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The recent trend in extending coastal jurisdiction to 200 nautical miles under the "exclusive economic zone"[1] concept has greatly increased the scope of national authority of developing nations. Extended coastal jurisdiction has strengthened efforts by developing nations to secure a greater share of benefits from living marine resources.[2] These developing nations now have an authoritative claim to a combined ocean area that encompasses approximately 64 percent of the world's fisheries.[3] As these developing nations begin the task of managing the living resources off their coasts, they face a range of policy options regarding the focus of development and the choice of institutional arrangements through which to pursue their management goals. The purpose of this article is to identify certain aspects of contemporary fisheries development and management regimes that may have undesired, and largely unforeseen, consequences for developing nations. Specifically, this article examines the conflict between western-oriented management theory and technique and the cultural and socio-economic dynamics of non-western coastal fishing communities. These non-western coastal fishing communities are generally engaged in small-scale or artisanal fishing,[4] producing over 33 percent

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1. The "exclusive economic zone" is an extension of coastal state authority and control beyond the traditional territorial sea. Under this principle coastal states extend their sovereignty over this area for the purpose of exploring, exploiting, conserving, and managing the living and non-living natural resources of the seabed and superadjacent waters. *See* U. N. Convention on the Law of the Sea, U.N. CLOS at Part V., arts. 55-57, U.N. Doc. A/CONF. 62/122, (1982). Prior to the advent of the Convention, fifty-nine coastal states had made unilateral declarations to establish exclusive economic zones. NATIONAL ADVISORY COMMITTEE ON OCEANS AND ATMOSPHERE, THE EXCLUSIVE ECONOMIC ZONE OF THE UNITED STATES: SOME IMMEDIATE POLICY ISSUES 25 (1984). The United States declared its own zone by presidential proclamation on March 10, 1983. *Id.* at 101.

2. *See* Lucas & Loftus, *FAO's EEZ Program: Helping to Build the Fisheries of the Future* in 3 OCEAN Y.B. 38 (M. Borghese & N. Ginsburg, eds. 1983).

3. Bell, *World-wide Economic Aspects of Extended Fishery Jurisdiction Management* in ECONOMIC IMPACTS OF EXTENDED FISHERY JURISDICTION 14 (Anderson, ed. 1977).

4. The term "small-scale," or "artisanal" fisheries refers to those communities or individuals whose fishing technology, techniques, and productive organization sharply contrast with modern, large-scale fishing enterprises or industries. Artisanal fishermen use small craft that are either rowed, sailed, or utilize low horsepower engines. Their fishing techniques and equipment were developed and passed on from generation to generation, changing little except that manufactured synthetic

of the food fish consumed worldwide and an even greater percentage of the fish consumed in the developing world.[5]

The present conceptual and institutional orientation of fisheries development and management will negatively impact these coastal communities. The present fishery models do little to guarantee the efficient utilization and preservation of fishery stocks, or to insure broad-based economic growth. Such results, however, are not predetermined. A development scheme predicated upon utilization of indigenous management systems and oriented toward local development can assure developing nations of the full benefits of their extended authority.

THE "STACKED DECK"—THE PREDICATES AND PROMISES OF CONTEMPORARY FISHERIES DEVELOPMENT AND MANAGEMENT

Policy makers in developing nations seek rational, efficient exploitation of the living marine resources off their coasts for the broad goals of national development. However, the fisheries management concepts and techniques upon which these policy makers rely are socially and economically ill-suited to address the specific needs of their coastal communities and broader national development goals. Furthermore, the international assistance regime exacerbates this mismatch by orienting fisheries development into resource exploitation patterns that inhibit long-term, broad-based development. In this section, the interrelated development and management components of contemporary fisheries development will be examined. It will be seen that these components, as presently constituted, combine to "stack the deck" of policy choices toward large-scale, export-oriented development, with only secondary consideration given to internal national needs.

The Predominant Fisheries Management Paradigm

The dominant theoretical foundation of fisheries management is the product of European and American economic thought. This system will be referred to as the "western model" in this article.

The western model begins with the proposition that fisheries must be managed to eliminate or mitigate the consequences flowing from the

materials now often replace the formerly home-produced gear. "Productive organization, community structure, and many forms of social interaction among artisanal fishermen evolved from familial and kinship ties. Their low productive potential is only partially oriented to a market economy, as a substantial part of daily catches is designated for home consumption." Sabella, *Jose Olaya—Analysis of a Peruvian Fishing Cooperative That Failed,* 53 ANTHRO. Q. 56, 57 (1980).

5. Ben-Yami, *Community Fisheries Centres and the Transfer of Technology to Small-scale Fisheries,* 19 INDO-PACIFIC FISH. COUNCIL PROC. 936, 937 (1980).

