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SUSTAINABLE DEVELOPMENT OF COASTAL FISHERIES IN THE PACIFIC ISLANDS REGION

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Sustainable Development of Coastal Fisheries in the Pacific Island Region

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A. Introduction

Fisheries have traditionally occupied an important position in Pacific Island societies, which have relied on nearshore resources[3] for much of their food and subsistence needs. Nearshore fisheries possess several characteristics which distinguish them from offshore fisheries: first, they have been practiced in the Pacific for centuries. The sheltered coastal ecosystems favored the development of labor-intensive fishing practices primarily destined to satisfy subsistence needs and, more recently, to supplement the cash income of coastal communities.

Second, in many Pacific Island countries (PIS), nearshore fisheries are subject to some of the most intricate systems of customary marine tenure in the world, which provide a powerful incentive for community-based management. By contrast, no customary claims exist over offshore resources which are the subject of industrial fisheries. Moreover, with the exception of small pelagics, many nearshore fisheries involve low-mobility species, which are highly susceptible to overexploitation; consequently, the long-term potential for sustained commercial extraction is poor if strict management regimes are not adopted.

Nearshore fisheries also differ from industrial fisheries in their low investment costs, thereby providing opportunities for domestic investors and generating broad based benefits to coastal populations. Finally, because the prevalent pattern of fishing is opportunistic and involves part-time operators, the exploitation of nearshore fisheries depends to a large extent on external socio-economic trends, such as short-term cash opportunities outside the fisheries and availability of substitute products. A good understanding of these exogenous trends is therefore vital to the formulation of long-term strategies in the sector.

B. Economic Importance

The fisheries sector holds a modest share of gross domestic product (GDP) in most PIS countries, averaging about 14 percent in Kiribati, 7 percent in the Solomon Islands and the Marshall Islands, and less than 2 percent in Fiji. These national accounts statistics clearly understate the economic importance of the sector because they usually fail to account adequately for artisanal and subsistence production.

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[3] For the purpose of the present paper, aquaculture, deep slope finfish and small-scale tuna fisheries are included in the definition of nearshore fisheries.

Exploitation of nearshore resources among PIS countries is well developed and varies widely across countries. From the available data, it is clear that nearshore fisheries are significant compared to offshore fisheries in terms of output value and local employment, but less so in terms of export value. Most important, however, is their role in generating broad-based benefits for local communities and guaranteeing food security. National sources reveal that as many as 83 percent of the coastal households of the Solomon Islands; 35 and 99 percent respectively, of the rural households of Vanuatu and Kiribati; 87 percent of the households in the Marshall Islands; and half of the rural households in Upolu (Western Samoa) fish, primarily for local consumption. By contrast, the industrial and commercial sector provide full-time employment to less than 4 percent of the formal employment of the Solomon Islands, and about 10 percent of that of Kiribati.

In terms of export value, nearshore fisheries account for nearly all of the fisheries exports of Vanuatu, less than 10 percent in Fiji, Marshall Islands, and Solomon Islands, and about 3 percent in the Federated States of Micronesia (FSM). The two most important nearshore export commodities are bêche-de-mer and trochus products, followed by finfish and aquarium fish. Seaweed exports are also important in Kiribati.

Despite increasing commercialization of the catch, subsistence fisheries remain a vital source of animal protein in the region. This is particularly true in isolated and small islands, among coastal communities, and in areas where sources of cash income are scarce. While their importance is generally recognized among PIS governments, the value of subsistence fisheries is largely unknown and tends to be ignored in national accounts. Table 1 presents estimates of the value of subsistence fisheries for selected PIS countries in terms of volume, foreign exchange savings[4], and caloric value to consumers. These estimates suggest that subsistence fisheries play an important role in the PIS countries' economies. In Fiji, for example, their caloric value to consumers was equivalent to 54 percent of the retail value of the total artisanal catch in 1992. Significant foreign exchange savings can also be attributed to subsistence fisheries throughout the region: for Vanuatu, these savings were equivalent to the value of all fish and meat products imported during 1992. In the Solomon Islands, the value of subsistence fisheries was equivalent to more than 60 percent of the value of canned fish exports. The protection of subsistence fisheries should therefore remain a high priority for PIS governments.

