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Eating for a Lifetime: Filling the Policy Gaps in Philippine Fisheries

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ABSTRACT

The fishery sector has become a large and dynamic contributor to Philippine agriculture. However, the sector confronts the problem of high poverty and alarming threats to its resource base. Policy responses to these problems have been implemented in recent years, but serious gaps remain. Addressing these policy gaps requires reforms that would lead to aquaculture development, bureaucratic rationalization and decentralization, the protection of aquatic habitats, the implementation of a science-based regime of fisheries management, and the promotion of diversified livelihoods among poor fishing communities. A concerted effort to address poverty and resource degradation may incur considerable short-run costs, but would likely yield larger long-term social payoffs.

INTRODUCTION

Philippine fisheries (as broadly defined) constitute a significant and growing sector within the country's agriculture. However, fishing communities remain among the poorest of the rural poor. Degradation of the environment and natural resources threatens the livelihoods of millions; on the other hand, rising domestic demand and increased foreign trade pose opportunities and challenges for a sustained expansion of the sector. Past development strategies have either overlooked fisheries, or have focused narrowly on short-term production. Fortunately, this neglect is now gradually being corrected. From the mid-1980s onward, the Philippines has emerged as a pioneer in tropical aquaculture and participatory resource management.

Numerous studies have been conducted on fisheries development, given its importance in food security, livelihood, and the country's global status as a major fish producer. Previous works that attempted to do an overall policy assessment include Gorrez et al. (1998) and de Jesus, Bondoc, and Maghirang (1998). In particular, the coastal and marine sector has been the subject of exhaustive reviews (e.g., World Bank 2005). However, there is as yet no comprehensive, policy-oriented survey of the whole sector, covering the gamut of studies

from the 1990s to the present. This paper intends to fill the gap, synthesizing this considerable literature to arrive at a sector assessment and a set of recommendations.

OVERVIEW OF PHILIPPINE FISHERIES

As an archipelagic country in the tropics, the Philippines has a rich endowment of aquatic resources. Its total marine area is 220 million hectares (ha), of which 26.6 million ha are coastal (compare with the total land area of about 30 million ha). The shelf area (with maximum depth of 200 meters) is about 18.5 million ha. The country's coastline is one of the longest in the world (17,460 kilometers). Inland water bodies (excluding fishponds) occupy nearly 0.5 million ha, nearly half of which is swampland. The fishpond area is almost 0.25 million ha, 94% of which is brackish water. The coastal population accounts for about 85% of the country's total (World Bank 2005). The country's coral reef area, the fourth largest in the world, lies at the global center of tropical biodiversity (Spalding et al. 2001).

Fisheries and the economy

Fisheries' gross value added (GVA) accounts for nearly 28% of the GVA of agriculture, fisheries,

and forestry (Table 1). The fisheries sector has moreover been growing more rapidly than the rest of the economy, hitting 8.6% growth in 2004. Fisheries are also a major source of agricultural employment (Table 2), providing the main livelihood for about 1.5 million people.

As shown in Figure 1, total fisheries production reached 3.7 million tons (t) in 2004. Over the past three decades, output has grown by an average of

3.4% per year. Using the Food and Agriculture Organization (FAO) categories, the largest share is still marine capture (56% in 2004). The smallest share is provided by inland capture (only 3.7% in 2004). Official statistics divide total capture into commercial and municipal capture (where the latter includes inland capture and catch by vessels below three gross tons). By 2005, the total capture was almost evenly divided between the two official

Table 1. Gross value added of fisheries, growth rate and share, 1989–2003 (%)

Year	Growth rate	Shares	
		Agriculture GVA	GDP
1990	3.9	25.1	4.3
1991	4.0	25.4	4.5
1992	1.2	25.5	4.5
1993	1.4	25.1	4.5
1994	1.1	24.5	4.3
1995	3.8	25.2	4.3
1996	-0.5	23.9	4.0
1997	-0.1	22.9	3.8
1998	0.7	25.1	3.9
1999	3.0	24.1	3.9
2000	4.4	24.1	3.8
2001	5.8	24.6	4.0
2002	6.5	25.4	4.0
2003	7.4	26.5	4.2
2004	8.6	27.9	4.2

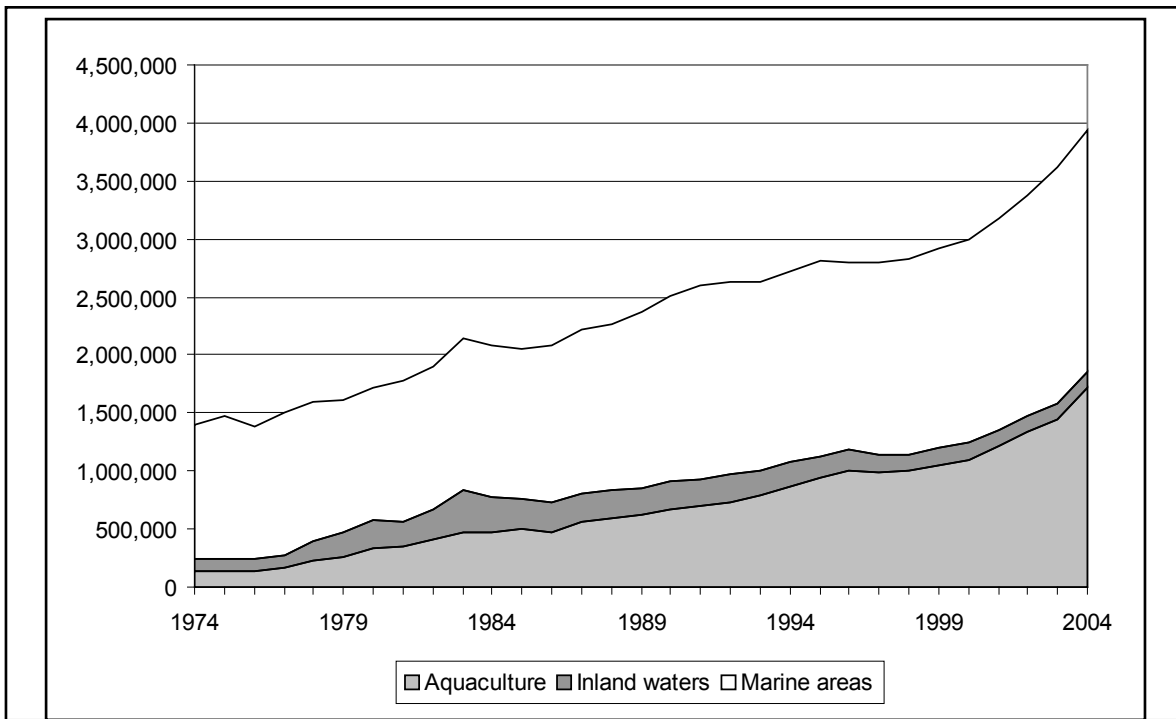
Source: National Statistical Coordination Board.

