ARTISANAL CORAL REEF FISHERIES AND SUSTAINABLE DEVELOPMENT: THE ARNO ATOLL FISHERIES ASSOCIATION

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The concept of sustainable development is inexact, requiring additional specification in application. How the subject of analysis is bounded will have consequences for understanding what is being sustained as well as for determining whether something is sustained. Here I examine a fisheries development project in the Marshall Islands. Shifting boundaries, I create three accounts of the project. In the first account, which focuses on resources and monetary cost and benefits, the project is clearly unsustainable. In the second account, focusing on international relations, the project sustains the relations of power and dependency. In the third account, I suggest that evaluation should take into account history, process, and the costs of knowledge rather than settle for facile assessments of success or failure.

In the fall of 1989, a development project began buying fish in rural Arno Atoll of the Marshall Islands for resale in nearby Majuro Atoll, the urbanized capital of the country. Japanese foreign-aid agencies managed the project and bankrolled it with more than US$6 million. When I arrived to begin fieldwork in the fall of 1993, it had paid out over US$270,000 to Arno fishermen and was shipping around a ton of fish each week. While not without problems, it seemed a viable concern. The report of the Japanese management team as they turned the project over to local control showed the project operating at a sustainable level, and an expatriate advisor congratulated the staff of the fisheries agency on their success. A few short years later, however, many judged the project a failure, another in a series of troubled fisheries projects in the island Pacific.

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What went wrong? It is possible to write different accounts, each arguably true, depending on how one contextualizes the analysis. In this article I construct three accounts to examine ways in which different levels of analysis point to different challenges for sustainable development and different understandings of what it might mean. I begin with a short project history and economic analysis, then recontextualize it as a discussion of the political economy of fisheries projects in the Marshall Islands, and again as a historical event in the dynamic unfolding of postcolonial processes among islands formerly incorporated in the United States Trust Territory of the Pacific Islands.

Economic Development in the Marshall Islands

The Republic of the Marshall Islands (RMI) includes thirty-two low-lying coral atolls and islands located in the mid-Pacific. Traditionally, inhabitants subsisted on fishing and cultivation of a small number of crops, primarily taro, coconut, breadfruit, pandanus, and arrowroot. Most lands were held in usufruct by matrilineages, *bwij,* segments of exogamous matriclans, under the control and protection of chiefs, *iroij,* who could alienate or assign land parcels, *weto,* and who received tribute through personal service and first-fruits offerings. *Alab*s, usually males but sometimes acting on behalf of a senior female, managed the lands and the *bwij,* and consulted with the *iroij.* Succession was based on seniority within and between generations as well as on ability. Extended families resided in households, often but not necessarily organized by uxorilocal residence, which served as units of consumption and land-based production, while gift exchange distributed food and other goods and built ties among households linked variously by kinship, friendship, and proximity. Living in fragile environments vulnerable to typhoon and drought, islanders emphasized developing diversified residential and economic options through social relationships (Alkire 1965).

Explorers, whalers, and traders made landfalls in the Marshalls beginning in the sixteenth century, but extended contact only followed the arrival of missionaries in 1857. Germany asserted sovereignty over the Marshalls in 1885, with the support of one of a number of rival high chiefs, *iroij laplap* (Hezel 1983). Japan took the Marshalls and the rest of northern Micronesia from Germany at the opening of World War II and held these territories until U.S. invasions won control in 1944. Commercial interests in the Marshalls centered on copra, the dried meat of the coconut, and the oil that could be obtained from it. With the encouragement of the chiefs, who managed the collection of the copra in return for a large share of the payments, the Marshalls became the largest producers of copra in Micronesia. Earn-

ings from copra production as well as wage labor in phosphate mining were used to purchase staples such as rice, flour, sugar, salt, tea, tinned meats, tobacco, soap, and cloth. Machetes, sewing machines, and throwing nets entered local tool kits. Cultivation of taro and breadfruit declined.

When the United States sought United Nations ratification of its de facto control in Micronesia, one provision was that the peoples be prepared for self-rule as an independent nation. Although efforts in the first decades of U.S. administration were somewhat perfunctory, eventually the United States began making more serious efforts to examine the options for economic development. In 1965 R. Nathan and Associates was commissioned to produce a report that emphasized three industries: agriculture, tourism, and fisheries (RNA 1967). While there have been changes in thought about what form development of these industries should take, in the Marshalls these three sectors continue as the focus of government planning.[1]

In the Republic of the Marshall Islands, little land and poor soil limit the potential for developing agriculture for export. With a population that has multiplied sixfold since the end of World War II, it is doubtful that the Marshalls can produce even enough calories for its own population without significant technological development in agriculture.[2] Low prices and irregular shipping discourage expansion of copra production. Tourist development has been inhibited by the complexity of land tenure as well as by underdeveloped infrastructure and limited capital. The most visible development efforts have been in the fisheries industry.

In the Marshalls there are several kinds of fisheries, and these are variously linked to each other by drawing on the same pool of household resources, exploiting the same stocks, selling to a common market, or making demands on national and international development aid. There are also links to other sectors of the economy, including agriculture, retail, and the public-service sector. While such links exist in any economy, in the Pacific Islands these sectors are connected not merely through national accounts and markets, but at the household level. Islanders purposefully create and maintain these connections, relying on diversified economic activities for security and access to various goods and services, which circulate through several modes of exchange and redistribution. Nero (1997b) describes three economic systems operating concurrently in the Marshall Islands that are based on different models of social relationships: a redistributive family and chiefly system, a redistributive governmental system, and a Western user-pays system. A basket of food originating in family production may be exchanged for cash from a relative's wage earnings to pay for clothes bought at a store, for example. (The U.S. dollar is the official currency of the RMI.)