"common property"[6] nature of fisheries resources.[7] Common property is the traditional characterization of North Atlantic fisheries.[8] There are two significant consequences to the common property condition of fishery development. First, there is a tendency to waste the resource physically. Since there is no limitation on access to the fishery, nor any private ownership, there is no reason for a fisherman to limit his catch; anything left for another day's effort may be freely taken by others. Thus, there is incentive to overexploit fish stocks.[9] This may be viewed as an oceanic version of the "Tragedy of the Commons."[10] Second, there is a tendency toward economic waste. If a fishery appears profitable, it will attract new entrants, who will put additional pressure on the resource base and may depress prices by raising total catch. More significantly, a larger number of fishermen going after a decreasing stock encourages investment in larger vessels and more sophisticated gear as each fisherman is faced with the need to increase efforts to maintain his share of the available catch.[11]

The western model employs a number of management techniques to overcome the waste inherent in this view of fisheries. These techniques include limiting the quantity of fish taken, limiting the gear type or style, and limiting entry to the fishery. Limiting the catch quantity serves the economic purpose of keeping fish prices high and the conservation purpose of preventing stock depletion. Limiting gear type or style[12] may

6. The concept of "common property" is a manifestation of the principle of communal ownership dating back to pre-Norman England. *See* Juergensmeyer and Wadley, *The Common Lands Concept: A 'Commons' Solution to a Common Environmental Problem,* 14 NAT. RES. J. 361 (1974). In the modern resource management context, common property generally refers to a distribution of property rights in resources in which a number of owners are co-equal in their rights of usage. Ciriacy-Wantrup & Bishop, *'Common Property' as a Concept in Natural Resources Policy,* 15 NAT. RES. J. 714 (1975).

7. The seminal articles analyzing the "common property" characteristics of fisheries are Gordon, *The Economic Theory of a Common Property Resource: The Fishery,* 62 J. POL. ECON. 124 (1954); and Scott, *The Fishery: The Objectives of Sole Ownership,* 63 J. POL. ECON. 116 (1955). A more recent advocate of sole ownership is Keen, *Common Property in Fisheries: Is Sole Ownership an Option?,* 7 MARINE POL. 197 (1983).

8. *See, e.g.,* F. Christy, Territorial Use Rights in Marine Fisheries: Definitions and Conditions (FAO Fish Tech. Pap. No. 227, 1982).

9. This aspect of the common property nature of fisheries is described by T. Panayotou, Management Concept for Small-scale Fisheries: Economic and Social Aspects (FAO Fish Tech. Pap. No. 228, 1982).

10. In Hardin's classic metaphor, each individual pasturing his herd on common land will increase the size of the herd without concern for the communal consequences. The commons will become overgrazed, and all herders will suffer ruin. *See* Hardin, *The Tragedy of the Commons,* 162 SCIENCE 1243 (1968). Hardin's vision has been applied to the living resources of the oceans by W. HALE & D. WITTUSEN, WORLD FISHERIES: A TRAGEDY OF THE COMMONS? (Woodrow Wilson Monograph Series in Public Affairs No. 4, 1971).

11. This analysis has been applied to the Newfoundland cod fisheries in Sinclair, *Fishermen Divided: The Impact of Limited Entry Licensing on Northwest Newfoundland,* 42 HUM. ORG. 307, 308-09 (1983).

12. *E.g.,* minimum mesh sizes for gill nets.

prevent harvesting of immature fish, and thereby increase the fish size and quantity in the coming season. It also serves to limit total catch and support higher market prices. Limiting entry by means of licensing is designed to eliminate the negative effects on fishermen's incomes of over-participation and over-capitalization of fully utilized fisheries. In order to achieve economic efficiency, the western model encourages concentration of capital into fewer, more modern vessels and related technologies, with a consequent limitation on the overall labor devoted to a fishery.

The Contemporary Fisheries Development Model

The present orientation of fisheries planning for the developing world is best illustrated by the Food and Agriculture Organization (FAO) program for development and management of fisheries in exclusive economic zones.[13] The three principal objectives of the FAO program are: (1) to strengthen the capabilities of coastal countries to manage and develop their fisheries; (2) to promote rational management and full use of fisheries resources in coastal zones; and (3) to strengthen efforts by developing nations to secure a greater share of, and higher benefit from, living marine resources.[14] The FAO plan of action to pursue these objectives is two-fold. First, in order to meet the most urgent needs of the developing country, the plan of action would (a) assess national fisheries opportunities and provide technical assistance for catching, processing, and implementing business management; (b) train skilled administrators and managers for the management and development of fisheries zones; and (c) promote and mobilize funding from bilateral and multilateral sources, focusing on development and capital projects. Second, there would be a long-term analysis of development options based on social, economic, and technical studies of all aspects of fisheries.[15] The contemporary fisheries development model envisioned by FAO calls for expansion of fishing effort through capital investment, introduction of improved catch technology, expansion of processing facilities, and organization of markets.[16]