Table 2. Trade data for fisheries, 1993–2004 (US\$ '000)

Year	Total exports	Trade balance	
		Fisheries surplus	Agriculture deficit ¹
1993	499,511	404,079	113,885
1994	559,635	449,298	430,728
1995	545,650	409,336	497,444
1996	482,309	340,571	1,049,327
1997	472,464	335,294	741,149
1998	479,710	384,012	1,044,459
1999	418,844	294,956	1,287,408
2000	449,376	337,780	1,034,543
2001	414,430	343,068	985,276
2002	453,030	360,506	1,134,792
2003	464,463	378,058	938,419
2004	454,384	380,492	1,081,249

Source: Food and Agriculture Organization (2005, 2006).

¹Crops and livestock products, excluding live animals.



Source: Food and Agriculture Organization (2005).

Fig. 1 Fisheries output by production category in t, 1974–2004

categories (though in the early 1990s the share of municipal capture was almost 60%).

Aquaculture, which was initially comparable in size to that of inland capture in the 1970s, has grown rapidly to become a major contributor to fish production. This sub-sector has been averaging 8.7% annual growth over the last 30 years, compared to only 2.0% growth for marine capture. Currently, the bulk of output (about 60%) originates from the culture of *Eucheimia* seaweed.

Exports in 2004 reached US\$ 454 million, accounting for over one-fifth of all agricultural exports (Table 3). From 1990 to 2003 fisheries exports expanded by 17% (in nominal US\$). Fisheries trade balance has been positive, in sharp contrast with the rest of agriculture. Since 2003, the biggest fisheries export (in value) has been tuna, replacing shrimps and prawn. Consistently at third place is seaweed. In terms of imports, tuna is the leading fishery product, as well, recently displacing fishmeal. Other major imports are the raw materials for the canning industry, such as mackerel and sardines.

Fisheries and households

Fisheries are a significant source of food and livelihood. Data from the FAO fishery statistics estimate a per capita fish consumption of 28.8 kilograms per year (kg/yr), much higher than the global per capita consumption of 15.1 kg/yr; figures also show that about 38% of animal protein intake is from fish. However, Dey et al. (2005a), using primary data, argue that for some countries like the Philippines, the FAO data are severely underestimated. Moreover, national averages conceal the importance of fish in the diet of the poor; data show that the lowest quartile’s share of fish in animal protein intake is much higher than the top quartile’s. Likewise, de Jesus and Almazan (2002) find that a food consumption survey estimates per capita consumption of fish at about 36 kg/yr in 1993, compared to only 24 kg/yr estimated from fisheries statistics data.

The poverty profile by basic sectors computed by the National Statistics Coordination Board (NSCB) shows that the poverty incidence among

Table 3. Export and import shares of fish products (%)

	2000	2001	2002	2003
<i>Export shares (values)</i>				
Tuna	23.7	25.1	27.5	29.2
Seaweeds	16.8	15.6	14.4	15.4
Octopus	4.8	6.3	6.4	7.0
Crab	3.8	6.7	5.9	6.2
Live grouper	2.7	2.5	2.1	1.7
Others	19.7	16.4	15.9	16.4
<i>Import shares (values)</i>				
Fish meal	30.9	41.5	34.0	25.9
Tuna	18.6	11.6	17.8	39.4
Mackerel	13.7	9.3	8.3	6.5
Sardines	12.6	7.9	17.2	2.9
Squid and cuttlefish	8.7	7.9	5.2	3.4
Others	15.5	21.8	17.6	21.8

Source: Bureau of Agricultural Statistics

Table 4. Poverty Incidence by region, all sectors and fisheries sector (%)

Region	All sectors	Fisheries	
		Poverty	Region's population share
National Capital	7.6	27.9	1.7
Ilocos	35.1	57.4	5.0
Northern Luzon	30.4	24.2	1.2
Central Luzon	21.4	27.0	4.8
Southern Tagalog	19.1	33.4	6.1
MIMAROPA	45.2	54.8	7.2
Bicol	52.6	57.1	12.0
Western Visayas	44.4	60.9	9.6
Central Visayas	36.2	43.9	9.2
Eastern Visayas	45.1	36.1	7.8
Zamboanga Peninsula	44.8	53.4	2.9
Northern Mindanao	43.8	53.6	4.1
Davao	33.1	43.6	5.7
SOCCSKSARGEN	46.8	47.4	3.3
CAR	37.6	-	0.1
ARMM	59.8	66.6	14.8
Caraga	50.9	59.9	4.5
Philippines	33.0	50.8	100.0

Source: National Statistical Coordination Board (2005).

fisheries workers is higher than total poverty, or even poverty among farmers (Table 4). With few exceptions, poverty among fisheries workers is higher than regional poverty, particularly in the poorest regions. Finally, regions accounting for greater shares of the fishery population also

have very high rates of poverty among fisheries workers.

Not only are fishery-dependent households poor, they are also highly vulnerable. Fishing is one of the most dangerous of occupations; fish yield (whether from capture or aquaculture) is

unpredictable due to local conditions and climate fluctuations. Nevertheless, among rural households with access to the sea or water bodies, fishing is a household strategy to maintain subsistence as well as cope with shocks (McFadyen and Corcoran 2002).

Trends in resource degradation

Favorable production trends mask the alarming deterioration in the country's aquatic resources. By the 1990s, demersal marine biomass in major fishing areas had fallen by a range of 65% to 90%, compared to their baseline levels in the 1940s to 1970s (Silvestre et al. 2003). A large part of the stock decline is attributed to overfishing. The commercial fleet expanded rapidly in the 1960s and 1970s, although it has contracted since then (Trinidad 2003). Fishing effort has also been increasing in the municipal fisheries, based on data available for small pelagic fishes up to 1985. Catch per unit effort or CPUE (in t/horsepower/year) fell from 2.5 to 0.84 for the capture of small pelagic fishes from 1965 to 1985 (Dalzell et al. 1987). Since then, employment in fisheries, mostly in the municipal sub-sector, has risen, indicating a continuation of this trend. The average catch of a municipal fisher is now probably only 30% of 1991 levels (World Bank 2005). Meanwhile, in regard to demersal capture, CPUE fell from 1.13 to 0.42 from 1965 to 1985 (Silvestre and Pauly 1987).

Stock assessment and bioeconomic studies confirm the hypothesis of overfishing and the consequent rent dissipation. Dalzell et al. (1987) compute a maximum sustainable yield (MSY) of 544,000 t for small pelagic fishes, an output level reached back in 1975. Foregone economic rent is estimated at US\$500 million/yr (Trinidad et al. 1993). Similar figures for MSY are obtained for the same fishery by Padilla and de Guzman (1994), with foregone rent computed at about 7 billion pesos. On the other hand, for demersal capture the MSY is computed at 340,000 t, an output level that was reached in the 1970s (Silvestre and Pauly 1987). Israel and Banzon (1998) compute an MSY for of 786,000 t for commercial fisheries, which was attained in the early 1990s. The maximum economic yield is 674,000 t, implying that a 45% effort reduction is required to maximize economic rent.