The RMI fishing industry is usually divided into three sectors: industrial

deep-sea fisheries for pelagic species; and artisanal near-shore fisheries, divided between subsistence and commercial sectors (Kattil 1987). In addition, local businessmen seek to develop a charter sport-fishing industry; several export small ornamental fish for the aquarium market. Recently a consultancy of the Asian Development Bank suggested that collection of shellfish for handicrafts should also be recognized as a significant fishery sector (Nero 1997b), addressing biases in how fisheries are usually conceptualized around male activities, contributing to gender biases in development planning. Male fishing in the Marshalls focuses predominately on the capture of finfish, while women pursue shellfish and crustaceans.

The distinction between artisanal and industrial fisheries captures differences in organization. Artisanal fisheries are labor- rather than capital-intensive, use relatively simple gear, may use unmotorized boats or small motorized craft, and land fish in small quantities. Industrial fisheries are capital-intensive, depend on wage labor, use more complex gear, and depend on large catches. While artisanal fisheries vary in the range of species exploited and the techniques employed for capturing them, industrial fisheries concentrate on one species and one gear type.

Industrial fisheries in the Marshall Islands concentrate on international exports and have been the biggest focus of development efforts, including construction of a fleet-basing facility in Majuro and a loan obtained through the Asian Development Bank to operate a fisheries school and build a small local deep-water fleet. Currently, however, fleets of distant water fishing nations such as the United States, Japan, and China are the principal participants in this sector, and only a few dozen Marshallese find employment on boats, at the base, or in the government fisheries agency.

The government also seeks to develop the small artisanal commercial finfisheries sector for internal food supplies. Population growth has been accompanied by the increasing concentration of the people in the urban centers of Majuro and Kwajalein Atolls, seeking education, jobs, health care, and entertainment (Alexander 1978). Two-thirds of the population now resides in these urban areas, living primarily on imported foods. Through artisanal commercial fisheries development the government seeks to (1) supply food fish from the rural atolls to urban populations, (2) improve rural people's access to cash and decrease their desire to move to the urban centers for jobs, and (3) substitute locally produced food for imports and decrease the balance-of-payments deficit (OPS 1991).

Artisanal fisheries long constituted the major source of animal protein in the diet of Marshall Islanders. A wide variety of named fishing techniques enabled islanders to exploit complex combinations of habitat, species, weather, season, and social purpose. For most men being a fisher was one of the most

socially significant roles in life, and other fishers would readily evaluate a man's skill and knowledge. It has been a dynamic industry, with fishers seemingly eager to take up new gear and techniques, such as the throw nets or goggles introduced by the Japanese.

Commercialization of the artisanal fisheries is not new, but it is uncertain how long and to what degree fish have been diverted from food and exchange networks among islanders into markets. It is likely that fish were bartered with traders from the nineteenth century on, and some Arno residents report peddling fish during Japanese times. Spoehr (1949) notes Majuro fishermen selling part of their catch. One leader in Arno used cash income from his government job to purchase outboards and boats, which his family used to bring fish from Arno to Majuro for sale in the 1970s. A fishing cooperative operated in Majuro from 1977 to 1983, failing because of problems with maintenance and management, but having sold several hundred tons of fish on the market in the meantime.

A significant factor in commercialization is the cultural construction of rights in fish, which in general belong to the fisher who has captured them. As one fisher asked me, "Who can own fish?" suggesting that ownership was connected to control and that fish in the seas are not under anyone's control. Marine tenure assigned rights in only a few species, most notably turtle, to the *iroij. Iroij* also controlled access to several group techniques for fishing and certain areas of the reef or lagoon (Tobin 1958). Fishing territories otherwise were limited to the area of beach and reef immediately adjacent to a *weto* as far out as a man could stand and fish.[3] Having been granted access to such a territory by the *alab,* the fisher was obligated to offer the *alab* some of the catch. The fisher is expected to support adequately the food needs of household and relatives and should show kindness and generosity to friends and neighbors. The distribution of a catch is a fisher's right and responsibility, and while some people in Arno mourn the increased diversion of fish from networks to markets, no one suggested to me that it is forbidden by custom, *manit.*

Arno was well situated for the purposes of the government's artisanal commercial fisheries project. Majuro has the largest population (around twenty thousand or 46 percent of the total enumerated in the 1988 census) and best-developed commercial sector of any of the Marshalls. Arno is only about fifteen miles from Majuro, has a good-sized lagoon and a substantial population, and 98 percent of all households reported that they engaged in fishing (OPS 1989).

Arno leaders began talking in the 1970s about ways to improve their opportunities to sell fish. In 1979 the Marshalls adopted a constitution and formed a government that acted under the supervision and control of the

U.S. Trust Territory of the Pacific administration. Within the government the Ministry of Resources and Development was given charge of development efforts, and President Amata Kabua appointed Senator Brenson Wase from Arno as minister. The Marshall Islands Marine Resources Authority (MIMRA) was given charge of fisheries management and development.[4] Although discussions with the Japanese International Cooperation Association actually started before implementation of the Compact of Free Association in 1986, little was done for artisanal fisheries during the U.S. Trust Territory period. With the implementation of the compact, however, discussions gained a new impetus. Agreements were concluded that the Japanese International Cooperation Association would construct fishbase facilities and improved transportation infrastructure. In 1988 the Overseas Fisheries Cooperation Foundation (OFCF), another agency of the Japanese government, entered the picture and provided an operating plan and funds. MIMRA's chief of fisheries explained to me that, as the Marshallese agency was new and inexperienced, its staff followed the proposals of the Japanese.

The plan for the Arno Atoll Fisheries Association addressed the perceived constraints to the development of the commercial artisanal finfisheries sector (OFCF 1987).[5] These constraints could be categorized as technical and economic, but the plan also addressed their social dimensions. Key features of the plan included

1. Capital investment. The Japanese International Cooperation Association provided $4 million for infrastructure and capital investments in Arno and $2 million for Majuro. OFCF provided $500,000 for equipment and operating expenses.
2. Markets. The project would develop markets for fish purchases in Arno and sales in Majuro.
3. Training and management. The project would train employees through both formal programs in Japan and on-the-job training; OFCF would provide project managers.
4. Access to motorboats and fishing gear. The project would provide eight outboard motorboats and access for all fishermen in Arno by giving fishing crews turns in a monthly rotation. As project success would depend on achieving a certain level of production and past experience shows that artisanal fishers in the Pacific are unlikely to switch to full-time fishing (Rodman 1989), rotating access to boats would maximize catches, limit capital investment, and promote equal access to project benefits.
5. Fish processing and storage. The project would provide ice and coolers to fishers and provide cold storage for holding fish in Arno and Majuro.