C. The Changing Patterns of Resource Exploitation

Increasing Sales. Future strategies for nearshore fisheries development in the Pacific need to be based on a good understanding of the socio-economic trends affecting the sector. There is evidence, for example, that in many areas the reliance on subsistence fisheries is declining due to increased commercialization of the catch at both the village and national levels. The sales of fisheries products is currently practiced by 31 percent and 17 percent, respectively, of the income-earning households of Kiribati and the

Table 1: Subsistence Fisheries in Selected Pacific Island Countries, 1992

	Volume (MT)	Value to Consumer (US$ mill.)	Foreign Exchange Savings (US$ mill.)
Fiji	16,400	6.3	8.2
Solomon Islands	12,690	7.8	7.7
Vanuatu	3,090	2.2	1.3
W. Samoa	3,050	0.5	2.6
Total	**35,230**	**16.8**	**19.8**

Source: World Bank. *Pacific Island Economies: Sustainable Development of Fisheries. Draft Report, 1995.*

[4] A similar methodology was used by David and Cillaurren (1992), to compute the value of village fisheries in Vanuatu.

Solomon Islands; 40 percent of the fishing households of Vanuatu; and 36 percent of the fishing households in Upolu, Western Samoa. Village sales appear to be replacing traditional bartering systems in many areas.

Box 1: Trends in the Use of Coastal Fisheries:The Case of Vanuatu

	1983		1993
% of Rural Households Fishing	50%	▼	35%
% of Rural Households Collecting Trochus	10%	▼	19%
% of Rural Households Collecting Green Snail	8%	▼	13%
Average Fishing Trips/Week	1	▼	7
% of Fishing Households Selling their Catch	n/a	▼	40%
% of the Above Selling Within their Village	n/a	▼	70%
% of Households Purchasing Fish from Formal Outlets 1	n/a	▼	31-33%

Source: Department of Agriculture, Agriculture Censuses 1983 and 1993

Some of these trends are highlighted in Box 1, which indicates an overall decrease in the number of households involved in fishing in Vanuatu over the last decade, but a rise in the proportion of households collecting shells—an important source of cash income. Average fishing effort has also increased, suggesting that fishing activities are being concentrated in the hands of fewer, but more intensive operators.

While domestic sales are expanding, there is little evidence that public programs are responsible for this trend. The most rapidly expanding markets have been informal village outlets, unstructured roadside sales, and direct sales to private outlets in major urban areas. In many cases, these informal and private outlets have surpassed public distribution centers in efficiency and success of operations. In Fiji, for example, the share of domestic sales held by non-municipal market outlets has increased from 50 percent in 1978 to nearly 80 percent at present. Similarly, in Vanuatu, 67 percent of the seafood consumed in Efate is sold through private outlets.[5]

Decreasing Importance in Local Diets. In countries such as Tonga, Western Samoa and, to a lesser extent, Vanuatu, the role of seafood products in the total protein supply has declined (Table 2). While this trend is not apparent in other PIS countries where fish is a more important component of animal protein supply, the consumption of alternative products to fresh fish—in particular canned fish and meats—has been rising in the region. As much as 80 percent of the fish consumed in Honiara, for example, is frozen or canned.[6] The lower price and non-perishability of these processed foods plays major roles in influencing consumer choice.

Table 2: Trends in Per Capita Supply of Fisheries Products Available for Consumption *(1974/76-92)*

	1974/76	1985	1992
Kg/year/capita			
Fiji	24.9	42.5	40.7
Kiribati	51.4	72.6	74.6
Solomon Islands	55.7	58.3	53.9
Tonga	11.5	30.5	15.5
Vanuatu	45.7	39.4	31.7
Western Samoa	44.2	45.2	43.2
Seafood as % of Animal Protein Consumed			
Fiji	33.0	35.4	28.9
Kiribati	70.0	71.3	68.2
Solomon Islands	70.6	67.1	73.6
Tonga	21.0	32.9	17.9
Vanuatu	39.0	35.3	30.9
Western Samoa	46.6	39.2	31.8

Source: FAO, Agrostat Database, Food Balance Sheets, 1984-86.

Increasing Pressure over Key Resources. The introduction of new technology and targeted demand from export markets, tourist outlets and urban centers is increasing pressure on high-value nearshore resources, especially near urban centers. In Western Samoa, commercial sales of nearshore fish at the Apia Fish Market decreased by 90 percent from 1986 to 1991, largely as a result of overexploitation[7]. This fishing pressure cannot be easily reduced by redirecting effort to less exploited areas or alternative species. Remote areas, while well

[5] MacAlister Elliot & Partners (1992).

[6] Crossland and Philipson (1993).

[7] Other causes include the destruction of reefs caused by cyclone Ofa, coastal degradation, and shifts in the location of sales in favor of private outlets.

endowed with resources, are often commercially unprofitable due to lack of economies of scale and high costs of transportation. Changes in target species, similarly, are not easily compatible with either tourist or export markets. Where it exists, pressure on target nearshore resources is thus likely to remain high for the near future.

