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The Quest for a Better Environment: Past Experiences and Future Challenges

Danilo C. Israel

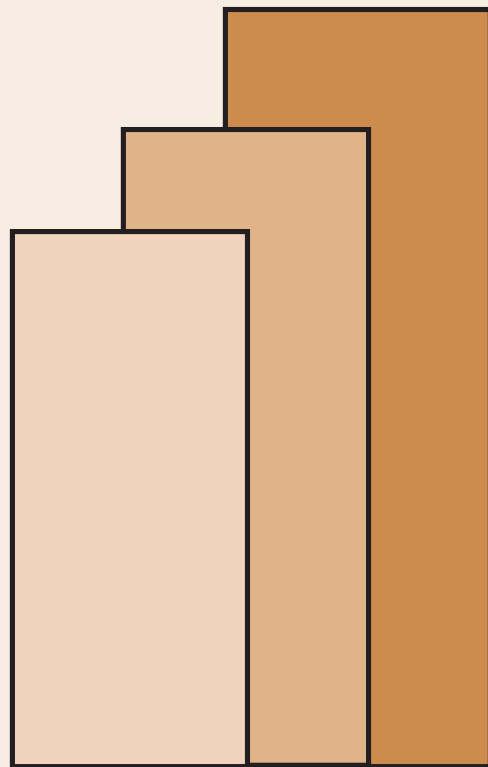
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by

Danilo C. Israel

Abstract

The persistence of serious natural resource depletion and environmental degradation means that much remains to be done years into the implementation of Philippine Agenda 21 (PA 21). With this background, the paper reviewed the past experiences and discussed the future challenges faced in the natural resource and environment sector, concentrating on the most important issues still to be addressed in light of PA 21, including those that have policy implications. The purpose was to highlight the issues and promote a more focused discussion.

The paper reviewed the natural resource and environmental problems across ecosystems, per ecosystem and per critical resource. Then, it presented a history of natural resources and environmental laws and policies, with PA 21 highlighted, and discussed some of the important gaps and issues. In conclusion, the paper argued that while the implementation of PA 21 may be behind schedule, a determined effort to address the most pressing issues will hasten the attainment of a more sustainable form of development for the country.

Keywords: Philippine Agenda 21, ecosystems approach, natural resource and environmental laws and policies

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The Quest for a Better Environment: Past Experiences and Future Challenges

by

Danilo C. Israel*

I. Introduction

The persistence of serious natural resource depletion and environmental degradation years into the implementation of the Philippine Agenda 21 (PA 21), the declared formal blueprint for sustainable development of the country, means that much remains to be done. At this point, society is still far from attaining many of the positive environmental changes that the Agenda envisioned.

At the ground level, much of the success of PA 21, and the overall effort to attain a more sustainable form of development, depends to a large extent on the active implementation of the various action strategies and agenda that it proposed. This implementation is contingent, in turn, on the pursuance by the government of the enabling policies that PA 21 outlined, on the basis of which the mix of action strategies and agenda were developed.

To a significant extent, the policies needed to support PA 21 have been in place already. For one, some of the important laws proposed for enactment by the Agenda were actually passed during the last five years. In addition, a recent listing (DENR 2002) reflected the preponderance of policy issuances done for the natural resources and environment sector. On one hand then, the government can be seen as active in policymaking as part and parcel of its role in PA 21. On the other hand, the continuing unwanted environmental situation means that important issues and constraints endure, some of which may have policy implications.

With the foregoing, this paper reviewed the natural resources and environment sector in light of PA 21, and highlighted some of the most pressing issues still at hand. The purpose was to have a focused discussion and hopefully generate some consensus on at least some of the issues.

The paper was organized as follows. The second section reviewed the problems in the overall natural resources and environment sector, by ecosystem and by critical resource. The third section presented a history of laws and policies for the natural resources and environment since the beginning up to the present. The fourth section discussed the issues for the natural resources and environment overall and the individual ecosystems and critical resources. The last section provided the summary and conclusion.

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The issues identified in this paper were by no means comprehensive given the myriad aspects and wide coverage of the natural resources and environment sector. Also, the discussions were done in a general and review manner and the order of presentation of the issues, before the concluding remarks, was arbitrary and not based on priority or importance. The paper made good use of data and information from the existing literature and interviews with key sector informants.

II. Problems in the Natural Resources and Environment Sector

Although there were some other ways of defining the physical nature of the natural resources and environment sector, the ecosystems approach followed by PA 21 was well accepted (e.g. NEDA 1998). Here, the sector, which was not necessarily just economic, was classified into 5 ecosystems and 2 critical resources. The ecosystems were the upland/forest ecosystem, lowland/agricultural ecosystem, freshwater ecosystem, marine/coastal ecosystem, and the urban ecosystem. Mineral resources and biological diversity resources comprised the critical resources. Because of increasing population and intense exploitation over many years, these various ecosystems and critical resources have been facing serious, if not worsening, levels of natural resource depletion and environmental degradation as explained below.

Upland/Forest Ecosystem

The upland/forest ecosystem referred to areas with a slope of at least 18 percent/minimum crown cover of ten percent consisting of trees, shrubs and grasses and not subjected to agricultural uses. As of 2000, the total forest cover of the country was 5.7 million hectares (NSCB 1998). This was only about 19 percent of the total national land area of 30 million hectares and 39 percent of the land area of 15 million characterized as forestland. Furthermore, this forest cover was only approximately half of what existed 20 years ago, indicating that rapid rate of deforestation that has been occurring over the past two decades.

Deforestation was defined as the permanent depletion of the crown cover of trees to less than 10 percent of the surface area (WRI 1994, ASEAN 1997). In the 1970s, the estimated average annual deforestation rate had been as high as 300,000 hectares (ADB 1998). This was reduced to 150,000 hectares in the 1980s. In 1997, the annual average deforestation rate was 100,000 hectares. The underlying causes of deforestation in order of decreasing significance were the bias of state policies for commercial utilization of natural resources up to the 1970s; promotion of development projects such as plantations, ranches, dams and mines at the expense of prime forests; weak use of command and control schemes of forest management where the government lays down standards but weakly enforces compliance; inadequacy of pricing schemes and instruments to reflect true scarcity values of forest resources; and the inequities that force the landless in the lowlands to migrate to the uplands, putting pressure on the forest and competing with the long-term residents and indigenous peoples (NEDA 1998).

There were no time-series data available on deforestation but there were on forest destruction. Data from the NSCB (Various Years) for the period 1976-2000 (Table 1 and Figure 1) indicated that forest destruction was generally higher in the late seventies and

early eighties than in later years. Forest destruction reached a peak in 1983. The rate of destruction was erratic in the late 1980s until recently but was generally increasing during the entire period. The most significant cause of forest destruction indicated was forest fire. There were some years, particularly in the 1990s, when most of the recorded forest destruction was practically due only to forest fire.

In response to the problem of deforestation and for commercial purposes, reforestation has been going on over the years in the country (Table 2). In 1976, total area reforested was 31,733 hectares. By 1999, this area rose to 42,167 hectares, of which about 74 percent was done by the government through the DENR and other agencies while 26 percent was conducted by the non-government sector, mostly the timber licensees. The ratio of government to private reforestation had been erratic (Figure 2). Government reforestation reached a peak in the early nineties and in some years was lower than private reforestation.

Lowland/Agricultural Ecosystem

The total agricultural land area of the Philippines was about 10.3 million hectares (NEDA 1998). Of these, 45 percent was located in the lowlands and 33 percent was in the uplands. One of the major problems faced in this ecosystem was land conversion. For the 1988-2001 period, the total agricultural lands approved for conversion to non-agricultural uses were 50,719 hectares or an average of 2,505 hectares per year (Table 3). The approved conversion has been on a generally increasing trend and reached a peak in 1998. The data of course did not include illegal conversion that, even in the absence of concrete figures, was suspected as increasing over the years as well. Overall, land conversion was due to the increasing population and industrialization that in turn precipitated the rising demand for land for residential, industrial and other economic activities.

Soil erosion was another problem in the lowland/agricultural ecosystem. As of 1991, about 9 million hectares of land was classified as slightly eroded, 8.5 million hectares as moderately eroded and 5 million hectares as severely eroded (Table 4). Mindanao was the most severely eroded region. All in all, about 45 percent of the national land area was classified as eroded. The man-made causes of soil erosion were improper land uses, shifting cultivation practices, extensive deforestation of sloping areas and improper use of chemicals.

Freshwater Ecosystem

The freshwater ecosystem of the country comprised a total area of about 569,600 hectares and included 384 major river systems and 59 lakes. Freshwater consisted of surface water that flows and collects in lakes, rivers, and reservoirs and groundwater that collected in porous layer of underground rocks, otherwise known as aquifers, and renewed by rain percolation.

A major problem in some of the river systems and other inland water bodies was pollution due to domestic waste, industrial effluent, agricultural run-off and other wastes brought about by the increasing population, agricultural intensification and industrialization. Rivers crossing urbanized cities like Metro Manila, in particular, were facing various level of degradation (NEDA 1998). Aside from the Pasig River that was

generally already accepted as biologically dead, other rivers in Metro Manila did not meet the Dissolved Oxygen (DO) and Biochemical Oxygen Demand (BOD) standards for class C water (Table 5).

Another problem under the freshwater ecosystem was the water crisis experienced by the country. Both the stocks of ground water and surface water have been decreasing in recent years with more prominent changes in the former (Figure 3). Groundwater depletion was due to the intensive extraction for residential, commercial and industrial usage especially in major cities like Metro Manila. This resulted to subsidence and saltwater intrusion that in turn affect the availability of quality of water not only from aquifers (NEDA 1998). Surface water depletion, on the other hand, was reflected in the receding waters in dams and other water reservoirs and caused mainly by shortened rainy seasons.

Marine/Coastal Ecosystem

The marine territorial waters of the country covered about 2.2 million square kilometres and comprised about 80 percent of the territory. The marine/coastal ecosystem served as a rich source of fish and aquatic products used for food and adornment, habitat for countless underwater wildlife, and natural areas for recreation, tourism and related activities.

Like other ecosystems, the marine/coastal ecosystem has been plagued by resource depletion and environmental degradation. A major problem was mangrove destruction. In 1918, the mangroves covered about 500,000 hectares nationally (Table 6). This went down to 288,000 hectares in 1970 and 175,000 hectares in 1980. By 1998 only about 112,400 hectares of mangrove forests remained. The rapid decline has been attributed to the conversion of mangrove areas to fishpond and other aquaculture activities, land reclamation, construction of dikes and other coastal structures, wood extraction and uncontrolled development of tourism.

Another problem in the marine/coastal ecosystem was the degradation of seagrass. There used to be about 5 million hectares of seagrass beds in the country (La Vina 1999). Data on seven seagrass sites showed that most of them were in fair to good condition. However, 60 percent to 100 percent of the seagrass beds in sites in Southeast Luzon were in poor condition (CEP 1997). The man-made causes of seagrass degradation were coastal mining activities, coastal land conversion, run-offs due to deforestation and destructive fishing methods.

Another problem in the marine/coastal ecosystem was the destruction of coral reefs. The national coral reef area was estimated at about 27,000 square kilometers and contributed at least 10 to 15 percent of the total marine production (NEDA 1998). Out of 742 coral reef sites once surveyed in 1991, only 5.3 percent or 39 sites were in excellent condition while 30.5 percent or 226 were in poor condition (Table 7). The destruction of coral reefs was attributed to siltation, mine tailings, pollution, coastal development, overfishing, and destructive fishing practices like the use of cyanide, dynamite, purse seine, and muro-ami.

Still another problem in the marine/coastal ecosystem was marine pollution. The uncontrolled discharge of wastes and contaminants from both land-based and sea-based economic activities rendered the coastal areas no longer suitable for their best use. In Manila Bay, for instance, total coliform counts were found to be over the standards set by the DENR (La Vina 1999, EMB 1996). Due partly to the pollution of the waters of Manila Bay, the red tide problem has occurred from time to time causing substantial economic losses to shellfish growers and even morbidity and mortality among some of consuming public.

Arguably the most important management issue in the marine/coastal ecosystem was fishery resource depletion. Fishing levels have already exceeded what ensured maximum productivity of fish stocks. Data showed that estimated actual catch started to exceed sustainable catch in 1987 (Figure 4). The level of fishery resource depletion increased up to 1992, after which it decreased a bit. The main causes of depletion were effort over-fishing or the increase in the number of fishermen exploiting the seas, particularly in the coastal waters, and destructive fishing or the use of illegal fishing gears and methods.

Urban Ecosystem

The urban ecosystem included the cities and other important population centers of the country. Metro Manila was the largest urban ecosystem. Although it only covered 0.2 percent of the national land area, it accounted for almost 14 percent of the total national population and almost 30 percent of the total urban population. The increasing population in the metropolis brought about an increase in the number of squatter or informal settlements. Comparatively, the percentage of informal settlers households to the total number of households was much higher in Metro Manila than in the other regions and the country as a whole (Table 8). The high population, small area, high rate of informal settlers and the lack of a comprehensive land-use and human settlement plans for the metropolis produced environmentally-critical problems that have currently reached alarming proportions.