Development and Management Applied: Confronting the Mismatch

The development and management systems described above appear rationally directed toward an economic goal of efficient exploitation of fisheries stocks. When applied in many developing nations, however, the

13. The FAO program is discussed in COMM. ON FISHERIES, UN FOOD & AGRIC. ORG., FAO FISH TECH. REP. NO. 228, Report of the Thirteenth Session of the Committee on Fisheries 1-6 (1979); *see also* Lucas & Loftus, *supra* note 2.

14. Lucas & Loftus, *supra* note 2, at 62.

15. *Id.* at 63.

16. *Id.* at 63, 70-72.

systems fall far short of reaching their goal and may do substantial harm to the coastal communities.

The common property concept underlying the western model does not comport with the social and cultural realities of many coastal communities in developing nations. As such, it is not sufficiently sensitive to the contexts in which fishing occurs, or to the different patterns of human behavior and motivation that influence fishing and its consequences in non-western cultures.[17] In many communities with long maritime or fisheries traditions, fishing is characterized by a high degree of order, with social regulation of entry, catch, and gear that are well-adapted to the needs of the community and the preservation of the ecosystem. Traditional sea tenure systems have operated, and continue to operate, around the world.[18] A study of subsistence Cree fishery in northern Canada[19] found fishing practices well adapted to the sub-arctic ecosystem, which is characterized by unpredictable and large seasonal and annual environmental fluctuations. There was no rigid territorial system, thus allowing greater flexibility in catch distribution and maximizing the yield.[20] Similarly, gear was limited to small nets in order to maintain mobility.[21] Only certain areas and depths were fished and mesh size was limited, allowing regeneration of stocks and minimizing the taking of immature fish.[22]

A socially enforced territorial reef and lagoon tenure system controlled the right to fish in particular areas throughout Oceania.[23] The Oceania natives were found to be well aware of the conservation needs of the fishery and regulated taking by limiting the number of traps allowed, closing seasons and areas, and allowing escape for regeneration.[24] The system was responsive to social need; for example, temporary fishing permission was given to non-user communities which were subject to poor fishing conditions.[25] Villages would also cede the rights to surplus areas of their fishery to less fortunate villages in return for a percentage of the catch or other arrangement.[26]

The management system of Japanese fisheries combines both com-

17. Emmerson, Rethinking Artisanal Fisheries Development: Western Concepts, Asian Experiences, World Bank Staff Working Paper No. 423 at iv-v (1980).

18. *See, e.g.*, Alexander, *Innovation in a Cultural Vacuum*, 35 HUM. ORG. 333 (1975), and Iwakiri, *Mataqali of the Sea—A Study of the Customary Right on Reef and Lagoon in Fiji, the South Pacific*, 4 MEM. KAGOSHIMA U. RES. CENTER S. PAC. 133 (1983).

19. Berkes, *Fishery Resource Use in a Subarctic Indian Community*, 5 HUM. ECOL. 289 (1977).

20. *Id.* at 302.

21. *Id.* at 293, 303.

22. *Id.* at 304.

23. Johannes, *Traditional Maritime Conservation Measures in Oceania and Their Demise*, 9 ANN. REV. ECOLOGY SYS. 349 (1978); *see also* Iwakiri, *supra* note 18.

24. Johannes, *supra* note 23, at 353.

25. *Id.* at 351.

26. *Id.*

munal and private rights.[27] The community is granted exclusive rights over coastal fishing grounds by the national government, with the rights vested in a community fishery association or cooperative for a period of ten years or so.[28] All households wanting fishing rights are required to join the association, whereby they automatically acquire the privilege of fishing the communal waters.[29] The association acts as an administrative and enforcement agency with regard to communal rights.[30] The private rights reserve specific seasons, types of fishing or gear, or specific areas.[31]

In coastal communities in Sumatra, fishing rights were obtained by annual auctions for specific areas.[32] In addition, the auctions allocated use rights for fishing from platforms, dropping nets from a frame, using a motor-powered boat, and using sail-powered vessels.[33] The individual auction winner also wins the right to manage the resources in the area, including collecting user fees and buying fish from others who harvest within the auctioned area.[34]

Most of these systems are based in and enforced by social custom and are not recorded in law books. Hence, they tend to be overlooked or ignored as non-authoritative or "not legal" by western-oriented or trained fisheries planners. Yet, ignoring regulatory systems that are inextricably intertwined with the social and economic fabric of the community may preclude successful adoption of contemporary management techniques and lead to disastrous results.

