The implication of the inappropriate waste management system in Metro Manila is exacerbated several fold in over nearly 30 major human settlements in the country. Aside from Metro Manila, Metro Cebu and Davao City with urban populations of over one million people also experience similar conditions.

This insufficiency of sewage treatment facilities is also paralleled in the lack of a solid waste disposal system. For example, only 60-70 per cent of daily solid waste generated is collected and absorbed in dumpsites and landfills. The rest is burnt or immediately dumped as waste in tributaries and coastal waters. It is interesting to note that in the solid waste generation of 0.2 kg day, 1. 43 per cent consists of putrescible matter (i.e., included in the list of toxic and hazardous waste)(NCSO 1983).

In the Batangas Bay Region (ENROPGB 1996), solid waste is accumulated for the following reasons:

1. Inadequate dump sites;
2. Low collection efficiency;
3. Random dumping of uncollected waste;
4. Wastes from ships especially domestic passenger vessels;
5. Absence of incinerators;
6. Lack of collection fleets;
7. Narrow roads for large garbage vehicles;
8. Irregular street sweeping and open drain cleaning;
9. Lack of incentives and penalties to implement waste minimization, segregation and recycling.

The social cost of absorbing the sewage and solid waste is as yet not clearly defined. There is a need to clarify who would absorb the responsibility, either civil society or the Government for the sharing of allocations. There is a need for planning the financial allocation for the public and private sector cost sharing for the establishment of a comprehensive waste disposal system. This should include waste minimization and recycling programmes at the local, regional and national levels.

### 4.1.2 Agrochemical loading

The livestock waste as of the moment has no clear limits in terms of the stocking density of poultry and livestock. No limits in poultry and livestock density leads to excessive and unregulated livestock waste. Since there are no estimates and regulations for the cumulative effects of this agrochemical input, then an integrated system similar to the programmatic EIAs may be needed to deal proactively with these problems.

Farm inputs, fertilizers (for example, urea and NPK) and pesticides (for example, insecticides, herbicides and molluscicides) have no clear guidelines on what are the proper crop and livestock raising practices. In effect legal controls of waste from farm outputs become voluntary and may be susceptible to consumer preferences and pressure. Pesticide and nutrient inputs are considered primarily for production without sufficient controls on environmental impacts. Regulation and control of pesticide manufacture is also necessary to limit the impact of this issue.

### 4.1.3 Siltation/sedimentation

Natural coastal erosion and sedimentary depositional shift as well as recreational and coastal activities primarily lead to heavy siltation and sedimentation in low lying areas or depressions, rivers and coastal areas (for example, Manila Bay, Lingayen Gulf, Cebu and Marinduque). Aside from natural factors, intensified deforestation and subsequent land conversion is a major source of these problems.

Strict implementation of laws regarding illegal logging activities is needed to minimize its effect. In addition, adaptation of proper and adequate soil erosion measures in the specific area of concern and land use planning should be instituted.

### 4.1.4 Organic pollution in terms of biological oxygen demand (BOD)

Deocadiz (1997) enumerated the five major manufacturing industries (food processing; sugar mills, refineries and distilleries; desiccated coconut and coconut oil mills; pulp and paper; and textiles) that contribute largely to the organic pollution load in rivers and streams and coastal areas. In addition, waste generated by these industries (for example, food processing) also includes effects on the COD, suspended solids and nutrients. The removal of these nutrients in the wastewater treatment facilities is not given proper care and importance and is often neglected. Significant discharges from the manufacturing process need monitoring and control to minimize organic pollution loadings.

### 4.1.5 Toxic and hazardous waste [THW] including heavy metals and mine tailings

Most manufacturing industries (for example, mining and processing factories) have insufficient waste disposal mechanisms and unsafe practices owing to the lack of capacity of the public and private sectors to monitor, evaluate and control these practices. For example in 1993, over 11,000 manufacturing industries existed with over half of these in Metro Manila. The major THW contributors by industry sector are chemicals, food and drink, and textiles which accounted for over 50 per cent of the total THW loading in Metro Manila, Region 3 and 4. It was observed that liquid THWs are currently discharged in an uncontrolled manner to sewers and watercourses. Moreover, chlorinated organics, trace metal, pathogens and oily wastes enter the inland water system and seas (IMO 1995). There are also toxic wastes critical to the health of humans and associated organisms being dumped at municipal landfills. This implies that the Environment Management Bureau has insufficient government resources, including manpower and time, to monitor and control industrial waste.

Listed below are other general observations on the generation of toxic and hazardous waste in the Philippines (IMO 1995):

1. Geothermal plants generate ash residues with very high concentrations of heavy metals;
2. Oil residues and volatile organic carbons originate from petroleum refineries, bulk depots and storage tanks in industrial plants;
3. Oxides and sulphides of arsenic and other heavy metals are produced from copper roasting and smelting processes;
4. Used polyethylene bags impregnated with pesticides from banana plantations are disposed of in an uncontrolled manner;
5. Mercury contamination originates from small-scale mining in Mindanao, and chromium wastes are produced by leather tanning and finishing operations;
6. Heavy metals such as cadmium, chromium, zinc, nickel and copper originate from metal plating and finishing plants;
7. Hospital and laboratory wastes containing pathological and infectious agents and other toxic chemicals are normally co-disposed with municipal wastes.

Moreover, mining and quarrying operations not only dump wastes which have heavy metals but also contribute significantly to problems of sedimentation and erosion. In the Batangas Bay region, the significant contributory factor to the issue of mine wastes is the unregulated environmentally destructive practices (for example, the open-pit mining method).

### 4.1.6 Oil pollution

The issue of oil contamination from shipping and sea transportation is critical especially in the western Luzon area. There are three major coastal refineries in the country (Bataan Refining in Limay, Bataan, Caltex South of Luzon and Pilipinas Shell in Batangas) which contribute to incidents of oil spill. There is insufficient institutional and administrative capacity to ensure environmentally responsible maritime practices. Moreover, there is improper siting and no strategic coastal development plans in the country.

In addition, oil spills caused by shipping accidents (from discharge, spillage, grounding and sinking incidents) in Philippine waters reached 14 cases in 1978 from the list of the National Operation Centre for Oil Pollution. These incidents are expected to continue because of insufficient understanding of navigational routes and inadequate contingency plans.

Increased threats of oil discharges from industries (for example, in the Batangas Bay region) is primarily due to insufficient control and lack of proactive measures (for example, readiness and effective response and active preventive management). There is also a prevalence of inadequate skills to detect, control and enhance areas of spills.

### 4.1.7 Harmful algal bloom (HAB)

Outbreaks of toxic and harmful red tide are caused by human and naturally induced conditions. According to Deocadiz (1997), from 1983 to 1994 there were 16 areas all over the country that had been affected by red tide and paralytic shellfish poisoning. Eutrophication from sewage, other pollutants (for example, phosphate and nitrate from fertilizers) and utilization of coastal waters from aquaculture have also been attributed to cause some of the algal blooms, which in turn sometimes lead to fish kills and paralytic shellfish poisoning. Nutrient accumulation can also be due to the inefficiency of the existing wastewater treatment facilities of some of the industries to remove excess nutrients. In this regard consideration of a harmful algal bloom facility is necessary. This facility can provide monitoring control and surveillance (MCS) and at the same time provide strategic policy guidelines and proactive tactical interventions in the issues related to harmful algal bloom.

## 4.2 ROOT CAUSES OF WATER SHORTAGES AND QUALITY DEGRADATION

### 4.2.1 Surface water quantity and quality

Contamination of surface water resources (for example, groundwater and sewers) is primarily caused by improper disposal of waste including THWs, insufficient sanitary landfills for municipal waste disposal and contamination by septic tanks effluents. In Metro Manila, only two sanitary landfills have been developed and operated since the 1990s (in San Mateo, Rizal and Carmona, Cavite) (Deocadiz 1997). According to Deocadiz (1997), all surface waters in Metro Manila are highly contaminated with human wastes. Other urban centres (for example, Metro Cebu, Davao and Cagayan de Oro) are also contaminated with domestic waste in the form of sewage, solid waste and leachate from dumpsites. There were reports that contamination of drinking water in Metro Manila also originated from a local timber mill in Quezon City which improperly discharged wastewater with Cr, Ar and Cu (IMO 1995). Other toxic chemicals were also detected in the surface waters of Manila Bay, Calancan Bay, Davao and Palawan. This leads to a conflict of surface water uses. There should be effective regulation of waste disposal in tandem with the establishment of an efficient enforcement body.

### 4.2.2 Groundwater quantity and quality

Depletion of water in reservoirs and salt water intrusion in Metro Manila and Cebu is primarily due to unregulated water consumption or overextraction. As noted in the global waste survey by the International Maritime Organization (IMO), in the Philippines in general, there is poor pollution control and waste management around groundwater resources. Shallow groundwater resources have been contaminated by septic tank effluents and THWs, which are improperly disposed of by several manufacturing industries. Moreover, sanitary landfills for municipal waste disposal is insufficient to accommodate the waste generated by households, commercial establishments and industries.

### 4.2.3 Hydrological alterations

Development activities such as damming of rivers can alter the existing hydrology in an area. Changing a riverine environment to lacustrine has a high impact on the aquatic environment and hydrology of the area. Although development like this can alleviate the shortage of freshwater in the metropolis, there should be a comprehensive EIA study to minimize the adverse impact on the surrounding environment, including the socio-economic conflicts that would arise from this development.

### 4.2.4 Freshwater issues related to global changes (for example, El Niño effects)

Naturally occurring pollution (for example, tropical cyclones, earthquakes, volcanic eruption and El Niño effects) can affect the freshwater resources of the country. The Mt. Pinatubo eruption in 1991 obliterated the surrounding river channels and floodplains of central Luzon. Floods damaged property and crops and caused increased turbidity, high concentrations of suspended solids and silt in the streams and rivers. Deocadiz (1997) also noted that surface and groundwater in the Philippines contain natural background levels of heavy metals or elements in trace levels (for example, arsenic).

### 4.2.5 Maritime transport environment

In the marine transport environment the following issues: unregulated dumping of domestic sewage and solid waste in the coastal waters, THWs pollution (for example, deep sea dumps of radioactive wastes), and oil spill accidents from refineries or floating barges are important. In many cases, transnational ships dump waste 500 to 600 kilometres offshore before entering the country. In addition, there have been attempts to illegally dump waste, such as alkaline, petrochemical tank residues, mine tailings, dredge material from coastal reclamation zones and THWs, in Philippine territorial waters (IMO 1995). From 1986 to 1992, the Philippine Coast Guard issued ocean-dumping permits for caustic soda (IMO 1995). The Philippines is said to be a signatory of the MARPOL 73/78 but to date it has not been ratified.

## 4.3 ROOT CAUSES OF OVER-EXPLOITATION OF AQUATIC RESOURCES

### 4.3.1 Unclear access arrangements (for example, overlapping roles of stakeholders)

Resource depletion in coastal areas (i.e., mostly traditional fishing grounds) is often the product of the "open access" nature of the fishing industry. Despite legal restrictions on the access of commercial fishers into municipal water (for example, less than 7 kilometres from shore) competition exists for common fisheries and their fishing grounds. Commercial fishing boats usually encroach into the 7-15 km zones of the more productive municipal waters.