6. Transport. The plan provided a boat dedicated to the transport of fish and supplies between the two atolls. A truck with a crane for lifting hundred-pound coolers of fish also provided on-atoll transport between the two fishing bases on the islets of Ine and Arno within Arno Atoll.
7. Transport Infrastructure. The project would construct a causeway to link the major islets on the western side of Arno Atoll and improve the channel by which small boats enter Majuro lagoon.

The minister and the other Arno senator, who was also a member of the lineage of *iroij laplap* in Arno, traveled to the major islets and held meetings to discuss the plans and tell the fishermen to form crews for using the boats. Construction was begun on facilities on the islets of Arno and Ine within Arno Atoll. Each fishbase was equipped with cold storage for fish, a diesel generator, scales, a water catchment, an office and shower, piers on lagoon and ocean sides of the islet, large coolers for transporting fish, a stock of fishing gear for sales and rental, and fifty-five-gallon drums for fuel storage. The Arno islet base also had ice-making equipment and spare parts that supplied both bases. Closer to Majuro, it was the Arno Atoll headquarters of the Arno Atoll Fisheries Association and the port of choice for shipments between Arno and Majuro. OFCF supplied a thirty-five-foot boat, the *Jolok,* for making these trips. The Japanese fisheries experts from OFCF moved into a prefabricated house erected near the fishbase and Marshallese were hired to assist them in buying fish, operating the *Jolok,* maintaining equipment, and marketing the fish.

The project began buying fish in August 1989. When its turn came, a fishing crew was given use of an outboard motorboat, ten gallons of gas, ice, and a cooler. Crews made their own decisions about where to fish, which techniques to use, and what kinds of fish to pursue. They were instructed to gut the fish as soon as possible and store them on ice in the cooler for transport back to one of the bases. There the fish were inspected, sorted by price categories, weighed, loaded into large coolers, and stored in the walk-in coolers. Fishing crews were paid in cash with a 10 percent deduction for use of the boat. Three times a week the fish from both bases were loaded onto the *Jolok* and taken to Majuro. Some were sold directly from the dockside, but most were loaded onto a truck for wholesale distribution to schools, the hospital, the two large grocery stores, and the ubiquitous roadside family-operated retail stores.

Some problems occurred during this stage, normal challenges for any start-up enterprise. *Alab*s for the *weto* used for the bases thought it proper that they have a say about who was hired to work at the base—some nomi-

nations worked out, others didn't. Some fishermen were careless about the project boats, so there were collisions, propellers damaged running over the reefs, and rumors of petty sabotage, like pulling spark plugs from the outboards. The project managers decided to appoint two boat operators from each major islet to be responsible for the boats. There was some initial resistance to cutting the operator in for a share of the catch, which was overcome when one of the staff asked the fishermen if they would mind the boat drifting away while they were out with spears or nets, and if the operator's contribution wasn't important in trolling.

This phase of the project was scheduled to last two years. Reports say about seventy-five men regularly went out on the boats, and perhaps two hundred participated at some level. Fishing was good, yielding 137,000 pounds of fish and earning fishermen $104,000. While not all trips were successful, with charges levied as a proportion of sales the financial risks were low. With luck, a fisher might walk away with $50 or more as his share from a few hours out fishing—the equivalent of selling four bags of copra, usually a couple of weeks' work. Also, with the OFCF project managers came access to OFCF funds. It is no surprise, then, that MIMRA asked for an extension of the project. OFCF complied and supplied an additional $200,000 capital, some of which was used to purchase additional equipment and parts, the rest to fund operating costs.

The renewal was not simply a continuation on the old basis, however. A good portion of the original fund had gone to subsidize fishing. The whole $500,000 had been spent, while the project realized $200,000 from sales. It would be hard to characterize this first phase as a sustainable development project. It was decided to start charging fishermen directly for operating costs such as gas and ice, gradually raising prices in steps to a near-market level.

This was a clear change from the original practices of the project, and Arno leaders and project personnel again traveled around Arno, holding meetings to explain the changes. The Japanese told the fishermen that the charges were necessary for continuing supply purchases, that without the charges the project would only be buying fish for a couple more years. According to the current fishbase manager, the fishermen reluctantly accepted the changes.

When I came two years later, many were still very unhappy about this shift. I asked fishermen whether they understood why charges were added; few said they did. I asked about the meetings held to explain the changes. Some said they had never heard of the meetings; others said they hadn't gone. A manager contradicted some of these men; yes, they were at the meeting, he claimed. Clearly, this change in operations affected attitudes toward the project. It seems likely that many interpreted this change as a

shift from one of the economic systems described by Nero to another, a use of governmental power to redefine social relations against their wishes. What had been a government project to help the people, redistributing resources in return for labor contributions to a community project, may now have appeared as a profit-seeking business enterprise. One can apply Scott's concept of a moral economy not only to the family and chiefly redistributive system; other systems, including Western markets, are equally founded on premises about the proper relations of people with respect to goods and services. If, as Lieber (1994) says, such premises underlie authority relations that sustain institutions, this shift redefining the moral premises would mean that, despite outward continuities, to Arno people the project was now a fundamentally different organization. Following less the hierarchical organization of the redistributive systems, it became more susceptible to the individuated decisions of fishers to bypass it for other markets noted below.