Additionally, the development scheme exemplified in the FAO program outlined above calls for a funding orientation toward "efficient" harvesting, including the use of larger boats and new gear technologies.[35] Adverse impacts on the resource and the population cannot be avoided without consideration of the consequences of introducing this concept of efficiency into small coastal communities. The breakdown of traditional tenure and its socio-economic consequences has been chronicled in Pacific

27. Asada, *License Limitation Regulations: The Japanese System,* 30 J. FISH. RES. BD. CAN. 2085 (1973); *see also* Comitini, *Marine Resource Exploitation and Management in the Economic Development of Japan,* 14 ECON. DEV. CULT. CHANGE 414 (1966); and Chang, *Institutional Changes and the Development of the Fishing Industry in a Japanese Island Community,* 30 HUM. ORG. 158 (Summer 1971).

28. Asada, *supra* note 27, at 2088.

29. The rights acquired are monopolistic and are regarded as "rights in rem" (property rights). *Id.* at 2087-88.

30. *Id.* at 2088, 2090.

31. *Id.* at 2087-89.

32. The auction system is called *lelang*. W.L. Collier, Development Problems and Conflicts in the Coastal Zone of Sumatra: Swamps are for People (Sept. 18-22, 1978) (Programmatic Workshop on Land-Water Interactive Systems, given at U.N. University and Bogor Agric. Univ., Bogor, Indonesia).

33. *Id.* at 31.

34. *Id.* at 31-32.

35. Lucas & Loftus, *supra* note 2, at 63, 73.

islands.[36] In this region conversion of self-sufficient, internally regulated subsistence fishing economies to money-based export systems destroyed the conservation ethic inherent in the traditional system and put the population into an unbreakable debt-cycle.[37] The development of export markets and an individual profit motive encourages competition among the fishermen for money and more fish.[38] Therefore, the fishermen must buy better equipment and fish more diligently. No longer constrained by subsistence or local needs, fishing efforts begin to draw down the fishery stocks. As equipment becomes more sophisticated, its price rises beyond the means of local fishermen, who are forced to finance and fall into debt.[39] Additionally, employment opportunities dwindle as more efficient boats with smaller crews drive out native craft.[40]

The scenario changes somewhat in relation to the location of the fishery, the sophistication of the artisanal fishermen, the type of fish sought, and a host of other factors. However, there are certain aspects of this confrontation between local or subsistence fishing and contemporary management that seem rather constant. The contemporary scheme is based on production and conservation, whereas a prime consideration of artisanal fisheries regulation is based on distribution of catch to community members.[41] This distinction plays a critical role in the ability of contemporary development and management schemes to address the social and economic goals of local traditional fisheries. Administrative and structural configurations of the contemporary development and management models have the appearance of providing support for fisheries "growth" but seldom deliver in a meaningful manner. Examples of this failure to provide meaningful support are government-sponsored cooperative formation and gear introduction.

The studies of fishing cooperative failures are legion.[42] Several common factors have been identified with cooperative failure, stemming from central government organization and control with little regard for local systems. Local fishermen at Coopepes, Costa Rica resisted a cooperation hierarchy run by non-fishermen, with the retention of limited individual control.[43] This lack of control ran counter to their traditional, individu-

36. Johannes, *supra* note 23; *see also* Cordell, *Modernization and Marginality,* 27 OCEANUS 28 (1973); Cole, Report on Fisheries Development and Requirement of Fishery Education and Training in Malaysia, Thailand, Fiji, and the Philippines (FAO Fish Rept. No. 143, 1973).

37. Johannes, *supra* note 23, at 356.

38. *Id.*

39. *Id.* at 356-57.

40. *Id.* at 357.

41. Emmerson, *supra* note 17, at 29, i, 57; and Johannes, *supra* note 23, at 356.

42. *See, e.g.,* Poggie, *Small-scale Fishermen's Psychocultural Characteristics and Cooperative Formation,* 53 ANTHRO. Q. 20 (1980); *see also* Sabella, *supra* note 4, and McGoodwin, *Mexico's Marginal Inshore Pacific Fishing Cooperatives,* 53 ANTHRO. Q. 43 (1980).