In the Philippines most of the fishing grounds experience a certain degree of resource-use conflict in terms of the area of operation and the target species. The difference lies in the availability of resources of the stakeholders. Most of the time, artisanal fishers have limited resources (i.e., not enough capital) to afford them effective and high-tech fishing gear for them to venture into areas fished by commercial fishers.

Moreover, the overlapping roles of stakeholders result from the influence of the vested interests of politicians and the elite on resource use arrangements.

Increasing offshore developments (for example, oil drilling exploration) and other nearshore coastal development have constricted access to coastal fishers and user groups. Restriction on fishing activities occurs when companies operate wharves (oil companies) or conduct oil drilling exploration activities. The exclusion zone puts some limitation to the fishing grounds especially if it is within the 15-km municipal waters. Although the municipality directly benefits from these activities (for example, tax), small-scale fishers suffer from a limited area for fishing. Provisions can be given to these fishers by most of the operators or companies of these explorations (for example, employing some of the members of the municipalities directly affected and allowing fishers to fish in areas where fully lighted boundaries are located).

### 4.3.2 Overpopulation, allocation and insufficient preferential access rights (for example, integrated fisheries management)

A high exploitation rate of the fisheries resources is currently being experienced by these fishing grounds (i.e., both the hard and soft bottom areas of fishing grounds). The twelve priority bays included in the Fisheries Sector programme of the Department of Agriculture were the following: Carigara Bay, Panguil Bay, Calauag Bay, San Miguel Bay, Manila Bay, Ormoc Bay, Tayabas Bay, Ragay Gulf, Sorsogon Bay, Lagonoy Gulf, San Pedro Bay and Sogod Bay.

The use of destructive fishing methods such as blast fishing and cyanide fishing further exacerbates the heavy exploitation status of most of the traditional fishing grounds. The Government still has to explore incentives for the exploitation of lightly exploited areas (for example, Palawan waters, the Babuyan and Batanes group).

Overlap between coastal communities in access to the resources are also experienced by most of these traditional fishing grounds. There are cases in which one coastal municipality benefits more from the local resources of another coastal community. The increasing number of fishing vessels (including commercial fisheries) and the unregulated fishing activities by various groups complicate the situation.

The increasing problem of poverty in the country greatly affects low-income fisher families. Owing to limited access to other sources of income, there is a tendency to population growth and migration to the coast. One action that should be taken in this issue is to harmonize economic and social incentives to establish comprehensive coastal community development (for example, livelihood opportunities and a proper mix for rural and urban areas).

### 4.3.3 Absence of coastal zoning programmes

Upland and coastal activities that include conversion into fishponds, industrial establishments (including mining activities) and human settlements, including changes in the development thrusts of urban and rural settings, greatly affect the existing landscape of the area. The absence of coastal zoning mechanisms led to the degradation of coastal habitats and the denudation of the coastal ecosystem, eventually decreasing the effective fishing area.

One issue is the loss of coastal productivity and safe habitats for juveniles because of the destruction of mangrove swamps. An increase in nearshore activities such as the conversion of domestic ports into international ports (for example, Batangas) can result in the loss of marine biodiversity. Pollution from oil spill/discharges including unregulated waste disposal from land and water based sources could also affect the coastal areas. The absence of a harmonious land and sea use classification and guidelines lead to increased conflicts, thus hastening resource degradation and depletion.

### 4.3.4 Poor policies and weak law enforcement

Annex V presents some of the existing environmental legislation regarding fisheries. However, because of the poor living conditions of many of the fishing people, they tend to depend on illegal means of fishing. The Bantay Dagat and coastguards of each area should give particular attention to the increasing problem of illegal fishing. Equivalent sanctions should be properly enforced when the law is violated. The existing fishery decrees and laws are not properly enforced and there are times when these are neglected. Law enforcers are often implicated in illegal activities themselves. Supplemental strategies for enforcing laws and regulations should also be initiated.

Encroachment of commercial fishing boats in the 7-15 km zone of the municipal waters is prevalent in many parts of the country. Most of the operators of these commercial vessels belong to the elite. Instead of increasing competition (i.e., in terms of space and resource) between the small-scale and commercial fishers in traditional fishing grounds, the Government should encourage joint venture arrangements in international waters. To date, many offshore areas and the exclusive economic zones are under-utilized.

### 4.3.5 Others

The over-exploitation of the marine resources in the country is also caused by the inadequate policy to implement realistic coastal resource economic values and rent systems. There are studies on the existing economic valuation of coastal resources in the country (for example, Evangelista 1992). Ignoring the economic loss of resources results in an underestimation of its implications for the country's GDP.

Integrated coastal management programmes of DENR mainly focus on the planning aspects of the coastal resources dealing with the management, technical skills and information needed for sustainable development. However, the issue of the over-exploitation of fisheries resources is not linked in the planning perspective of this programme. Implementation of coastal zoning should be integrated with fisheries management.

## 4.4 ROOT CAUSES OF THE DEGRADATION OF HABITATS AND THEIR MODIFICATION

The coastal habitat change or loss is influenced by human intervention and natural phenomena that affect the sustainable development of marine resources. Habitat degradation and modification caused by human impacts can be a result of both direct and indirect causes. The major causes include:

(a) Illegal and destructive upland activities that cause siltation and sedimentation, such as deforestation;
(b) Devalued resource rents;
(c) Absence or inappropriate zoning classification and negligence of acquisition of proper permits from regional growth centres and national integrated protected areas;
(d) Inappropriate tenurial arrangements (human settlement, industrial zones and coastal conversion, for example, mangroves into fishponds);

(e) Unclear jurisdictional responsibilities (administration, ancestral domain, autonomous region and exploration);
(f) Inadequate procedural mechanisms ( for example, EIAs);
(g) Coastal pollution (for example, indiscriminate dumping of uncollected and untreated waste);
(h) Illegal means of fishing;
(i) Law enforcers are often implicated in illegal activities themselves.

Natural effects include typhoons and volcanic eruptions. The Philippines is visited annually by at least 12 tropical cyclones accompanied by floods. Aside from environmental and property damage, there are human deaths and injuries. The 1991 Mt. Pinatubo eruption caused physical and economic dislocation to about a million residents and heavy siltation in river channels and coastal waters.

For mangrove forests, there are proposed alternative management strategies that will suspend large-scale exploitation while conducting research studies with time allocated for recovery and preservation, conservation and some fish pond development. Public education on adaptive management schemes is needed to cope with the interaction of natural and human induced effects. In addition, coastal development plans should be harmonized at various levels (local, regional and national levels).

### 4.5 NON-MARKET OPERATIONAL ALLOCATIONS AND MARKETING BASED INTERVENTION

Pollution problems in the environmentally critical areas such as coastal areas are emphasized in the environmental impact statement (EIS) system. However, the individual EIAs of each development activity in an area is not sufficient or adequate to accommodate the environmental problems of the water-related issues of the ecosystem. Proper allocation quotas for pollution loads (i.e., taxation and financial interventions or debts swaps) should be implemented, including both the industry and the household based estimated cumulative effects of the system's carrying capacity. The programmatic EIA by the DENR incorporates all aspects of environmental problems resulting from different causative factors or activities around the area. Quotas derived from carrying capacity estimates can include non-market preferential allocations to provide some safety nets to marginalized sectors. Co-management by the private and public sector is the primary builder of sustainable community development. With the carrying capacity principle, public responsibility in resource use and management can be appropriately accounted for while some private sector allocations can also be facilitated by market based interventions (for example, individual transferable quotas and pollution loads).

## 5.0 ONGOING AND PLANNED ACTIVITIES RELEVANT TO THE IDENTIFIED WATER-RELATED PRINCIPAL ENVIRONMENT ISSUES

The Philippines has formulated national programmes to prevent, minimize and control the consequences/ impacts of the water-related issues especially in the transboundary location of a body of water. The existing legal and administrative laws tackle issues on the sovereignty, allocation, regulation and protection of the natural and human resources in the Philippines. Different approaches (national programmes and projects) have been formulated and implemented to preserve and conserve freshwater and coastal ecosystems.

The major national legislation that incorporates environmental law and policies are the Philippine Constitution and Presidential Decree (PD) 1151, known as the Philippine Environmental Policy. A summary of the ongoing and planned activities relevant to the identified water-related principal environmental issues can be seen in annexes IV and V.

## 5.1 ONGOING AND PLANNED ACTIVITIES FOR POLLUTION ABATEMENT

Deocadiz (1997) enumerated the major laws, rules, regulations and standards for pollution control and residuals management:

1. Republic Act 6969. The Toxic Substances and Hazardous Wastes Control Act of 1990. The act prohibits the entry, even in transit, of hazardous wastes and their disposal within Philippine territorial limits. It provides for the proper management of hazardous wastes by specifying the responsibilities of wastes generators, wastes transporters and wastes treaters and mandates registration of all waste generators in a prescribed form. It establishes a manifest system to be maintained, which includes waste transport records, specifications of waste storage and labelling, and the issue of permits for new waste treatment and disposal facilities.

2. Marine Pollution Decree of 1976. National Operations Centre for Oil Pollution (NOCOP) under the Philippine Coast Guard for combating marine pollution including oil spills.

3. Toxic Substance and Hazardous and Nuclear Wastes Control Act of 1990. This act controls all activities regarding chemical substances and mixtures including hazardous and nuclear wastes that present unreasonable risks and/or injury to health or the environment.

4. Presidential Decree 1586. Environmental Impact Statement System (1978) DAO 96-37, revised EIA system. This introduces a system for environmental impact assessment.

5. DENR Administrative Order 34. Revised Water Usage and Classification/ Water Quality Criteria. This incorporates the different classifications of freshwater and coastal/marine waters in terms of usage and criteria values for conventional parameters and toxic/deleterious parameters.

6. DENR Administrative Order 35. Revised Effluent Regulations of 1990. This define the effluent quality of discharge into different classifications of receiving bodies.

7. DENR Administrative Order 29. This provides for the implementing Rules and Regulations of RA 6969.

Following are the programmes and projects related to the pollution issue. They contributed to the system of pollution management assessment of priority industries highlighting the promotion of waste minimization measures (Deocadiz 1997):

1. Industrial Efficiency and Pollution Control programme funded by the World Bank/ Japan Bank;
2. Metropolitan Environmental Improvement programme funded by the World Bank;
3. Industrial Environment Management programme funded by USAID.

The industrial efficiency and pollution control programme was designed to prevent and reduce pollution at source by utilizing manufacturing process improvements that increase the profits of the participating companies, reclaim industrial wastes and encourage cost effective pollution abatement technologies (Jacinto and Gervacio 1997). The four components of the project were as follows: (a) pollution reduction, (b) policy studies and public/private dialogues, and (c) a capacity-building component.

Several other projects emanated from the framework of the Sewerage and Sanitation Master Plan (Year 2000 Plan) under the auspices of the Metropolitan Waterworks and Sewerage System (Deocadiz 1997):

1. Sewerage Development programme - aims to rehabilitate the central sewerage system in Metro Manila and expand the collection system, construct monitoring facilities for wastewater disposal, and monitor programmes and complementary activities;

2. Sanitation programme - aims to improve the health situation in densely populated, low income areas.

To account for the litter and solid waste problem in the country, the ntegrated national solid waste management framework was established under the leadership of the Presidential Task Force on Solid Waste Management in collaboration with the Environmental Management Bureau of DENR and the Metropolitan Manila Development Authority.