This second stage lasted two years. In 1993 the project was turned over to MIMRA. Boats were privatized. A boat with its outboard motor sold for $5,000, with $2,000 required as a down payment and the balance to be paid out of sales to the project. People were invited to apply for a boat, and contracts were signed with those who were first to come up with the down payment. The Japanese managers drew up a draft report on the project's history and a plan for continuing operations. They projected ten years into the future, showing a sustainable project. They left in the spring of 1993. When I arrived in the late summer, the Marshallese personnel of MIMRA and project participants were managing on their own, buying and selling fish, maintaining the equipment, and keeping the books. The *Jolok* was making about three trips a week, carrying coolers of fish to Majuro and drums of fuel to Arno.

Some Arno residents thought the project useful; it provided an alternative to copra for income, expanding their options and supplementing their ability to buy staple foods and household goods. It helped them cope with declining copra productivity due to tree senescence, infestation, and damage from a 1989 typhoon. Ice became available for cooling drinks. Other residents welcomed the regular connection to Majuro provided by the *Jolok.* After MIMRA decided to allow passengers on the boat (which the Japanese had forbidden), it became an ocean taxi, carrying people, local produce, and retail goods back and forth, intensifying family exchange processes. One man, employed in Majuro but married to a woman with land on Arno, became a weekend commuter.

Other people were less satisfied. They said the project didn't really help people in Arno. The prices paid for fish were too low and not all kinds of fish were purchased. People were aware of the prices the fish sold for, both

wholesale and retail, in Majuro, and some portrayed the differences as taking advantage of Arno people. Fish were becoming harder to come by; it took more work to catch enough to feed a family or to pay for gas and ice. Some fish were smaller, and the annual migration of grouper through the major channel into the lagoon, once guaranteed to provide a bounty, had become small and uncertain. Some said there were fewer fish: how could there not be after eight boats had been out fishing day and night for four years? Others said the fish were still there, but fishermen with poor technique had hooked them and then lost them, and now the fish were easily scared and ran away. Others said the problem was that fishermen from Majuro came over to steal Arno fish.

At the project level, managers were worried that not enough fish were coming in. Some fishermen developed their own analysis of marketing economics and decided to take their fish by themselves to Majuro, where they could capture the higher wholesale prices and sell fish the project wasn't buying. They could also take advantage of the wider consumption opportunities of the capital, including the liquor sales banned in Arno. The project thus lost cash flow and margin. The problem was exacerbated by the decision to require down payments on the sale of project boats; it wasn't people dependent solely on fishing who could assemble that kind of payment quickly, but store operators and people with wage jobs. The interests of such boat owners were less tied to the project; they might combine fish marketing with restocking their stores, and they had alternatives for getting cash. Some charged that the people marketing the fish in Majuro would take the best fish first to stores run by relatives rather than to the larger stores that would take all kinds of fish, that they let the stores weigh the fish, or that they left the coolers on trucks parked in the sun where the fish would spoil; all contributed to reduced income. On the Arno side, managers worried about the delays in getting spare parts and the amount of fuel charged to the project that was used up in Majuro. On the Majuro side, the chief fisheries officer and the MIMRA director worried about whether receipts would meet expenses and considered whether to turn the project into a cooperative, balancing their hope to better capture the fishermen against fears of problems based on the history of the defunct Majuro cooperative.

Given the uncertainties and various evaluations of the benefits and prospects of the Arno project, how is one to produce an analysis of whether the project was sustainable? One party, the Japanese, seemed to have a firm position, expressed in their draft report and prospective plan (OFCF 1993).[6]

Before offering my own analysis, I wish to pay my respects to the OFCF managers of the Arno project. Consultants such as Elsey (n.d.) or the team sent for the U.S. National Marine Fisheries Service (Milone et al. 1985) visited the Marshall Islands in the mid-1980s and raised doubts about the

advisability of attempting to develop commercial fisheries in the outer islands. Their reports noted significant obstacles—high fuel costs, lack of infrastructure, the unknown commitment of outer-island fishermen, the uncertain but limited size of fish stocks, the lack of fisheries and management expertise, the competition of cheap imports of canned fish in the urban markets. The National Marine Fisheries Service report concluded, "We consider the risk factors here to be high." Yet the government, counter to the often visible "urban bias" of developing countries, persisted in seeking outer-island development projects, and the Japanese took on the challenge. In accord with the rhetoric of international development, they delivered a project that emphasized self-reliance, of both the fishers and the nation linked as producers and consumers, and could be represented as self-generating after an initial infusion of expert (foreign) management, technology, and capital.

That said, I will argue that what it means to be sustainable depends on how a given set of practices is contextualized. By recontextualizing the Arno project, I hope to raise questions about representations of sustainability and development. Ferguson (1990) describes how Lesotho was rhetorically reconstructed as a suitable object of international development efforts. The conceptual boundaries used to define the development project, aid payments, the locus of the nation, and the results of projects profoundly affect an analysis. A report is a rhetorical device rather than an objective lens on the project; in the case of the Arno project, it is a mechanism through which the experts construct a representation of a project that can pay its own way while generating incomes for producers in Arno and food for consumers in Majuro. The representation defines the project, in part, by the boundaries it draws separating project and context.