43. Poggie, *supra* note 42, at 24.

alistic orientation.[44] This perception was based on the organization format of the cooperative, which imposed fishing locations, gear, and boat type selected by the government-appointed administrators.[45]

The same factors were cited in the failure of inshore cooperative shrimp fisheries on the Mexican Pacific coast.[46] In addition, the government withdrew substantial support to these cooperatives and curtailed their harvest when it decided to develop offshore shrimperies for export, thereby confirming the structural insensitivity of fisheries management to the local socioeconomy.[47]

Gear introduction without consideration of local socioeconomic conditions can have significant adverse impact. This situation was described in studies of traditional fisheries in Brazil.[48] The introduction of nylon nets to increase fisheries output in order to supply urban areas caused tremendous disruption of the well-developed system of traditional property rights and community regulation.[49] The new nylon gear was too expensive for the local population; therefore, urban and local businessmen purchased the nets and hired fishermen on a salaried basis to conduct the fishing.[50] The salaries were not enough to allow fishermen to save toward purchase of their own equipment, and many fishermen lost control of their traditional territories.[51]

Introduction of new gear may also upset the catch and conservation balance that has evolved over time in a given community. In Indonesia trawlers indiscriminately take a variety of non-targeted fish species and age-groups, thereby affecting the regenerative capacity of the fishery, as well as the ability of the artisanal sector to survive.[52] There have also been unsuccessful attempts to mechanize southern Sri Lanka peasant fisheries by introduction of small vessels powered by inboard engines.[53] Although the Sri Lanka fisheries were more than subsistence, a strong community ethic existed regarding catch division. Fisheries planners ignored this ethic, however, basing their efforts on the implicit assumption that the values and attitudes of the operators would be those of the urban

44. *Id.* at 20.
45. *Id.* at 23-24.
46. *See* McGoodwin, *The Human Costs of Development*, 22 ENV'T. 25 (1980), and McGoodwin, *supra* note 42.
47. *Id.* at 44.
48. Cordell, *Carrying Capacity Analysis of Fixed Territorial Fishing*, 17 ETHNOLOGY 1 (1978).
49. *Id.* at 5-6.
50. *Id.* at 6.
51. *Id.* at 6.
52. Bailey, Fisheries Resource Conflict and Political Resolution: Indonesia's 1980 Trawl Ban (Aug. 1984) (paper prepared for the 1984 Rural Sociological Soc. meeting, University of Texas at Austin).
53. Alexander, *Innovation in a Cultural Vacuum: the Mechanization of Sri Lanka Fisheries*, 34 HUM. ORG. 334 (1975).

mercantile community.[54] Furthermore, the different traditional technologies in Sri Lanka were adapted to distinct ecological niches; beach seining[55] was directed toward anchovies and sardine-like small fish, small rowing outrigger canoes handlined[56] for medium-sized mackerel and perch-like fish, while deep-sea sailing outriggers fished for tuna, mackerel, shark, and demersal (i.e., bottom dwelling) species. Introduction of the motorized fleet impacted beach seining by requiring additional anchorage space, thereby displacing a number of seiners.[57] Since seining provided subsistence income for otherwise surplus labor, displacement raised local unemployment.[58] Similarly, the mechanized craft displaced locally-built outriggers, thereby eliminating work for local craftsmen and women, as well as a number of crewmen.[59] The high cost of mechanized craft was addressed by a centralized, government-instituted borrowing scheme.[60] The fixed payments plan contrasted sharply with the flexible arrangement whereby local financiers would finance craft but allow repayment to mirror catch levels.[61] While the catch in Sri Lanka increased substantially, so did costs, unemployment, and inequality of wealth distribution in the impacted coastal villages.[62] Additionally, government technical assistance was limited to operations training, leaving the villagers with the problems of creating completely new institutions to enable them to purchase additional equipment, distribute earnings, and repair and replace worn-out and damaged mechanical equipment.[63]

The Sri Lanka situation is a strong example of how administrative and structural factors may inhibit successful implementation of contemporary fisheries management in coastal communities. The western model, in its over-reliance on economic efficiency in exploitation, ignores critical factors in the developing world that may not be as significant a problem in western or more developed nations. These factors include the lack of alternative employment opportunities in small coastal communities,[64] and

54. *Id.* at 338.

55. A beach seine is a long rectangular net weighted along the bottom (the "landline"), with wooden or cork floats along the top (the "corkline"). One end remains on the beach while the other is walked, or taken by boat, offshore. The seiners maneuver the net into a large circle, returning the floating end to the beach. The net is then hauled to the beach, retrieving whatever fish were encircled by the net and captured. A good primer on fishing gear and methodology is SAINESBURY, COMMERCIAL FISHING METHODS—AN INTRODUCTION TO VESSELS AND GEARS (1975).

56. "Handlining" is the use of a single line with baited hook.