Other support projects were undertaken to alleviate the increasing problem of pollution, such as the nationwide clean-up activities during Earth Day on 22 April, the Environment Month in June, the National Clean-up Month in September and tree planting activities. Environmental quality monitoring activities are conducted in Manila Bay, Pasig River and selected river systems in various parts of the country (Deocadiz 1997).

Several other research activities are currently being undertaken to monitor and assess the behaviour and transport of land-based pollution (Deocadiz 1997). Database systems are being made at different levels of development and technology in various agencies, programmes and projects.

## 5.2 ONGOING AND PLANNED ACTIVITIES TO MITIGATE WATER SHORTAGES

The Philippine Environment Code (1977) prescribes management guidelines to protect and improve the quality of the environment particularly the water resources. The protection of the surface water systems takes the form of water quality classification based on DENR Administrative Order 34 in 1990. At present the National Water Regulatory Board identified 421 principal river systems, of these only 168 (40 per cent) are officially classified (Deocadiz 1997). According to Deocadiz, classification of water bodies is an important component of water quality management especially in the application of effluent standards and ambient water quality criteria.

Watershed management is one of the areas prioritized in terms of the rehabilitation activities of the Government. It basically aims to increase forest cover and reduce sediment and pollution loads downstream (Deocadiz 1997). Other areas were the appropriate management of agriculture to reduce siltation and toxic chemicals-laden runoff in the river systems (for example, Pasig River, Boac River).

The JICA (1997) study provides a comprehensive review of the status of groundwater and surface waters, including an indicative water resources master plan. Last March 1997, JICA completed the master plan study on the small water impounding management (SWIM) which was developed for the following purposes:

(a) Irrigation;
(b) Watershed management;
(c) Inland fishery;
(d) Flood control;
(e) Mini-hydro power generation;
(f) Domestic water supply.

Out of 501 SWIM projects, 230 projects were selected for earlier implementation based on guidelines and development scales set by the Department of Public Works and Highways, National Irrigation Authority, National Electrification Administration and the Bureau of Soils and Water Management. Candidate SWIM projects by geographic water resources region are shown in the following table.

Table 5.1 Number of qualified SWIM projects by region and agency

| Region No. | No. of candidate projects | No. of qualified SWIM projects (classification by agency) | | |
|---|---|---|---|---|
| | | DPWH | NIA | BSWM |
| I | 63 | 41 | 6 | 24 |
| II | 62 | 35 | 4 | 31 |
| III | 63 | 27 | 1 | 17 |
| IV | 38 | 11 | 5 | 4 |
| V | 55 | 20 | 1 | 5 |
| VI | 15 | 9 | 1 | 8 |
| VII | 82 | 35 | 0 | 9 |
| VIII | 44 | 14 | 1 | 8 |
| IX | 14 | 8 | 0 | 7 |
| X | 25 | 10 | 0 | 10 |
| XI | 15 | 10 | 1 | 9 |
| XII | 25 | 11 | 3 | 8 |
| Total | 501 | 230 | 23 | 140 |

Note: DPWH = Department of Public Works and Highways
NIA = National Irrigation Authority
BSWM = Bureau of Soils and Water Management

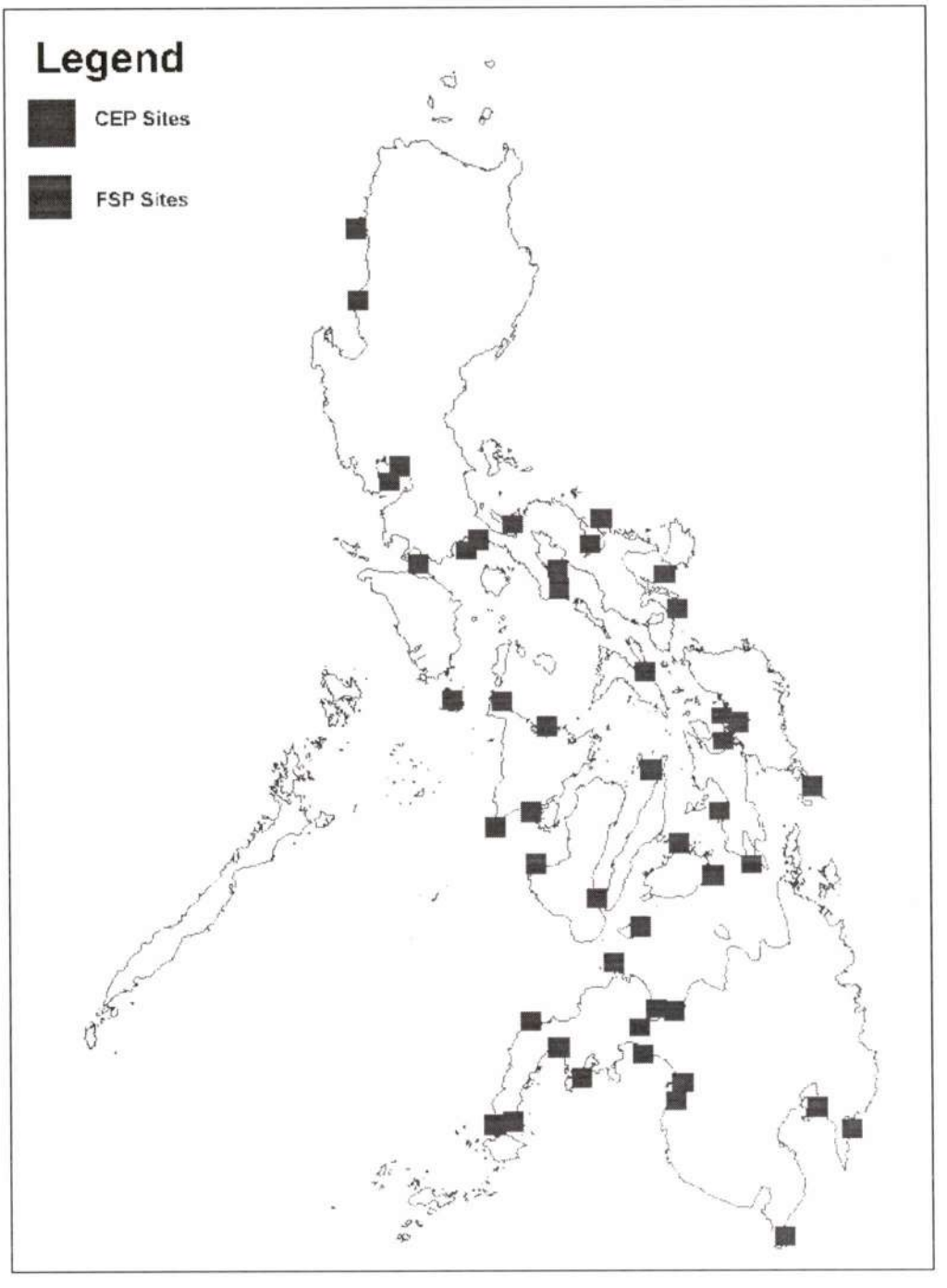
## 5.3 ONGOING AND PLANNED ACTIVITIES TO REGULATE OVER-EXPLOITATION OF AQUATIC RESOURCES

The Fisheries Decree of 1975 (PD 704) covers all existing laws regarding fishery activities and the development of the fishery industry under Philippine jurisdiction. Aside from this, there are many initiatives regarding the management of Philippine coastal areas and resources. One of the major completed government programmes under the Department of Agriculture is the fisheries sector programme. This is a five-year project (1990-1995) addressing the declining productivity in the marine fisheries and the deteriorating coastal environment. Twelve priority bays in the country were included in the programme, which involved an institutional network of government agencies, non-government organizations and academic institutions.

Jacinto and Gervacio (1997) explicitly enumerated the following objectives of the fisheries sector programme (figure 5.1):

1. To regenerate coastal resources, rehabilitate the coastal environment and alleviate poverty among municipal fishermen particularly through diversification of their sources of income;
2. To intensify aquaculture production, particularly for the benefit of domestic consumption but within the limits of ecological balance;
3. To induce commercial fishing away from overfished nearshore areas into offshore waters.

Figure 5.1 Fisheries sector programme (FSP) and coastal environmental programme (CEP) sites



The following were the six components of the programme:

I. Resource and ecological assessment which involves the appraisal of fisheries resources and ecosystems in priority areas, the establishment of a national fisheries information system to monitor fish stocks, habitats, ecological parameters and socio-economic indicators;

II. Coastal resources management which involves the encouragement of community-based initiatives in resource management and resource enhancement measures, and the development of viable alternative livelihood projects to draw fishermen into other economic activities, thus relieving the pressure in overfished coastal waters;

III. Research and extension which includes the preparation of a comprehensive national fisheries research programme, including the networking and upgrading of existing research facilities, provision of scholarships and training to meet long-term research and extension staffing needs; the conduct of priority studies and expansion of fisheries extension services.

IV. Law enforcement which involves the training and logistical support to community-based task forces such as the local police, government personnel and the local fishermen;

V. Credit which includes the support of income diversification programmes for small-scale fishermen, intensification of aquaculture production and identification of alternative financing schemes;

VI. Infrastructure and marketing support which involves the establishment of post-harvest facilities such as fish landings, cold storage and processing centres; and research to develop and promote technologies that will reduce spoilage and upgrade the quality of fishery products.

The fisheries resources management project is one of the proposed projects to continue under the second phase of the fisheries sector programme which aims to 'reverse the trend in fisheries resource depletion with its long-term goals to obtain sustainable development in the sector and to reduce poverty among municipal fisherfolks' (Jacinto and Gervacio 1997).

An example of a national ongoing project is the coastal environment programme (figure 5.1, annex V). This aims to promote community-based sustainable use of resources in coastal areas by encouraging the use of environment friendly technologies, providing livelihood opportunities to coastal communities, promoting equitable access to resources and building DENR capacities in the management of coastal areas (Jacinto and Gervacio 1997).

The programme started in 1993 with 61 sites proposed all over the country involving about 168 organizations from the government and non-government sectors. According to Jacinto and Gervacio (1997) the strategies are community organizing (i.e., involvement of communities in the protection and management of coastal ecosystems), mobilization of financial and administrative resources from public and private sectors and the use of contingent approaches in identifying issues, problems and opportunities for human and environmental details.

The coastal resources management project primarily aimed to achieve sustainable management of the fisheries resources in coastal waters in selected areas in the Philippines (in Palawan, Visayas and Mindoro) in order to offset the current trends in resource degradation (Jacinto and Gervacio 1997). It involves stakeholders, local authorities and the relevant social and economic sectors in planning, implementing and decision-making.

The five components of the community-based coastal resources management project are as follows:

(a) Community management of coastal resources for widespread implementation;
(b) Local government capacity-building;
(c) National agency policy implementation;
(d) Information, education and communication;
(e) Special activities to enhance local and national capacity to support implementation.

Integrated coastal management takes on a planning perspective that gives a broader coverage of the coastal resources management project (for example, the framework plan for Lingayen Gulf and the strategic environmental management plan for the Batangas Bay region). For example, the strategic environmental management plan covers the following key components (Deocadiz 1997):

(a) Legal and institutional mechanisms;
(b) Integrated policy and planning systems;
(c) Integrated management systems and technical interventions;
(d) Management and technical skills improvement;
(e) Information base improvement;
(f) Sustainable financing development.