Of the environment-related problems in the urban areas, solid waste was the most visible, especially in Metro Manila. In 1995, it was estimated that 6,334 tons of solid waste were generated per day (Table 9). Fifty percent of the domestic waste was transported to landfill sites, 40 percent dumped illegally and the remaining 10 percent was recycled. The largest producers of solid waste were the South and North Sectors of the metropolis. The largest producer on an individual city basis was Quezon City which was understandable given that it also had the largest population. Aside from the increasing urban population and its inability to properly handle and recycle solid wastes, the problem of solid waste resulted to a large extent from the lack of a comprehensive and effective management policy to contain it.

Sewage disposal was also serious in Metro Manila and other urban centers where much of the population were poor and living in informal settlements. In 1998, a significantly higher percentage of families owned water-sealed toilets in Metro Manila than nationally (Table 10). However, among families belonging to the lowest 40 percent of the income strata in Metro Manila, ownership of water sealed toilets was much less compared to those belonging to the highest 60 percent of the income strata. EMB (1996) reported that only 7 percent of residents of Metro Manila were actually served by existing sewerage

systems. The remaining population depended mainly on on-site disposal and septic tanks that drained the untreated domestic sewage directly into drainage points at existing rivers, creeks and other waterways.

Being the most urbanized, Metro Manila also has the worst air pollution problem in the country. The annual average total suspended particulates (TSP) in the entire metropolis already exceed air quality standards by over 200 percent and still increasing (NEDA 1998). This trend was largely attributed to the growing number of diesel-fueled vehicles and industries. In general, the worsening air pollution problem was due to the overdependence on conventional and highly pollutive energy sources such as coal, failure of policy to internalise environmental costs among energy users, lack of incentives for energy users to reduce air pollution, lack of access to appropriate clean technologies and the failure of the government to properly monitor and enforce existing laws on air pollution (NEDA 1998).

Mineral Resources

Mining was an important economic sector of the economy but also a major source of environmental problems. The environmental problems caused by the sector included the stripping of vegetation, alteration of terrain, soil erosion, habitat destruction, and production of mine waste and tailing that caused significant pollution, siltation and sedimentation of water bodies. The hazards of mining were starkly highlighted during the Marcopper Mining accident in Marinduque when large volumes of mine waste and tailing spilled into the lower water bodies and caused substantial environmental damage and economic losses.

Another environmental problem in mining, and in other industries for that matter, was the generation of toxic and hazardous wastes (Table 11). This problem was extra serious since exposure could lead to immediate death or long-term health effects on people. A special case was the much publicized mercury pollution in small-scale gold mining area in, Diwalwal, Compostela Valley, Mindanao (see e.g. Israel and Asirrot 2002). Other than its effects on human health, mercury pollution rendered inedible the fish stocks in the affected water bodies downstream of the mining sites and reduced their viability as sites for recreation and other economic activities.

Biological Diversity

Serious Biodiversity loss has been occurring in the country due to habitat destruction and fragmentation, overexploitation, chemical or environmental pollution, biological pollution, climatic change, natural calamities and other contributing factors. In the case of flora, a partial lists showed that a number of species were already declared as rare, endemic and endangered as of 1996 (List 1)). For fauna, several species were likewise declared as endangered, threatened, or vulnerable (List 2). Aside from the already mentioned factors, loss of biodiversity was exacerbated by the inappropriate, overlapping, conflicting and obsolete policies and institutions, poor monitoring and enforcement, lack of technical expertise and funds for research and development, and the weak capacities for information, education and communication (NEDA 1998).

Summary

Apparent from the above review was the inadequacy of the available data on the individual natural resources and environment problems. This limitation prevented the full assessment of the extent of natural resource depletion and environmental degradation going on over time in the last 5 years when PA 21 has been in implementation. While so, there is little doubt that the problems were serious, if not worsening. This assertion has support from official pronouncements made in statistical publications on the environment (e.g. NSCB 2000b, Foreword).

Because of natural resource depletion and environmental degradation, the capacity of most of the resource-based economic sectors to produce goods and services was impaired. Data showed that while the gross value added (GVA) at constant prices in agriculture has been generally rising, those in forestry fishery, and mining and quarrying either stagnated or declined in the past two decades, including the years immediately after PA 21 implementation (Figure 5). Furthermore, when resource depreciation was valued and deducted from the GVA of resource-based economic sectors covering forestry, fishery and mining, results indicated that the GVA fell down significantly in the 1990s (NEDA 1998).

III. Review of laws and Policies for the Natural Resources and Environment

The discussions in this section veered away from the ecosystem approach and followed the more traditional approach of classification by economic sector. The presentation of laws and policies were organized under the two major headings: the natural resources and the environment.

Laws and Policies for Natural Resources

Forestry

For a long time in the past, the government implemented the policy of economic development that placed little regard on conservation in the natural resources sub-sector. This policy had the singular goal of generating income, employment and foreign exchange and was pursued to exploit resource stocks that were abundant back then. It was only in more recent years that resource conservation gained ground as an objective parallel to economic development.

In forestry, the development-oriented policy was spelled out as early as in the Philippine constitution of 1935 that gave Filipinos the exclusive right to exploit natural resources. Later, the government pursued this policy by granting to the private sector large tracks of forestlands as logging concessions under Timber License Agreements (TLAs). In these agreements, minimal use charges and token rehabilitation requirements were imposed. The main beneficiaries were the rich investors who acquired concessions through economic and political power.

The policy of economic development in forestry led to the rapid rate of deforestation and the decimation of large tracks of forests by the 1970s. The situation was made worse because the government gained little in terms of public revenues as, over time, user fees remained low.

The alarming decline of forest areas eventually caught the attention of government policy-makers. In the mid- 1970s, two important laws, the Forestry Reform Code and the Revised Forestry Code, were enacted. These and the succeeding policy pronouncements in the 1970s put up stricter legal measures intended to conserve forestry resources. Nevertheless, charges for the use of forest resources remained low. Coupled with weak monitoring and enforcement, corruption in forest management and other institutional problems, the policy of economic development remained.

In the 1980s, more changes occurred as the country adopted the moderate policy of forestry development that included the reduction of environmental degradation and the improvement of the welfare of the people as objectives (Nelson 1984). Forest charges were increased and additional financial payments were demanded from loggers, including forest research deposits and environmental fees. Francisco and Sajise (1992) cited that these adjustments still fell short in reflecting the true value of forests and the environmental damages that logging caused.

In the 1990s, other than exacting fees and financial requirements, the government used more innovative methods to pursue forest conservation and rehabilitation. In 1992, RA 7586, or the NIPAS Act, was enacted that placed old growth dipterocarp forests under the National Integrated Protected Areas Systems (NIPAS). In NIPAS covered areas, logging was strictly prohibited. The government also embarked on an aggressive expenditure program for reforestation, agro-forestry and improved overall forest management. A total ban on log exports and the selective exportation of particular forest products were put in place.

Aside from the NIPAS law, there were other policies that supported the shift in emphasis from pure resource extraction to resource conservation in the forestry sector. One was the adoption of the flexible system of forest charges as specified in R.A. 7161 of 1991, the law that also banned the cutting of mangrove trees. The law stated that the forest charges on each cubic meter of timber cut be set at 25 percent of the actual FOB market price based on species and grading. Another important policy was the adoption by the government in 1995 of Community-Based Forest Management (CBFM) as the national strategy to achieve sustainable forest management. A third major policy was the adoption in 1999 of the Watershed and Ecosystem Planning Framework as an innovative strategy for resource management.

Fisheries

The overall policy history in the fisheries sector mirrored that in forestry. As early as 1932, CA 4003, otherwise known as the Fisheries Act, pursued pure economic development by allowing commercial fishing to operate even without permits. Resources were exploited under open access and taken mainly as sources of food, employment and income. Then, in 1975, PD 704, or the Fisheries Decree, revised and consolidated all previous laws in fisheries. License fees for commercial fishermen and lease rates for aquaculture operators using publicly owned ponds under Fishpond Lease Agreements

(FLAs) were imposed. The rates were minimal and far below the true value of the resources exploited. In addition to the low fees, financial support from the national government was provided, such as the granting of subsidized production loans for commercial fisheries and aquaculture. The policy of economic development led to serious resource depletion and environmental degradation in fisheries by the 1980s.

In 1998, RA 8550 or the Philippine Fisheries Code was enacted to codify previous fishery laws. A positive feature of this law was its declaration of resource conservation and poverty alleviation as objectives in fisheries, together with increased production (e.g. Israel 1999). To its further merit, the Code mandated that the license fee rates in the commercial fisheries and the lease fees in aquaculture be estimated based on resource rents and the granting of exploitation rights be done considering maximum sustainable yields (MSY). A few years ago, the rates for aquaculture were indeed increased but the changes remained minimal.

In 2001, DAO 17 was released that set the guidelines for delineating and delimiting municipal waters. Now in effect, DAO 17 has been hotly contested because of its provision that the waters within 15 kilometers of the offshore islands belonging to a municipality were part of the jurisdiction of that municipality. Commercial fishermen viewed this as greatly favoring the municipal fishermen and limiting their own areas of operation.

Mining

The situation in mining was not much different from those in forestry and fisheries. Over time, mineral exploitation followed the policy of economic development with little regard for resource conservation and environmental degradation. The earliest mining law was CA 137, or the Mining Act of 1936, that gave priority to Filipinos to explore and utilize mineral lands and resources. PD 463, or the Mineral Resources Decree of 1974, succeeded that aimed to provide for a modernized administration, exploitation and develop of mineral lands. In 1984, PD 1899 established small-scale mining as a new dimension in mineral development.

User fees imposed on mining operations were generally low and resource conservation and environmental protection were secondary concerns of both government agencies and the mining firms. To further pursue the policy of economic development, the national government gave strong financial and related support to the mining sector, including the provision of production assistance, pricing subsidies and tax incentives. The efforts were not enough to develop the sector as it stagnated due to declining international prices and growing resistance to the various social and environmental problems it was causing.

In the 1990s, two major mining laws were enacted. One was the People's Small Mining Act of 1991 which stated as policy the development of small-scale mining for purposes of employment and the equitable sharing of wealth in the rural areas. The law mandated the establishment of People's Small-Scale Mining Program partly for the stated purpose of addressing the environmental and various other problems connected to the activity.

The Mining Act of 1995 was legislated to revive the mining industry and address its various problems. This law pronounced the modified policy of sustainable mining that combined increased production, resource conservation and protection of the interests of mining communities as goals. To attain these, a mix of regulatory, economic and institutional approaches was specified. Among the regulatory approaches were the implementation across all mining operations of the EIS system and the imposition of mine wastes and tailing fees as payment of mine related damages. The law also provided the non-taxation of pollution control devices acquired, constructed or installed by the mining firms. An important institutional change in the mining law was the stipulation that no ancestral land shall be opened for mining without the prior consent of indigenous cultural communities concerned and the payment of royalty to said communities when operations occur.

Agriculture

In the agriculture sector, various policies have been implemented over the years that were directed to attain food sufficiency and other economic goals. Among these policies were those intended to affect commodity output prices or input prices. The first group of policies included quantitative restrictions, import prohibitions, price controls, and direct government involvement in marketing through the National Food Authority (NFA). The second group included the imposition of tariffs on inputs such as fertilizer and similar inputs and the provision of infrastructure such as irrigation and other input providing public expenditures in agriculture.

The overall policy environment in agriculture was seen as constraining to sustainable growth (David 1996). For instance, while the price intervention policies have become more favorable to agriculture, this gain was attained by increasing protection of major import competing commodities instead of reducing disincentives on exportable commodities through lower distortions in exchange rates. Moreover, public expenditures in the sector have not sufficiently focused on long-term productivity enhancing investments in order to reverse its declining competitive advantage.

To address the problems in agriculture and modernize the sector, the Agriculture and Fisheries Modernization Act (AFMA) was enacted in 1997. Environmentally, this law stated the promotion of sustainable development as a sector objective, together with economic and social goals.

Other Laws and Policies on Natural Resources

Laws other than the above were also legislated for the management of other natural resources not classified by economic sector, particularly water and biodiversity. For water resources, the most important ones were PD 1067 of 1976 or the Water Code of the Philippines, RA 8045 of 1995 or the Water Crisis Act, and EO 364 of 1996 that created the Presidential Task Force on Water Resources Development and Management. The more recent laws were intended to properly manage water resources and address the water crisis faced by the country.

The older laws on biodiversity included Act 2590, or the Act for the Protection of Game and Fish, passed in 1916 and RA 395, or the National Parks Law, passed in 1932. In more recent years, the passing of the NIPAS law in 1992 that established protected areas around the country and contributed greatly to the protection and maintenance of biodiversity. In 1995, EO 247 prescribed specifically guidelines and established a regulatory framework for the prospecting of biological and genetic resources.

Lastly, a law that has implications on various natural resources, including forestry, mining and biodiversity, was RA 8371 or the Indigenous Peoples Rights Act of 1997. This law recognized the rights of the indigenous population to their ancestral domain, including forest and mining areas, and created the National Commission on Indigenous Peoples (NCIP) to implement it.

Laws and Policies for the Environment

Laws and policies referring to the environment have a relatively shorter history compared to those for natural resources. Before the 1970s, little importance was placed on environmental problems as they were thought to be not critical back then. Factories were set-up and cars plied the streets without having to comply with any water and air pollution standards and controls.