57. Alexander, *supra* note 53, at 342.

58. *Id.*

59. *Id.* at 339, 342.

60. *Id.* at 337-38.

61. *Id.* at 339-40.

62. *Id.* at 341-42.

63. *Id.* at 335.

64. *See, e.g.*, Crutchfield, *Economic and Social Implications of the Main Policy Alternatives for Controlling Fishing Effort*, 36 J. FISH RES. BD. OF CAN. 742 (1979).

the lack of marketing facilities or infrastructure.[65] Additionally, fisheries departments in developing nations are generally staffed with western-trained or oriented technical personnel, and the management planning and institution are not geared toward inclusion of social and cultural considerations.[66]

Furthermore, the national and international structure of lending that supports fisheries development in these nations is largely biased toward large-scale, export-oriented expansion efforts.[67] Institutional support is geared in this direction for several reasons, including the general bias toward large-scale fish harvest technologies under the western approach to management[68] combined with institutional fixation on "economic efficiency" with its presumed contribution to overall economic growth.[69] Large-scale fisheries can concentrate in a few landing areas, which allows economies of scale in the provision of infrastructure and the delivery of assistance programs.[70] There is also the "visibility" factor[71] which often affects international assistance decisions.[72] Government taxation and credit policies often encourage large-scale development to the disadvantage of the artisanal sector. For example, it has been reported that government taxes on diesel fuel used by commercial trawlers are significantly lower than prices for regular gasoline used by artisanal fishermen in the Phil-

65. Such as processing plants, refrigerator trucks and equipment, and roads. *See* Ruckes, *Marketing Aspects of the Development of Small-Scale Fisheries*, 19 INDO-PACIFIC FISHERIES COUNCIL PROC. 955, 961 (1980).

66. These factors are discussed by Pollnac & Littlefield, *Sociocultural Aspects of Fisheries Management*, 12 OCEAN DEV. & INT'L L. 209 (1983). It should be noted that these problems are not limited to the developing world. Failure to consider social and cultural factors have been identified in the failure of American attempts to develop New England offshore fisheries. *See* BOERI & GIBSON, TELL IT GOODBYE, KIDDO: THE DECLINE OF THE NEW ENGLAND OFFSHORE FISHERY (1976).

67. I.e., government planners have favored large-scale and capital-intensive operations in Malaysia and Indonesia, including state-operated commercial fisheries enterprises whose activities conflict with capture by small-scale fishermen. Yahaya, *Capture Fisheries in Peninsular Malaysia: Lessons from MAJUIKAN's Experience*, 5 MARINE POL'Y 322 (1981). A similar bias has been found in Thailand. *See* Panayotou, *Economic Conditions and Prospects of Small-scale Fishermen in Thailand*, 4 MARINE POL'Y 142, 144-45 (1980).

International aid to Indonesia and the Philippines has export production as the major objective. Sfuer-Younis & Donaldson, Fishery Sector Pol'y Paper 8, 48 (World Bank, Wash. D.C. 1982); and *see* Asian Development Bank, Operations in the Fisheries Sector 5-7, Appendix 5 (Manila, 1979) (demonstrating that only 12 percent of the aid for fisheries projects prior to 1979 was for vessels less than 20 gross tons).

68. *See, e.g.*, Emmerson, *supra* note 17, at 4-5.

69. Panayotou, *supra* note 9, at 26; Bailey, *Managing an Open-Access Resource: The Case of Coastal Fisheries*, in PEOPLE CENTERED DEVELOPMENT 98 (D. Korten & B. Klauss eds. 1984).

70. Panayotou, *supra* note 9, at 26.

71. The "visibility factor" refers to the apparent desire of international assistance agencies and national decisionmakers to provide large-scale, visible products of development assistance, such as hydroelectric plants or new trawler fleets, rather than instituting low visibility, long-term growth projects such as soil replenishment or fish programs.

72. A thorough review of the mechanics of decisionmaking in one major international assistance organization can be found in PAYER, THE WORLD BANK—A CRITICAL ANALYSIS (1982).

ippines.[73] If the fuel tax structure was the same, trawlers would be incurring substantial losses instead of earning large profits.[74]

Of course, this orientation is not completely unwarranted in light of the export potential of fisheries and the cash needs of developing nations. However, the orientation substantially contributes to the negative aspects of fisheries development and masks the real costs of following the western model. The growing export orientation of developing nations fisheries regimes sheds light on the darker side of claims for a greater share in the living resources of the oceans.[75]

Although the extension of coastal state authority over fisheries resources has tremendous potential for the developing world, overreliance on export-oriented development may pass the benefits of the new system to the developed world without broad-based, lasting growth and development for the exporting nations. There is a very lively debate as to whether, or to what extent, developing nations should participate in the global economy as resource suppliers, and the effects such participation may have on their ability to provide for their own populations.[76] The fisheries development policy chosen has serious ramifications in this debate. The present policies may lead to higher gross national products for developing nations in the short-term, but the figures would hide the maldistribution of that new income and the human costs of cultural dislocation. Additionally, the overharvesting of the national fisheries for export will eventually deplete the resource or, as in the Mexican shrimpery,[77] deny it to a needy local populace.