## 5.4 ONGOING AND PLANNED ACTIVITIES FOR APPROPRIATE LAND AND COASTAL ZONING

The coastal zone environmental and resource management project is under the auspices of the ASEAN-Australia Economic Cooperation programme (Phase III). The project focuses on 'institutional strengthening through development and maintenance of a national directory of coastal and marine data; and utilization of information technology tools to resolve national priority issues in coastal zone resources management through a case study'. Lingayen Gulf in north-western Luzon was chosen as the case study for the Philippines.

Some of the government-planned programmes regarding this issue are the following:

1. Municipal coastal environmental initiatives emanating from the industrial environment management programme and the coastal resources management project aiming to combine industrial pollution reduction and coastal zone management;
2. Development of a marine environmental master plan for the Philippines;
3. Mapping and land cover assessment of mangrove areas using small format aerial photogrammetry;
4. Strengthening of marine environmental monitoring assessment and conservation programme;
5. Geosciences for coastal and environmental studies;
6. Integrated coastal zone management project of DENR;
7. Integrated coastal zone management of industrially threatened biodiversity-rich bays and river tributaries of DENR in collaboration with Silliman University, the ICLARM, concerned local government units, industries in the area and local non-governmental organizations.

# 6.0 CONSTRAINTS TO ACTION

In the section 4 on root causes, mention was made regarding cross-sectoral and interactive relationships of water-related issues. This interrelationship often refers to the causes, which are systemic in nature or linked in the pathway of the problem. Inherent in all the issues are the following constraints in:

(a) The understanding and scientific uncertainties of experts and the public;
(b) Financial and economic capacity of the stakeholders in actualizing the solutions;
(c) The policy environment, legal instruments, institutional arrangements and administrative and managerial capacity.

## 6.1 POLLUTION ABATEMENT AND WASTE MANAGEMENT

### 6.1.1 Information, scientific uncertainties and public awareness

As can be derived from the evaluation of the issues, causes and possible solutions, there are many information needs especially in areas outside Metro Manila and Cebu City. Only limited endowments in terms of technical and financial capacity for research and technical expertise are present in the north-western region except for areas such as the Lingayen Gulf where a growing collaborative effort is being undertaken by the institutions around the Gulf.

Information in the western areas in Palawan is only starting to be generated, especially in the Mindoro area. Around the area in Batangas, the initiatives by UNDP-IMO have provided the initial environmental and socio-economic profile of the area. This state of patchy and insufficient information on the levels of pollution and measures for waste management is prevalent in the areas mentioned earlier.

A wide range of uncertainties exists in the understanding of pollution effects, especially in terms of evaluating the cumulative and interactive effects. In addition, the relation of water quality standards and criteria to the health and well-being of biological organisms and ecosystems is not yet well understood. This is complicated by the inadequate monitoring and infrastructure which exists in these areas, both in terms of the point and non-point sources of pollutants. In many areas conflicting uses of the water environment are occurring which leads to inadequate regulatory mechanisms to deal with pollution. This often arises because of the absence of land and water use zoning classification.

A mistaken tautology exists which says that for every development there will always be wastes and pollutants. This perspective may also be related to the lack of public awareness of options in waste management and recycling approaches and techniques. Some areas in the EIA process are unclear and compliance and environmental monitoring are inadequate in providing appropriate solutions. Only a few success stories are available in pollution abatement and waste management.

### 6.1.2 Financial and economic

Inadequate allocation of financial resources for pollution abatement and waste management is prevalent to such an extent that the prevention of pollution is considered a luxury. Insufficient revenues in most of the municipalities constrain the setting up of sewage disposal and treatment facilities for the community. Environmental taxation schemes are not in place or are insufficient to make environmental management effective. In addition, market based interventions have not been established. The Environmental Guarantee Funds (EGF) are not yet fully operational and in many areas non-existent.

### 6.1.3 Legal, institutional and managerial

At present the mechanisms for taking into consideration the carrying capacity of ecosystems into a legal and institutional framework are not fully in place. Some initial guidelines in the establishment of a programmatic EIA have been hampered by the inadequate capacity of personnel to undertake ecoprofiles of whole bay ecosystems or island wide ecosystems. The criteria and management rules for allocating quotas to stakeholders are hindered by the lack of financial and economic valuation and pricing mechanisms for translating these measures into fees, permits and taxation. In addition, these socio-economic instruments are based on carrying capacity assumptions which have not been fully validated as practical applications in tropical resource management systems.

This framework also assumes that administrative and technical coordination with competent Department of Agriculture and DENR personnel are available, together with strengthened regulatory powers. Most often since both personnel and technical capacity may be limited, these constraints have to be overcome by capacity-building efforts at many levels of the institutional framework (see capacity-building aspects in section 7).

The success of the programmatic EIA also requires that a high level of participation takes place among stakeholders. Ideally, the set-up needs sufficient understanding and information to be available in order to have a good basis to make informed decisions on a diverse array of choices. In multiple use areas where some protected areas are situated, the local resource management councils or committees should have enhanced capacity to incorporate and manage the ecosystem concerns of the area.

## 6.2 WATER SHORTAGE AND DEGRADATION OF WATER QUALITY

### 6.2.1 Information, scientific uncertainties and public awareness

With increased usage of water resources more detailed information of water sources are needed. At present, there is insufficient information of water bores and the extent of reservoirs in watersheds. This is needed in order to evaluate the viability of water supply and degree of contamination of the water sources. In the face of these uncertainties it is often better to be on the conservative side and remember to apply the precautionary principle in water use. This also requires that mechanisms need to be established to enhance public awareness of water conservation measures and the ongoing status and dynamics of these resources (for example, the work being done in relation to the El Niño situation).

### 6.2.2 Financial and economic

Water resources management requires adequate public awareness and political will to implement decisively the needed measures with the participation of the community. Since water resources are a basic human and social need it should be an integral quality-of-life indicator. This means that this has to be linked to how public and private investments are placed into these goods and services and how the costs and benefits are allocated to the various stakeholders.

### 6.2.3 Legal, institutional and managerial

Water policy in the granting of water rights and the privatization schemes are not fully implemented and may have to expand their criteria in terms of sustainability and equity principles. In effect the pricing for water services is not yet clearly established.

It also presupposes that institutional arrangements in monitoring and evaluation are in place. At the moment they are still highly inadequate.

## 6.3 OVER-EXPLOITATION OF FRESHWATER AND MARINE RESOURCES

### 6.3.1 Information, scientific uncertainties and public awareness

In order to have sufficient capacity to implement regulatory and enhancement measures, knowledge of the maximum economic and sustainable yields and carrying capacities of the ecosystem are needed. To date, in many areas there are insufficient data inputs, which creates uncertainties in estimating the carrying capacities and sustainable yields in relation to the South China Sea. It is probably only in Manila Bay where sufficient information can approximate some estimation of maximum sustainable yield and carrying capacity. Batangas Bay and Lingayen Gulf may also have approached some level of understanding regarding the level of resources exploitation. In the Palawan area, most of the information and understanding of resource exploitation is quite limited.

### 6.3.2 Financial and economic

Some of the recommendations to diffuse and overcome the over-exploitation of resources suggest alternative and diversified areas of exploitation so as not to deplete the resources.

One of the alternatives is to encourage offshore exploitation and joint ventures with foreign investors. These options have not yet been well implemented as there have been many constraints in stimulating offshore exploitation and joint ventures. Insufficient financial resources and the prevailing economic deflation are not conducive for its implementation. Not enough financial resources are available to improve infrastructure, such as post-harvest and processing facilities. If these are established, greater effort should be taken to provide social services to the marginal fishing communities and the poor. This is constrained because of the large gap between the rich and poor which exists in the country. This affects resource allocation and access arrangements that result from resource management interventions.

### 6.3.3 Legal, institutional and managerial

Initially, the proposed fisheries code was lobbied in order to empower the marginal fishing communities and the supporting government institutions such as the Bureau of Fisheries and Aquatic Resources. The current bill has been watered down to provide loopholes on the provisions which profess to restrict the access of commercial fisheries in municipal waters. Concern from many scientific personalities suggests that the proposed revisions of the fisheries code are inadequate and may cater to greater resources use conflict between commercial and municipal fishermen.

Institutional arrangements of provincial organizations and local government units needs to be better defined in order to emancipate access and tenurial relations among the various stakeholders in the community. Critical to the improvement of regulatory mechanisms to prevent over-exploitation is the archaic licensing and permit procedures in the various agencies. These functions for government need to be expanded and, where appropriate, shared by the private sector.

## 6.4 HABITAT MODIFICATION

### 6.4.1 Information, scientific uncertainties and public awareness

Since underwater habitats and resources are difficult to evaluate and ecosystem responses to human alterations unclear, the scientific uncertainties are often large. Nevertheless, since these systems are dynamic and some habitat modification requires urgent action then management interventions may not be as ideal and efficient in responding to the needs of the situation. It is also important that the public is aware of these constraints so that undue expectations are minimized. Public awareness and education in the Philippine setting is a balancing act between not being sensational and not being boring so that the message for improved effective action is not lost in all the statistics.

### 6.4.2 Financial and economic

Since ecosystem understanding and management are often complex and need to be undertaken on a sufficiently large and appropriate scale, there are often financial and technical incapacities in the development and implementation of ecosystem management strategies. Increasingly, access to ecosystem services is not equitable.

Continued economic losses from habitat modification require greater expenditures than original ecosystem values. Restoration and enhancement efforts may not necessarily benefit the present generation and thus incentives to motivate action require innovative approaches.

### 6.4.3 Legal, institutional and managerial

Ecosystem and habitat management systems require that the concept be integrated in policy formulation. Presently, ecosystem level management is not yet clear in the consciousness of policy makers.

In addition, institutional arrangements and proper valuation of resource rents need to be incorporated in monitoring and control systems and operations. These conditions are not as easily forthcoming in the short term but can be undertaken possibly within the next five years.

## 7.0 SPECIFIC ACTION PROPOSED FROM IDENTIFIED ISSUES AND PROBLEMS

Various general principles for the sustainable development of the Philippine environment are embodied in the Philippine Constitution and the Philippine Strategy for Sustainable Development (see annex VI-VII). A recent draft for a comprehensive marine affairs policy also reinforces the country's commitment to address land and sea interaction (DENR 1997). A cabinet committee on marine environment policy also reaffirms some strategic actions proposed by Deocadis (1997) to address land-based pollution affecting the marine environment.

In order to plan and implement the following programmes proposed below, a national coordinating advisory council could serve as a programme management body under the cabinet committee for marine environment policy. This would facilitate the integration of lessons learned and enhance quick decisions for action. In addition, a database management system needs to be established within an information network system, which is interactive among the components of the programme through, for example, the National Environment Resources Information Centre (NERIC). It could incorporate a computer-based decision analyses support system similar to those of the SIMCOAST programme (see also Luna 1993 and the CZERM 1995). Critical to making informed decisions would be the information derived from resource valuation analyses such as cost-benefit approaches and other politico-economic considerations in various site-specific scenarios. Enforcement and political will are inherent elements in the effective implementation of the programmes which has to be taken in the context of public education and participation and the inputs derived from the monitoring, evaluation and control systems for each programme.