The destruction of habitats is another major threat to aquatic resources. In the 1980s, 33% of coral reefs were rated as being in 'poor' condition, rising to nearly 40% in the 2000s (Tun et al. 2004). Aside from overfishing and destructive practices (such as blast and poison fishery), other sources of damage are sedimentation and dive tourism. Mangroves are also in a precarious state. Of an estimated 450,000 ha of mangrove forest in 1918, only 31% is currently standing. The biggest source of mangrove destruction is the conversion to fishponds, accounting for over half of the loss; this is followed by the harvesting of mangrove forests for fuel wood (White and de Leon 2004).

Pollution compounds the aforementioned problems. Domestic and industrial wastes, agrochemical loading, siltation/sedimentation, toxic wastes (from mine tailings), and oil pollution have affected several bays (McGlone et al. 2004). Increasing urbanization appears to be closely linked to rising pollution levels (de Guzman and Dumayas 1998). Even inland fisheries are not spared, as they are endangered by terrestrial activities and alternative water uses (Juliano 1999).

THE POLICY ENVIRONMENT

Historical background

Traditionally, virtually all fish production was marine fishing, for which the community fishing rights were in place at the barangay (village) level. Under the colonial period, municipalities largely supplanted barangays as the administrative unit; however, the absence of management led to a de facto open access (Lopez 1985). Commercialization of fisheries began in the twentieth century; by the 1970s policies began to favor increasing production, as commercial capture was classified as an investment priority (Trinidad 2003). Up to the mid-1980s, government also promoted municipal fisheries production alongside aquaculture.

By the 1980s, the consequences of a productivity-oriented thrust became apparent. Overfishing led to lower returns per unit effort, squeezing dry the profitability of fishing as a livelihood. Moreover, conflicts of resource access and use were heightened by the inducement for large-scale exploitation of aquatic resources. In commercial capture, investment incentives led

to the entry of large fishing boats with greater fishing power, extracting stocks in both inshore and offshore waters. In aquaculture, fishpond leases tended to fall into the hands of wealthy investors, as the majority of small-scale fishers lacked the funds and the know-how for brackish-water aquaculture (such as for prawn raising), nor had they the political connections to facilitate the acquisition of leases and permits (World Bank 2004). Cage aquaculture in lakes also restricted open-water fishing for municipal fishers. These inequities eventually galvanized the fisherfolks and civil society to advocate grassroots empowerment.

Legislative framework

Currently the legislative framework for fisheries is mostly contained in the Fisheries Code of 1998, the Local Government Code of 1991, and the Agriculture and Fisheries Modernization Act (AFMA) of 1997. The AFMA introduced reforms in the agriculture sector as a whole (such as in the areas of credit and extension). The Local Government Code meanwhile places resource management, including coastal and inland fisheries, under the jurisdiction of local government units (LGU). It also devolves to LGUs the provision of aquaculture support services (along with general agricultural support services), and the operation of fish ports.

Under the Fisheries Code, municipal waters consist of both inland waters as well as marine waters up to 15 km from the shore. The 0–10 km zone is exclusively reserved for municipal fishers. The Code also assigns to LGUs the task of identifying the fisher organizations which may gain the sole use of demarcated areas for capture or mariculture. It authorizes the creation of Integrated Fisheries and Aquatic Resource Management Councils (IFARMC) to cover bays, gulfs, and water bodies bounded by two or more municipalities, thus addressing the issue of shared stocks and habitats. Commercial waters, meanwhile, are placed under the Department of Agriculture (DA), the lead agency for fisheries development. Within the DA, fisheries functions are handled by the Bureau of Fisheries and Aquatic Resource (BFAR), which was reorganized as a line bureau with its own regional units.

Under the Code, fisheries management may take the form of licensing, gear restrictions, open

and closed seasons, catch ceilings, fish sanctuaries, and other instruments. Harvest is to be kept at levels consistent with MSY, to be determined according to the best available scientific information. Commercial fishery production is provided incentives towards offshore fishing, such as duty-free importation of fishing vessels, and tax rebates on fuel.

For aquaculture, the Code assigns to the DA the responsibility for the leasing of public lands to be used as fishponds. Priority lessees would be the fisher cooperatives. Lease rates are to be determined by the DA at levels consistent with resource rents. Leases are to last for 25 years, and are subject to renewal; lease income is supposed to accrue to national aquaculture research institutes. For marketing and foreign trade, the Code restricts fish importation, except for raw materials for the canning industry; the restriction can only be lifted with prior certification from the DA. Imports and exports are regulated under a permit system, while exports of fry, eggs, brood stock, and captured live fish are prohibited. The Code also provides for designation of various credit support funds as well as the reorganization of the R & D system.

Programs

Fisheries development is primarily implemented through the GMA–Fisheries program which is administered by the BFAR. Program components include rural finance, fisheries production, fisheries training and extension services, fisheries information and marketing support, research and development, fisheries infrastructure, and fisheries management. The management component aims to promote community-based coastal resource management, particularly at the bay level. It also seeks to establish marine protected areas (MPAs) as well as strictly enforce fishery laws and regulations.

Other agencies and bodies have functions closely related to fisheries, reflecting the multiple-use nature of aquatic resources, as well as the diverse government structures created in response to these multiple needs. Coastal resource management falls under the Department of Environment and Natural Resources (DENR). For municipal waters, a number of LGUs undertake their own coastal and fisheries programs, often with the support of nongovernmental organizations (NGOs) as well as donor funding. The other government agencies

involved are: the Maritime Authority and Coast Guard; the Philippine National Police, and the Armed Forces.

Within each agency, there may also be specialized offices for specific tasks. For instance, within the DA, the Philippine Fisheries Development Authority (PFDA) is in charge of fishing ports. Within the DENR, there is the Protected Areas and Wildlife Board (PAWB) to take charge of national reserves, the Environment and Management Bureau (EMB) to handle pollution and water quality, the Water Board to assign rights to inland water bodies and groundwater, and the Laguna Lake Development Authority (LLDA) to manage Laguna Lake.

ASSESSMENT OF POLICIES AND PROGRAMS

Framework for assessment

In Figure 2 we illustrate a simple framework for assessing the contributions of programs and policies to the well-being of fish-dependent households. The

two aspects of well-being are food consumption and livelihoods. Contributing to these are fisheries-related activities, related overall to value creation (that is, production, processing, and marketing). Other economic activities (under the rubric of diversification) offer alternative means of obtaining food and livelihood. Note that these two types of activities are intertwined: the diversification of livelihoods of fishers may reduce fishing pressure and protect the flow of fish catch; conversely, increasing the value creation of fisheries may permit some fishers to diversify their livelihood and food consumption.