Actually, however, as early as the 1950s and 1960s, the country already experienced external diseconomies in the form of air, water, and land pollution, particularly in Metro Manila (DENR 1991). As a response, RA 3931, which created the National Water and Air Pollution Control Commission, was passed in 1964. Both the law and the commission were ineffective due to token funding, limited powers and the resistance of powerful industrial interests. The environmental problems continued to magnify and worsen.

In 1976, President Marcos created the Inter-Agency Committee on Environmental Protection (IACEP) to look into the state of the environment and develop policies and programs for environmental protection. Among others, this committee proposed the creation of a central environment agency. The IACEP was later reconstituted into the National Environment Protection Council (NEPC).

In 1997, two important laws were passed which embodied the environmental policy of the country for some time: PD 1151 or the Philippine Environment Policy and PD 1152 or the Philippine Environment Code. The first law declared that it was the continuing policy of the state to create, develop, maintain, and improve conditions under which man and nature can thrive in productive and enjoyable harmony with each other; fulfill the social, economic and other requirements of present and future generations of Filipinos; and to insure the attainment of an environmental quality that is conducive to a life of dignity and well-being.

Due partly to the environmental legislation in the late 1970s, environmental concerns were starting to get attention in the development plans of the country since then. In the 1978-1982 Development Plan, environmental issues were first incorporated into national development planning. In the plan, the approach of resource exploitation and utilization on one hand and protection and replenishment on the other hand was followed.

When President Aquino came into power, the environment generated more focus from the national government. The Department of Environment and Natural Resources (DENR) was created in 1987. Also in the same year, the World Commission on Environment and Development (WECD) produced “Our Common Future,” or the Brundtland Report, which significantly helped place development and environment concerns in the forefront of national decision-making. The report defined sustainable development as “meeting the present needs without limiting the options of the future generations to meet their needs.”

With the widespread popularity of the Brundtland Report, the concept of environmental protection and management embodied in P.D.s 1151 and 1152 was expanded to the broader concept of sustainable development. A concrete manifestation of this was the adoption in 1989 by the Philippine Cabinet of the Philippine strategy for Sustainable Development (PSSD) as a means to achieve and maintain economic growth without degrading the environment.

In 1992, the Earth Summit took place in Rio de Janeiro, Brazil and produced the Agenda 21. This document was a comprehensive plan of action to be taken globally, nationally and locally by organizations of the United Nations System, Government and Major Groups in every area in which humans impact on the environment. In the same year, the Philippine Council for Sustainable Development (PCSD) was created by the government and mandated to ensure the implementation of Agenda 21. On record, the country was among the very first to formally respond to and put into action the internationally crafted agreement.

Philippine Agenda 21

An important achievement of the PCSD was the completion of the PA 21 in 1996 (PCSD 1997). As mentioned, the Agenda currently serves as the blueprint for the country’s sustainable development, particularly in relation to the objective of improving the quality of life of every Filipino (e.g. NEDA 2001). Also as mentioned, it classified the natural resources and environment sector into various ecosystems and critical resources for purposes of sustainable development.

To manage the transition to sustainable development, PA 21 identified the following areas of concern needing intervention: a) integrating sustainable development in governance; b) providing enabling economic policies; c) investing in human and social capital; d) mapping out a legislative agenda; and e) addressing critical and strategic concerns, to include: population management, human health, food security, human settlements and land use. These areas were responded in PA 21 with the formulation of the Action Agenda across ecosystems.

All in all, The Action Agenda of PA 21 across ecosystems identified 11 items falling under integrating sustainable development in governance; 5 under creating an enabling economic policy environment; 13 under employment, productivity and income; 2 under investing in human development; 1 each under human health, human settlements and land use, 3 under food security; 5 under population management, 2 under disaster management and 5 under legislative agenda. The 5 action agenda items under creating an enabling policy environment with the targets and timetables of implementation were provided in List 3.

For the forestry ecosystem, 5 areas of concern were identified: a) expanding, marginal, degraded, unproductive upland areas; b) unsustainable management of remaining upland forest; c) under-utilization of non-timber resources; d) weak institutional capability for forest management; and e) policy reforms. The specific action agenda items under policy reforms, the targets, and the specific timetables of implementation were presented in List 4.

There were eight areas of concern for the lowland/agricultural ecosystem: a) implementation of a genuine Comprehensive Agrarian Reform Program; b) Absence of a National Agricultural Land Use Policy; c) impacts of agriculture on marginal lands; d) deterioration of shore and water quality due to pollution; e) food security; f) dependence, excessive and improper use of pesticides and inorganic fertilizers/chemicals; g) lack of economic incentives and support for sustainable agriculture; and h) lack of stakeholder participation in planning and management of agricultural systems. The specific action agenda items under absence of a National Agricultural Land Use Policy were shown in List 5.

Five areas of concern were listed under freshwater ecosystem: a) absence of a national policy framework for the sustainable use of the country's freshwater ecosystem; b) need to harmonize development plans/activities in areas affecting freshwater ecosystems; c) need to institutionalise a mechanism for integrated water management; d) degradation of water quality and freshwater ecosystems; and e) need for water resource assessment. The action agenda items under absence of a national policy framework for the sustainable use of the country's freshwater ecosystem are shown in List 6.

Five areas of concern were also included under coastal and marine ecosystem: a) policy and legal issues; b) uncoordinated and conflicting uses of the coastal and marine ecosystem; c) deterioration of shore and water quality due to pollution, sedimentation and coastal erosion; d) socio-economic issues; and e) lack of capacity to effectively manage coastal and marine ecosystem. The action agenda items under policy and legal issues are provided in List 7.

Eight areas of concern were identified for the urban ecosystem: a) efficiency and capability of urban administration; b) rapid urban population growth; c) human settlement/poor living condition; d) uncontrolled land development or conversion; e) management of hazards, disasters and risks; f) quality of air/pollution from transport and industry; g) quality of water/pollution from domestic wastes and industrial effluents; and h) inadequate urban infrastructure for basic services. None of these areas of concern dealt directly on policy concerns.

Under mineral resources, 9 areas of concern were listed: a) environment disturbance due to mining operations; b) inadequate institutional capability to implement provisions of the mining act; c) lack of programs on the non-extractive side of the sector d) mine safety and risk arising from mining operations; e) lack of information to support decision making; f) lack of geologic information on solid waste disposal, geohazards, and geohydrology; g) unintegrated small-scale mining laws, h) conflicts on delineation of existing and potential ancestral lands/domain claims; I) lack of enabling instruments for off-shore mining projects. None of these areas of concern dealt directly on policy concerns.

Lastly, four areas of concern were identified under biodiversity resources: a) loss of biodiversity; b) problems/conflicts in the implementation of the NIPAS law; c) bioprospecting; and d) conservation of endemic species. Again, none of the areas of concern dealt directly on policy concerns.

In addition to all of the above issues and concerns, PA 21 provided for a priority action agenda for 1996-1997. This priority agenda included the integration of sustainable development principles in the decision-making processes and the conduct of an immediate review of existing programs, policies and activities of the government to align these with PA 21.

Updated Philippine Agenda 21

After 5 years of implementation, a review of the implementation of PA 21 and a process to develop an Updated PA 21 is ongoing. In July 2002, a national integration workshop was conducted where certain improvements on the Agenda were considered. Ganapin (2002a) argued that although PA 21 as originally crafted remained valid and its vision remain the same, there was the need to set-up more concise set of goals elements that will provide a way to set directions and gauge progress. He proposed the following as goal elements: a) poverty reduction; b) social equity; c) empowerment and good governance; d) peace and solidarity; and e) ecological integrity.

Ganapin explained that instead of listing the action elements under the traditional headings of ecosystems as was done in the original PA 21, they should be organized under the goals elements in the Updated PA 21 to be drafted. Some of the numerous action elements suggested for initial consideration under the individual goals elements included 16 for poverty reduction, 4 for social equity, 16 for empowerment and good governance, 7 for peace and solidarity, 24 for ecological integrity and 7 for cross-cutting measures.

Other Laws and Policies on the Environment

Other laws were legislated in recent years that touched on the environment in addition to those already mentioned above. The most important of these laws were RA 7160 or the Local Government Code of 1991 that devolved many of the environmental functions of the national government to the local governments; RA 6969 or the Toxic Substance and Hazardous and Nuclear Waste Control Act of 1990 that regulated the use of dangerous substances and wastes; RA 8749 or the Clean Air Act (RA 8749) of 1999 that set guidelines for the control and reduction of emissions in the air; and RA 9003 or the Ecological Solid Waste Management Act of 2000 that set guidelines for waste management.

Various administrative orders and other forms of policy pronouncements were also issued by the DENR between 1996 and 1991 to pursue improved natural resources and environmental management in the country (Table 12). Most of these pronouncements were for forestry, followed by environment, protected areas and wildlife, mines and land. Furthermore, the country participated in and ratified some international conventions related to the environment, a detailed review of which was provided in DENR (1996).

IV. Challenges for Natural Resource and Environmental Management

Issues Across Ecosystems

Environmental Accounting

In 1995, the national government launched the Environment and Natural Resources Accounting (ENRA) program with the NSCB as lead agency and the DENR and NEDA as collaborating agencies. This effort led to the development of the Philippine System of Environment and Economic Accounts (PSEEA) based on the United Nations System of Integrated Economic and Environmental Accounts (UN SEEA). In line with the action agenda PA 21 across ecosystems (see List 3), EO 406 was signed in 1997 institutionalising the Philippine Economic-Environmental and Natural Resources Accounting (PEENRA) System and creating units within the NSCB, DENR and NEDA to implement it.

Among the major outputs of ENRA was the publication of the asset accounts for forest, land/soil, fishery, mineral and water resources (NSCB 1998). In this work, physical measures of resource depletion and the monetary costs associated to it were computed. Another output was NSCB (2000a) that presented physical and monetary estimates of the environmental degradation caused by some environmentally sensitive economic activities. These works were of great value to environmental research and overall management since they are the earliest attempts to conduct environmental accounting across numerous resources and economic activities. Nevertheless, they were preliminary in nature, being based on the limited available data. Moreover, the estimations they contained concentrated only on the direct impacts natural resource depletion and environmental degradation.

To generate the data needed for environmental accounting and as a parallel effort for ENRA, the NSCB in 1995 also spearheaded the formulation of the Philippine Framework for the development of Environment Statistics (PFDES) based on the United Nations Framework for the Development of Environmental Statistics (UNFDES). This effort produced the first Compendium of Philippine Statistics (2000b) that provided valuable data for environmental accounting in various components of the environment including flora, fauna, atmosphere, water, land and soil, mineral and energy resources, and human settlements. Most of the data contained were on physical stocks of resources, their productivities, and physical measures of the environmental problems faced. No price data were provided and the number of years covered was limited.

Continued strong support for environmental accounting efforts is necessary. Activities in the future must include not just the estimation of the actual use value of natural resources, particularly productivities or consumption values, but also their other more indirect contributions, such as non-consumption values. If possible, effort should also be done to analyze the option values and existence values of resources. This is important particularly for forest, marine, and biodiversity resources where direct economic uses may be of less significance over the long term compared to the other uses mentioned. In a similar vein, for environment-sensitive economic activities, computations should include not just on-site and short-term degradation effects but also off-site effects and long-term effects.

The NSCB planned to update its compendium every two years and this augurs well for data generation intended for environmental accounting. Actual time-series data sets on the environment will be many times more useful compared to periodic data sets separated far in between and covering only a few years or time-series data sets that were based on projections. To reduce costs, data gathering can be conducted as an attachment of the existing surveys of government agencies, an approach that is now tried to some degree by the Bureau of Agricultural Statistics (BAS) for instance. Government bureaus and offices that contributed data to the compendium may also be made to gather additional data and conduct some studies dealing on special issues of concern. Furthermore, the government should consider conducting a survey of all natural resources and environmentally critical economic activities every five years. This would not only provide reliable comparative statistics between periods but also validate those gathered on an annual or bi-annual basis through other means.

The institutionalisation of localized or area-base ENRA as proposed by PA 21 should be supported for environmentally critical areas. There have been efforts to conduct environmental accounting and develop the relevant statistics for the purpose at the provincial level, for instance in Palawan, and similar efforts in other areas such as critical watersheds or bays must be done.

Furthermore, the pertinent agencies, in cooperation with various environmental interest groups and other interested entities, should develop sustainable development indicators for management purposes. These indicators will be for the entire environment and for the individual ecosystems and critical resources and cover nationally and specific environmentally critical areas. There were already initial efforts along this line in the research sector and these can be used as starting points in a participatory formulation of indicators involving all sectors.

The integration of the environment into macroeconomic models should be a natural consequence of good environmental valuation and accounting. There have been efforts to develop development-environment models in the past, for instance at the Philippine Institute for Development Studies (PIDS) but these were constrained by inadequate data. When environmental valuation and accounting becomes mainstream and accurate environmental data become available, development-environment models should become more applied.

Natural Resource and Environmental Pricing

The imposition of pricing instruments that reflected the true value of natural resources and the costs of environmental damages was another action agenda across ecosystems of PA 21 (see List 3). The review above showed that charges imposed were still minimal and mostly based on fixed amounts, such as those in aquaculture and commercial fisheries. Furthermore, they were determined by law and can be changed only through legislation or executive order.