The proposed actions outlined below, as component programmes to address the general water-related issues, are broad guidelines which have generic and interrelated strategic and tactical action agenda. Each subcomponent requires further refinements with indicative financial planning and prioritization to phase the schedules and put into context realistic timeframes to actualize the programme milestones.

### 7.1 POLLUTION (POLLUTION ABATEMENT AND WASTE MANAGEMENT PROGRAMME)

Goal: Sustain industrial and agricultural development in the context of environmental sensitivity and minimization of environmental costs.

Objectives:
(a) To proactively mitigate for pollution effects by the various industries
(b) To minimize waste disposal from the various industrial sectors

### 7.1.1 The legal and institutional framework

The legal and institutional framework needed to mitigate pollution in water-related issues should:

(a) Establish legal and institutional mechanisms for environmental monitoring and compliance systems which involve public and private sector participation (i.e., such as the implementation of programmatic EIAs);
(b) Facilitate market and non-market based interventions utilizing user pay principles;
(c) Utilize precautionary principles in which the onus of proof of compliance to environmental criteria and standards rests on the potential locator or source of pollutants.

### 7.1.2 Policy initiatives and indicative guidelines

Various initiatives and indicative guidelines need to be reaffirmed and consolidated to actualize national policies on water-related issues:

(a) Initiate classification and standardization of programmatic quotas on waste discharges to include cumulative, interactive and ecosystem effects of pollutants;
(b) Implement guidelines for toxic and hazardous waste disposal;
(c) Clarify how the allocation of market and non-market based revenues from user fees can be allocated for the optimum benefit of the most disadvantaged sectors;
(d) Institutionalize policy review and evaluation to respond to adaptive management strategies.

A multisectoral policy advisory committee on pollution needs to be established. This committee to be chaired by the Environment Management Bureau, can facilitate the fleshing out of general and specific concerns for policy consideration.

### 7.1.3 Public education and participation (especially in pollution control and abatement and waste minimization)

In order to enhance the capacity of the public to participate in actions towards pollution abatement and prevention, a public education programme is needed. Such a programme facilitates consultations, consensus and ownership of outcomes derived from public action against pollution and moves towards appropriate waste disposal. The programme can primarily target the following sectors, their possible roles and targets:

(a) Strengthen the role of consumers in preventing pollution and in minimizing waste;
(b) Enhance the role of family households in reducing pollution through the establishment and subscription of appropriate sewerage and garbage disposal systems;
(c) Improve the multisectoral participation of the public and private sectors in monitoring and evaluating pollution abatement programmes.

### 7.1.4 Monitoring, evaluation and control system

Monitoring and evaluation mechanisms are cost-effective measures which facilitate feedback and control in tackling problems such as pollution. One of the most common strategies to prevent industries and other potential polluting firms from exceeding pollution standards and classification criteria is to establish a multisectoral monitoring group in their locality. This programme may address the mechanisms which enhances the monitoring and evaluation capacities in these localities and the strategic roles they can play in the planning and regulatory processes to prevent pollution and effect appropriate waste disposal.

These mechanisms require the coordinated action of multisectoral groups with clearly defined roles and responsibilities in the monitoring, evaluation and control system (MECS). The following priority strategies are needed:

(a) An enhanced technical capacity for MECS to be implemented by establishing and/or improving strategic pollution MEC centres;
(b) Improved interaction between the academic and government sectors to provide technical assistance and training to various multisectoral MECS groups;
(c) An increased representation of civil society in the MECS groups and an increased role in consumer education, public awareness and private sector monitoring.

### 7.1.5 Capacity-building

There is a limited capacity to plan and implement solutions in water-related issues in pollution prevention and appropriate waste disposal. In around at least 20 priority hotspots in the country the inadequacy of human resources and technical facilities is prevalent. A considerable allocation of the Environmental Guarantee Fund in the municipalities can be budgeted for capacity-building requirements in these areas. Infrastructure investments (waste treatment and monitoring facilities) and technical support in training and other human resources development needs can be stimulated by appropriate sourcing of financial assistance. The following capacity-building strategy needs may be considered:

(a) Enhance the technical capabilities of human resources and the infrastructure base in at least 20 priority hotspots in the country;
(b) Allocate funds for capacity-building in the Environmental Guarantee Funds of each municipality;
(c) Sustain financial capacity through innovative financing schemes.

Capacity-building can be further facilitated by projecting the human resources development needs for each region. At least six PhD and twelve MSc scholarships for pollution monitoring, evaluation and control systems and related fields may be needed to enhance the success of a national integrated programme to control pollution and management disposal systems. Aside from enhancing the high level of management expertise in the country, assistance should be provided in the social preparation and capacity-building of various communities into local organizations.

## 7.2 FRESHWATER SHORTAGE AND DEGRADATION OF WATER QUALITY (SURFACE WATER ENHANCEMENT AND GROUNDWATER REHABILITATION AND MANAGEMENT PROGRAMME)

Goal: Enhance the surface and groundwater capacity and maintain water quality for sustained use and development in the near and long term

Objectives:
(a) Improve water resources use and management
(b) Rehabilitate insufficient water supply and degraded water quality conditions

### 7.2.1 The legal and institutional framework

Adequate and good quality water resources are basic requirements for society. The following integrated legal and institutional arrangements have been suggested:

(a) Strengthen legal and institutional support for integrated watershed management systems;
(b) Enhance the legal framework of the management of the surface and groundwater resources especially the private and public interaction in the management process;
(c) Assist the strengthening of institutional arrangements that prioritize water conservation and management of the regeneration of degraded water reservoirs;
(d) Improve the legal and institutional powers of the water resources development boards at the local, regional and national levels.

The National Water Resources Development Board can take the lead in the formulation of a comprehensive and responsive programme with the participation of the stakeholders in the community.

### 7.2.2 Policy initiatives and indicative guidelines

In a move towards a highly deregulated water resources management system an integrated and strategic watershed and water resources management policy is needed. This policy framework provides the principles for a sustained development of strategic watersheds and increased quality services and goods for a rational freshwater and groundwater usage. Coordination and sufficient implementing powers to provide the teeth to enhance coordination is crucial to consolidate the deregulated environment into an effective sustainable development agenda.

(a) Improve the implementation of the water code through the clarification of roles and responsibilities;
(b) Integrate actions needed in the coordination of general and specific needs of water resources management;
(c) Establish mechanisms for the prevention of contamination of critical ground and surface waters and the maintenance of improved water quality standards and criteria;
(d) Improve arbitration and conflict resolution procedures.

As mentioned earlier, the realization of the interrelated concerns of the issues are especially relevant for water shortages and reduced water quality. Thus it may be important for the NWRB to consider the best and appropriate cabinet department for implementation (for example, to be transferred to DENR).

### 7.2.3 Public education and participation

Public education and participation in water resources conservation and management should focus on the following priority concerns:

(a) How individuals and households can contribute to water conservation measures;
(b) How non-governmental organizations and provincial organizations can assist local government units in community-based interventions in integrated watershed management;
(c) How alternative and complementary measures of the different stakeholders can integrate the sustained development of water resources.

Since water resources and their associated services are one of the basic needs of human society, programmes on public education and participation of the private and public water utilities bodies may provide mechanisms whereby the priority concerns outlined above can be pursued.

### 7.2.4 Monitoring, control and evaluation

Water conservation and management efforts require proper monitoring, evaluation and control systems. A biannual review of the implementation of the proposed programmes in the master plan study on water resources management in the Philippines is needed (JICA 1997). Efforts can focus on some of the priority areas:

(a) Public and private waterworks use and rates monitoring;
(b) Monitoring of the effectiveness of market and non-market interventions (pricing and market forces);
(c) MECs on the effectiveness of watershed management on the charge and recharge capacities of groundwater sources.

Consumers and consumer groups can be primary targets to provide the motive force to participate in the MECs to complement government and corporate management initiatives.

### 7.2.5 Capacity-building

Capacity-building efforts in developing human resources and institutional capacity would need to emphasize the following concerns:

(a) Enhance the understanding and capacity of water resources users in implementing water resources conservation and management;
(b) Improve institutional capacity in integrating watershed management to water uses;
(c) Establish capacity to sustain the development of water resources without unduly reducing water supply and maintain their appropriate use values.
(d) Establish capacity in the infrastructure base to cope with water shortage problems and provide adaptive mechanisms to detect and sustain water supply and quality;
(e) Sustain financial capacity for integrating watershed management and providing an adequate water supply.

The capacity-building initiatives can focus in areas where there are considerable problems of water shortage and degradation of water quality (for example, in Metro Cebu and Metro Manila).

## 7.3 OVER-EXPLOITATION OF LIVING AQUATIC RESOURCES (SUSTAINABLE MARINE AND AQUATIC RESOURCES UTILIZATION PROGRAMME)

Goal: Sustain fisheries resource utilization and other resource extractive uses under the aegis of the carrying capacities of the multispecies resources.

Objectives:

(a) Regulate harvests to assure sustained harvests in perpetuity;
(b) Initiate resource enhancement measures in over-exploited areas;
(c) Identify and establish strategic marine protected areas which are critical in providing the sustained replenishment of genetic and biodiversity resources.

### 7.3.1 The legal and institutional framework

(a) Clarify jurisdictional complementation and institutional coordination;

(b) Identify areas of overlap and utilize complementary confidence-building activities to minimize accentuating turf problems and distinguish responsibilities where specific roles are more appropriate. Example: Fishing boat licensing are distinctly BFAR's responsibilities whereas the dugong and marine turtle protection and management are under the DENR's Parks and Wildlife Bureau.

(c) Institutionalize inter-agency action programmes concerning aquatic and marine resources conservation and management into a unified implementing body;

(d) Facilitate the regularization of programmes through proactive administrative, financial and management planning; Example: Bay management councils and Fisheries and Agricultural Resources Management Councils (FARMC) should be made compulsory and other MOAs be given more implementing powers through appropriate legislation.

(e) Provide mechanisms to concretize sustainable use and allocation of benefits;

(f) Stimulate private and public sector cooperation through the modernization of commercial offshore fisheries and the establishment of a common fund;

(g) Institutionalize a multisectoral council (Marginal fishermen, local government units, government organizations and commercial fishing operators) to implement regulatory measures in resource use and afford equitable access arrangement;. Example: Many consultative bodies and networks are ad hoc bodies which are issue based and thus it is crucial that strategic programmes be put in place to implement sustainable fisheries and other marine resources management.

(h) Create a national and a regional fisheries management council;

(i) Harmonize economic and social incentives to establish comprehensive coastal community development (for example, livelihood opportunities and a proper mix for rural and urban areas).

### 7.3.2 Policy initiatives and indicative guidelines

The Philippines as an archipelagic country found in the highest marine biodiversity region of the world requires some important policy innovations and needs to implement the following indicative guidelines:

(a) Incorporate sustainable use principles such as the concept of carrying capacity and multispecies interactions;

(b) Reform existing mechanisms which do not adequately address sustainable development objectives and implement appropriate quotas, taxation, licensing and permits etc.;

(c) Clarify management and development goals;

(d) Clarify alternative measures to minimize growth overfishing;

(e) Explore incentives for the exploitation of lightly exploited areas;

(f) Encourage joint venture arrangements in international waters;

(g) Implement coastal zoning and integrate fisheries management;

(h) Allocate municipal fishery rights for small fishers;

(i) Organize private fisheries interest groups;

(j) Provide incentives for the commercial fisheries sector to fish farther in the EEZ;

(k) Manage and regulate the exploitation of internationally-shared tuna stocks.