Factors affecting the way economic activities are conducted are institutional arrangements and other policies and programs. Institutional arrangements are especially crucial for the management of natural resources. For capture fisheries, the open-access policy explains the overexploitation of renewable resources (including fish stocks) and the dissipation of economic rent.

“Other policies and programs” is a catchall for diverse measures such as credit provision, livelihood assistance, research and development, extension,

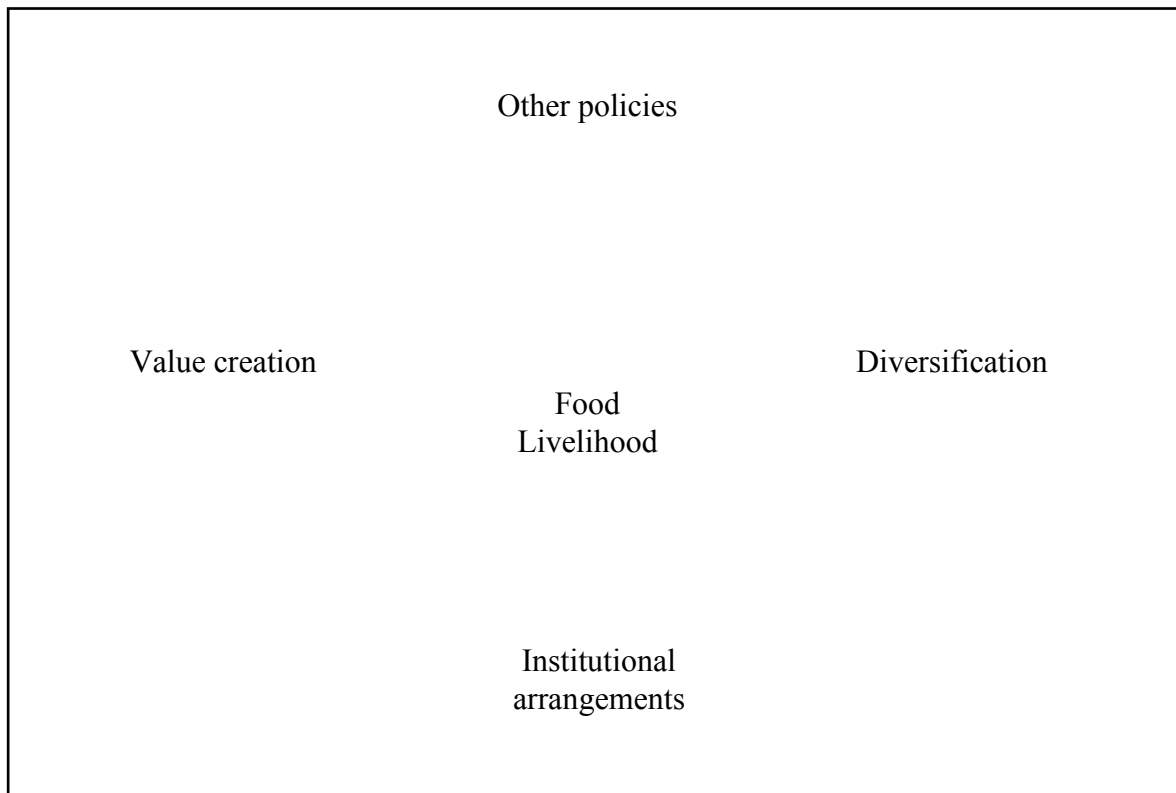


Fig. 2 Conceptual framework

infrastructure provision, and various market and trade interventions (tariffs, taxes, product standards, subsidies, and so on). The framework indicates that policies related to institutional arrangements and resource management specific to fisheries, be considered separately from other policies, which share features common to other types of economic activities promoted or restrained by government intervention.

The new institutional arrangements for managing resources

The trend in natural resource management is the adoption of community-based, collaborative approaches involving national and local governments, as well as fishing communities and NGOs. These arrangements fall in between individual rights-based arrangements, such as Individual Transferable Quotas (ITQ), and state-administered command-and-control. Experience in both developed and developing country fisheries has exposed severe flaws in command-and-control (Clark 2006). Neither are ITQs appropriate within the setting of tropical fisheries, which are often small-scale and multi-species (Squires et al. 2003). Collaborative management avoids these disadvantages and is winning increasing acceptance among governments, development agencies, and researchers (Nielsen et al. 2004).

In the Philippines, virtually all collaborative management projects are found in coastal areas. The most typical elements of community-based coastal management projects are: community organization, establishment of marine protected areas, enforcement of fishery laws, gear restrictions, rehabilitation of aquatic habitats, and livelihood generation.

These projects have at times scored tangible successes. Increases in fish catch have been observed, for example, in the Central Visayas Regional Project or CVRP (de los Angeles 1994), and the Marine Conservation Project of San Salvador (Katon et al. 1997). The Coastal Resource Management Project (CRMP) estimates that around its marine sanctuaries, fish stocks have tripled after nine years (CRMP 2004). Management of mangroves and solid wastes, protection of marine sanctuaries, enforcement of fishing laws, and protection of marine sanctuaries were cited

as the most successful elements of the CRMP. This is virtually identical to the list of successful components identified in San Salvador, and the CVRP.

Collaborative approaches do have their share of problems. First is the lack of sustainability. Pomeroy and Carlos (1997) note that among 47 community-based projects in 1984-1994, only nine continued after project completion. Many of these coastal resource management programs are initiated by, and end with the donor funding. One explanation is that community-based institutions are plagued by transaction costs and free rider problems, which may well undermine the durability of these organizations (Mustapha et al. 1998). One estimate places the share of transaction cost in total project cost to be as high as 37% (Sumalde 2004). Lack of sustainability could also be traced to the weak capacity of LGUs. The second problem arising from collaborative approaches is the lack of program replication. Again, weak LGU capacity in terms of human resources and administrative infrastructure constrains the spread of co-management approaches (World Bank 2004). Furthermore, the concept of co-management may not be welcome among some municipalities prone to elite capture.

Systems and implementation of fisheries management

Institutional weaknesses also plague fisheries management at the national level. The plethora of agencies and bodies with fisheries-related functions leads to jurisdictional overlaps, duplication of effort, lack of accountability, or outright contradictions in policies and programs. Dynamics within the bureaucracy further exacerbates the confusion, as new offices are created, or the functions of existing offices are frequently modified, weakening institutional memory and capacity (La Viña 2002).

Another serious oversight is the persistence of implementation gaps. The Fisheries Code, for example, mandates technical guidelines, such as the extraction of resource rents, and fishing at levels consistent with MSY. These guidelines are not enforced. For instance, the pricing of resources by the DA falls way below levels consistent with resource rents. This holds for both fishpond leases (White et al. 2005) and commercial vessels; neither

are the latter monitored for compliance with the principles of responsible fishing (World Bank 2005).