There were efforts in the past to assess the resources rents in fisheries and forestry and to use the results as basis for imposing use charges but these met strong opposition from the resource users. In effect, over time, only token increases were imposed and the use rates remained low. In forestry, the shift from the fixed rate to the flexible rate was considered an improvement since the flexible rate better reflect the true value of the resource, adjusts proportionately to inflation, and does not require legislation to change (SEIC-DICI 2001).

Some things can be done to improve the current system of natural resource pricing. First, periodic studies on natural resource and environmental valuation should be done to improve on the methodologies and make the results acceptable to the resource users. Second, as a matter of policy, the government must decide what percentage of the estimated total value of resources will actually be imposed on resource users. This is important since imposing the total value, which is likely large, can be limiting to economic development. Third, once the rates are determined, thorough public hearings should be conducted to solicit acceptance among resources users. Fourth, only strong resolve and political will can make the imposition of resource rents effective among users, who, other things constant, would not want to pay fees anyway.

With the rigidity of the fixed use rates for most resources, the government should explore more flexible options. Following the example in forestry, charging on the basis of product price or other production variable should be considered. Alternatively, since economic rent is the part of the net income above normal profits, it can be set as some fixed percent of average net income of the industry. These options were more flexible than the fixed rates but would require good periodic monitoring of the production costs and returns of resource users. On an industry basis, the gathering of costs and returns can be made part of the usual data gathering activities of pertinent agencies. Still another option that may be considered is to simply amend the laws providing the fixed charges for the individual natural resource sub-sectors. A new provision can be inserted that explicitly provides for annual changes in the fixed use charges on the basis of some accepted inflation index.

Conflicting Environment-Related Laws

The increasing number of environment-related laws brought with it confusion when the various government agencies actually operationalize their provisions. A glaring example is IPRA vis a vis the NIPAS and the Mining law. These laws have been unclear over whose management jurisdiction would fall sites that were both declared as protected areas or intended for mining development and at the same time claimed as part of the ancestral domain of indigenous peoples and vice versa. Clarification on jurisdiction was necessary since different claimants may have conflicting goals in the management of contested areas. For instance, protected areas under NIPAS that were also declared as ancestral lands under IPRA may be logged by indigenous peoples even though logging was totally banned in these sites. It would serve environmental management well if the government addresses these conflicting provisions in the environmental laws so that smooth implementation can proceed.

Under-funding of Environmental Laws

Some laws for the natural resources and environment sector, and for other economic sectors in the economy for that matter, have been passed without the assurance of adequate funding. An example is the Clean Air Act that cannot be implemented by the DENR because of lack of funding, even though the needed organization structure to do so has been in place already. Laws that were considered priority for implementation, such as AFMA, also suffered cuts in their original budgets. While this problem can be traced to the budget deficits that the country is experiencing year after year, Congress should try to match its propensity to produce laws with the public ability to fund them, in order that its efforts are not wasted.

Weak Monitoring and Enforcement

It was often said that monitoring and enforcement was the Achilles Heel of environmental management that prevented the smooth management of the sector despite the general adequacy of laws for the purpose. Weak monitoring and enforcement was usually blamed on limited manpower and financial resources and the wide coverage of the natural resources and environment sector. Another reason forwarded was the fact that many government personnel involved not only in environmental monitoring and enforcement but in decision-making at the very top were corrupt and willing to trade their functions for quick monetary gains.

The devolution of many of the environmental functions to the LGUs eased a bit the conduct of monitoring and enforcement by the national agencies. Furthermore, the deputization of the local population as guardians of the environment contributed to improved monitoring and enforcement. These, however, were not enough to significantly improve on monitoring and enforcement so other options must be explored. One potential way is to provide incentives to the deputized guardians by giving them a share of the confiscated illegally gathered natural resources. This approach was tried some years ago by the DENR in forestry but it hit a snag due to the requirement that proceeds from confiscated logs be returned to the national treasury. A study should be done to see how to go about this regulation legally or better still, the regulation may be amended so that the provision of rewards and incentives to the guardians of the environment can be done. At the level of the LGUs where the national regulations may not apply, officials should be encouraged to put up ordinances that will permit them to provide the necessary rewards and incentives to the deputized wardens.

In general, corruption is an old issue that has yet to see some effective solutions in Philippine governance. The conduct of value formation seminars had been tried in the past in many agencies to no obvious long-term positive results. One way to reduce the potential for corruption is to streamline or shorten the procedures in the bureaucracy to bare essentials, for instance by reducing the signatories of government documents. This will reduce red tape and likely also the rent-seeking behavior among approving government personnel.

Weak LGU Institutions for Environmental Management

Many LGUs still do not have the adequate institutions and organizations to implement natural resource management even though the process of devolution under the Local Government Code started a decade ago. In some cases, LGUs still have to put up their local environmental and natural resources offices (ENROs) while in others, these offices have not been adequately funded and manned. The low priority that many LGUs put on natural resource and environmental management, among others, was due to limited financial capability and the perception of some local leaders that environment projects were not attention getters among the voting public. Many leaders, for instance, would prefer to fund sports activities conducted in the town poblacion to tree plantation projects high in the uplands or enforcement of illegal fishing regulations out in the high seas where voters were few or non-existent.

To make LGUs commit more to environmental management and strengthen its capabilities, assistance from the DENR and other national agencies should be provided, especially in the technical training of the staff of the local environmental offices. Another way to promote participation is to develop a national program that provides awards and incentives to LGUs and local officials who perform well in environmental management. Still another option is to consider providing as part of International Revenue Allotments (IRA) additional funds based on the environmental services of LGUs, particularly if these services involved the protection of important local watershed areas or other environmentally critical sites (e.g. Ganapin 2002a).

As an immediate action, the devolution of functions from the DENR to the LGUs should be reviewed so that the true intentions of LGUs related to their roles in environmental management were known. Those that were taking their tasks seriously can be selectively provided the necessary financial and technical assistance by the national government. A legislative option is to make mandatory the setting up of ENROs instead of optional among LGUs, through an amendment in the Local Government Code (e.g. Rola et al. (2002).

Streamlining Government Agencies and Functions

Streamlining the bureaucracy has been urged for many years but it only kept on growing. In the environment sector, there were previous calls to merge the DENR and DA because of their complementary functions in the exploitation of some natural resources. Ganapin (2002a) cited the possibility of re-engineering the DENR into two separate agencies with clear and non-conflicting mandates, a Department of Environment and a Department of Natural Resources. Making two departments out of DENR may not serve the purpose of reducing the size of government but can significantly streamline environmental functions if done properly. Given the potential gains, it is time for the national government to again look seriously into streamlining for both the entire bureaucracy and the environment-related agencies of the country.

Population Programs in Local Environmental Initiatives

Population management was one of the issues considered in PA 21 across ecosystems (PCSD 1997, p. 32). Yet, practically all of the action agenda listed for this purpose were nothing new but similar to those already done by national agencies. The

DENR can contribute to the effort of population control by thinking of innovative ways to promote it within its jurisdiction. One approach is to require community-based natural resource management projects, such as CBCRM and CBFM, to have a population management component that will promote population control in their respective areas of operation. These projects are close to where the real action is and could greatly improve the local implementation of population programs.

Integrated Database Management System

Some agencies working in the natural resources and environment sector have been developing their respective databases for research, planning, management, information dissemination and other purposes. A Database Management System for the entire sector that gathers all the available information in one place is needed. As a starting point, the Integrated Database Management System (GRID) that DENR started in 1999 for forestry can be expanded to cover the entire sector. The database systems of the other agencies and individual programs and projects can be made part of this overall system through electronic linkage.

Paucity of Economic Research on the Environment

At the international level, research pertaining to economic issues in the natural resources and environment sector were in abundance. This was not so locally as research was mostly concentrated on the bio-physical and institutional aspects of the environment. This paucity in economic research can be attributed to the limited national pool of experts that can conduct it. There is the need to engage more economists into research activities pertaining to the environment and enlarge the pool of experts through training and post-graduate studies. More funding support for this type of research is required.

Innovative Financing for Environmental Management

The increasing annual budget deficits necessitate innovative financing for environmental management. There have been measures suggested to enhance environmental funding, including the earmarking of funds generated from use charges specifically for environmental management. This, however, requires legislation to proceed. The imposition of the maintenance of environmental guarantee funds within firms in some sectors has been done also and this could help finance environmental management at the micro-level. The need for more funds to address worsening environmental problems demands that other novel options be devised.

Trade and Environment Impacts of International Agreements

The country is a party to many Multilateral Environmental Agreements (MEAs), some of which have trade and development implications, like the Convention on International Trade in Endangered Species (CITES) for instance. It is also a member of international trade organizations, such as the World Trade Organization (WTO) and some of the commitments it made in these groupings may have environmental repercussions. Although some research were done already on the interactions of trade and the environment, additional work especially on the environmental impacts of international commitments is

needed. Understanding the full repercussions will provide trade negotiators a better information base with which to negotiate.

Integration of Philippine Agenda 21

The integration of the PA 21 into the policies and programs of the different agencies was an immediate action agenda of PA 21 (see PCSD 1997, p. 95). The progress on this particular activity should be part of its overall review and the drafting of the updated PA 21. Since the Agenda is a multi-agency effort at sustainable development, the cooperation of the different agencies tasked to conduct its different action agenda for all ecosystems and resources were required to succeed. Incentives for those agencies which are found performing the assigned roles and functions vis a vis PA 21 can be developed as well as disincentives for those who are reneging, in order to motivate future cooperation among the agencies.

Issues in the Forest Ecosystem

Passage of the New Forestry Code

During the Aquino administration, efforts were initially exerted to pass a New Forestry Code that will integrate the desirable features of previous laws, exclude the obsolete ones and put forward new reforms. Unluckily, up to the present, the initiatives have snagged in Congress.

The passage of the new forestry law was a major action agenda of PA21 for forestry (List 4). This law was to follow the policy of sustainable forestry that has the feature of conservation of protected forests and the continued production of goods and services in production forests. To have it passed, the different agencies of the government and other stakeholders in the forestry sector must put up a strong and effective lobbying effort.

Passage of the National Land Use Act

Passage of a National Land Use Act was also an important action agenda of PA 21 for forestry (List 4). The experience in this case was similar to that of the New Forestry Code as until now, efforts to pass a comprehensive land use law in Congress have been unsuccessful. A land use policy is important to have unified and coordinated rules to follow in the allocation, distribution and use of the lands, including for forestry purposes. Presently, the determination of the use of forestlands is still done through the broad classification made by the government that did not have the benefit of sound land use planning. Again, strong and effective lobbying by the various stakeholders in the affected economic sectors, including forestry, would be necessary to pass the National Land Use Act.

Absence of a Final Forest Line

The country has no policy on a "Final forest Line" that can create security for the forest communities and be used to identify areas for protection, production and social needs (e.g. Ganapin 2002b). In the pursuance of this policy, the following points must be considered: a) the final forest line is not where the forest has already receded but rather the area in which forests have to be protected or rehabilitated to provide sustained ecological

services; b) it is not used to keep people out of the forest but rather to identify areas for focused assistance or investment and to provide a baseline for natural resources management accounting and project monitoring; and c) that in the meantime, community land-use plans that integrates land, forests, and water resources management be supported as a way to focus assistance and to build up comprehensive land-use plans for macro-planning. This policy on final forest line may form part of the important provisions of the New Forestry Code to be passed.

Forestry for Poverty Alleviation

The forestry sector houses a high population of rapidly growing poor communities and indigenous peoples. With this, there should be a paradigm shift that moves forestry away from its traditional role of simple provider of timber and related economic goods to the more challenging task of poverty alleviation and other social concerns (Ganapin 2000b). A policy that redefines forest management from one that just concerns wood supply to one that also covers equity promotion, cultural enhancement, participatory management, and other social dimensions as important concerns can be stated in the New Forestry Code.

With the abovementioned paradigm shift, national agencies and personnel managing forestry should not just have the technical expertise but also develop the cultural sensitivity and social concern needed for their jobs. A program to develop these new attitudes within the staff of the DENR and related agencies can be conducted through periodic value formation training and seminars and reorientation visits to forest communities and areas.

In addition to the paradigm shift, a common definition of Sustainable Forest Management is needed in the New Forestry Code. This is necessitated by the great divergence of opinion on the matter between the environment and development advocates in the sector.

Forest Destruction due to Forest Fire

The above review of environmental problems indicated that forest fire is by far the single most important cause of forest destruction. Yet, forest fire prevention receives less attention than it deserves in forest management. This was partly due to the expansive nature of the problem and the limited resources of the government for the job. Even then, a clear policy on forest fire is needed. At the ground level, forest fire prevention can be enhanced by training and commissioning responsible members of the upland population as forest guards. Furthermore, the penalties for causing forest fire should be set high not only to serve as deterrent but also since the total value of the forest resources lost to it are certainly immense.