### 7.3.3 Public education and participation

Since the exploitation of living water resources is a multi-stakeholder situation, it requires a high degree of public participation and awareness. In order to achieve these, the following actions can be pursued:

(a) Incorporate the concept of sustainable use indicators and mechanisms into formal and non-formal education venues;
(b) Encourage information and education campaigns (IEC) to facilitate participatory action based on a range of legal, scientific, and managerial mechanisms (for example, harvest controls with appropriate resource rents values through licensing, permits and other tax measures);
(c) Facilitate regular multisectoral consultations to tackle urgent needs and plan proactively for future decisions and actions;
(d) Strengthen environmental awareness;
(e) Empower local of communities to enable them to make decisions and plans on the use and conservation of living marine resources and the provision as to how they may take part in implementing the plan.

### 7.3.4 Monitoring, Evaluation, Control and Surveillance (MECS) System

(a) Explore ways of viably reducing fishing effort through the licening and social pressure modes ;
(b) Explore supplemental strategies for enforcing laws and regulations (for example, market and non-market incentive strategies);
(c) Strengthen fisheries conservation through law enforcement and non-regulatory measures (for example, education);
(d) Establish adaptive management mechanisms in the monitoring of resource uses and enhancement interventions;
(e) Identify appropriate indicators to measure the impact or effectiveness of harvest regulations and other management interventions through question oriented research and applications for resource management;
(f) Clarify management decisions based on monitoring and evaluation feedback and act accordingly at the right time, at the right degree and level.

### 7.3.5 Capacity-building

(a) Improve the personnel of the various levels of government organizations and local government units to implement the regulation of harvest controls and resource extraction through apprenticeship programmes and formal scholarship grants;
(b) Enhance the absorptive capacity of institutions to efficiently utilize funds and sustain financial capacity after programme phase-out;
(c) Allocate funds for human resources development in the various common funds for resource management and appropriate incentives for improved performance of harvest controls and resource extraction.
(d) Establish and maintain infrastructure (for example, ships and equipment) to modernize government capacity to manage water-related resources.

## 7.4 HABITAT MODIFICATION (LAND CARE AND INTEGRATED COASTAL MANAGEMENT PROGRAMME)

Goal: To harmonize the land and coastal zoning and management measures in order to facilitate the sustainable development of the land and water ecosystems without undue stress from habitat modification

Objectives:

(a) Establish land care measures (such as zoning and resource extraction regulations) which assure soil conservation and watershed management;
(b) Initiate and establish a national functional zonation scheme for the country in order to harmonize multiple use sustainable development needs;
(c) Integrate land and coastal zone development plans and implement appropriate management at various hierarchical levels.

### 7.4.1 The legal and institutional framework

DENR as the government institution that is in the strategic position and has the mandate to safeguard and manage our natural ecosystem can take the lead in pursuing the following actions:

(a) Integrate land care (for example, agriculture and watershed management) and integrated coastal management through legislative enactment and other paralegal measures;
(b) Enact appropriate land use and coastal zonation plans for all municipalities.

### 7.4.2 Policy initiatives and indicative guidelines

Policies and their appropriate guidelines, which tend to facilitate the integration of management initiatives, should be undertaken to be more effective. In this regard, the following principles can be initiated:

(a) Incorporate considerations of land and sea interactions into all land and coastal uses;
(b) Effectively implement the principles of ecosystem carrying capacities and connectivities in zoning plans, together with doable implementing guidelines

### 7.4.3 Public education and participation

There is insufficient understanding and appreciation of the ecosystem values and services that are provided. Public education and participatory action researches are needed in order to overcome inappropriate habitat and resource uses and transform these into actions that lead to their wise utilization. The following actions can be considered:

(a) Facilitate the awareness of the community into joint land care and ICM practices in the individual, household, village and municipality levels;
(b) Enhance provincial, regional, national and global mechanisms for assistance, support and coordination;
(c) Incorporate participatory education and action researches into the land care and ICM programmes.

Owing to the large extent of the needs for protecting critical habitat and ecosystem needs, enforcement measures through direct regulatory means and police action, though necessary, will be very expensive. Public education and participation in sustainable land and coastal zoning development and protected area management are cost effective alternatives and complementary to enforcement, surveillance, research and monitoring.

### 7.4.4 Monitoring, control and evaluation

(a) Improve the monitoring and evaluation of the impacts of land care and coastal management especially in soil conservation of agriculture practices and land and coastal conversions;
(b) Sustain research into better agricultural and forest management measures to facilitate better control of erosion and minimize coastal conversion;
(c) Incorporate adaptive and proactive feedback into research, monitoring and evaluation of land care and integrated coastal zone management programmes.

### 7.4.5 Capacity-building

There is an insufficient number of integrated coastal managers who appreciate the land and water interaction so as to adequately plan and manage these strategically important life support ecosystems. In order to address the capacity-building needs to assure the sustainable development of ecosystem services of the country, the following concerns have been proposed:

(a) Expand and strengthen the cadre of watershed managers who relate with farmers' organizations to integrate and harmonize zoning with coastal zone planning and management to meet sustainable development goals;
(b) Enhance the capacity of networks and coordinating institutions to facilitate the effectiveness of actions at all hierarchical levels (local, regional, national and global);
(c) Sustain the financial viability of land care and integrate coastal management through the appropriate valuation of ecosystem services, inputs and outputs effects of these ecosystems, and implement a comprehensive revenue system for these values in order to sustain the use and equitable allocation of ecosystem benefits.

The priority action criteria are to assure the protection of strategic watersheds and critical ecosystem habitats which integrate land to sea water-related ecosystems. The need to consolidate and sustain a representative system of network integrated protected areas should be a priority agenda (i.e., at least one, large enough to be of national significance, in each of the ten marine biogeographic zones).

## 8.0 IMPLICATIONS OF THE PROPOSED ACTION BY SECTOR

The proposed actions will require adjustments both philosophically and pragmatically in various sectors. The priority sectors concerned in relation to the effective implementation of the programmes of actions to address the major water-related issues can be related to the cause and the solution to the problems outlined previously. In this regard, the actions should not be considered as separate sectors but as multisectoral and interactive with each other (see table 8.1 and figure 8.1). For example, the implications to the financial sector require that the economic sector pave the way to be able to sustain the capacity to implement the proposed actions. In addition, industries in the forestry, fisheries and agriculture sector require that regulations and harmonized programmes recognize and deal with their inherent and inter-sectoral water-related concerns (for example, the downstream effects of deforestation on agriculture and fisheries). The following are the possible conflicting policy imperatives in the socio-economic environment and the sustainable development needs:

1. Fisheries production needs for food as compared with the "carrying" capacity of fisheries and the conservation needs for the ecological integrity of the life-giving attributes of the coastal and marine ecosystems;
2. Pollution may be expected to increase and habitats change with the industrial trajectory of the nation (for example, the regional industrial centres and programmatic EIA, the mining act and tourism master plan);
3. Freshwater needs and habitat change together with increases in population create a greater demand at all levels of resource use and the governance which accrues from it (for example, the forestry master plan, the national integrated protected areas system act, and the water master plan).
4. Transboundary concerns in terms of living and non-living resources, together with the demands of global liberalization and breakage of trade barriers (for example, maritime and transboundary concerns).

Looking at the first area of possible policy conflicts listed above, the following concerns need to be addressed. One of the strategic issues which faces difficulty in achieving a consistent sustainable development trajectory is the concern for food security and the need to increase fish production in situations of dwindling resources. The national agencies concerned such as BFAR, PFDA and DENR, need to:

(a) Monitor and evaluate their production targets and the concomitant programmes;
(b) Harmonize policies towards a common sustainable development agenda;
(c) Coordinate the short- and long-term implementation of its action.

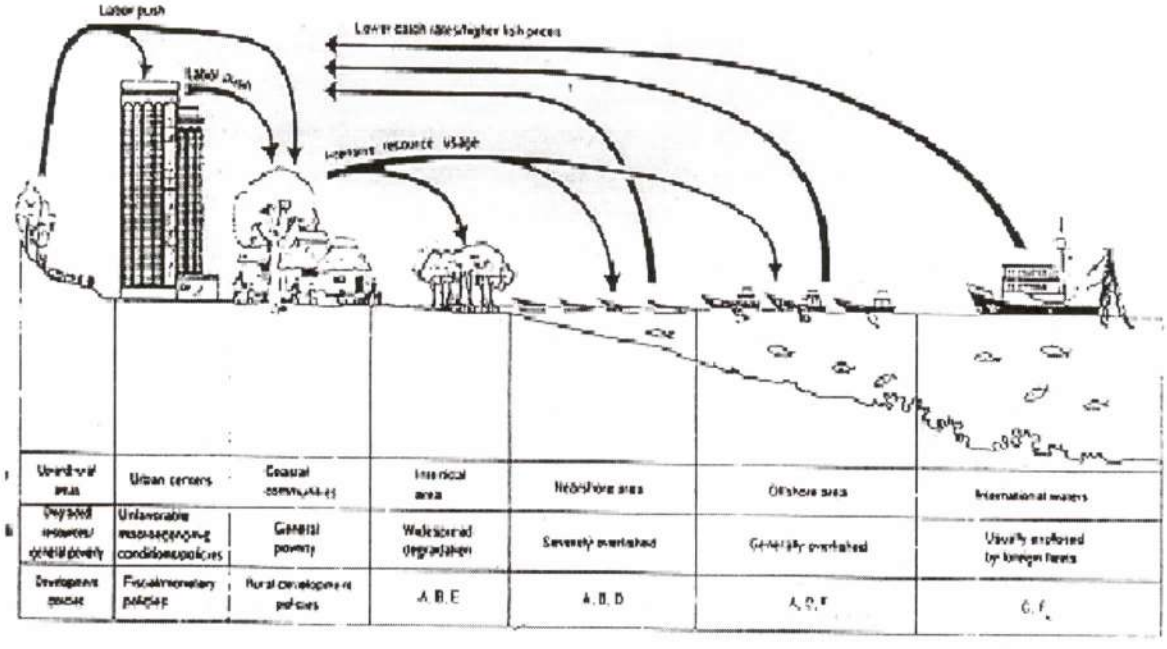
Table 8.1 Matrix of past and present policies affecting the use of coastal resources (see also figure 8.1)

| Economic policies | Coastal activities affected | Environmental impacts |
|---|---|---|
| A. Applicable incentives from Board of Investments (Executive Order 226)<br>- Income-tax holidays<br>- Tax and duty exemption from imported capital<br>- Tax credits on imported capital, feeds for grow-out and raw materials | Preferred areas of investment which vary yearly, for 1989;<br>➢ Capture fisheries (upgrading and modernization of vessels)<br>➢ Fry production for sea bass, grouper, milkfish and spiny lobster<br>➢ Seaweed production | ➢ Increases fishing intensity/ and stock depletion<br>➢ Decreases pressure on wild fry but may put pressure on culture environment<br>➢ Decreases pressure on wild stocks; widespread seaweed farming may disturb coral reef ecosystems |
| B. Interest rate subsidies (through, e.g., Biyayang Dagat Programme) and guarantee schemes | Activities financed such as pond construction and improvement, shrimp farming, among others | Encourages mangrove conversion into fishponds; encourages capital intensive production technologies; provides alternative employment to fishers which may reduce fishing pressure |

| | | |
|---|---|---|
| C. Tax exemption and drawback schemes for fuel (Executive Order 1047) | Fishing in international waters | Reduces fishing pressure on the country's EEZ |
| D. Subsidy on diesel fuel | Nearshore and offshore fishing operations | Increases fishing pressure on offshore and nearshore stocks |
| E. Subsidy on inorganic fertilizers | Fishpond aquaculture | Promotes intensive culture methods; possibly slows down mangrove conversion to ponds |
| F. Reduced import duties on (used) fishing vessels, factory ships etc. (Executive Order 364) | Commercial fishing operations (presumably on offshore fish stocks) | Increases fishing pressure on offshore stocks |

Source: Padilla and de los Angeles 1992.