The control of fishing efforts to keep them at levels consistent with MSY is virtually absent. In the first place, reference points (such as MSY) have yet to be defined. The rich information collected by the National Stock Assessment Program remains underutilized for the purpose of setting reference points and monitoring fish stocks.

At the LGU level, there are a few instances of fisheries management measures. General Santos City, for example, imposes size restrictions on tuna fishery to avoid recruitment overfishing. Zamboanga City implements open and closed seasons within its coastal waters. On the whole, however, the lacuna in fisheries management is quite obvious for most municipalities and cities. The systematic administration of municipal waters presupposes a formalized system of registered users. However, municipalities have largely failed to formalize the municipal fisheries system, again due to weak capacity and the sheer magnitude of the informal sector to be regulated. Campos et al. (2003) for instance find that 84% of municipal fishers in Lamon Bay operate without a license. Furthermore, where licensing is implemented (as in Sarangani Bay), fees are merely seen as a means to generate income and not as a tool for fisheries management or generating economic rent (Elazegui et al. 1998).

Interestingly, management gaps persist even for the much-touted co-management schemes. It is fair to say that effort reduction is not an explicit objective even in community-based approaches. One gains the impression that such projects have focused almost exclusively on the rehabilitation of reefs and mangroves, combined with MPAs and the elimination of illegal fishing, to improve fish stocks. These measures are certainly beneficial, though whether they are sufficient is another matter. Bundy and Pauly (2001), in a study of San Miguel Bay, demonstrate that municipal fishers contribute more to the reduction of fish abundance than commercial trawlers.

De los Angeles (1994), using regression analysis, notes the ambiguous effect of the CVRP on fishing effort: while greater community involvement in coastal resource management tends to be associated with lower fishing effort,

the infrastructure and technology interventions of the CVRP led to higher fishing effort (for example, better roads may improve access to fishing grounds). De Guzman (2004), in another study of Danao Bay, points out that the catch per unit effort and profitability remain low, despite the presence of an MPA. In fact, Danao Bay remains essentially an open-access fishery, without curbs on fishing effort.

VALUE CREATION PROGRAMS

One of the strengths of the fisheries value chain is an open and competitive marketing environment (despite popular belief to the contrary). A 2005 Asian Development Bank (ADB) study on the domestic freshwater fish market found that in 1997-2001, real marketing margins fell 7% annually as free entry forced inefficient traders out of the market. Farmers could expect to receive no less than 50% of the retail price. This market structure characterization probably holds for most domestic fish markets in the country.

For foreign trade, the restrictions imposed by the Fisheries Code on imports and exports appear stringent, on paper. However, calculations of the effective protection rate (almost identical to the nominal protection rate) arrive at low estimates of protection, around 4.3% in 2004, down slightly from 6.3% in 1999. Tariff protection on fish products is also low; in 2004, rates for fish ranged from 1% to 15%, averaging 6.9%; the rates for processed fish were 3% to 15%, averaging 9.8% (World Trade Organization 2005). Domestic markets are therefore fairly open to international trade, though concerns remain about tariff escalation, as well as the continuing penalization—dating back from the late 1990s—experienced by sub-sectors such as tuna, seaweed, and milkfish (Gonzales et al. 1998).

Problems begin to be observed as we move back up the supply chain. The list of problems henceforth resembles those besetting agriculture, as a whole. In the post-harvest stage, wastage is pervasive, owing to insufficient preservation and handling facilities, particularly in fishing ports. Post-harvest losses may amount to as much as 40% (Platon and Israel 2001). Municipal ports are burdened by a large demand in excess of their limited facilities. Ice plants or warehouses are small, dilapidated, or absent, particularly in areas

where power supply is highly irregular. In some cases, there is no choice but to turn over fresh fish to those undertaking traditional preservation and processing for the domestic market, so as to avoid deterioration in the ports. In contrast, regional ports (of which there are only seven in the country) are underutilized due to inadequate commercial catch (Israel and Roque 2000).

For the modern processing sub-sector, technological development and adoption has been quite rapid; this is especially true for large and medium-size firms processing tuna, seaweed, prawn, and milkfish (Pabuayon, Musa, and Espanto 1998). The major issue here is market access and export requirements, both domestically and abroad, with respect to food safety and environmental standards. Compliance typically favors large-scale operations (Dey et al. 2005b), which already enjoy economies of scale in processing, export logistics, and marketing, thereby making it difficult for small-scale traditional processors to penetrate the foreign market.

On the production side, a persistent problem is the prevalence of low yields in aquaculture (Platon and Israel 2001). Rising aquaculture output is the result of area expansion rather than yield increase; technical inefficiencies exist in the production of key commodities such as milkfish, tilapia, and shrimp (de Jesus, Bondoc, and Almazan 2005). This has been attributed mainly to insufficient investments in the generation and dissemination of appropriate technologies, interacting with resource constraints, in terms of access to credit and lack of know-how in the use of modern technologies.

Funding for agricultural research is infinitesimal, gauging by the research intensity ratio (percentage of research and extension expenditure in agriculture GVA), which is among the lowest in the Asian region. Within agriculture, the fishery sector is even more disadvantaged, receiving less than 4% of the total allocation for agriculture and natural resources, far lower than its share in agricultural GVA (Israel 1999).

The BFAR has a number of technology centers and their staff conduct farm visits and provide technical assistance to fish farmers within their respective vicinities. Given their limited geographic coverage, most of the country's fish farmers would have to be served by municipal extension agents; however, few municipalities provide adequate

support or assign priority to aquaculture extension (Yap 1999).

Credit for fisheries is also severely constrained. Banks are reluctant to lend to smallholders due to transaction costs, risk, and the absence of assets that could be used as collateral (such as land). Within agriculture, fisheries suffer from a lopsided allocation. The sector accounts for only a minuscule portion of loans extended by existing agricultural credit programs for small borrowers. The credit and guarantee schemes mandated under the Fisheries Code have not been funded.

RECOMMENDATIONS

Value creation programs

As discussed in the foregoing, value creation programs in fisheries are plagued by the same problems as the rest of agriculture, only more acutely. The remedy, therefore, parallels the usual list of agriculture sector reforms, with resources and investments directed to fisheries commensurate to its importance within agriculture (for example, congruent to its share in agricultural GVA).

More resources need to be channeled to public fisheries research. The additional funds should be allocated to the various commodities and research problems, following a rigorous, stakeholder-led priority-setting exercise. Resources should be invested to improving the extension system. Extension reform should recognize the roles played by both local governments and the private extension system, as exemplified by after-sales service of production inputs such as seed, fertilizer, and feed (ADB 2005). National-local extension collaboration needs to be oriented towards new technologies and locations with high aquaculture potential, but for which the private extension system is weak or nonexistent. Such pioneering efforts should focus on the more environmentally-friendly forms of aquaculture, rather than the common forms such as milkfish and prawn culture.