Issues in the Lowland/Agricultural Ecosystem

Agricultural Land Use Policy

A priority of PA 21 in this ecosystem was the formulation and implementation of a national agricultural land use policy and plan (see List 5). This was addressed in part by AFMA with its provisions on the Strategic Agriculture and Fisheries Development Zones (SAFDZ) for agricultural and agro-industrial development. Among

others, the law mandated that the development of SAFDZ be done in an environmentally sound manner and under an integrated development plan that has environmental protection as a basic component.

Delays in the implementation of AFMA in general and the SAFDZ in particular have been encountered. Aside from funding constraints, this was because the timetable set by the law was itself tight and difficult to meet. In particular, AFMA required that SAFDZ be identified within 6 months after its approval of the act. At any rate, the identification and mapping of SAFDZ all over the country were critical in order that subsequent planning, implementation and other succeeding activities within these sites can proceed.

Sustainable Agriculture Practices and AFMA

Another priority of PA 21 was sustainable agriculture and the provision of incentives to promote its adoption (PCSD 1997, p. 56). Although AFMA declared that agriculture and fisheries be developed under the principle of sustainable development, actually it was mainly a development-oriented law that focused on productivity and competitiveness concerns. Thus, it made little reference to addressing destructive agriculture practices to promote sustainable agriculture, such as Kaingin that caused extensive soil erosion.

AFMA nevertheless provided substantial financial support for agriculture and fisheries R&D. Indirectly, therefore, the law can promote sustainable agriculture by making it a major research component of research program of the Bureau of Agricultural Research (BAR) and other research agencies receiving AFMA funds. The interests of sustainable agriculture will be served further if the various incentives offered by AFMA can cover enterprises that indulged in sustainable agriculture.

AFMA Versus the Philippine Fisheries Code

Being a mainly production-oriented law, AFMA sometimes run counter to the Philippine Fisheries Code, which was environment and conservation-oriented. In some coastal areas, some personnel of some community-based coastal resources management projects reported that they found it difficult to implement resource conservation measures in their areas because LGUs maintained that these were AFMA covered. The early identification of sites for development and conservation at the local level can help mitigate this problem. It should also be made clear which law takes precedence when conflicts of jurisdiction arise.

Land Conversion

The main law in the country that governed land conversions from agricultural to non-agricultural uses was the Comprehensive Agrarian Reform Law (CARL). In its amended form, the law totally prohibited the conversion of irrigable lands to other uses. This provision, however, has been violated at times because of the low penalties set for transgressors and the Local Government Code allowed LGUs to reclassify a portion of their agricultural lands for non-agricultural uses.

Land use conversion problems can be addressed either by amending CARL or passing a National Land Use Act that will contain provisions to address them. Important components in these legal remedies should be the increase in penalties to a level that can effectively deter illegal conversion and the increase in the land conversion taxes to discourage legal conversion. Another possibility that may be considered is to declare critical agricultural areas in the country as “agricultural reserves” in the same manner as “protected areas” in forestry, where conversion is illegal under any condition.

Issues in the Freshwater Ecosystem

Comprehensive Water Resources Management Law

PA 21 highlighted the absence of a national framework for the sustainable use of the freshwater ecosystem (List 6). Various bills are now in Congress intended to come up with some form of a Comprehensive Water Management Law that integrates previous laws. The bills may have to be integrated into one but containing the finer features of each in order to hasten passage.

Among the contentious issues that have to be settled in the new law was whether to create a new national water body that serves as a one-stop shop for water management or to simply leave the function to the DENR. Contreras (2002) explained that creating a water body adds on to the already bloated bureaucracy if not properly done while giving the work to the DENR may be inappropriate due to its limited personnel and already numerous functions at present. Thus, the options must be seriously studied on the basis of institutional economy and institutional capacity.

Watershed Approach to Management and Local Water Management Bodies

Francisco (2002) argued that the proper way to manage freshwater resources was through the watershed-based management strategy and, so, this should be made mandatory in the new national water resources law. Because of the watershed approach to water management, the creation of local water management bodies to govern watersheds became essential (e.g. Contreras 2002, Rola et al. 2002). These bodies can take the form of councils, authorities, NGO networks or even cooperatives and will take care of the actual management of watersheds only for water related purposes. The national water body can then support the development and growth of these local bodies through advocacy and capacity building in the same way that the DENR promotes environmental institutions at the local levels.

Issues in the Urban Ecosystem

Cities Without Slums

The “Cities Without Slums” initiative was a suggested action element for the updated PA 21 (Ganapin 2002a). It was to be pursued by improving the access to land, property and basic services for the urban poor and supporting local authorities in elaborating slum-upgrading programs, among others. Examples of actual programs leading to this initiative were the provision by recent national administrations of land titles to the urban

population living in squatters and the transfer of some of them to other sites with more dignified living conditions.

Activities contributing to “Cities Without Slums” have been constrained by the limited resources of government and the piece-meal approach with which they were implemented. An example of the latter was the program of moving people out of slums into other areas without the accompanying provision of livelihood opportunities that did not make people stay put in the new areas in the long term. Despite the constraints, the “Cities Without Slums” initiative, if adequately funded, will go along way not only towards improving the environment but also in reducing the traffic, criminality and other social ills in urban areas.

Inadequate Urban Waste Management

Due to its immediate visibility to voters, the management of solid wastes has been a major concern of administrators and politicians in urban areas. For instance, the Metropolitan Manila Development Authority (MMDA) in a significant way was created to address the solid waste disposal and management in the metropolis. Despite MMDA, and numerous programs already initiated to address it, the solid waste problem only worsened over the years. To make solid waste management effective, RA 9003, or the Ecological Solid Waste Management Act of 2000, was passed.

In May 2002, The Asian Development Bank (ADB) and the Philippine Government signed a technical assistance grant agreement to tackle the solid waste management problem in Metro Manila and help some LGUs implement RA 9003. The amount of the grant was modest compared to the immensity of the problem of solid wastes but if properly handled should contribute in some way. Looking for alternative sites to replace the closed disposal facilities was a priority of this program. A potentially explosive management issue was whether or not the putting up of disposal facilities in identified areas will be acceptable to the people living close by.

Alternatives to Incinerators

The Clean Air Act prohibited the use of incinerators but the debate has been continuing. With the ban, the government is hard pressed to look for alternatives for the disposal of hazardous wastes, including the medical wastes coming from the 700 or so hospitals in Metro Manila. The problem in one of those to be considered under the ADB grant mentioned above. When the Act is up for amendment, it will be worthwhile to reconsider the provision on incinerators as meritorious arguments have been presented from both sides.

A corollary issue to the above is the illegal importation into the country of medical wastes coming from some developed countries, under the guise of legitimate trade. Although some apprehensions have been reported, there was no telling what percentage of the total illegal importation actually passed through undetected. Stricter monitoring and enforcement of the law and stiffer penalties are required here to discourage the potential violators.

Issues in the Coastal Ecosystem

Amendments to the Philippine Fisheries Code

The drafting of a Fisheries Code was another major agenda item of PA 21 (List 7). This took fruition with the passing of the Philippine Fisheries Code. This law is up for review soon and some contentious issues will have to be revisited and amended, if necessary. The most important were the provision that allowed some form of commercial fishing in municipal waters and the other one that allowed the delineation of municipal waters to include the coastal waters of islands belonging to the municipalities. After participatory consultations, the national government must strongly pronounce its policy on what really constitutes municipal waters and whether or not these will have to be exploited by coastal fishermen exclusively.

The provision in the Fisheries Code on the prohibition of the exportation of fish fry must be amended also to exclude those marine species whose hatchery propagation was already practiced at the industry level and where exportation can expand markets and increase earnings without endangering domestic supply. Furthermore, the provision that no person shall import fishery products without securing a permit from the Department of Agriculture (DA) must be studied for possible amendment as it has been viewed as unnecessarily giving too much power to the department, making trade less transparent and developing unwanted rent seeking among fish importers, fish producers and government officials (De La Pena 1999).

Inadequate Evaluation of CBCRM

The Local Government Code and the Fisheries Code provided the policy environment for the popularisation of Community-Based Coastal Resources Management (CBCRM) in the coastal areas. During the last two decades, the number of this type of projects proliferated, some of which have been funded by large foreign loans. With the huge investments of the country into the loan-funded CBCRM activities, the ex-post evaluation of their performance should be mandatory. This is made more urgent by reports although unverified, that some activities failed miserably in attaining their objectives or were implemented way behind schedule. The methodologies for proper evaluation should be developed and applied for at least the large CBCRM activities and results of the evaluation used for future CBCRM planning and implementation.

Support for Sustainable Aquaculture

The promotion of sustainable aquaculture, including small-scale aquaculture, for food security and economic development was suggested as an action element for the updated PA 21. This support for sustainable aquaculture was also explicitly mentioned in the Fisheries Code and research activities on it was already mainstream in the various aquaculture agencies and institutions (see. Platon and Israel 2001). The R&D program of the Southeast Asian Fisheries Development Center-Aquaculture Department (SEAFDEC AQD), for instance, included research, training and extension activities on environment-friendly intensive shrimp farming and mangrove friendly aquaculture. Furthermore, the institution was the lead agency in the development of the Regional Implementing Guidelines of the FAO Code of Conduct for Responsible Fisheries-Aquaculture Development (RCCRF-AD) for the ASEAN region.

The practice of sustainable aquaculture remained below the desired levels as problems persist. At the national level, the overriding concern of the government to produce more to meet the needs of the growing population impeded to some degree the development of a totally environmentally responsible aquaculture sector. At the ground level, full adoption was hindered by the profit-motive orientation of the private sector that oftentimes saw the code of practice for aquaculture as another bureaucratic constraint to their operations.

For sustainable aquaculture to be practiced wide, R&D agencies should put emphasis on environment-friendly but cheap aquaculture technologies, such as those that reduce feed use and fertilization rate per unit area. Once developed, the government must then actively promote the use of these technologies among the private sector through effective training, extension and demonstration. Moreover, the adoption by the private sector of the codes of conduct for fisheries and aquaculture should be hastened by developing economic incentives for environment-friendly practices as mandated by the Fisheries Code. A review of the existing system for penalizing environmental offenders in aquaculture must be done also to identify loopholes, improve the system and make it an effective deterrent for the potential offenders.

Issues Under Mineral Resources

National Program for Small-Scale Mining

The formulation and implementation of a National Program on small-scale mining law was a major action agenda of PA 21 (PCSD 1997, p. 86). The Mining Law stipulated that the management of small-scale mining remained under RA 7076 and other existing laws on mining. The present management set-up, have been ineffective as environmental problems worsened in the sub-sector in recent years (Israel 2002). The problems attained special urgency in Diwalwal where mercury pollution was reported to have already caused serious health problems among the population. Diwalwal was further controversial because many people already lost their lives in the fight on the issue of who has the right to mine the area.

The government should follow the suggestions of PA 21 and implement a national program for small-scale mining. Of the social problems in this sub-sector, settlement of conflicts on mining rights between small-scale miners and medium-scale mining firms, such as in Diwalwal and the operations of small-scale miners in the mining claims of large-scale mining claims, such as in Aroroy, Masbate and Paracale, Camarines Norte, should be addressed immediately. Furthermore, confronting mercury pollution and other environmental problems in small-scale mining sites effectively will alleviate the fears that the activity is grossly environmentally unsafe.

Review of the Mining Law

The review of the mining law was in the PA 21 agenda (PCSD 1997, p. 83). The review should include a determination of what really constituted sustainable mining and how it should be pursued in actual implementation. It should also address provisions in the

law that conflict with those in other laws and strengthen its environmental provisions for improved management.

National Program for Quarrying

In the management of the mining sector, the quarrying sub-sector has been given secondary attention since it traditionally contributed only little to total output in the past. With the rapid growth in the construction in support of overall development, quarrying has now gained prominence. The mining law afforded little discussion on quarrying, however, having allocated less than three pages of reference to it. Also, in the years of the implementation of PA 21, there have been DAOs and MOs issued referring to quarrying but only for particular sites, for instance in lahar areas, Rizal and Quezon, and little on the total development of the sub-sector.

As in small-scale mining, a national development program for quarrying should be implemented. This program must put emphasis on the negative impacts of quarrying on environment, which were believed to be substantial also (e.g Israel et al. 2001).

Database for the Mining Sector

The limited data and information available to support decision making in mining, especially for environmentally critical areas, was an issue mentioned in PA 21. The gathering of primary data and information to remedy this constraint should be afforded priority. To go about this, the pertinent agencies must a) identify environmentally critical mining operations, particularly those located in important watersheds; b) gather primary data and information to establish the physical, economic, social and environmental database for such operations and areas; c) process the data and generate maps and other tools useful for decision-making through the GIS and other modern technologies; and d) periodically update to data to monitor changes over time.

Issues Under Biodiversity Resources

Codification of Biodiversity Laws

As mentioned earlier, some laws that dealt on biodiversity directly, e.g. EO 247, and there were others which partially touched on it, such as relevant laws in the forestry and mining sectors. To provide integration and highlight the importance of biodiversity as a critical resource, the laws on biodiversity should be codified. The new law should implement the proposals of PA 21 and, among others, contain a realistic structure for setting access fees, incentives and penalties related to the use of biodiversity resources. It should also set strong measures for the conservation of conservation of flora and fauna resources especially those that are considered endangered. Furthermore, it should set up the needed institutions, e.g. Regional or National Center for Biodiversity Conservation, that will promote the interests related to biodiversity.