Yet developing nations want national growth, and small-scale fishing communities are often deep pockets of poverty. Must development ignore local need? How can a development and management regime be structured to accommodate both national growth demands and strengthened local economies without the destructive results outlined above?

Steps Toward an Appropriate Fisheries Development Regime

Fisheries must not be developed in a social and economic vacuum. In order to reap the full benefits of extended coastal authority, fishery de-

73. Smith & Mines, *Implications for Equity and Management,* in SMALL-SCALE FISHERIES OF SAN MIGUEL BAY, PHILIPPINES: ECONOMICS OF PRODUCTION AND MARKETING 139 (8 ICLARM Tech. Rep.) (I. Smith & A. Mines eds. 1982).

74. I.Smith, D.Pauly & A. Mines, *Small-Scale Fisheries of San Miguel Bay, Philippines: Options for Management and Research* 11 ICLARM TECH. REP. 58 (1983).

75. *See supra* note 2 and accompanying text.

76. *See, e.g.,* Amin, *Self-Reliance and the New International Economic Order,* 29 MONTHLY REV. 1 (1977); and Nugent & Yotopoulos, *Orthodox Development Economics versus the Dynamics of Concentration and Marginalization* in PEOPLE CENTERED DEVELOPMENT 107 (D. Korten & R. Klauss eds. 1984).

77. McGoodwin, *The Human Costs of Development,* 22 ENV'T 25 (1980).

velopment must be tied to local and regional growth.[78] Otherwise, this growth will occur only as a secondary by-product to investment in other national sectors. If export earnings are received at the national or large-scale commercial level they would reach local communities in a "trickle down" manner which has rarely been shown to occur beyond theory.[79] There are many advantages to locally-centered fisheries development. First, local orientation makes distribution of benefits more likely and immediate, thus providing truly broad-based growth potential. Concomitantly, local orientation may inhibit the widening of income gaps between urban and rural coastal areas which is often the product of industrialization or large-scale development.[80] Locally-centered development may take advantage of local knowledge regarding fishery conditions and provide assistance in information gathering and enforcement functions which are vital to successful management. Strengthening the authority and ability of local fishermen to police resource use serves several primary functions. First, it encourages participation in the management of the resource and gives the population a sense that management is a proper and locally meaningful activity. As one author noted, successful management requires that "a fisherman must not be able to continue to regard regulation as some alien restraint imposed upon him for purposes he does not recognize."[81] It also relieves the government of a potentially substantial regulatory responsibility that would place additional burdens on generally understaffed and underfunded policy or fisheries enforcement departments.[82] Finally, locally-centered development that utilizes local understandings of and relationships to fisheries stocks may prevent exhaustion of those stocks and related societal disruptions.

The major criteria for an "appropriate fisheries development" model (AFD) would be a combination of production, conservation, and distribution aspects, each of which influences and affects the others. The production aspect should be redefined from strictly economic efficiency of maximum sustainable yield (MSY)[83] which does not account for the

78. *See, e.g.*, Sinclair, *supra* note 11, at 312 and Ben-Yami, *supra* note 5, at 940-41.

79. COCHRANE, THE CULTURAL APPRAISAL OF DEVELOPMENT PROJECTS 4 (1979).

80. The process of growth in metropolitan centers as a result of the appropriation of the economic surplus (e.g., earning potential from the export sale of fish) of rural communities has been described by Frank, *The Development of Underdevelopment*, 18 MONTHLY REV. 17 (1966); *see also* GONZALES-CASANOVA, DEMOCRACY IN MEXICO (Salti trans. 1970); FRANK, CRISIS IN THE THIRD WORLD (1981); and Lipton, *Urban Bias in World Development*, PEOPLE CENTERED DEV. 152-54 (D. Korten & R. Klauss eds. 1984).

81. Kesteven, *Management of the Exploitation of Fishery Resources*, WORLD FISHERIES POLICY: MULTIDISCIPLINARY VIEWS 230 (Rothschild ed. 1972).

82. *See, e.g.*, Bailey, *supra* note 69, at 101-02.