Representations and Economics

The OFCF report includes three sections: a description of results, prescriptions for future operations, and predictions of the results of this plan, including tables of financial projections. It begins by summarizing the operations between August 1989 and December 1992 in terms of fish and dollars:

> In actual operation for three years and five months between Aug. 1989 and Dec. 1992, the total catch weight is 279,103.6 *lb.* (approximately 127 tons), and the total amount from the catch is $213,901. In fact, Arno fishermen have gained $213,901.00 for the period. The total weight of fish sale to the Majuro market is 260,782.2 *lb.* (119 tons), as well as the total amount of fish sale is $311,177.11. On this, the expense is only fish purchase from the fishermen, the other expenses are covered by OFCF's fund. Therefore, the balance

> of AAFA fund is increasing every month.[7] The balance of end of Dec. 1992 should be $131,798.51. (OFCF 1993)

The draft report then lays out the conditions of the plan projections, that is, the prescriptive operating plan. Part of this plan defines MIMRA responsibilities: (1) project management, (2) fish marketing in Majuro, (3) project accounting, (4) managing facilities, equipment, and materials, (5) purchasing fuel, materials, and equipment as needed, and (6) paying the rents on the land used for the bases. The project will sell off the fishing boats, and current stocks of fishing gear and engine parts (and income from their sale) will last three more years. The project staff in Arno are listed and reallocated: the Arno base manager will be transferred from the project to the MIMRA staff and payroll, and the project will pay wages for only three of the four remaining Arno staff. The report lists the major fixed capital assets to provide the basis for later projections of costs. The report then notes that depreciation of facilities and equipment is not considered because of very high costs; worn equipment will be replaced with money from the Arno Atoll Fisheries Association fund (OFCF 1993).

The report uses this plan to project an annual profit and loss statement (Table 1). Figures for fish purchases and sales are drawn from actual figures for the year from October 1991 to September 1992. Table 1 shows revenues of $160,474 and expenses of $143,333, projecting an annual profit of $17,141. In Table 2, these figures are projected forward for ten years, with the costs of replacing worn-out equipment added in lieu of depreciation. This calculation yields a projected loss over the ten years of $43,190. But this loss can be covered by interest earnings on the capital fund. If $100,000 of the association fund (projected to stand at $150,000 when MIMRA takes over the project) is invested at 7 percent compound interest, over ten years it will generate interest payments totaling $96,715, sufficient to cover operating deficits, and the project capital will actually increase by $53,525.

In this report, critical boundaries define what is project and what is not-project. I will offer an alternative accounting based on a reexamination of project boundaries and cash flows. Take the allocation of labor, which assumes a boundary between the project and its management. The OFCF plan reassigned the Arno site manager to the staff (and budget) of MIMRA and says that only three of the remaining four Arno staff will remain on the project budget. It may be they thought the Ine assistant expendable. As he was from the family of the Ine base landowners, however, discharging him was not a real option. In the end, all employees were retained on the association payroll. The plan also assigned various tasks to MIMRA with no charges to the project for these services. Marketing and materials supply took one man full time, bookkeeping and payroll and marketing assistance engaged

TABLE 1. **Profit and Loss Projected by OFCF (U.S. dollars)**

Revenue	160,474.00
Fish sales	116,189.00
Fuel sales	29,165.00
Ice sales	10,320.00
Fishing gear	2,400.00
Outboard parts	2,400.00
Expenses	143,333.00
Fish purchase	78,564.00
Fuel	41,349.00
Gas	25,812.00
Diesel	9,333.00
Two-cycle oil	5,184.00
Four-cycle oil	1,020.00
Materials purchase	6,000.00
Labor	17,420.00
Balance	17,141.00

Labor Detail

Position	Base	Percentage	Yearly
Ine manager	240.00	100	6,240.00
Jolok operator	230.00	100	5,980.00
Chief engineer	200.00	100	5,200.00
Labor subtotal			17,420.00

another person at least one-third time, and supervision and management for the project was a major responsibility of the chief fisheries officer, which I estimate conservatively at one-quarter time.

Other expenses were also left off the books and outside of the project definition. I do not have hard figures on these but will make rough estimates. Land rents, based on the government standard of $3,000 per acre and eyeball estimates of one acre per base, may run about $6,000 annually. Depreciation, it was acknowledged, was not considered. The OFCF plan provided for replacement of vehicles and generators, but not buildings. Ignoring the costs of surveying, site preparation, dredging, and so forth, I estimate the replacement cost of the buildings at $100,000 and figure depreciation over a life of forty years.

Regarding fish purchases and sales, a brief examination showed that no calendar-year total matched the period chosen as the basis of analysis, and statistical analysis showed the fish purchases from fishermen to be almost one standard deviation above the mean of the rolling average yearly catches.[8] Fish-

TABLE 2. **Profitability for Ten Years Projected by OFCF (U.S. dollars)**

Year	Revenue	Operating Costs	Equipment Replacement	Total Expenses	Yearly P&L	Balance
Opening capital						150,000
1	160,474	143,333	0	143,333	17,141	167,141
2	160,474	143,333	0	143,333	17,141	184,282
3	160,474	143,333	0	143,333	17,141	201,423
4	155,674	143,333	28,000	171,333	–15,659	185,764
5	155,674	143,333	28,000	171,333	–15,659	170,105
6	155,674	143,333	41,000	184,333	–28,659	141,446
7	155,674	143,333	12,000	155,333	341	141,787
8	155,674	143,333	0	143,333	12,341	154,128
9	155,674	143,333	24,000	167,333	–11,659	142,469
10	155,674	143,333	48,000	191,333	–35,659	106,810
Sum	1,571,140	1,433,330	181,000	1,614,330	–43,190	

TABLE 3. **Profit and Loss Projected by Author (U.S. dollars)**

Revenue	153,304.00
Fish sales	109,019.00
Fuel sales	29,165.00
Ice sales	10,320.00
Fishing gear	2,400.00
Outboard parts	2,400.00
Expenses	168,879.00
Fish purchase	74,790.00
Fuel	41,349.00
Gas	25,812.00
Diesel	9,333.00
Two-cycle oil	5,184.00
Four-cycle oil	1,020.00
Materials purchase	6,000.00
Labor	38,240.00
Depreciation (buildings only, 40 years)	2,500.00
Land lease	6,000.00
Balance	–15,575.00

Labor Detail

Position	Base	Percentage	Yearly
Arno manager	240.00	100	6,240.00
Ine manager	240.00	100	6,240.00
Ine assistant	160.00	100	4,160.00
Jolok operator	230.00	100	5,980.00
Chief engineer	200.00	100	5,200.00
Marketing	240.00	100	6,240.00
Bookkeeping	260.00	33	2,230.00
Fisheries chief	300.00	25	1,950.00
Labor subtotal			38,240.00

ing intensity, fish stocks, and success rates are highly variable, and it seems more justifiable to me to base long-term projections on a mean than on an opportunistic sample.