Increasing Environmental Degradation. Because of their proximity to land, nearshore fisheries are vulnerable to the environmental impacts of rapid urbanization and poor land management. These include urban pollution of reefs and lagoons, increased sedimentation of reefs, lagoons, and nearshore ecosystems (e.g., through logging), and direct alteration of coastal environments. Alterations of vital coastal habitats such as estuaries and mangroves can also have long-lasting negative impacts on coastal fisheries, since these areas serve as nursery grounds for many species of fish and shellfish.

In view of the above trends, and considering the important socio-economic role of coastal fisheries in Pacific Island economies, management of coastal resources should become a matter of national priority. Given the limited capacity of most fisheries departments in the region, it will be important to ensure that management strategies are supported by community action and effective enforcement mechanisms, and that they are adequately linked to broader environmental and nutritional strategies.

D. The Role of PIS Governments

As shown, fisheries play an important role in the economy of PIS countries. With few other natural resources to draw upon, Pacific Island countries look toward their marine resources as a source of future economic growth. In order to achieve this goal, however, increased attention needs to be paid to the sustainable management of the resources, as well as to a re-definition of the appropriate roles of the public and private sectors in future fisheries development. At the present stage of development of PIS countries, it is recommended that the role of the governments focus on the following objectives:

- management and regulation of key fisheries;
- collection and processing of information to back policy decisions;
- provision of supporting infrastructure where economically justifiable;
- provision of key services such as training and extension;
- creation of an enabling environment for stable investment, both foreign and domestic; and
- development of quality control and grading for export products.

The ensuing sections discuss the formulation of a management and a development strategies for coastal fisheries which take into account the redefined role of PIS governments as proposed above.

E. A Management Strategy for Coastal Resources

The absence of adequate management has resulted in the overexploitation of many sedentary species resulting in boom-and-bust cycles. Figure 2 illustrates this pattern for bêche-de-mer exports. During the late 1980s, Fijian exports expanded rapidly to a level of 717 MT in 1988 valued at nearly US$2.0 million, only to drop abruptly in 1989 to US$1.3 million (365 MT). Subsequently, the trade moved to the Solomon Islands, where exports of bêche-de-mer peaked in 1992 at 715 MT, only to fall by over US$2 million in 1993 to 315 MT. Local traders attribute these declines to overexploitation[8]. The depletion of the Melanesian fishing grounds is reportedly causing a shift in trade to Micronesian and Polynesian countries, as indicated by recent export trends in Tonga and Western Samoa.

[8] In Fiji, the introduction of size limitations and the improvement of general socio-economic conditions may also have contributed to the decline in exports after 1988 (Adams 1992).

From a national standpoint, boom-and-bust cycles can result in the sudden loss of an important source of income for households involved in collection and processing.[9] There may also be investment losses in the case of trochus, where button-processing facilities have been established. Most importantly, wide fluctuations in the availability of raw material are not conducive to stable investment.

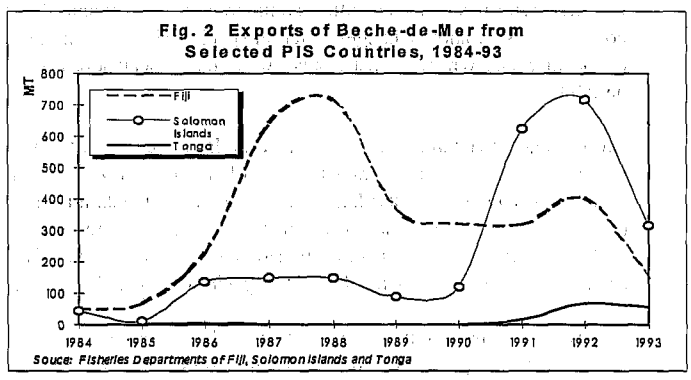

Fig. 2 Exports of Beche-de-Mer from Selected PIS Countries, 1984-93

Souce: Fisheries Departments of Fiji, Solomon Islands and Tonga

All PIS governments have adopted fisheries management legislation for key coastal resources, ranging from size limitations to closed seasons, and gear restrictions for certain species. The most important constraint to the implementation of these measures is, however, the poor enforcement capacity of public agencies. Recognizing the difficulties of managing complex multi-species fisheries with limited budgets and staff, several PIS governments have recently shown a renewed interest in establishing collaborative management regimes with traditional resource custodians. Recent examples include the drafting of participatory resource management plans for Aitutaki (Cook Islands) and the Arnavon Islands (Solomons).

