soils nourished by the compost. Thirty hectares of plantation had been planted by 2004, with a goal set to plant fifteen hectares per year.[7] The trees serve as a fuel source and building materials for the town so that natural forests would not be impacted. Mangrove reforestation projects were also being conducted by Aqualma and other shrimp aquaculture ventures around their aquaculture pond sites.

A key tool to enacting all of the programs, designs and infrastructure is partnerships. In Besakoa, the police station including one jail cell is run by the government and the electrification program is paid for by the government in partnership with Aqualma. The school, hospital, agriculture fields and more are all managed through the support of associations and NGOs. Partnerships combine financial resources, human resources, and commitment to environmental protection and social welfare. They become one of the most important tools in meeting goals of environmental and social sustainability.

[7] ibid, p. 5

Marketing Incentives and Eco-certification

The cost of shrimp in international markets has dropped in recent years, giving greater importance to product marketing strategy. The Madagascar companies are more than eager to state that the quality of their product is the result of environmental health and preservation. One of the more respected French labels for food excellence, "Label Rouge", awarded the Madagascar company, Aqualma, with its stamp of top quality. The environmental health and sustainable practices that contribute to the quality of the shrimp are internalized in the price of the shrimp, and thus far, the European consumer has shown a willingness to pay for the larger, tastier shrimp that result from lower stocking densities and an environmental agenda. Madagascar shrimp has already built its reputation for quality in countries such as Spain, Portugal and France that have strong cultural appreciation for shrimp. The large size of the Madagascar shrimp distinguishes it from the thousands of producers who prefer higher stocking densities, the use of antibiotics and smaller shrimp. These latter high-stocking density companies also have a greater risk of liquidating early due to the likelihood of system collapse because of disease contraction.

The case of Madagascar's marketing illustrates the significant influence of consumer awareness and marketing in making environmental sustainability a reality of any industrial sector. An eco-certification program for aquaculture shrimp is currently being developed by the Marine Stewardship Council (MSC) and the Center for Conservation Innovation at the World Wide Fund for Nature (WWF) with partners such as the David and Lucile Packard Foundation.[8] Madagascar is one country where the program may be implemented first. In the meanwhile, companies such as Aqualma have met ISO 14000 standards.

Legal Frameworks for Sustainability

The actions of the Madagascar shrimp aquaculture companies are not just voluntary. There are many advisory and legal frameworks that exist in Madagascar for the sustainable management of shrimp aquaculture. In 1998 the Management Scheme for Shrimp Aquaculture[9] (SAAC) was formed.[10] It identified the country's potential sites for aquaculture and proposed reasonable development guidelines to encourage and facilitate the implementation of aquaculture in Madagascar. It was also recognized that the greatest economic gain from this industry would come from the long-term presence of the industry, therefore maintaining the environmental integrity of shrimp aquaculture was imperative. In order to direct the industry toward long-term viability, the SAAC outlines the need for both government agencies and private business associations to commit to high levels of technical skill, organization, and government collaboration. The SAAC produced a Code of Good Conduct for the Responsible and Sustainable Development of Shrimp Aquaculture[11], which outlines "principles, norms, recommendations and

[8] http://www.worldwildlife.org/cci/aquaculture

[9] *"Schéma d'Aménagement de l'Aquaculture de Crevettes à Madagascar (SAAC)"*

[10] Etude Du Schema d'Aménagement p.2.

[11] *"Code de Conduite pour le Développement d'une Aquaculture de Crevette Responsable et Durable"*

directives applicable to the responsible development of aquaculture."[12] The code was based on pre-existing codes such as the FAO's 1995 Code of Conduct for Responsible Fisheries, and the Global Aquaculture Alliance's (GAA) Code for Sustainable Aquaculture.[13] Claude Boyd, author of the GAA code, contributed to the formulation of Madagascar's code.[14] The Madagascar producers' association, The Shrimp Farming & Fishing Industry Association[15] (GAPCM), adopted it and its recommendations such as limiting the aquaculture to semi-intensive levels instead of intensive levels used in most Southeast Asian farms. The code was not a legal framework but a collection of strong suggestions.