My accounting is shown in Table 3. Rather than a yearly surplus of $17,000, there is a deficit of over $15,000, roughly 25 percent of fishers' earnings. Projected over ten years (Table 4), this deficit accumulates to a difference of more than $320,000 from plan estimates. As deficits eat up capital, interest earnings would be lost. In this scenario, either the project would collapse in five to six years as capital equipment wore out and could not be replaced, or the project would require ongoing government subsidies.

TABLE 4. **Comparison of Ten-Year Projections (U.S. dollars)**

	OFCF Projection		Author Projection	
Year	Net Revenue	Fund Balance	Net Revenue	Fund Balance
Open		150,000		150,000
1	17,141	167,141	–15,575	134,425
2	17,141	184,282	–15,575	118,850
3	17,141	201,423	–15,575	103,275
4	–15,659	185,764	–48,375	54,900
5	–15,659	170,105	–48,375	6,525
6	–28,659	141,446	–61,375	–54,850
7	341	141,787	–32,375	–87,225
8	12,341	154,128	–20,375	–107,600
9	–11,659	142,469	–44,375	–151,975
10	–35,659	106,810	–68,375	–220,350
Close	–43,190	1,595,355	–370,350	–204,025

From another perspective one might ask: How much has the project benefited fishermen and their families in Arno? The draft report notes that "the total amount from the catch is $213,901," paid to fishermen. The payments made to fishermen were immediately reinterpreted as a "gain" to fishermen, leaving out the costs they are charged. Through the same period, the report shows other income (i.e., not from fish sales, but sales of fuel, ice, and gear) as $34,322 (OFCF 1993). These charges were implemented gradually, but by 1992 they amounted to 28 percent of sales. Allowing for sales of gas and ice for nonfishing use, costs were running at 20 to 25 percent of sales. Based on the mean of the yearly rolling average, Arno fishermen could expect to earn about $74,790 from fish sales with expenses of $16,469, for a net of $58,321, not counting depreciation of the motor and boat, a substantial cost where a $3,000 outboard has a life expectancy of about five years. With 1,787 residents in 217 households in Arno at the time of my census, net earnings come to about $33 per capita or $269 per household. Of course, not all households participate equally in the selling of fish; some benefit more and some less. I will not cover this variability in this discussion.

To place these figures in context, the per capita GDP of the Marshalls is about $1,600 (OPS 1990). Cash figures are more meaningful in urbanized atolls than in Arno, but this level would serve as a reference point for evaluating cash incomes. In Arno, the other main sources of cash income from production (as opposed to wage jobs) are copra and handicrafts. Copra earnings in this period averaged over $300,000 per year (*Marshall Islands Journal* 1994). Handicraft earnings for Longar, Arno, the one islet where I could get reasonably complete information, were about $8,000 in 1993. Projecting total

earnings from Longar, with 10 percent of the atoll population, suggests handicrafts could bring in as much as $80,000 per year. I think it is clear why Arno people offer mixed assessments of the benefits of the fisheries project.

There is yet another perspective to consider: opportunity costs. If the capital invested in the project had been put to another use, what kind of return could have been earned on the investment?[9] Using the same 7 percent figure employed by the OFCF report, and taking only the Japanese International Cooperation Association investment of $4 million in Arno, annual interest payments would come to $280,000, better than five times the annual earnings of the fishermen. Despite the presumed rationality of metropolitan aid agencies, it seems possible that something other than economic development is at stake here.

Political Economy

No one has gone to the Marshalls primarily to help the natives.[10] German companies sought copra and trade, while the government decided colonies were an important symbol of a modern nation. Japan sought to expand its economic catchment and political hegemony. The United States originally pursued strategic concerns, but economic interests expanded as fishing fleets moved into the western Pacific. Each nation in turn sought to establish a long-term colonial association with the Marshall Islands to achieve its ends. With the fading of colonialism, other means may be sought to form the desired association. Fish are the material resource in the Marshalls most desired by metropolitan nations, and aid is one means to secure access. When the Forum Fisheries Agency succeeded in 1987 in negotiating an agreement with the United States that would guarantee Pacific Islands nations payment of about 9 percent of the market value for fish caught in their waters, the American Tunaboat Association refused to pay the full amount. The United States agreed to pay the balance from its aid budget (Nero 1997a; Crocombe 1995). Japan uses its aid as a lever to prevent island nations from forcing it into multilateral negotiations for fishing rights, preferring to play off one state against another (Rix 1990). Aid is not primarily aimed at economic development but is structured to serve national interests and support politically important constituencies.

Other studies document how development projects often carry assumptions about gender roles, technological efficiency, what counts as economic activity, and how to behave rationally that are imported from the sociotechnical milieu of the donor country. The Arno project bought into a common analysis or "social representation" (Lemonnier 1993) about boats that "subsistence technology means subsistence production" (Mike McCoy, pers. com.,

1993). Consultants from industrialized nations may take as an article of faith the concept of "efficiencies of scale" and assume efficiency is equivalent to substituting capital or fossil fuels for human labor. It is tempting to assert that such beliefs, in conjunction with a need to make a donation adequate in comparison with Japanese fishing activity in the Marshalls, led to the disjunction between the scale of investment and the level of returns in the Arno project. I do not have the data that would let me take this idea beyond speculation.

I could also offer another speculation, noting that the Arno project, for continued operations, depends on ongoing subsidies from the government. As the fiscal basis of the government is not local production but overseas transfer payments, the project acts to maintain the very dependence on those payments that development is presumed to counter. A Republic of the Marshall Islands capable of exploiting its own marine resources, without the participation of overseas fishing fleets, would threaten politically effective interest groups in the donor nations. The overseas donors have interests in maintaining continued associations of dependence. Indeed, I heard expatriates in Majuro speculate that the high level of Asian Development Bank loans to the Marshalls was aimed at securing the support of the government in international political fora; in this construction the Marshalls' vote in the United Nations is a valuable resource, and the aid establishes a form of international debt peonage. Yet I am not in a position to argue that the project was structured purposely to maintain relations of dependence.