For milkfish and other key commodities, the role of central hatcheries (operated by the DA) should be actively supported. These central stations are the hub of the system: the center maintains the breeding nucleus, conducts research, and facilitates the dissemination of hatchery technologies and practices. Ultimately, however, the task of

disseminating quality seed should be performed by privately-owned satellite hatcheries. This “pyramid” system is already being followed, though the dissemination mechanism requires further strengthening. Research partnerships between private and public sectors should be expanded and institutional arrangements streamlined (Acosta et al. 2006). In particular, LGUs should widen their role in seed dissemination, by investing in know-how, logistics and facilities to promote the access of local hatcheries to seeds from the central stations.

With respect to credit, resource flows should be considerably increased to fund fisheries programs. Lending through microfinance providers can target the poor in fisheries, although livelihood projects should not be limited to fisheries; these programs can in fact encourage diversification, that is, activities outside of capture fisheries. (We shall be returning to this point later.) Lending through banks would probably target livelihoods in fish farming and processing, though options for collateral substitution should be carefully explored, say, by the expansion of the aquaculture insurance program.

For the post-harvest system, one vital intervention is upgrading the country’s municipal fishing ports. Port development though should fit within the context of a larger, integrated coastal development plan. In general, a port should not be built where it will encourage increased fishing pressure on dwindling stocks (Israel and Roque 2000), nor endanger fragile aquatic habitats (such as coral reefs). There is a clear private sector interest in investing in improved port facilities, if the future returns (from post-harvest losses avoided) are really high. Hence, private sector participation in port development should be encouraged; government cooperation would be needed to ensure the quality and availability of critical infrastructure such as power distribution and freshwater supply, and ease the regulatory environment for private fishing port investments.

In markets and trade, a few remaining steps towards trade liberalization still need to be taken. These involve lifting the prohibitions against imports and the export of live fish and fry, and continued tariff reduction, in transition to setting uniform minimal rates. Allowing the entry of cheap imported fish (subject to the usual food safety standards) would lower costs and maintain a reliable

flow of raw material for the fish processing and canning industry. It would also keep domestic fish prices down, benefiting consumers, promoting food security, and protecting domestic fish stocks.

Industry representatives and some NGOs are predictably opposed to tariff reduction under the current WTO round of negotiations, let alone the lifting of import restrictions. One common objection is rooted in the fact that developed countries offer enormous subsidies to their domestic fisheries, thus depressing the prices of fish imports. Domestic suppliers are adversely affected. These costs, however, need to be weighed against gains to consumers, due to cheaper imports, and to improved prospects for resource sustainability, owing to lower domestic production.

Institutional arrangements and resource management

The first set of recommendations is related to the public administrative system for fisheries. The promotion of grassroots democracy has admittedly produced mixed results; however, the dramatic improvement in governance in selected localities is encouraging. Rather than reversing devolution, the policy thrust should be to strengthen devolution by filling up the capacity gaps of LGUs. This recommendation hinges on a broader initiative to address a wide array of LGU constraints, such as the inadequacy of the Internal Revenue Allotment, the weakness in local resource mobilization, and the dearth of trained professionals in the LGU hierarchy. The regional and national offices of the DA should aim at human resource and institutional development at the level of provincial and municipal LGUs, rather than supplanting their roles.

Deeper reexamination of the institutional set-up is warranted. The organization of government functions with respect to aquatic resources management needs to be rationalized. The process of rationalization should cover not only intra-agency issues (such as within the DA), but also interagency issues. For instance, the protection of open access or common pool resources is primarily the task of the DENR. The DA, which has a fundamental mandate of assuring food security and promoting food production, may not be in the best position to administer that protection. This suggests that the fishery resource management functions of the

DA (inclusive of the leasing of public lands for fish farming), be moved to the DENR. Of course, productivity and value creation programs (covering R & D, technology dissemination, credit, regulation, and so forth) should remain within the DA.

The second set of recommendations relates to resource management. At the national level, one area for immediate reform is the allocation and pricing of fishpond leases. Lease rates (now set at low levels) should be drastically increased; fishery cooperatives should be actively supported and prioritized in receiving leases. Ideally, to help secure a constituency for this measure, the revenue from the leases should be allocated in part to LGUs and community organizations tasked with mangrove rehabilitation.

National government initiative is essential to the creation and strengthening of IFARMCs to implement ecosystem-based fisheries management. Fisheries management should go much farther than this, though; the national government should actively pursue the imposition of science-based catch limits and effort reduction. The catch limits should be set and adjusted over time to achieve MSY, for major fish stocks. Government can initiate this process on a predetermined short-list of priority fish stocks throughout the country, and gradually expand the list until all major fishing areas and stocks are covered. In addition, aside from supporting fisheries management, stock assessment and monitoring can also assist the commercial fishing industry to reduce risks and operating costs from venturing into deep-sea fishing.

Implementation of these management measures in municipal waters involves LGU cooperation. Coastal LGUs may initiate their greater involvement in fisheries management through the formulation of a coastal management plan, following the model of successful programs (such as the CRMP). The plans must include provisions for bringing in municipal fishers into the formal sector, where they can be regulated. In short, LGUs should de-legitimize the prevailing status quo of unlicensed municipal fishing. A clear incentive for them to do so would be the additional revenue to be generated by the license fees. An active information campaign, elicitation of support and compliance from the affected community, credibility in the stewardship of government funds, and simple political will are

needed to formalize and manage the municipal fisheries.

Community-based management has done fairly well in resource rehabilitation, establishment of MPAs, and curbing illegal fishing. It is natural to recommend expanding such programs. As community participation is a key ingredient in program success (Pollnack and Pomeroy 2005), community-organizing (often by NGOs) should be an essential activity. Program sustainability for donor-funded projects can be factored into project design; for example, donor-funded coastal management projects may require that the local counterpart be increasing over the course of project implementation.

With the prodding of LGUs and the national government, communities may begin to take on a task they have hitherto avoided – the reduction of fishing effort. This should extend not only to outside encroachment, but more importantly, within the community itself. Effort reduction at the community level would be essential for implementing the nationwide imposition of catch limits.

A crucial ingredient of effort reduction is the reliance on incentives, rather than on coercion. Resources should be made available to encourage some of the fishers to exit permanently. Coordination with livelihood diversification programs (especially in microfinance) mentioned earlier will be required. A particularly inviting target group would be new or part-time fishers, who employ fisheries as an alternative or fallback livelihood. Since households with occupational flexibility may find it easy to re-enter, the provision of territorial use rights for a community organization is essential to sustaining the gains from effort reduction. Conferment of these rights should be made conditional on the organization consistently enforcing fishery rules and catch limits.