In 2001 sustainable aquaculture did become the law in Madagascar. Law 2001-020 requires an "ensemble of technical and environmental constraints and a rigorous discipline" to ensure the Development of a Responsible Shrimp Aquaculture[16].[17] Law 2001-020 used a set of management guidelines that preceded it, called the Framework for Investment Environmental Compatibility[18] (MECIE), initiated in1999. MECIE implies an obligation for public and private investment projects to be in compatibility with the natural environment. The decree seeks to place aquaculture activities in a "perspective of responsibility, durability and sustainability in the long term, all in trying to find the best possible balance between development and protection[19]".[20] Part of MECIE was a requirement that an Environmental Impact Assessment[21] (EIE) be conducted on all projects. Based on the technical nature, scale and effect on the environment, the investment project also had to participate in the Environmental Engagement Program[22] (PREE).[23] The National Office of the Environment[24] (ONE) was founded at this time to enforce the statutes of these laws, including conducting the required EIEs on all aquaculture projects.[25]

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[12] Etude Du Schema d'Aménagement p.2.

[13] Etude Du Schema d'Aménagement p.3.

[14] Author's notes, interview with Claude Boyd, Antananarivo, Madagascar. July, 2005.

[15] *"Groupement des Armateurs à la Pêche Crevettière de Madagascar (GAPCM)".*

[16] *"Développement d'une Aquaculture de Crevettes Responsable"*

[17] "Loi no. 2001-020 portant developpement d'une aquaculture de crevettes responsable et durable" Dr. Edaly, presenter. Crevetticulture Responsable Conférence Internationale. Actes de Conférence. 3-5 December 2002. Antananarivo, Madagascar. P.106.

[18] *"Mise en Compatabilité des Investissements avec l'Environnement"*

[19] *". . . des activités aquacoles dans une perspective de responsabilité, de durabilité et de soutenabilité à long terme, tout en essayant de rechercher le meilleur equilibre possible de la dichotomie entre développement et protection."*

[20] Guide Sectoriel pour la Réalisation d'une Etude d'Impact Environnemental, Projets Aquacoles. December 2000. National Office of the Environment. Minister of the Environnement. Ministry of Fisheries and marine resources. p.5

[21] *"Etude d'Impact Environmental (EIE)".*

[22] *"Programme d'Engagement Environnemental (PREE)".*

[23] Guide Sectoriel.

[24] *"l'Office National pour l'Environnement".*

[25] The author has yet to identify who funded the establishment of this new department, but it is likely development banks including USAID.

International Coalitions, Codes of Good Conduct and Responsible Business Practices

There are a number of international conferences and treaties that have occurred in the last five to ten years to address the management and responsibilities of the shrimp aquaculture industry--an economy noted as one of the fastest growing in the global food sector. Treaties on sustainable shrimp aquaculture have emerged from these events including the 2002 Bangkok Declaration that stresses the importance of long-term investment strategies. In 2002 Madagascar hosted an International Conference on Responsible Shrimp Cultivation[26]. There are also nearly a dozen Codes of Good Conduct on shrimp aquaculture currently in circulation. Authorities include the FAO, the Global Aquaculture Society, the Global Aquaculture Alliance, and smaller national coalitions such as the Australian Prawn Farmers Association, Shrimp Farming Industry of Belize, Marine Shrimp Culture Industry of Thailand, Malaysia Department of Fisheries and the University of Rhode Island.[27] Social and environmental responsibilities such as town planning and community development are part of these codes. Madagascar's Code, adopted by GAPCM, is the product of review of all these pre-existing codes. Interest has been expressed by Madagascar and other East African countries for a set of Best Management Practices (BMPs) but they have yet to be written.[28]

Conclusion

Shrimp aquaculture may be a tool for economic and social development but only if matched with a strong framework to guide it toward environmental and social sustainability, including town planning and community development programming. Implementation requires partnerships with a variety of stakeholders that represent both top-down and bottom-up efforts including government authorities, financial institutions, international alliances, non-governmental organizations in areas of environment and human health, community associations, and local leaders. The harms to the welfare of Madagascar's people and environment are large if shrimp aquaculture is not properly managed. If a common goal of the above stakeholders is social and environmental responsibility, then these collaborations will be the tools that enable success.

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[26] *"Crevetticulture Responsable Conférence Internationale"*

[27] World Bank, NACA, WWF and FAO. 2002. Shrimp Farming and the Environment. A World Bank, NACA, WWF and FAO Consortium Program "To analyze and share experiences on the better management of shrimp aquaculture in coastal areas". Synthesis report. Work in Progress for Public Discussion. Published by the Consortium. p 82.