Another line of reasoning would, rather than assume a hidden agenda, recognize that the fisheries of the industrial nations are highly subsidized and assume that fisheries agencies of those countries reproduce what they know best. The Japanese and U.S. governments distribute aid monies to support their fisheries sectors. Worldwide fisheries are heavily subsidized at $54 billion per year, in an industry with catches valued at $70 billion per year (Sutton 1996).

Beyond the Project

As I have shifted the boundaries of the project, adding larger sets of economic relations, the view of whether the project is sustainable and what is being sustained has likewise shifted. Now I wish to look beyond the project, to view it as a waystation on a path rather than a singular event. History matters, everybody makes missteps, and perhaps the best perspective on the Arno Atoll Fisheries Association is not whether it in itself met all the goals one might desire, but rather to ask what it contributes to the people of the Marshall Islands.

Here I want to emphasize the project as a critical site for learning. While industrialized cultures may emphasize formal and specialized educational institutions, for most people learning comes in the context of observing and doing, and the project provided many opportunities for observing and doing technical, economic, and social practices (see Lieber, elsewhere in this volume). Fishers learned new techniques of fish processing. With more mobility they learned more about the habitat and fish resources of the atoll. They may have learned as well that outsider-financed projects will push the mode of economic relationality favored by the donors. As fishers increasingly bypass the project markets established in Arno, they increase their direct knowledge of the Majuro market, while learning to employ their relationally based exchange networks to channel fish in new paths outside their residential communities.

Learning is also taking place in MIMRA. Indeed, this was expected—the Arno project was often referred to as a pilot project, an initial step in larger plans to expand the outer islands' commercial possibilities. In making financial projections, I have been a bit disingenuous, accounting as if MIMRA would follow the OFCF plan. In fact, MIMRA made adjustments. The authority not only retained additional employees, it also maintained wages at lower levels. Fish were originally categorized into two groups to set prices; MIMRA expanded that to five categories to better match market conditions. When staffers realized how popular the *Jolok* was as transport between atolls, they accommodated social desires to capitalist economic logic by charging for passengers and goods. Nor were fish stocks ignored; the project would not buy certain fish when a decline in species abundance or size was believed by managers to be serious, and a plan to bring more motorboats to Arno at the end of the OFCF phase was dropped. With the knowledge also gained from the history of the Majuro fishing cooperative, MIMRA staff now have two data points on the effects of fishing intensification on coral reef fish stocks.

Learning also shows in the design of the second phase of the fisheries project, again an association of MIMRA, the Japan International Cooperation Association, OFCF, urban markets, local fishers, national politics, and international interests. Arno Atoll Fisheries Association figures show that fuel was second only to fish purchases as an operating expense for both the project and fishers. The new project uses solar panels instead of generators to make ice. Fishbases were built on three atolls, and one transport boat rotates buying trips among the three, spreading out fishing effort and minimizing impacts on the stocks. Instead of bringing in motorboats, fishers are expected to rely on locally acquired or built boats. Each fishbase was equipped with one boat to use in distributing supplies and collecting catches around

the atoll, saving fishers the necessity for fuel and motor to cross the lagoon. The atolls Alinglaplap, Namu, and Likiep are far enough away from the target market in Ebeye that capturing the production of the fisheries for the project will not be a problem.

The new project functions in new contexts and will bring new problems. Managers and employees will have to develop their understandings of the physical, social, and economic factors linked together in fisheries development, and often the most dramatic learning will occur when mistakes are made, when misunderstandings are most clearly illuminated. From this perspective, questioning sustainability from a focus on the development project is not wrong, but it can lead one to neglect a larger picture.

Associations, Development, Islanders

Parallel to anthropological studies of development, sociologists of science and technology have developed systems and networks approaches to technology. Works such as those by Law (1987) on Portuguese navigation and Hughes (1987) on electrical utilities emphasize the heterogeneous assembly of physical, intellectual, political, and environmental entities. Callon and Latour have elaborated this approach into actor-network theory (Latour 1996). Disavowing distinctions between the social and the technical, between artifacts and actors, they argue that technologies are created through enlisting entities in a "seamless web" of associations, a process Lansing (1991) calls "sociogenesis." A successful actor-network must be robust enough to withstand forces that attempt to disassociate entities from the network, regardless of whether the forces are normally understood to be social, environmental, or technical. Lieber (1994) explores the decomposition of sociotechnical networks. In development projects, as Koenig (1988) makes clear, the risks of disassociation are high, for the people tasked with creating the new networks are already coupled into other networks of government agencies, contractors, and consultants. These ties endure beyond the project and, through long associations and affinity, are usually stronger than their ties to the supposed beneficiaries of the project.

Creating robust associations is best accomplished by people with a strong commitment to the outcomes. And commitment will only come when the projects serve people's goals. What can be learned about the development goals of Arno people? What options have Arno people chosen in the past, when they had the power to choose?

Status is important in Pacific Islands societies. Knowledges are reevaluated as shifting contexts open alternative paths, often to new positions of status. Formal education, introduced by missionaries and colonial powers,

became highly valued as a path to gain access to new positions of status created in churches and governments as well as new possibilities for diversified production and consumption. Further, Hess, Nero, and Burton (n.d.) show that Marshallese readily recognize the systematic distribution of costs and opportunities across linked geographical locations in their regional branch of the world economy. Elders and dependent children are shifted to outer islands where the costs of reproduction are supported by the subsistence economy, students are sent to schools in urban centers and abroad, while workers of employable age concentrate in the urban sectors of the Marshalls and the United States. They accomplish these shifts by using existing linkages of family and kinship, and creating new ones through personal ties and transnational institutions. They use economic resources arising from both transfer payments from the United States and the natural-resource endowments of their environment. These resources may be used to support vital exchange relationships, or they may be converted to cash used to pay school fees and living expenses of students at home and abroad. The students usually turn into wage earners in urban areas and broaden the family's resources and possibilities.