Updating of Baseline Information

An important gap in the conservation and management of biodiversity is the lack of baseline information (DENR 1996). Some data on flora and fauna, in particular, were outdated and need to be updated and validated to be currently useful. Development of baseline data does not have to wait for the passing of a new law but can be made priority of existing agencies. Data on land-based flora and fauna can be collected by agencies implementing the NIPAS program while those marine-based can be gathered by BFAR in coordination with their various existing programs and projects. These activities can also be supported by NGOs and educational and R&D institutions working on biodiversity concerns.

V. Summary and Conclusions

Indeed, from the above review, much remains to be done before the objectives of PA 21 can be attained and the country move closer to sustainable development. Some of activities on the must-do list were pointed here but there were certainly others that escaped mention and must be addressed as well.

In summary, among the most important issues to be addressed to improve the chances of success of PA 21 is the passing of the laws it proposed that are still pending in Congress. These laws contained the enabling policies that will allow the full implementation of the action agenda of PA 21 across ecosystems and for the individual ecosystems and critical resources. The passing of the National Land Use Act, in particular, should be prioritised because its coverage includes not just the natural resources and environment sector but also the other land-based sectors.

The settlement of the contentious provisions within and between laws should be immediately attended to when the concerned laws are up for amendment. Contentious provisions could promote paralysis in implementation and spawn costly and drawn out legal conflicts between affected stakeholders, including the government. It will cause significant losses in terms of time and money if the national government is mired into legal battles over the contentious provisions in the laws. A politics-free process that is supported by good background research in most cases would be necessary to settle contentious provisions in the laws.

The full financing for the environmental laws already passed is a major constraint that must find solution if the laws are to be implemented. The budget deficit made this issue a truly difficult one to tackle at present. Maybe the existing laws have to be changed so that locally-based and innovative ways of financing environmental programs and projects can be legally allowed. Giving back to the natural resources and environment the proceeds from its use, for one, will help render sustainable financing less of a dream and more of a reality in the local areas.

The integration of PA 21 into the mainstream of public governance is also a requisite for better environmental management. This is something that is probably not happening yet at present, not even in the agencies that were assigned major tasks to implement it. PA 21 should not just be a document for implementation exclusively by those directly involved in the environment sector, such as the DENR and its various offices at the national and regional

levels, but a framework to be seriously taken by all agencies and instrumentalities of the government, both national and local. It is only when all government offices both directly and indirectly impacting on the environment work together and do their individual roles in PA 21 that the goals of the Agenda can be attained. A government that is fragmented and turf-driven stand little chance of success in attaining the hoped for improvements in environmental management.

The strengthening of local institutions is also needed for the promotion of the objectives of PA 21. Many environmental problems are location-specific and so, local institutions are the most apt to handle them. Provision of financial and technical support to the LGUs particularly in environmentally critical areas will be needed. The active support for the growth of responsible NGOs dealing on environmental issues is also a welcome thing for the environmental management of local areas. NGOs do not serve only as guardians but also partners in many local initiatives.

The establishment of good database systems across ecosystems and for individual ecosystems and critical resources is another requisite to improve management of the natural resources and environmental sector. These systems should include the financial, economic, social, environmental and all the other aspects of the sector so that they become truly comprehensive sources of data and information. They should be integrated electronically so that they are of ready access to users, even to those who are based in areas outside of population centers.

It goes without saying that efforts at environmental accounting should be given priority as well. This will allow society to have a better measure of the total costs of economic development, which includes the environmental ones. Support for environmental accounting at the national and even the regional and area specific levels in the long run will lead to the development of improved methodologies for the purpose and the generation of more accurate figures that reflect true environmental costs.

The promotion of economic research on the environment is necessary to improve management. This research should go beyond the environmental valuation and accounting efforts at present and into the cost-benefit analysis of major programs and projects. It is by knowing the full economic impacts of such programs projects that the government can ascertain their financial and economic viability as a public investment. The large scale and loan-funded projects in forestry and fisheries that have been completed or currently in implementation should be priority for assessment.

In conclusion, the continuing problems of resource depletion and environmental degradation in the country is not just a reflection of the delay in the implementation of PA 21 but also of the fact that environmental problems are resilient and take a long time to contain. Other factors, the fast growing population particular, can likewise easily impede any well-meaning national program to tackle environmental issues. The objectives of the Agenda then should be given more time to materialize. For its part, the national government can more effectively implement PA 21 by way of addressing the various issues still at hand. The recent ongoing efforts to update PA to make it in tune with current developments, five years into its implementation, should also help increase the probability of success of the Agenda.

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Appendices

Table 1. Forest Destruction in the Philippines, 1976-2000 (Hectares)

Year	Total Destruction	Kaingin	Forest Fire	Illegal Logging	Others (Pests, typhoon, etc.)
1976	8,400	-	-	-	-
1977	8,400	-	-	-	-
1978	65,958	-	-	-	-
1979	62,196	-	-	-	-
1980	32,640	6,302	18,324	7,348	666
1981	24,605	5,826	12,471	6,108	200
1982	16,654	3,286	8,063	4,954	351
1983	121,326	2,241	117,951	1,015	119
1984	4,895	1,137	3,177	478	103
1985	14,632	941	11,743	1,918	30
1986	7,682	1,991	4,257	90	1,344
1987	7,146	570	5,386	676	514
1988	10,255	2,914	423	4,474	2,444
1989	12,814	4,683	675	1,727	5,729
1990	15,549	-	-	-	-
1991	7,233	759	5,872	72	530
1992	12,806	86	12,720	-	0
1993	17,862	90	15,330	-	2,442
1994	10,342	1,529	7,720	107	986
1995	24,103	409	10,331	9	13,354
1996	5,186	94	4,558	10	524
1997	24,893	4,693	3,539	93	16,568
1998	39,605	14,430	18,313	2	6,860
1999	4,061	119	3,206	45	692
2000	11,171	73	4,809	4,510	1,780

Source: NSCB (Various Years)

Note: Details may not add-up to totals due to rounding. - means no data available.

Table 2. Reforestation in the Philippines, 1976-1999 (Hectares)

Year	Total Reforestation	Government	Non-Government Sector
1976	31,733	23,228	8,505
1977	53,263	33,365	19,898
1978	78,425	44,686	33,739
1979	79,397	51,858	27,539
1980	60,516	39,881	20,635
1981	64,541	33,296	31,245
1982	63,262	35,201	28,061
1983	78,538	42,239	36,299
1984	38,935	16,088	22,847
1985	24,231	12,684	11,547
1986	32,998	24,426	8,572
1987	39,811	28,843	10,968
1988	64,183	31,226	32,957
1989	131,404	89,452	41,952
1990	191,663	153,949	37,714
1991	93,039	73,602	19,437
1992	40,593	24,304	16,289
1993	19,211	6,347	12,864
1994	49,551	18,032	31,519
1995	65,233	21,841	43,392
1996	46,096	18,869	27,227
1997	66,237	49,301	16,936
1998	42,368	33,219	9,149
1999	42,167	31,184	10,983

Source: DENR (1999)

Table 3. Approved Land Use Conversion from Agricultural to Non-Agricultural Uses in the Philippines, 1998-2001 (Hectares)

Year	Area	Annual Growth Rate
1988	335.27	-
1989	551.18	64.40
1990	1,790.60	224.87
1991	3,230.94	80.44
1992	1,992.76	-38.32
1993	1,534.20	-23.01
1994	4,189.01	173.04
1995	2,443.44	-41.67
1996	3,254.11	33.18
1997	2,988.86	-8.15
1998	5,885.21	96.90
1999	3,514.65	-40.28
2000	2,272.80	-35.33
2001	1,080.37	-52.47
Average	2,504.53	33.35

Source: DAR Unpublished Reports (2002)

Table 4. Soil Erosion in the Philippines, 1991(Hectares)

Region	No Apparent Erosion	Slight Erosion	Moderate Erosion	Severe Erosion	Unclassified Erosion	Total	Share %
CAR	130,367	515,825	737,134	413,729	32,313	1,829,368	6.09
I	514,881	242,343	262,226	264,569		1,284,019	4.28
II	726,022	374,153	1,158,953	416,644	7,986	2,683,758	8.94
III	923,250	400,855	323,659	143,297	32,021	1,823,082	6.07
IV	1,341,043	1,896,162	1,134,444	317,337	67,030	4,756,016	15.84
V	445,705	635,856	511,197	153,579	16,912	1,763,249	5.87
LUZON	4,081,268	4,065,194	4,127,613	1,709,155	156,262	14,139,492	47.10
VI	551,633	541,365	497,893	391,721	39,698	2,022,310	6.74
VII	181,247	376,717	558,010	328,733	55,233	1,499,940	5.00
VIII	507,871	825,550	388,481	405,619	28,764	2,156,285	7.18
VISAYAS	1,240,751	1,743,632	1,444,384	1,126,073	123,695	5,678,535	18.92
IX	354,500	582,033	705,116	212,343	14,518	1,868,510	6.22
X	330,216	964,821	920,531	603,451	13,751	2,832,770	9.44
XI	529,049	1,090,510	574,877	966,174	8,680	3,169,290	10.56
XII	595,698	549,128	706,767	464,960	12,767	2,329,320	7.76
MINDANAO	1,809,463	3,186,492	2,907,291	2,246,928	49,716	10,199,890	33.98
PHILIPPINES	7,131,482	8,995,318	8,479,288	5,082,156	329,673	30,017,917	100.00

Source: BSWMReports (n.d.)

Table 5. Annual DO and BOD Concentrations of Four River Systems in the Philippines, 1990-1995 (Milligrams/Liter)

Name of River/ Stations	1990		1991		1992		1993		1994		1995	
	DO	BOD	DO	BOD	DO	BOD	DO	BOD	DO	BOD	DO	BOD
Marikina River												
1. Montalban Bridge	7.6	2	3.5 *	5	6.9	2.0	7.4	3.0	7.6	3.0	8.4 *	2.6
2. Rosario Bridge	2.7 *	12 *	1 *	17 *	2.9 *	14 *	1.5 *	17 *	3 *	23 *	2.6 *	18.4 *
3. Vargas Bridge	1.7 *	16 *	1.3 *	19 *	3 *	20 *	2.3 *	24 *	2.6 *	28 *	2.7 *	21.3 *
San Juan River												
1. EDSA_Congressional Bridge	0.8 *	29 *	0.8 *	25 *	2.3 *	36 *	1.7 *	38 *	2.9 *	29 *	3.8 *	26.7 *
2. Dario Creek Bridge	0.1 *	89 *	0 *	116.06 *	0.5 *	81 *	1.7 *	80 *	0.2 *	106 *	0.6 *	54 *
3. Quezon Avenue Bridge	0 *	56 *	0 *	0	0.2 *	55 *	0.2 *	50 *	0.1 *	94 *	0.3 *	43.5 *
4. Sanchez Bridge	0 *	37 *	0.2 *	45 *	0.1 *	48 *	0.3 *	44 *	0.1 *	66 *	0.2 *	47.1 *
Parañaque River												
1. Parañaque Bridge	3 *	16 *	1.5 *	14 *	4.1 *	11 *	5.8	18 *	3.6 *	21 *	5.4	19.8 *
2. MIA Road Bridge	0.3 *	35 *	0.5 *	35 *	0 *	39 *	0.1 *	43 *	0.1 *	47 *	0.3 *	44 *
3. Aurora-Tramo Bridge	0 *	54 *	0.2 *	40 *	0 *	55 *	0 *	57 *	0.3 *	58 *	0.2 *	55.4 *
Tullahan-Tinajeros River												
1. Gulong Bridge	1 *	26 *	0.4 *	40 *	-	-	3.3 *	14 *	3.8 *	21 *	4.5 *	6.0
2. McArthur Highway Bridge	0.2 *	71 *	0.6 *	166 *	-	-	0 *	41 *	0.2 *	81 *	0.4 *	66.4 *
3. North Expressway Bridge	0.2 *	66 *	0 *	67 *	-	-	2.3 *	72 *	0.3 *	102 *	0.6 *	49.9 *
4. Gov. Pascual Bridge	0.2 *	29 *	0 *	36 *	-	-	0.2 *	37 *	0.1 *	64 *	0.1 *	49.1 *

Source: EMB (1996)

Notes: DO means Dissolved Oxygen and BOD means Biochemical Oxygen Demand. - means no data. The standard for DO is 5-8 Mg/L* while the maximum standard for BOD is 10 Mg/L for Class C Water. Class C Water is intended for propagation and growth of fish and other aquatic resources, boating and manufacturing processes after treatment. * in DO means below or above standard level while * in BOD means above the standard level.

Table 6. Mangrove Resources of the Philippines, 1918-1998 (Hectares)

Year	Stand	Periodic Decline Rate (%)
1918	500,000	-
1970	288,000	-42.40
1980	175,000	-39.24
1988	140,000	-20.00
1993	138,000	-1.43
1995	117,000	-15.22
1998	112,400	-3.93

Source: Melana and Courtney (2000)

Note: 1998 figure was taken from DENR Fies.