[28] World Bank, NACA, WWF and FAO.

Sakalava Shrimp Documentary Film

To learn more about the documentary film, ***Sakalava Shrimp***, and watch its 2-minute teaser, please visit the website:

http://pantheon.yale.edu/~rbg22

Sakalava Shrimp profiles the traditional fishermen, industrial fishing fleets and shrimp aquaculture industry in northwest Madagascar and asks the question, "Can shrimp aquaculture be sustainable?"

Shrimp Aquaculture: An Introduction

Faced with the crisis of over-fished seas, many entrepreneurs are turning to the young science of industrial aquaculture to produce the quantities of seafood the oceans can no longer generate. One of the marine creatures easiest to cultivate is shrimp, and in the last three decades, many Latin American and Asian countries have witnessed shrimp aquaculture transform their tropical, mangrove shores into production grounds. Meanwhile, pristine coasts of East African nations are increasingly subject to speculation by shrimp aquaculture investors.

Shorelines of developing countries provide large expanses of land at low cost, but they also hold the world's remaining coastal biodiversity. The mangroves that are ideal for shrimp farming are also critical to the breeding and feeding of most creatures in the ocean's web of life. In order to restore the world's fisheries, the existence of this biodiverse habitat is necessary. Yet mangrove destruction and water pollution have characterized industrial shrimp aquaculture in most places for the last thirty years.

Mismanaged shrimp aquaculture is not only a threat to vital landscapes but to human health. The use of antibiotics to suppress disease outbreaks is often extensive and unregulated, and the consumer is not informed. Shrimp in western supermarkets is currently unlabeled as to whether the product is wild-caught or farmed, and raised with or without the use of antibiotics.

What Can We Learn from Madagascar?

Madagascar is an East African island nation whose waters and mangrove coastline are ideal for shrimp aquaculture. Madagascar has been considered one of the most economically poor nations in the world and has gained much from the advent of the new industry. It is also one of the richest in endemic plants and animals that have increasing value not only to conservation organizations, but to governments and development agencies in Madagascar and abroad.

What is unique in Madagascar is that the shrimp aquaculture industry may be valuing a biodiverse, protected environment just as much as the environmentalists. The companies are betting that environmental protection measures, the prohibition of antibiotics and community development will produce larger and tastier shrimp and greater profits over time. Meanwhile, the people of Madagascar benefit from this stable, long-term economy.

"Sakalava Shrimp" Documentary Film

The 26-minute documentary film, *Sakalava Shrimp*, filmed in High Definition Video (HDV), investigates the policy framework, partnerships and responsible business practices that may be guiding Madagascar shrimp aquaculture in the right direction. The film profiles the industry in the northwest of the country, and questions whether this new science of seafood production really can be conducted without severely altering the natural landscapes and cultures of the coasts in which it is implemented. The story presents the human innovation and marine ecology behind both historic and modern cultivation of shrimp in Madagascar, as well as the perspectives of the stakeholders involved today--from the aquaculture businesses established in the last decade, to international shrimp trawling companies, to the local traditional fishermen. Can Madagascar show us what it takes to do shrimp aquaculture right?

Audience

The film will be distributed to European and United States television stations to educate consumers on the source of their seafood and the environmental repercussions of their dining and shopping choices. The documentary is also written as an educational tool for decision-makers in the professional and academic fields who are looking for information on the realities of shrimp aquaculture management and policy success. The film will be complimented by a Master's Degree thesis in Environmental Management at the Yale School of Forestry & Environmental Studies. *Sakalava Shrimp* is one in a series of documentary films titled *Unsustainable Consumption* that looks at the disconnect between the aggressive methods of seafood harvesting today and the oceans' ability to regenerate life.

The Team

Rachel Gruzen, Producer/Scriptwriter, is a student at the Yale School of Forestry & Environmental Studies working toward her Master's Degree in Environmental Management, building skills in environmental policy and sustainable economic development strategy for African countries. Ms. Gruzen has worked with The Nature Conservancy on conservation planning, and in Spring 2003 participated in a research project with World Wide Fund for Nature (WWF) on the management of shark fisheries in northwest Madagascar.