In some cases, then, people may choose to convert their natural resources into alternative forms that can be deployed in new arenas of performance. Sometimes it is economically rational to deplete a resource and reinvest the proceeds where they can earn a higher rate of return than can be obtained from sustained exploitation of the resource (McCay and Acheson 1987). This strategy may be applicable in the Pacific Islands states, where costs of transportation and factors of scale and skills and limited resource endowments make economic development particularly difficult. Dahl (1996) compares the investment decisions of the Marshalls and Kiribati. The Republic of the Marshall Islands went into debt on the theory that borrowed capital would develop the economy and generate future returns. Kiribati invested the capital it received in overseas financial markets and finances government with the interest, no longer depending on aid for this purpose. Similarly, Palau's compact provided US$66 million up front, which it invested in overseas financial markets, and Tuvalu has set up a similar kind of fund. Dahl argues that such investments implicitly recognize the limited development possibilities of microstates, the governments choosing to invest in overseas financial markets instead of forming capital locally, and that migrants' remittances can also be viewed as income from foreign investment.

There were problems with development in the Marshalls other than the choice of strategy.[11] The choices made by Kiribati, Nauru, Tuvalu, and Palau, however, are challenges to the received paradigms of development by agricultural intensification, industrialization, and tying one's fate to world com-

modity markets. Wiseman argues that Tuvalu's choice may offer an alternative model for sustainable growth particularly applicable in smaller Pacific countries (1993). Kiribati and Nauru received the monies used to create trust funds as payment for massive and devastating resource extraction. If this is a viable choice, it may place policy makers on the horns of a dilemma: what do they wish to sustain—islands or islanders?

This is probably a false dichotomy. In the past, islanders have found flexible strategies that mix various kinds of production with investment in acquiring skills and knowledges and in building and maintaining relationships to be the best way to adapt to a variable and often harsh environment. Few may envy the position of the people of Nauru (Pollock 1997), figuratively sitting on a big trust fund but literally sitting on lands stripped to the bones of the coral it is built on. I think it likely that these flexible and multiplex strategies will continue to serve islanders and their interests in their future development, and sustainable production based on the islands' natural-resource endowments will be a necessary component of those strategies.

Conclusion

In this article I have constructed three of many possible accounts of the Arno Atoll Fisheries Association project. In the first account, which focuses on resources and monetary cost and benefits, the project is not self-sustaining. In the second account, focusing on international relations, the project sustains these relations of power and dependency, and models of industry/government relations as well. In the third account, I suggest that evaluation should take into account history, process, and the costs of knowledge rather than settle for facile assessments of success or failure.

"Development" is a concept constructed in international political rhetoric and practice, and the paradigmatic example of a development project is still an infusion of outside money, policy experts, technical advisors, managers, and materials acting in conjunction with governmental agencies to transform local social systems of production. The call for "sustainable development" arose in response to the often massive extractive and destructive efforts of these coalitions of interests. While local groups are not innocent of destructive practices, such as cutting down forests (Shankman, this volume) or the destruction of fish and habitat by use of poisons and explosives, there is the danger that the concept of sustainable development may be turned into another rhetoric of domination, insisting on the perspective of the outside expert or imposing restrictions on developing nations that donor nations reject within their own competing economies. The idea of "sustainable development" may lead analysts to think in concepts such as equilibrium,

homeostasis, or the ahistorical ethnographic present. As such, it lends itself to being applied in ways restrictive to dynamic, adjusting societies in changing circumstances.

"Sustaining islanders" calls for us to focus on the people, to let them judge the trade-offs between different values. The Marshallese emphasis on education and diversification may reflect a reasonable assessment of the limited possibilities of expanding primary production from the land and sea and be more realistic than all the development plans of the experts. They work to increase their range of options and their abilities to make adjustments (see Lieber, this volume), to balance homeostasis with autopoesis. The challenge of development is to enhance the power of people to achieve their goals through access to tools, resources, knowledge, and decisions.

NOTES

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1. Light manufacturing, such as garment factories, was also encouraged by favorable tariff policies negotiated as part of the Compact of Free Association.

2. Early estimates for the Marshalls usually place total population at around ten to fifteen thousand people, which probably represented the long-term carrying capacity under subsistence horticulture of tree and root crops.

3. Also, access to the lagoon and near-shore waters of an atoll is held in common, and some even say that traditional tenure extends to joint control of archipelago waters by the collectivity.

4. The government marine-resources agency went through several reorganizations and name changes between establishment in 1979 and my research in 1993–1994.

5. The project has been called various names; for simplicity I will refer to it by the current name, the Arno Atoll Fisheries Association.

6. I base this discussion on the draft report, as I never saw a final report. I acknowledge the possibility that it was revised later.

7. This balance is money accumulated from sales less the cost of the goods sold; this is not a profit, as many project expenses are paid out of the OFCF operating fund, and the two funds are kept separate.

8. I dropped the first year as well as the year following the departure of the OFCF advisors as unrepresentative. Both modifications raised the mean figures for purchases and sales, reducing the difference between my figures and the plan's, so my figures seem defensible.

9. I look only at the opportunity cost for this use of the capital and not at alternative allocations of fishers' time or of the fish themselves.

10. See Hanlon 1995 for an analysis of U.S. development projects in the U.S. Trust Territory of the Pacific Islands.

11. I think it likely that the path chosen, taking on debt to create future returns through investment in business, is only likely to work when one knows the business well. It would make sense for Ford to borrow $100 million to build a new car factory but not to develop biotechnology. I have argued above that learning is a necessary part of the process, and the Marshallese have about two generations of learning to do before they are ready to become a nation of private enterprise.

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