Table 7. Status of Coral Reefs in the Philippines, 1991

Locations	Total Number of Stations	Living Coral Cover							
		Excellent (75-100%)		Good (50-74%)		Fair (25-49.9%)		Poor (0-24%)	
		Number	%	Number	%	Number	%	Number	%
Luzon	334	12	3.6	86	25.6	146	43.4	92	27.4
Visayas	363	24	6.6	95	26.2	131	36.1	113	31.1
Mindanao	43	3	7.0	6	14.0	13	30.2	21	48.8
Total	740	39	5.30	187	25.2	290	39.0	226	30.5

Source: EMB (1996)

Table 8. Formal and Informal Household Settlers in the Philippines, 2000

Location	Total Households	Formal Households		Informal Households	
		Number	Percent to Total	Number	Percent to Total
Philippines	15,271,290	14,015,908	91.8	1,255,382	8.2
NCR	2,132,989	1,416,824	66.4	716,165	33.6
CAR	263,816	241,398	91.5	22,418	8.5
Region I	831,549	825,054	99.2	6,495	0.8
Region II	554,004	551,231	99.5	2,773	0.5
Region III	1,632,047	1,577,687	96.7	54,360	3.3
Region IV	2,410,972	2,231,872	92.6	179,100	7.4
Region V	891,541	872,465	97.9	19,076	2.1
Region VI	1,211,647	1,173,452	96.8	38,195	3.2
Region VII	1,129,317	1,082,006	95.8	47,311	4.2
Region VIII	715,025	702,414	98.2	12,611	1.8
Region IX	595,728	571,251	95.9	24,477	4.1
Region X	542,075	501,258	92.5	40,817	7.5
Region XI	1,066,199	1,027,073	96.3	39,126	3.7
Region XII	501,915	485,610	96.8	16,305	3.2
ARMM	393,269	389,650	99.1	3,619	0.9

Source: NHA Reports (n.d.)

Table 9. Solid Waste Generation in Metro Manila, 1995

Cities/Municipalities/Sector	Population	Tons Per Day	Cubic Meters Per Day	% Share to Total
West Sector (Manila)	1,654,761	1,108.7	3,359.7	17.5
Quezon City Sector	1,989,419	1,332.9	4,039.1	21.0
North Sector	2,036,847	1,364.7	4,135.4	21.5
Kalookan City	1,023,159	685.5	2,077.3	10.8
Malabon	347,484	232.8	705.5	3.7
Navotas	229,039	153.5	465.0	2.4
Valenzuela	437,165	292.9	887.6	4.6
East Sector	1,389,129	930.7	2,820.4	14.7
Pasig City	471,075	315.6	956.4	5.0
San Juan	124,187	83.2	252.1	1.3
Marikina	357,231	239.3	725.3	3.8
Taguig	381,350	255.5	774.3	4.0
Pateros	55,286	37.0	112.3	0.6
South Sector	2,383,884	1,597.2	4,840.0	25.2
Makati City	484,176	324.4	983.0	5.1
Mandaluyong City	286,870	192.2	582.4	3.0
Parañaque	391,296	262.2	794.5	4.1
Las Piñas	413,086	276.8	838.7	4.4
Muntinlupa	399,846	267.9	811.8	4.2
Pasay City	408,610	273.8	829.6	4.3
GRAND TOTAL	9,454,040	6,334.2	19,194.6	100.0

Source: NSCB (2000b)

Table 10. Families by Type of Toilet Facilities in Metro Manila and the Philippines, by Income Strata, 1998

Income Strata/ Region	Total Families Reporting	Water Sealed (%)	Closed Pit (%)	Open Pit (%)	Other Types (%)	None (%)
Philippines	14,371	69.4	11.0	6.2	2.5	10.9
Lowest 40%	5,748	49.5	16.3	10.5	2.8	20.9
Highest 60%	8,623	82.7	7.6	3.2	2.3	4.2
NCR	2,020	89.8	5.2	0.6	3.1	1.3
Lowest 40%	104	81.4	7.4	1.2	5.0	5.0
Highest 60%	1,917	90.3	5.1	0.5	3.0	1.1

Source: NSO (1999)

Table 11. Toxic and Hazardous Wastes Generated in the Philippines, by Industry, 1996

By Industry	Volume (Tons)	Percent to Total
Chemicals, Petroleum, Coal	48,929	21.06
Food, Beverages and Tobacco	40,829	17.58
Textile, Clothing, Footwear	40,143	17.28
Engineering	17,642	7.59
Non-metallic Products	15,629	6.73
Basic Metal Products	11,809	5.08
Miscellaneous Manufacturing	5,862	2.52
Paper Products and Printing	3,816	1.64
Wood and Wood Products	1,968	0.85
Others	45,679	19.66
Total	232,306	80.34

Source: NSCB (2000b)

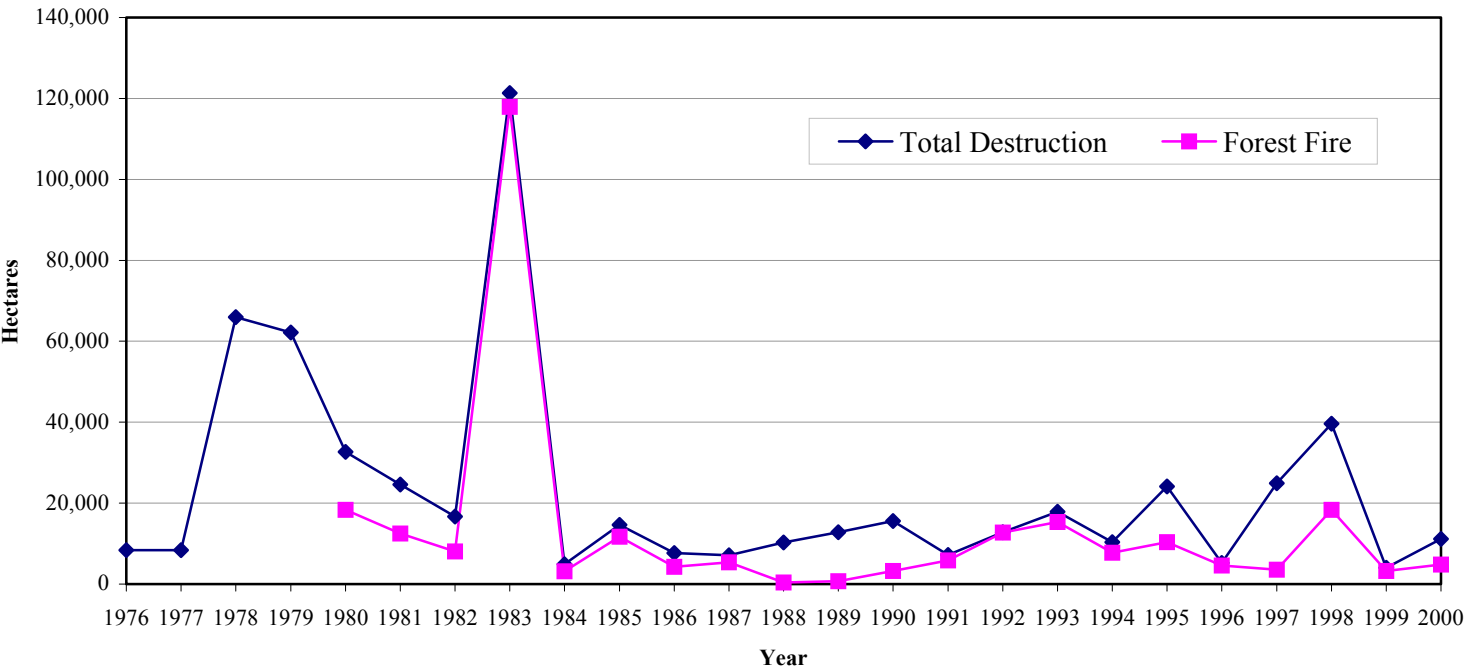
Note: Others include Agriculture, Mining, Power Generation and Distribution, Transport, Health Care and Construction

Table 12. Policy Issuances in the Natural Resources and Environment Sector, 1996-2001

Ecosystem/Subsector	1996	1997	1998	1999	2000	2001	Total
Forestry							
DAOs	13	8	28	23	46	7	125
Others	12	13	9	20	5	6	65
Sub-Total	25	21	37	43	51	13	190
Land							
DAOs	1	1	5	2	2	1	12
Others	0	2	0	0	3	1	6
Sub-Total	1	3	5	2	5	2	18
Mines							
DAOs	3	5	0	4	7	1	20
Others	2	4	9	5	3	0	23
Sub-Total	5	9	9	9	10	1	43
Environment							
DAOs	3	5	9	2	13	5	37
Others	0	4	7	2	5	3	20
Sub-Total	3	9	16	4	18	8	57
Protected Areas and Wildlife							
DAOs	7	8	5	7	6	5	38
Others	4	2	0	0	0	5	11
Sub-Total	11	10	5	7	6	10	49
TOTAL	45	52	72	65	90	34	357

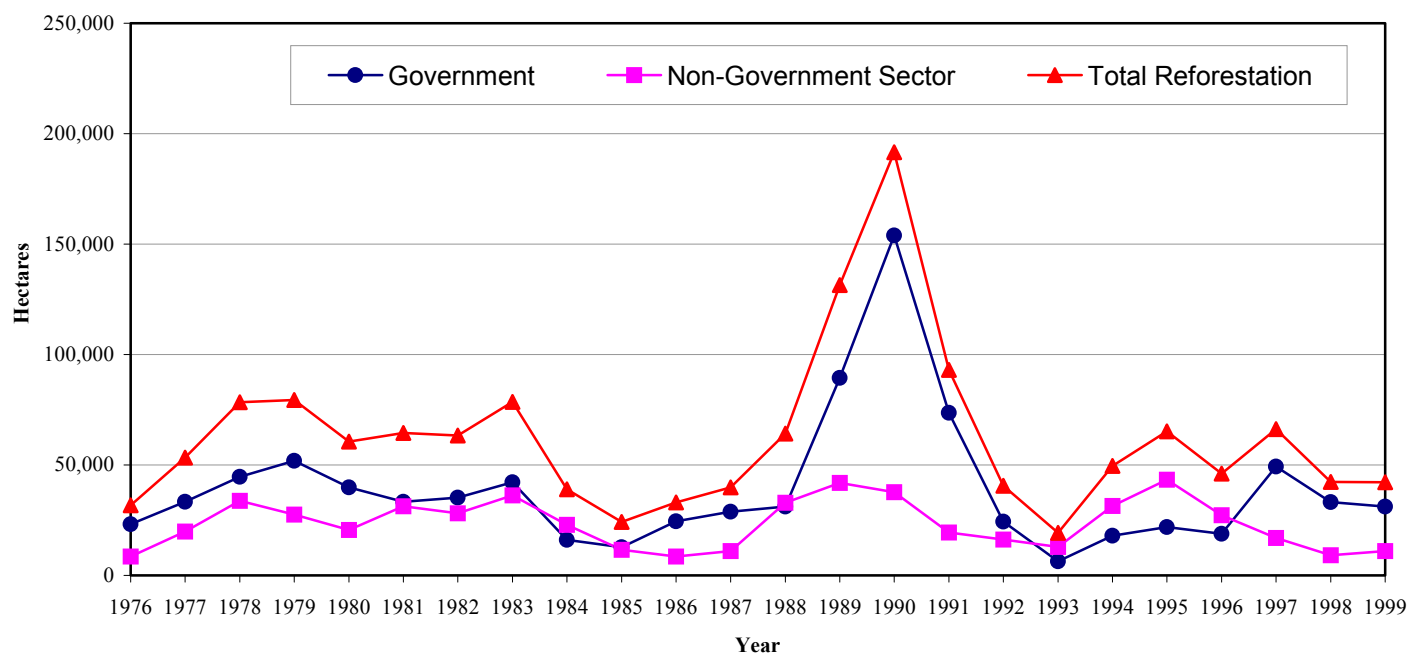
Source: DENR (2002)

Figure 1. Forest Destruction in the Philippines, 1976-2000 (Hectares)