What is envisioned in this recommendation is no less than a well-funded, nationwide program of coastal management incorporating effort and capacity reduction, over both commercial and municipal waters, at the national and local scales. Clearly, such an effort would require a broad, interagency, multi-stakeholder approach, and considerable investments up front (especially for incentive-based withdrawal from fishing). However, the initial investments would make

perfect economic sense in view of the enormous rents and other use values to be recovered from improved management. White and Trinidad (1998) offer the example of a typical bay, covering an area of 10 km², restored to its healthy state. Annual benefit flows amount to at least 15.2 million pesos (as of 1998), whereas annual management costs (inclusive of enforcement measures) are only around 1.36 million.

CONCLUDING REMARKS

This paper has highlighted two striking paradoxes of the fisheries sector. The first is the paradox of poverty: despite the tremendous economic progress of the sector, most fishery-dependent households remain destitute. This attests to both the inequitable distribution of economic benefits as well as the massive population pressures bearing down on the sector. The second is the paradox of productivity: in both capture fisheries and aquaculture (particularly in brackish-water areas), large increases in production conceal a deteriorating resource base, dissipating resource rents and threatening the collapse of fish stocks.

These problems are well-recognized, and policies have been formulated in response. Many of the reforms have scored noteworthy successes; however, it is also acknowledged that much more needs to be accomplished. Large gaps in implementation remain, and the policy inertia can be frustrating. This inertia is due less to ignorance, and more to the difficult options that present themselves, namely: one, to maintain the status quo and its attendant paradoxes; the other, to incur and inflict short-term costs, forcing the dislocation of some sub-sectors, to win long-term social gains. The sharing of these benefits is nonetheless a key to forging a consensus for reform among the diverse and competing stakeholders.

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REFERENCES

- Acosta, B., R. Sevilleja, M. Gupta, B. Rodriguez, T. Abella, and M. Tayamen. (2006). "Public and Private Partnerships in Tilapia Research and Development: An Overview of Philippine Experience". In B.O. Acosta, R.C. Sevilleja, and M.V. Gupta, eds. *Public and Private Partnerships in Aquaculture: A Case Study on Tilapia Research and Development*. WorldFish Center Conference Proceedings, 72 p.
- Asian Development Bank. 2005. "An Evaluation of Small-Scale Freshwater Aquaculture Development for Poverty Reduction". Operations Evaluation Department, Asian Development Bank, Manila, Philippines.
- Bundy, A. and D. Pauly. 2001. "Selective Harvesting by Small-scale Fisheries: Ecosystem Analysis of San Miguel Bay, Philippines". *Fisheries Research*, 53(3): 263-281.
- Campos, M., B. Pantoja, N. Manalili, and M. Bravo. 2003. "Economic Evaluation of Fishery Policies in Lamon Bay, Quezon, Philippines". Research Report 2003 RR9. Economy and Environment Program for Southeast Asia (EEPSEA), Singapore.
- Clark, C. 2006. "Fisheries Economics: Why Is It So Widely Misunderstood?" *Population Ecology*, 48(1): 95-98.
- Coastal Resource Management Project (CRMP). 2004. "Completion Report: the Coastal Resource Management Project 1996-2004." CRMP – DENR [Department of Environment and Natural Resources], Cebu City, Philippines.
- Dalzell, P., P. Corpuz, R. Ganaden, and D. Pauly. 1987. "Estimation of Sustainable Yield and Maximum Economic Rent from the Philippine Small Pelagic Fisheries". Technical Paper Series 10(3). WorldFish Center, Penang, Malaysia.
- De Guzman, A. 2004. "A Fishery in Transition: Impact of a Community Marine Reserve on a Coastal Fishery in Northern Mindanao, Philippines". Research Report 2004 RR6. EEPSEA, Singapore.
- De Guzman, P., and E. Dumayas. 1998. "The Impact of Urbanization on the Marine Environment and Welfare of Small Municipal Fisherfolks". Policy Paper Series No. 98-04. Philippine Council for Aquatic and Marine Research and Development (PCAMRD), Los Baños, Laguna, Philippines.

- De Jesús, C., L. Bondoc, and C. Almazan. 2005. "Attaining Maximum/Optimum Productivity in Aquaculture: The Next Best Alternative". Policy Paper Series 05-01. PCMARD, Los Baños, Laguna, Philippines.
- De Jesus, C., L. Bondoc, and M. Maghirang. 1998. "Policy Research in the Fisheries Sector: Status, Direction, and Priorities". Policy Paper Series 98-06. PCMARD, Los Baños, Laguna, Philippines.
- Dey, M., M. Rab, F. Paraguas, S. Piumsumbun, R. Bhatta, M. Alam, and M. Ahmed. 2005a. "Fish Consumption and Food Security: A Disaggregated Analysis by Types of Fish and Classes of Consumers in Selected Asian Countries". *Aquaculture Economics and Management*, 9(1-2): 89-111.
- Dey, M., M. Rab, K. Jahan, A. Nisapa, A. Kumar, and M. Ahmed. 2005b. "Food Safety Standards and Regulatory Measures: Implications for Selected Fish-Exporting Asian Countries". *Aquaculture Economics and Management*, 9(1-2): 217-236.
- Elazegui, D., M. Paunlagui, C. Arteaga, and J. de Luna. 1998. "The Impact of the Local Government Code on Governance of Fishery Rights". Policy Paper Series No. 98-03. PCMARD, Los Baños, Laguna, Philippines.
- FAO. 2005. *FAO Fishstat v. 2.3*. <http://www.fao.org>. Accessed 15 May 2006.
- FAO. 2006a. *FAOstat – Agriculture*. <http://faostat.fao.org>. Accessed 15 May 2006.
- Gonzales, L., P. Alviola, V. Gonzales, and C. Elca. 1998. "Impact of Macropolicies on Fisheries Export Winners". Policy Paper Series 98-01. PCMARD, Los Baños, Laguna, Philippines.
- Gorrez, D.D., E.D. Gonzalez, and F.R. de Jesus. 1999. *A Rational Approach to the Development of the Fisheries Sector*. PCMARD Book Series No. 25, Los Baños, Laguna, Philippines.
- Israel, D. 1999. "Research and Development in the Philippine Fisheries Sector". Discussion Paper No. 99-17. Philippine Institute for Development Studies (PIDS), Makati City, Philippines.
- Israel, D. and C. Banzon. 1998. "Overfishing in the Philippine Commercial Marine Fisheries Sector". Research Report No. 1998-01. EEPSEA, Singapore.
- Israel, D. and M. Roque. 2000. "Analysis of Fishing Ports in the Philippines." Discussion Paper No. 2000-04. PIDS, Makati City, Philippines.
- Juliano, R. 1999. "Inland Fisheries in the Philippines: Its Development, Management, and Future". In R. Guerrero III, ed. *100 Years of Philippine Fisheries and Marine Science 1898-1998*. PCMARD, Los Baños, Laguna, Philippines.
- Katon, B., R. Pomeroy, and A. Salamanca. 1997. "The Marine Conservation Project for San Salvador: A Case Study of Fisheries Co-management in the Philippines". WorldFish Center and Haribon Foundation, Inc., Manila.
- La Viña, A. 2002. "Community-Based Approaches in Marine and Coastal Resources Management in the Philippines: A Policy Perspective". In M. Torrel, and A. Salamanca, eds. *Institutional Issues and Perspectives in the Management of Fisheries and Coastal Resources in Southeast Asia*. WorldFish Center, Penang, Malaysia.
- Lopez, M., 1985. "Notes on Traditional Fisheries in the Philippines". In K. Ruddle and R. Johannes, eds. *Regional Seminar on Traditional Knowledge and Management of Coastal Systems in Asia and the Pacific*. United Nations Educational Scientific and Cultural Organization (UNESCO), Jakarta.
- Macfadyen, G., and E. Corcoran. 2002. "Literature Review of Studies on Poverty in Fishing Communities and of Lessons Learned in Using the Sustainable Livelihoods Approach in Poverty Alleviation Strategies and Projects." Fisheries Circular No. 979, FAO, Rome.
- McGlone, M., G. Jacinto, I. Velasquez, and D. Padayao. 2004. "Status of Water Quality in Philippine Coastal and Marine Waters". In Department of Agriculture –Bureau of Fishery and Aquatic Resources (DA-BFAR). In *Turbulent Seas: The Status of Philippine Marine Fisheries*. CRMP, Cebu City, Philippines.
- Mustapha, N., K. Viswanathan, and R. Pomeroy. 1998. "Transaction Costs and Fisheries Co-management". *Marine Resource Economics*, 13 (2): 103-114.
- Nielsen, J., P. Degnbol, K. Viswanathan, M. Ahmed, M. Hara, and N. Mustapha. (2004). "Fisheries Co-management – An Institutional Innovation? Lessons from South East Asia and Southern Africa." *Marine Policy*, 28: 151-160.
- National Statistics Coordination Board (NSCB). 2005. "Development of Poverty Statistics for the Basic Sectors". NSCB, Makati City, Philippines. Mimeo.
- Pabuayon, L., D. Musa, and L. Espanto. 1998. "Diversification