Figure 8.1 A coastal cross-section documenting major interrelationships between economic policies and the utilization of coastal resources in the Philippines (Padilla and de los Angeles 1992)




Some of the possible mechanisms to facilitate the monitoring and evaluation of the targets and programmes are through the following:

(a) Enhance the sharing of resource information on the status and use of the marine and freshwater resources and habitats through the a national environmental information system (for example through the National Environment Resources Information Centre);

(b) Foster participation of stakeholders in monitoring and evaluation, as partners in public education and in the feedback process of adaptive management;

(c) Restore and enhance the life-support functions of critical ecosystems through the development of more marine protected areas and sustainable types of aquaculture which considers equitable access of other stakeholders in the longer term perspective.

In addition, the harmonization of goals and the coordination of the implementation of the action programmes require that the Philippine Agenda 21 be consonant with the proposed PLAN 21. Greater emphasis should be made on establishing an archipelagic focus in national policy (i.e., in PLAN 21). This sustainable development strategy implies the delicate harmony of use and development takes into consideration the ecosystem conservation needs of development. Appropriate matching of production targets needs to be clearly defined with adequate environmental safeguards (for example, aquaculture proliferation) through resources conservation (for example, establishment of marine protected areas) and management (for example, fisheries regulation and management). The present state of marine affairs in the country is still wanting in these concerns.

The second possible conflict concerned pollution and industrial development. Pollution may be expected to increase and habitats change with the industrial trajectory of the nation. One of the strategic mechanisms which requires urgent implementation is the establishment of integrated coastal and land-use zoning. The establishment of functional zones (i.e., tourism zones, marine protected areas, and regional agro-industrial zones) which are harmonized with ecological and sustainable perspectives needs more comprehensive guidelines and an effective EIA system. Pollution loading and conversion of habitats, which threaten the existence of adequate ecosystem services, require the incorporation of improved procedures. Improvement should incorporate the projection of cumulative human impacts on the environment in appropriate spatio-temporal scales, and the cost and benefits of ecosystem services vis-à-vis conversion and other uses.

The proliferation of strategic master plans in the various sectors (such as tourism, forestry and mining) shows an inadequacy and lack of appreciation of the coastal and marine impacts of these developmental thrusts. Since more and more of these plans are being implemented by government programmes, then the involvement of the public and private sector should be enhanced. In order to obviate increased wastes and minimize pollution and coastal conversion, the following can be of priority concern:

(a) Minimize siltation and pollution from the various human settlements, industrial growth areas and poor agricultural practices. This necessitates the development of coastal and marine development plans which facilitate coordination of the hierarchical concerns of local (barangay and municipal levels), provincial, regional, national and global responsibilities and commitments;

(b) Utilize innovative market and non-market interventions among the various stakeholders;

(c) Incorporate precautionary and user-pay principles into the EIA system and include this consciousness in most urban and rural activities in the various sectors.

The third area of conflict concerned freshwater needs and habitat change together with increases in the population. An inadequacy in the present manifestations of the strategic policies of the forestry master plan, and the national integrated protected areas system act is apparent. An appreciation of the holistic attributes of the ecosystem services is lacking in the evaluation of their implications to natural resources management decisions.

This can be illustrated in the following examples:

(a) Emphasis on the amount of sustainable timber utilization is the prevalent basis for much of the area targets for the maintenance of forest areas in the country instead of determining the area needed to maintain a sufficient water supply in the watersheds and minimize soil erosion and siltation of downstream receptors;

(b) Representative sites within the NIPAs needs to be improved from that based on mammalian biogeographic distribution to a network of protected areas which does not only consider the corridors of dispersal of organisms but also the ecosystem connectivities of habitats and human societal needs;

(c) The appropriate mix of surface water uses in industrial, municipal and agricultural sectors does not adequately consider the cumulative ecosystem impacts, for example, dams for hydroelectric power and cooling water. These constraints require that the seemingly disjointed localized and fragmented impacts at the different sectors be evaluated in an integrated manner. For example, the emerging technologies in alternative energy generation and the rates of consumption and production levels should wisely balance the short-term needs with those of the next generation.

The fourth area of conflict concerned living and non-living resources, together with the demands of global liberalization and breakage of trade barriers. With quantum leaps in the information age, decisions are made faster without adequate information inputs of ecosystem values. Decisions to open shorter maritime routes may lead to the extinction of the last populations of migratory birds and marine turtles which move from the South China Sea to the Turtle Islands. The interference of reproductive events, larval dispersal and tuna migratory patterns from increased transport activity (for example, ballast water introduction of exotic species and higher probability for oil spills) causes recruitment collapse. The cluster of coralline islands and shoals in the Spratlys is not only one of the richest marine biodiversity centres in the world but is increasingly gaining a wide variety of uses from military reservations, tourism, fishing, and mining.

In addition, increased tension from conflicting claims in the South China Sea may potentially cause environmental disasters if there is military conflict. A military engagement may cause greater navigational hazards, ship sinkings and the destruction of offshore oil wells in Brunei or from the offshore oil and natural gas development of the western coasts of Palawan. The proposal for stewardship arrangements for marine biodiversity conservation to be fostered among claimants in the South China Sea area may be an important honourable mechanism for the countries in the region. The establishment of a transboundary marine protected area for all to preserve in perpetuity may be a worthwhile lasting legacy of this TDA project.

## 8.1 FINANCE

### 8.1.1 Financial planning and sustainability

The recognition of the need to incorporate environmental costs in water-related issues, as in all other environmental concerns, requires that appropriate mechanisms on how to provide funding sources and rationalize areas in the national budgetary framework be established. In order to sustain development without unduly jeopardizing the future generation's access to these ecosystem services and benefits, at the very least the allocation of the country's financial resources should at be the level of $9 billion (assuming 3 per cent environmental cost of GDP, de los Angeles and others 1993).

The present EIA system has incorporated the concept of an Environmental Guarantee Fund (EGF) as a mechanism for applicants seeking an environmental compliance certificate. How effective and how best to utilize these instruments should be made a major component of the action agenda of the Government.

At present, in addition to establishing some degree of environmental investment indices as a step towards estimating the allocation of the municipal development fund, internal revenue allocations and other taxation and fees schemes might be considered. Other innovative mechanisms can also be elicited from the private sector and international financial institutions (for example, environment credits

and productivity based indicators) and the public sector (for example, debt for nature swap). Moreover, it is important to explore the means to actualize and expand the coverage of implementing the user-pay principles into both financing and investment mechanisms.

## 8.2 ECONOMIC DEVELOPMENT

### 8.2.1 Sustainable healthy environment integral to development

As indicated in many environmental and natural resource accounting initiatives, the costs to the environment of development projects and other ongoing human activities should be an integral consideration in the evaluation and eventual implementation of control mechanisms.

More comprehensive ongoing investigations need to be undertaken to determine whether incorporating considerations of environmental costs into many or all economic activities has a direct impact on economic growth (Cruz and Repetto 1992, de los Angeles and others 1994 and Montes 1994). The combined effects of the present economic crisis and stabilization policies (for example, exchange and interest rates) which have led to unemployment and income decline needs to be met with adequate safety nets to prevent increased pollution, over-exploitation and habitat degradation.

At least this lack of information did not deter President Fidel V. Ramos from espousing the goal of becoming an Asian green tiger (AsiaWeek 1996). These attempts are also seen in some of the national policy statements especially in the Philippine Agenda 21 known as the Philippine Strategy for Sustainable Development (PSSD) which the National Economic and Development Authority (NEDA) serving as chair through the Philippine Council for Sustainable Development (PCSD). The quest for economic growth by becoming a newly industrializing economy within a highly competitive global economy has both positive and negative aspects in relation to the environment.

Enhanced recognition of the importance of a sustainable environment and natural resources has positively affected economic activity. Increasingly these factors are incorporated into annual projections of how they may affect expected targets of annual growth and diversification of economic activities (for example, the El Niño phenomenon, water shortages affecting food production). In addition, the appreciation of questions on the allocation of costs and benefits as a crucial concern in evaluating environmental and natural resources and services as a corollary to the criteria of economic growth per se is encouraging. The consideration of rates of change and the proper timing and allocation will be important determinants in dealing with the positive (sustained use and development) and negative (increasing costs from environmental degradation and depletion and unsustainable development) effects of the nation's development trajectory.

### 8.2.2 Sustainability and equity

As mentioned earlier, the implications of decisions and actions which consider the sustainability of water-related environmental goods and services should also integrate the implications on how the costs and benefits are allocated. These considerations in principle have a basis in the Social Reform Agenda. For example, embodied in the agenda are the concerns for preferential use rights for marginal fishing and indigenous communities. More often capacity-building mechanisms are required in order to pave the way for the appropriate manifestation and concrete pursuit of the sustainable development of the marginalized or disenfranchized sectors in society.

Cruz and Repetto (1992) have suggested that there is a need to strengthen resource rent and property taxation. On the other hand, Montes (1994) further cautions that not all environmental outcomes can be understood in terms of the impact of pricing policies; for example, the distribution of income and asset control and regulatory capability are also important. Safety nets are needed for an increasing number of poor Filipinos who are suffering from economic contraction and reduced access to dwindling resources and unfair competition with the elite. Provision of credit for livelihood activities through cooperatives and people's organizations should be expanded through greater contributions (for example, taxes) from the elite.

Montes (1994) has suggested that barring significant social restructuring (for example, sufficient access control through agrarian reform and controlling the entitlement of the elite to water-related resources), increasing the technical ability of the bureaucracy, strengthening groups outside the formal state apparatus and reorienting external assistance (for example, debt for nature swaps) can be second best interventions.

## 8.3 FISHERIES

### 8.3.1 Food security and sustainable fisheries

An often repeated dilemma is how to attain food and cash security and at the same time control pressures resulting from the increased over-exploitation of the water-related environment and resources. Reducing fishing effort through alternative livelihood activities has been proposed, activities that are not solely based on extraction or harvests from the fisheries sector. However, this does not deal with the question of the possibility of food shortages. At the moment, no creative strategic food supply projections have been explored in terms of their carrying capacities and other scenarios for alternative production and feeding modes.