Another form of collaborative management consists in using customary marine tenure systems (CMTs) to implement village-based fisheries management. Although CMT systems provide a basic foundation for locally-based marine conservation, they are often not managed well: local authority has weakened in many places leading to loss of the ability to enforce traditional management measures. In other areas, the introduction of commercial exploitation has brought new challenges with which traditional management was not designed to cope. There is therefore a need to link modern management principles with village-based management structures. The role of the government is here limited to facilitation and provision of technical advice on management issues. One of the most successful examples of the above has been the resurgence of village-based management in Vanuatu, through separate efforts initiated by the Fisheries Department and the Environment Unit.

There are cases where village-based management cannot be implemented. These include areas where CMT has never existed or has been weakened by proximity to urban areas, in-migration, or by the weakening of traditional authority. Moreover, CMT does not provide a practical means for protecting pelagic species or coastal species whose seasonal migrations take them in and out of tenured waters. In these cases, stronger government intervention in management and enforcement may be required.

Recommendations. In order to improve coastal fisheries management, PIS governments should:

- **Retrain extension staff in fisheries management principles**. In many fisheries departments, extension services need to shift from a development to a management focus. Collaborative management, for example, is more likely to succeed if supported by solid technical backup from extension services. National governments should also ensure that coastal fisheries management goals are included in national strategies, and that reorientation of extension services is adequately supported by incremental budget allocations.

[9] In the Solomon Islands, for example, an estimated 7 percent of the households involved in the cash economy participate in bêche-de-mer collection.

- **Improve the effectiveness of enforcement.** Penalties for violations of fisheries regulations should be punitively high to act as effective deterrents[10], and should target both fishers, as well as those linked to them in trade. Legislative ambiguity in the form of exceptions granted by Ministries should be avoided. Fisheries officials should assist customs officers in conducting regular inspections of export shipments. New laws and regulations should be developed and discussed with traditional resource custodians to facilitate future compliance.

- **Foster collaborative management with resource custodians.** Collaborative management regimes should be attempted in areas where strong customary leadership and CMT exist. A stronger collaboration between Fisheries Departments, Environmental Units and non-governmental organizations (NGOs) could help ensure that field support is adequate. Fisheries staff involved in collaborative management should have the complementary scientific knowledge that villagers need in order to improve resource management in their area. Management decisions, however, should be formulated and enforced by the resource custodians whenever feasible.

- **Develop management plans for key areas and resources.** Area specific and/or species specific management plans should be prepared in consultation with resource users, and implemented so as to involve them in decision making and enforcement (e.g., through the engagement of village wardens). Legal backing can be conferred through the issuance of by-laws but care must be taken to keep management options flexible and adjustable to changing conditions.

- **Publicize good examples of local management.** In almost every PIS country, there are good examples of local-level management that should be disseminated through the media, through the granting of awards during national conservation days, and through cross-visitation by local chiefs. The recording and dissemination of traditional resource management practices needs also to be further encouraged. In particular, the financial benefits from resource management should be highlighted, as there is often skepticism and ignorance on this subject amongst policy makers.

- **Use cost-effective ways to monitor field conditions.** Full-fledged stock assessments are rarely effective for the tropical multi-species conditions of the Pacific region. Often, the type of information required for management decisions can be obtained by low-cost rapid ecological surveys and participatory rural appraisal techniques. These surveys could be complemented by structured resource utilization surveys carried out at the national level. Additional effort should also be directed to the development of regional rules of thumb for such measures as stock abundance. These guidelines can be effective in guiding local level management efforts, particularly in the absence of national or other public support.

F. A Development Strategy for Coastal Fisheries.

National development strategies for nearshore fisheries should be reviewed to take into account areas which are clearly the government's responsibility (e.g. regulation) or where public agencies hold a comparative advantage over the private and informal sectors.

Substantial public investment has been devoted to the establishment and operation of marketing and distribution centers in countries like the Solomon Islands, Tonga and Vanuatu. Given the level of private activity taking place outside these outlets, it is doubtful whether government involvement in the operation of these facilities is justified. Privatization of selected marketing and distribution centers should therefore be considered.

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[10] In Vanuatu, for example, the draft Fisheries Act specifies severe penalties for use of poison or explosives—fines of up to Vt. 10 million (US$91,000) for fishers and traders employing these practices. This probably accounted for the recent decline in these activities.