83. Maximum sustainable yield (MSY) is the largest average catch or yield that can continuously be taken from a fish stock under existing environmental conditions without over-harvesting or depleting the fish resources. *See* RICKER, COMPUTATION AND INTERPRETATION OF BIOLOGICAL STATISTICS OF FISH POPULATIONS (1975).

many social costs, to a more encompassing framework. Maximum social yield (MScY) has been suggested as a proper goal for fisheries management in developing nations.[84] MScY takes into consideration lack of occupational and geographic mobility of local fishing populations, the subsistence orientation of many artisanal or traditional fishermen, and weighs the income distributional benefits of small-scale versus large-scale operations.

In-depth understanding of conservation requirements of a species cannot be hypothecated at a national level. Since fisheries populations vary by area, season, time, and other factors, local ecosystemic knowledge must be incorporated into management regimes. As we have seen, traditional tenure and technique have an immediate relationship to species conservation, and must be investigated and employed to facilitate AFD. Artisanal techniques have tremendous production and conservation potential. For example, some species have relatively high potential yield but are spread thin.[85] Commercial harvesting either destroys large numbers of non-target stocks to retrieve these species, or spends inordinate time, effort, and fuel to do so.[86] Exploitation by artisanal fishermen makes both economic and ecologic sense in this situation. Similarly, the danger of over-exploitation of highly-prized or scarce species[87] may be lessened by limiting capture to artisanal fishermen with appropriate gear. In terms of employment potential and local development, artisanal or small-scale fisheries may have a more lasting, if more slowly-paced, effect on both local and national growth. These fisheries provide a continuous, reasonably-priced supply of fish products to rural and coastal areas and other domestic markets without expensive preservation and transportation systems. A carefully conceived and implemented plan for incremental growth of fisheries-related infrastructure at the local, then regional, level would minimize the socioeconomic and ecological disruption, and maximize the overall benefit for both the local and national communities.

Thus, a successful AFD model would require a close and continual collaboration between national or outside specialists and local communities. It would require a clarification of authority and control that would recognize the propriety of horizontal, community-wide participation and administration in order to reorient national growth away from the trickle-down theory of gross national product (GNP) statistics, and toward meaningful indices of development such as relief from poverty, unemployment, and unequal distrubution of wealth.

The basis for the AFD model would be collective management of the

84. T. Panayotou, *supra* note 9, at 3.
85. Sabella, *supra* note 4, at 62.
86. *Id.* at 62.
87. Such as grouper; *see id.* at 62.

fishery commons according to rules established by the local community.[88] The governing community body for this purpose should reflect existing local decisionmaking authority. The relevant area of control, the means of distributing catch or regulating access, and the primary techniques for harvesting should be predicated upon traditional tenures and rules which can be operative after in-depth analysis by multidisciplinary teams of specialists.[89] This is not to say that all fishing should be at artisanal levels, or that fishing communities should be encapsulated from the rest of the nation. Rather, the purpose of this local orientation is to recognize the need to mitigate the socioeconomic and ecological consequences of the rush to embrace western management and technologies. Traditional tenures and techniques have evolved over time in specific relation and balance to relevant local circumstance. Fisheries based upon community control will continue to evolve in order to fit contemporary circumstances, if this development is uninhibited by centralized government decisionmaking.

Scientific determination of MScY will be essential to incorporation of this localized fisheries regime into a national development scheme. Again with local assistance, MScY can be determined for species, area, and season. Community needs in regard to food, employment effect, and other factors may be included to determine a MScY, and to determine what part of the MScY harvest can be allocated to export without damaging the local economy. The community may also wish to allocate part of its local catch for export or other external market sales. The "surplus" catch potential within a specific area can be leased or auctioned seasonally to local or non-local concerns. User fees may fund gear replacement or upgrading, a credit pool for local fishermen with flexible repayment tied to catch, or infrastructure improvement. As harvesting increases within the MScY, the community may decide on new gear introduction. Change, of course, is inevitable and can be welcome when regulated or monitored to minimize adverse impact. Finally, both national governments and international lending and assistance institutions should "unstack the deck" and promote steady, localized development and growth of fisheries. Although the visibility may not be as high, nor the cash flow in return as immediate, such a reorientation would contribute substantially to a developing nation's ability to harvest the maximum social and economic bounty from extended coastal jurisdiction.

88. *See, e.g.*, Bailey, *supra* note 69, at 101-03.

89. *See, e.g.*, Pollnac, Investigating Territorial Use Rights Among Fishermen, (1983) (paper prepared for the Seventh International Taniguchi Symposium on Maritime Institutions in the West Pacific, National Museum of Ethnology, Osaka, Japan, Nov. 1-8, 1983).