For example:

1. Since many of the water-related habitats are downstream receptors constrained by light and nutrient conditions, only a certain carrying capacity can be sustainably accessed by a population; the appreciation of limits to growth, especially in the water ecosystem, requires that in the long term both the supply and demand side (for example, family planning) capacities should be appropriately addressed.
2. The dietary preference of the population and a re-examination of the mixture of production targets of high value and low cost protein sources such as fish should also consider the impacts on the ecosystem.
3. Food security projections should be rationalized with sustaining the supply side of fisheries (both in the wild harvests and aquaculture).

## 8.4 AGRICULTURE

The importance of fisheries as a critical food source has guaranteed that it be considered primarily as a concern of agriculture despite its specific ecosystem characteristics which are different from a terrestrial ecosystem. This misconception of the water environment has been transposed to the idea that the water ecosystem's carrying capacity can be enhanced in the same way as agriculture approaches such as nutrient enrichment and predation control. In some mariculture systems these similarities can exist only to a limited extent especially because of the different thresholds of light and nutrient constraints. Moreover, the fluid nature of how light and nutrients are utilized as mediated by hydrography and topographic attributes are different.

Human society's increased appreciation of the water world's specific uniqueness can pave the way to the emancipation of agriculture systems into a more integrated and ecologically based perspective. Increasingly polyculture and integrated farming systems are incorporating ecologically sound approaches to food production and trade. Will it be possible to set ecozones and buffers and agriculture and productive centres which may pave the way to demarcating areas for agriculture zones while still maintaining critical watershed areas and meeting food security production targets?

In the short term, the urgency of some concerns are deflected from the root causes. For example, the shortage in rice production may be linked to the reduction of rice lands because of conversion into subdivisions and industrial zones. In addition, watershed and irrigation areas are being converted to other functional uses such as golf courses thus changing the food production and ecological capacities of these ecosystems.

Cruz and Repetto (1992) have aptly noted that structural adjustments could eliminate bias against agricultural activities that are environmentally friendly. In addition, improved access to agricultural resources by the poor would have favourable economic, social and environmental effects.

## 8.5 FORESTRY

### 8.5.1 Watershed management and silviculture

As in the agriculture sector, an increasing appreciation of the ecological functions of the forests, separate from the timber industry, has changed the perspective for the sustainable development of the forestry sector. The problem of erosion and the conversion into agriculture areas have been tactically approached through integrated agroforestry schemes (OECF 1997). Replanting and reforestation are becoming more integrated, rehabilitating and enhancing its hydrologic and erosion buffer value. The problem of the degradation of forests in watershed areas despite their proclaimed priority use and value as a source of water and erosion and nutrient buffer is starting to be afforded high protection status. If this positive trajectory is to be expanded and consolidated, an even greater capacity in this sector is needed so that it can absorb proposed programmes that are introduced. There have been some initiatives at providing cross-sectoral programmes in order to address these water-related issues such as the central Visayas resources programme and the OECF-ICZM programme in southern Mindanao. It is important to note that the modalities and mechanisms for coordination within these sectors can be improved especially in the following areas:

(a) Minimize the turf and jurisdictional concerns of the Department of Agriculture and DENR though coordinated efforts at enhancing technical assistance to local governments;

(b) Clarify the roles and responsibilities of local government units and the participation of the stakeholders;

(c) Enhance the capacity-building of concerned stakeholders to implement the desired programmes.

## 8.6 MANUFACTURING

### 8.6.1 Industrial zones

Increased pollution loads and social pressure have facilitated a slow realization especially for the bigger manufacturing industries that in future it cannot be business as usual. In the past, when the business climate was bad the environment was the first to suffer. A paradigm shift is very slowly emerging among emancipated industrialists that has facilitated their willingness to pay the environmental costs for the use of environmental goods and services. The sharing of environmental and resources costs can be facilitated by government and civil society. Some examples can be seen in how the environmental guarantee funds are established and implemented. The allocation of sharing the costs

and benefits is critical in order to sustain the harmonious relationships of the different users. It is critical that the cost sharing responsibilities arrive at some equitable arrangements to harmonize their goal for sustainable development. These concerns refer to how taxation and incentives, together with in-kind contributions (for example, environmental monitoring services) actually affect big and small manufacturing companies. Some investigations by the industrial environment management programme with assistance from USAID provide important guidelines to evaluate and respond to the implications of water-related programmes to the sector. Important are the market and non-market instruments which are proposed to overcome the resistance to change in the monitoring, control and evaluation of environmental cost sharing mechanisms.

### 8.6.2 International maritime areas

The transport of goods and services and the utilization of maritime areas both domestically and internationally will have increasing importance especially in transboundary concerns. Despite the ratification by the Philippines of many international protocols and conventions the commitment can be found wanting in the actual implementation of these agreements. Harnessing the political will and capacity requires that the sector is provided sufficient support in exchange for specific roles and responsibilities for such assistance. In order to facilitate programmes such as pollution abatement and waste minimization in the transport sector, the concessionary credit facilities necessary to stimulate infrastructure investment needs to be established. Initiatives need to be taken together with technical assistance in human resources and curricular development to enhance the technical skills and knowledge of the transport sector (especially maritime).

In addition to the water based transport facilities, land and transport infrastructure (for example, roads and ports) have made considerable habitat changes, which both directly and indirectly relate to water utilization. Directly, road construction (including reclamation for coastal roads) and development of communication facilities (underwater cables) have profound effects on habitat integrity. Development in these sectors should seriously consider how erosion can be minimized and siltation impacts on the water environment reduced. Indirectly, the profound effects in increasing access to watersheds, forest areas, coastal and marine habitats are often not adequately considered. In the programmes of action mentioned above careful consideration in the transport and maritime industry and the linkages to transboundary areas should be given in the planning and implementation of integrated coastal and land use plans.

## 8.7 MINING AND ENERGY

The stimulus for increased investments in the mining sector and the implications of how the action programmes can provide for a environmentally friendly mining industry is a difficult but important task. The programmes to deal with habitat modification and extraction of resources, together with the responsibility for pollution abatement and waste management, require the following considerations:

(a) Identification of strategic mining areas and energy development and the setting of industry quotas as targets to evaluate the effectiveness of waste treatment;
(b) Agreement on a sustainable development rate that considers the recovery and regeneration rates affected by habitat modification and extraction activities;
(c) Safety and environment planning will be integrated as part of an integrated management practice.
(d) Classification of strategic areas to be identified so as to harmonize priority uses for mining zones, which should not contradict strategic national and local protected areas and other land and water use classifications.

## 8.8 URBAN AND RURAL DEVELOPMENT REGIMES

The criteria for choosing priority areas for programme implementation and the process of producing the most effective impact ranges from highly urbanized areas to the least developed rural areas. To evaluate the effectiveness of water-related issues, replicate samples are needed from a hierarchical and nested representation of a gradient of high to low gravity of the problems and causes. The prioritized list derived from the set of decision criteria provides some decision rules whereby adaptive management mechanisms can be learned and practised at the same time. In effect the implementation of the action programmes have the following expected outputs for representative human settlement and development regimes:

(a) Representative zoning master plans of inland waters and coastal zones which implement integrated waste management systems, pollution abatement and sustainable fisheries management;

(b) Implementation of participatory action research, development interventions and adaptive management based on the plans and guidelines;

(c) Evaluation of the effectiveness of management measures at the different stages of implementation, including process documentation of lessons learned and analytical instruments.

National and local government counterparts may need to be identified in conjunction with the participation of concerned stakeholders in the civil society.

## 8.9 LABOUR

The effect of the programmes will most likely expand employment opportunities so that a new labour force may emerge to provide for sustainable environmental goods and services. At present, the specific and general role of the labour sector is not well recognized and thus not as well developed in the Philippines. Only in the recent decade have environmental issues been incorporated into labour and management collective bargaining agreements. Urban and rural workers will have varying manifestations of how they will relate to the various water-related issues. Their strategic role in the production process makes them crucial in the effective implementation of solutions to water-related issues. In addition, the heavy dependence of the nation on remittances from overseas Filipino workers may in fact further facilitate interventions in the transboundary concerns of water-related issues (for example, those in the maritime and mining industries).

The interrelated concerns of unemployment, poverty, and population pressure have a profound effect on the marginal resources such as the watersheds and coastal areas. A failure in economic expansion produces net upland and coastal migration into open access areas. These tend to increase the degradation and depletion of upland watersheds and coastal zones and fisheries resources.

## 8.10 CONSUMERS

Consumers are an important sector in the pursuit of market and non-market instruments as part of the solutions to water-related issues. A comprehensive approach at the individual and institutional level is required. Responsible and proactive consumerism can be a potent force especially in public awareness and education campaigns. Sustaining the consciousness of consumer protection as linked to environmental action will require considerable capacity-building (for example, organizing consumer groups) and social preparation. The recognition and actual effect on prices of value added products, which are environmentally friendly, are highly dependent on consumer sensitivity and social pressure.

## 9.0 SUMMARY

This country report aims to facilitate the establishment of a "report card" system on water-related issues of the Philippines which can be compared with information from other countries in the UNEP-East Asian Seas region. The attempt to identify transboundary concerns within the South China Sea is important especially to the coastal States bordering it. The Philippines is one of the countries occupying the eastern border of the South China Sea and is dependent on the South China Sea as an important life support system. In addition, the Philippines is one of the claimants to the Spratly islands, wherein the Kalayaan Island Group occupies a portion of the contested area. Despite the conflicting claims the transboundary concerns of the water-related issues, pollution, water supply, over-exploitation and habitat modification, are concerns of all the coastal states. Highlighting the gravity of these concerns are attempts to estimate the socio-economic losses that may be accrued from these stresses. A wide indicative range of around $0.3 - 9 billion annually has been suggested.

As an archipelago, the major concerns of the Philippines focus primarily in the western part of the country from the northern area in the Batanes region and north-western Luzon to the southern sections of Mindoro and Palawan.

Regarding pollution the highest concern is around the Metro Manila area, and of intermediate concern is the Lingayen Gulf and Batangas-Verde Island Passage area and to a lesser degree the area in north-west Palawan. Water shortages and contamination of freshwater supplies follow a similar pattern of concern as both are related to population growth and urban development. Over-exploitation of living resources and habitat changes are also associated with these development trends, although understanding the natural variability of ecosystems and natural populations cautions us not to trivialize and make broad generalizations. The reiteration of the need to incorporate the concept of carrying capacity and sustainable yields in good management practice is also necessary.

Inversely, the importance of establishing protected areas can focus on a network of large national representative sites of highly sensitive areas such those in western Palawan (including the Kalayaan Island Group) and the Batanes region.

Understanding and action leading to adaptive management approaches also has to be pursued in the context of the proposed social-economic options available in the areas concerned. Since the issues are caused primarily by human activities interacting with the environment, then interventions have to deal with the holistic nature (i.e., natural and man induced) of the problem. Specific actions are proposed for each issue ranging from: (a) the policy concerns and guidelines for action, (b) legal and institutional arrangements, (c) monitoring, evaluation and control mechanisms, (d) public education and participation and (e) capacity-building needs.

Although all the concerns are interrelated in a geographic and issue perspective, treatments per topic are made only for emphasis. But time and again, mention is made of the need to consider the interconnected nature of transboundary issues (for example. pollution and endangered species and habitats). In addition, the context of how they are going to be solved requires an appreciation of the necessary complementary action from the local, national, regional and global setting. Intersectoral coordination will facilitate integrated action in a multidimensional regime.

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