In order to develop small-scale tuna fisheries, many PIS governments have invested heavily in fish aggregation devices (FADs). Typical deepwater FADs cost between US$3,000-12,000, and last 3 to 14 months. For the most part, these costs are borne by government with no cost-recovery. Such an approach is not justified, particularly in Vanuatu, Western Samoa, Fiji and Kiritimati (Kiribati) where publicly-financed FADs are extensively used by sports fishers. There is now sufficient experience with FADs in the region to promote their privatization, and/or introduce mechanisms for cost-recovery, particularly if exclusive access rights can be granted and enforced.

PIS governments have devoted considerable public funding to promoting new fisheries. These fisheries may in fact be commercially unexploitable because ex-vessel prices in remote areas are too low to encourage fishers to raise effort levels and take advantage of economies of scale. New fisheries should not be seen as a panacea for reducing pressure on overexploited coastal resources, and public funding should only be directed to new fisheries if their economic viability has been proven.[11] In any event, the development of new fisheries should never be carried out at the expense of improved management of existing fisheries.

Training, extension and research functions should be re-evaluated to focus on those activities where national fisheries departments have a comparative advantage over the private sector or regional fisheries institutions. In Fiji, for example, the Fisheries Department is shifting the emphasis of extension services from development to management. A strengthening of regional collaboration in research could also help avoid duplication of basic research in such fields as hatchery techniques for aquaculture.

Creating an enabling environment for private investment will require streamlining procedures for license applications. This suggests a refocussing of the review process on issues which are obvious government responsibilities, namely the assessment of the implications for resource sustainability, environmental risks, and likely socio-cultural implications. In line with the recommended revised focus of the investment review process, and due to the inherent fragility of nearshore resources, it is important that technical departments and/or regional organizations be consulted on the potential environmental and socio-cultural impacts of these proposals, and that their expert opinion not be by-passed.

Experience has demonstrated that socio-cultural traditions of engaging in fishing as a part-time, opportunistic occupation must not be ignored. Coastal fisheries development programs should be designed with the understanding that these unstructured fisheries are likely to remain the prevalent pattern in the near future, and build upon these traditions to maximize their potential contribution to Pacific Island economies.

Recommendations. Based on the above discussion, it is recommended that PIS governments:

- Move towards privatization of selected marketing facilities and distribution centers, such as the regional fisheries extension centers in Vanuatu, the Natai Fish Market in Port Villa, and the provincial fisheries centers in the Solomon Islands.

- Devise cost-recovery mechanisms for the use of FADs, and promote private sector involvement in FAD construction and operation, in conjunction with the allocation of exclusive fishing rights.

- Introduce quality control and grading standards for bêche-de-mer, as any extra return from this fishery is likely to come from improving the presently low quality of the product. Appropriate regulatory measures (e.g. closed seasons) should be also be adopted to stabilize supply.

- Carry out an updated trochus marketing study to assess the competitiveness of Pacific Island products and the viability of trochus button industries in the region, with a view to formulate appropriate policy decisions.

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[11] It should be noted that in some instances, such as in Tonga, exploitation of a new fishery has been a significant source of economic growth and employment.

- In the Solomon Islands and Vanuatu, further economic analysis should be carried out on deep slope finfish to determine the optimal number of vessels that could be licensed in areas showing evidence of over-capitalization. Rotational fishing on sea mounts should be strictly enforced to allow stocks to recuperate. No exploratory licenses should be granted for the operation of foreign vessels because of the fragility of the resources[12].

- PIS governments should favor long-established operations for aquarium fish with a record of stable supply, low mortality, and use of sustainable fishing methods.

- Licenses for live reef finfish exports destined to the Asian restaurant market should be avoided and/or receive close scrutiny in view of the limited capacity of PIS governments to enforce contract agreements, and the potential for severe negative socio-economic and environmental impacts (e.g. use of cyanide poison). In areas where such operations are active, training should be provided to local resource custodians to improve their ability to monitor and enforce contract agreements.

- PIS governments should encourage low stocking rates for new black pearl culture operations in order to avoid overcapacity and gain technical experience. Stronger regional collaboration in quality control and grading is recommended to ensure that the quality reputation of Pacific black pearls is not undermined;

- Given the high rate of failure of aquaculture projects in the region, it is recommended that governments refrain from direct participation in commercial aquaculture ventures, while continuing to support appropriate research and extension, and ensuring that the environmental sustainability of new ventures are subject to careful scrutiny;

- Finally, it is recommended that a fisheries investment advisor position be established at FFA, with the explicit objective of assisting member governments in evaluating the environmental sustainability of fisheries investment proposals, and to disseminate information on their potential impacts. A regional register of investors and investment proposals should also be maintained.

[12] These proposals have been considered in both Western Samoa and Vanuatu.

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