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Rachel Gruzen

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Post-Production & Design
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This project is made possible through the generous support and partnership of:

The Hixon Center for Urban Ecology at the
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The Henry Foundation

The Ocean Foundation

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SAKALAVA SHRIMP

A DOCUMENTARY FILM

Dear friends and colleagues,

Rachel Gruzen, Rubén Casas Oché, and Fundición Gráfica are pleased to announce the two-minute teaser and website for the documentary film *Sakalava Shrimp*!

http://pantheon.yale.edu/~rbg22

(click on "View a Teaser" to watch the preview)

Sakalava Shrimp is an informative documentary on the future of Madagascar's coastal environment and fisheries. It cannot be completed without your support! Please help us reach our fundraising goal and meet a matching grant by making a tax-deductible, charitable donation through The Ocean Foundation today!

For further information, go to the website and click on "Support the Project" or contact the producer by email: rachel.gruzen@yale.edu, or by telephone: +1 (917) 796-2128

Sakalava Shrimp has been made through the generous support & partnership of:

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TURNING THE TIDE FOR CONSERVATION

fundición gráfica


SAKALAVA SHRIMP
A DOCUMENTARY FILM

Shrimp Aquaculture: An Introduction

Faced with the crisis of over-fished seas, many entrepreneurs are turning to the young science of industrial aquaculture to produce the quantities of seafood the oceans can no longer generate. One of the marine creatures easiest to cultivate is shrimp, and in the last three decades, many Latin American and Asian countries have witnessed shrimp aquaculture transform their tropical, mangrove shores into production grounds. Meanwhile, pristine coasts of East African nations are increasingly subject to speculation by shrimp aquaculture investors. Shorelines of developing countries provide large expanses of land at low cost, but also hold the world's remaining coastal biodiversity. The mangroves that are ideal for shrimp farming are critical to the breeding and feeding of most creatures in the ocean's web of life. In order to restore the world's fisheries, the existence of this biodiverse habitat is necessary. Yet mangrove destruction and water pollution have characterized industrial shrimp aquaculture in most places for the last thirty years. Mismanaged shrimp aquaculture is not only a threat to vital landscapes but to human health. The use of antibiotics to suppress disease outbreaks is often extensive and unregulated, and the consumer is not informed. Shrimp in western supermarkets is currently unlabeled as to whether the product is wild-caught or farmed, and raised with or without the use of antibiotics.

What Can We Learn from Madagascar?

Madagascar is an East African island nation whose clean waters and undeveloped mangrove coastline are ideal for shrimp aquaculture. Madagascar has been considered one of the most economically poor nations in the world and has gained much from the advent of this new industry. It is also one of the richest in endemic plants and animals that have increasing value not only to conservation organizations, but to governments and development institutions in Madagascar and abroad. Madagascar's shrimp aquaculture industry may be unique because the businesses there are valuing a biodiverse, protected environment just as much as the environmentalists. The companies are betting that environmental protection measures will produce larger and tastier shrimp and greater profits over time. Meanwhile, the people of Madagascar benefit from this stable, long-term economy.

***Sakalava Shrimp* Documentary Film**

The 26-minute documentary film, *Sakalava Shrimp*, filmed in High Definition Video (HDV), investigates the policy framework, partnerships and responsible business practices that may be guiding Madagascar shrimp aquaculture in the right direction. The film profiles the industry in the northwest of the country, and questions whether this new science of seafood production really can be conducted without severely altering the natural landscapes and cultures of the coasts in which it is implemented. The story presents the human innovation and marine ecology behind both historic and modern cultivation of shrimp in Madagascar, as well as the perspectives of the stakeholders involved today--from the aquaculture businesses established in the last decade, to international shrimp trawling companies, to the local traditional fishermen. Can Madagascar show us how to make shrimp aquaculture sustainable?

Audience

The film will be distributed to European and United States television stations to educate consumers on the source of their seafood and the environmental repercussions of their dining and shopping choices. The documentary is also written as an educational tool for decision-makers in the professional and academic fields who are looking for information on the realities of shrimp aquaculture management and policy success. The film will be complimented by a Master's Degree Thesis in Environmental Management at the Yale School of Forestry & Environmental Studies. *Sakalava Shrimp* is one in a series of documentary films titled *Unsustainable Consumption* that looks at the disconnect between the aggressive methods of seafood harvesting today and the oceans' ability to regenerate life.

The Team

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To view the two-minute trailer for the film, *Sakalava Shrimp*, and learn more about the project including ways of giving, please go to the project's website:

http://pantheon.yale.edu/~rbg22

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