- and Integration in the Philippine Fishery Sector: Implications for Microenterprise Development, Efficiency, Equity, and Environmental Sustainability". Policy Paper Series 98-02. PCAMRD, Los Baños, Laguna, Philippines.
- Padilla, J. and F. De Guzman. 1994. "Fishery Resources Accounting in the Philippines: Applications to the Small Pelagic Fisheries". Philippine Environmental and Natural Resources Accounting Project: Phase II. Quezon City, Philippines.
- Platon, R. and D. Israel. 2001. "The Bangkok Declaration and Strategy for Aquaculture Development: Beyond 2000 and Philippine Aquaculture". Discussion Paper No. 2001-21. PIDS, Makati City, Philippines.
- Pollnac, R. and R. Pomeroy. 2005. "Factors Influencing the Sustainability of Integrated Coastal Management Projects in the Philippines and Indonesia". *Ocean and Coastal Management*, 48(3-6): 233-251.
- Pomeroy, R. and M. Carlos. 1997. "Community-based Coastal Resource Management in the Philippines: A Review and Evaluation of Programs and Projects, 1984-1994." *Marine Policy*, 21(5): 445-464.
- Silvestre, G. and D. Pauly. 1987. "Estimate of Yield and Economic Rent from Philippine Demersal Stocks (1946-1984) Using Vessel Horsepower as an Index of Fishing Effort." Technical Contribution No. 418, WorldFish Centre.
- Silvestre, G., L. Garces, I. Stobutzki, M. Ahmed, R. Valmonte-Santos, C. Luna, and W. Zhou. 2003. "South and South-east Asian Coastal Fisheries: Their Status and Directions for Improved Management". In G. Silvestre et al., eds. *Assessment, Management and Future Directions for Coastal Fisheries in Asian Countries*. WorldFish Center Conference Proceedings 67.
- Spalding, M., C. Ravilious, and E. Green. 2001. *World Atlas of Coral Reefs*. Berkeley: University of California Press.
- Squires, D., I. Omar, Y. Jeon, J. Kirkley, K. Kuperan, and I. Susilowati. 2003. "Excess Capacity and Sustainable Development in Java Sea Fisheries". *Environmental and Developmental Economics*, 8(1): 105-27.
- Sumalde, Z. 2004. "Transaction Costs of Community-based Coastal Resources Management: The Case of San Miguel Bay, Philippines". *Coastal Management*, 32(1): 51-60.
- Tan-Garcia, Y., M. Dey, and S. Navarez (2005). "Demand for Fish in the Philippines: A Disaggregated Analysis". *Aquaculture Economics and Management*, 9(1-2): 141-168.
- Trinidad, A. 2003. "Socioeconomic and Bioeconomic Performance of Philippine Fisheries in the Recent Decades". In G. Silvestre et al., eds. *Assessment, Management and Future Directions for Coastal Fisheries in Asian Countries*. WorldFish Center Conference Proceedings 67.
- Trinidad, A., R. Pomeroy, P. Cruz, and M. Agüero. 1993. "Bioeconomics of the Small Pelagic Fishery". International Center for Living Aquatic Resources Management (ICLARM) Technical Report 38.
- Tun, K., L. M. Chou, A. Cabanban, V. S. Tuan, T. Yeemin, Suharsono, K. Sour, and D. Lane. 2004. "Status of Coral Reefs: Coral Reef Monitoring and Management in Southeast Asia". In C. Wilkinson, ed. *Status of Coral Reefs of the World: 2004*. Australian Institute of Marine Science, Queensland.
- White, A., and R. de Leon. 2004. "Mangrove Resource Decline in the Philippines: Government and Community Look for New Solutions." In DA-BFAR, *In Turbulent Seas: The Status of Philippine Marine Fisheries*, pp. 84-89. CRMP, Cebu City, Philippines.
- White, A. and A. Trinidad. 1998. *The Values of Coastal Resources: Why Protection and Management are Critical*. CRMP, Cebu City, p. 96.
- World Bank. 2004. *Philippines Environment Monitor 2004: Assessing Progress*. World Bank Country Office Philippines, Pasig City.
- World Bank. 2005. *Philippines Environment Monitor 2005: Coastal and Marine Resource Management*. World Bank Country Office Philippines, Pasig City.
- World Trade Organization (WTO). 2005. "Philippines: Trade Policy Review." WTO, Geneva.
- Yap, W. *Rural Aquaculture in the Philippines*. Publication No. 1999/20, Regional Office for Asia and the Pacific, Food and Agriculture Organization (FAO), Bangkok.