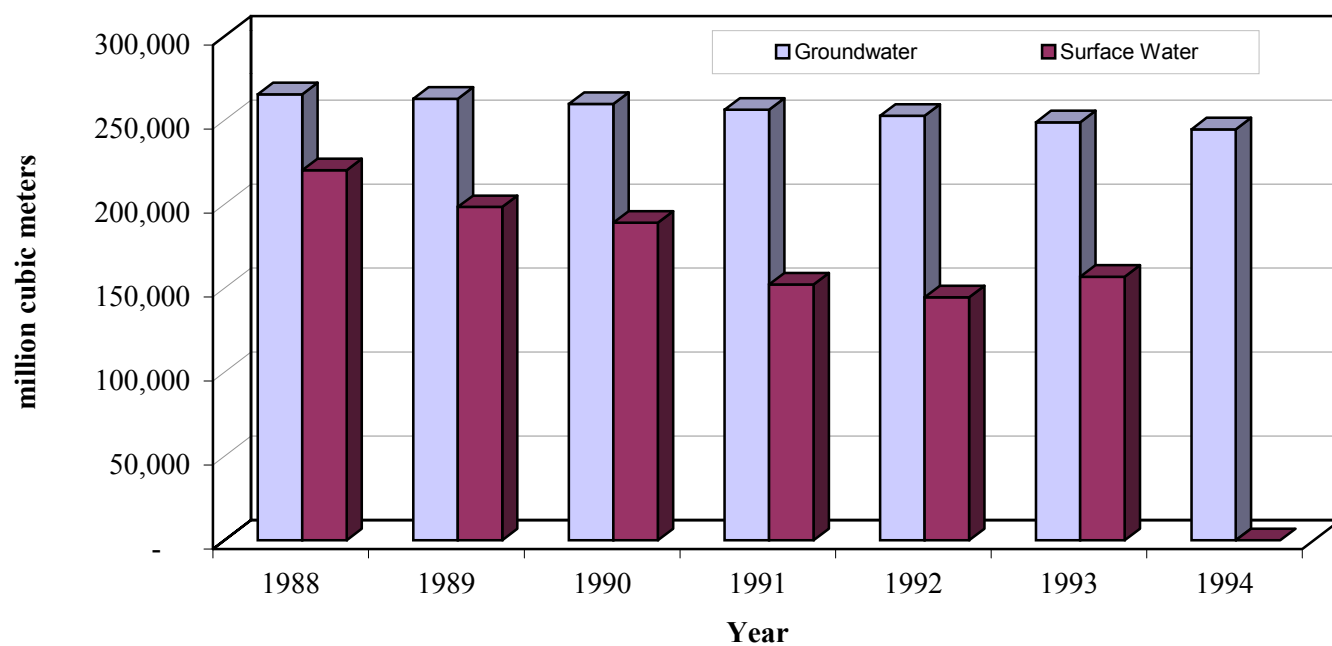
Source: Table 1

Figure 2. Reforestation in the Philippines, 1976-1999 (Hectares)



Source: Table 2

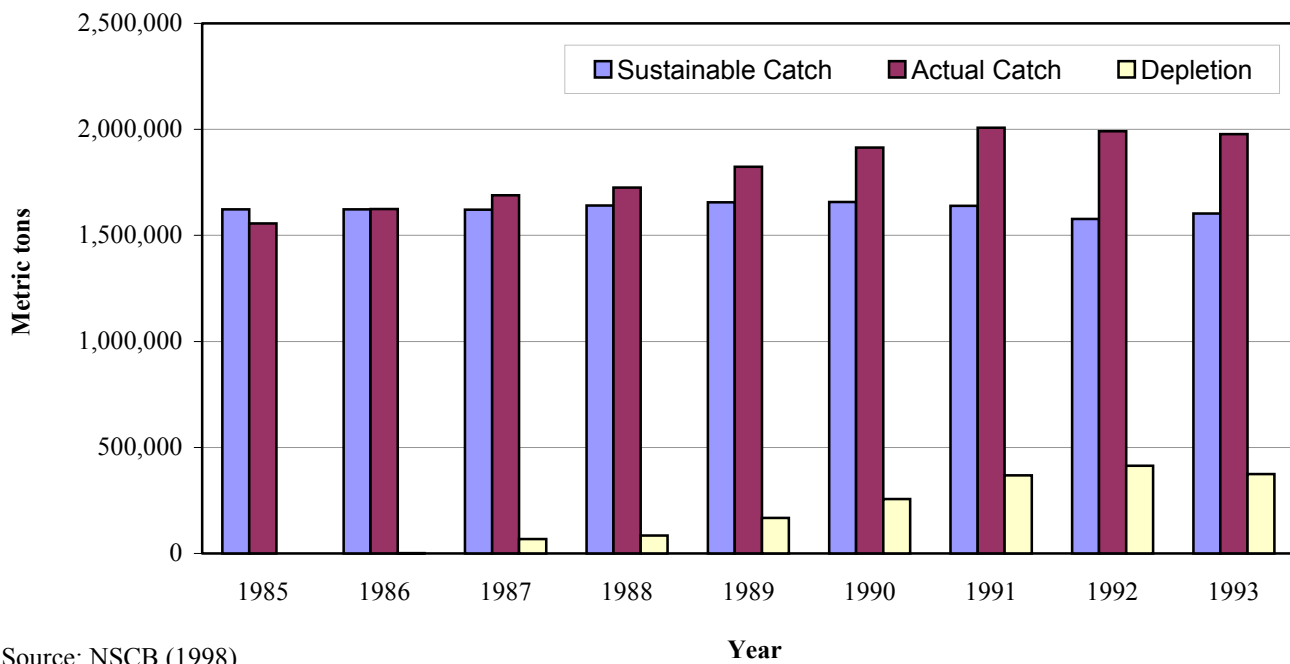
Figure 3. Stock of Ground and Surface Water in the Philippines, 1988-1994 (Million Cubic Meters)



Source: NSCB (2000b)

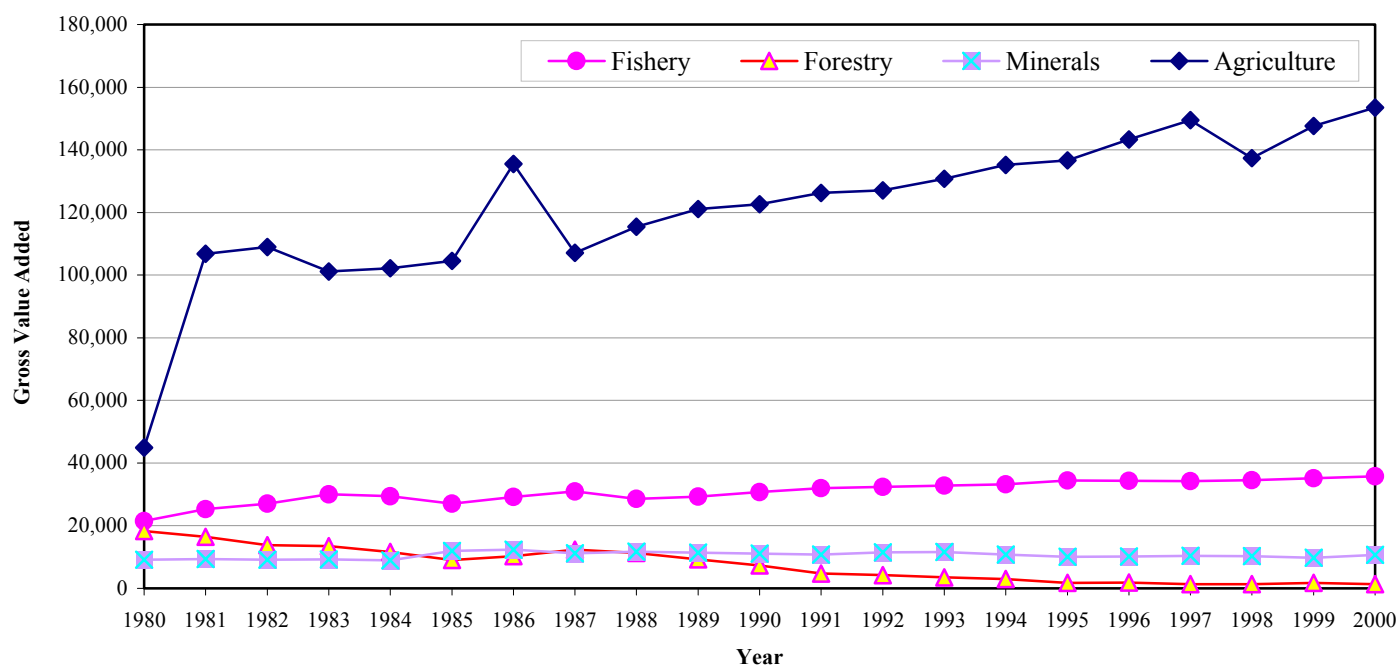
Note: No figure is available in 1994 for Surface water.

Figure 4. Sustainable Yield, Actual Catch and Depletion of Marine Fishery Resources in the Philippines, 1988-1993 (Metric Tons)



Source: NSCB (1998)

Figure 5. Gross Value Added in Forestry, Fishery, Mining and Quarrying, and Agriculture, at constant 1985 prices, 1980-2000



Source: NSCB (Various Years)

List 1. Tentative Partial List of Rare, Endemic, and Endangered Plants of the Philippines, 1996

1. *Rafflesia manillana* Teschem. (Rafflesiaceae)
2. *Cinnamomum cebuense* Kosterm. (Lauraceae)
3. *Cycas chamberlainii* Br. And Kienh. (Cycadaceae)
4. *Rosa Transmorrisonensis* Hayata (Rosaceae)
5. *Calamus* spp. (Palmae)
6. *Tectona philippinensis* Benth. & Hook. F. (Verbenaceae)
7. *Vanda sanderiana* Reichio.f. (Verbenaceae)
8. *Paphiopedilum* spp. (Orchidaceae)
9. *Taxus sumatrana* (Mig.) de Laub. (Taxaceae)
10. *Nepenthes* spp. (Nepenthaceae)

Source: Madulid (1996) as mentioned in EMB (1996)

List 2. Partial List of Priority Species of Philippine Wild Birds, Mammals and Reptiles, 1996

Scientific Name	Name	Status
A. Wild Birds		
<i>Pelecanus philippensis</i>	Spot-billed Pelican/Philippine Pelican	c
<i>Spilosnis holorpilus</i>	Serpent Eagle	h
<i>Pithecopaga jefferyi</i>	Philippine Eagle/Monkey-Eating Eagle	b, h
<i>Spizaetus philippensis</i>	Philippine Hawk Eagle	h
<i>Megapodius freycinet</i>	Philippine Megapode/Incubator Bird	h
<i>Polyplectron emphanum</i>	Palawan Peacock Pheasant	d, h
<i>Ptilinopus arcanus</i>	Negros Fruit Dove	c
<i>Gallicolumba luzonica</i>	Luzon Bleeding Pigeon	e, h
<i>Caloenas nicobarica</i>	Nicobar Pigeon	h
<i>Trichoglossus johnstoniae</i>	Mt. Apo Lorikeet/Mindanao Lorikeet	h
<i>Kakatoe haematuropygia</i>	Philippine Cockatoo/Red-vented Cockatoo	f, h
<i>Loriculus philippensis</i>	Philippine Hanging Parakeet	h
<i>Ninox scutulata</i>	Oriental Hawk Owl/Philippine Horned Owl	h
<i>Erythura coloria</i>	Mindanao Parrotfinch	c
B. Mammals		
<i>Bubalus mindorensis</i>	Tamaraw	j
<i>Cervus porcinus</i>	Calamian Deer	d, h
<i>Tragulus napu</i>	Mouse Deer, Luzon Sambar Deer	d
<i>Arctictis binturong whitei</i>	Palawan Bear-Cat	i
<i>Batomys grantii</i>	Luzon Forest Rat	h
<i>Macaca fascicularis</i>	Philippine Monkey or Long-tailed Macaque	e
<i>Tarsius syrichta</i>	Philippine Tarsier	h
<i>Orogale everetti</i>	Philippine Tree Shrew or Mindanao Slender-tailed Shrew	b
<i>Manis javanica</i>	Palawan Scaly Anteater	h
C. Reptilia		
<i>Crocodylus mindorensis</i>	Philippine or Freshwater Crocodile	h
<i>Varanus grayi</i>	Gray Monitor Lizard	a, h
<i>Heosemys leytenensis</i>	Leyte Freshwater Turtle	e

Source: EMB (1996)

Notes: a- Rare; b- Endangered; c- Threatened; d- Vulnerable; e- Indeterminate; f- Insufficiently unknown; g- Trade of species and subspecies of wildlife listed is strictly prohibited except for educational, scientific or research and study purposes; h- Trade of species and subspecies of wildlife is strictly regulated; i- Populations of species and subspecies of wildlife listed need local protection set under national policies as determined by the country's CITES Management Authority; j- CITES.

List 3. Action Agenda, Targets and Timetable Under the Issue of Creating an Enabling Environment Across Ecosystems.

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
Reflect the growing scarcity of natural resources	Taxes and other pricing instruments imposed on mining, real estate as well as pasture, wood and woodbased industries reviewed with the goal of regulating production to a sustainable degree	1998	
Promote stable and broadbased economic development in output and employment through a range of fiscal, monetary and investment policies consistent with PA 21	MTPDP updated and SD principles incorporated in the successor MTPDP using PA 21 as a guide.	1997	
Improve current efforts to consider and adequately value natural capital or ecosystem services in socio-economic decisions; establish a reliable database on social valuation estimates of environmental services	<p>Initial institutionalization of ENRA as an environmental management tool:</p> <ul style="list-style-type: none"> • reforms introduced in the Philippine Statistical System • area-based ENRA/SD database developed • necessary institutional structures for ENRA implementation in government created • joint implementation of ENRA with other key stakeholders (e.g. business, NGOs, academe, etc.) promoted 	1997	
	Market-based or economic instruments to complement command and control approaches to environmental management identified and implemented.	1998-2000	

List 3. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
	Analytical tools and methodologies developed to analyze cross-sector impacts of policies /programs:	1998	NEDA
	Action impact matrix formulated	1998	NEDA, POPCOM, DENR
	PDE modelling developed		2000
Strengthen the EIA process	Social acceptability analysis, and environmental risk assessment institutionalised	1997	DENR
	Extended cost benefit analysis developed	1998	NEDA
	EO 291 fully operationalized	1997	All Agencies
Strengthen SD as the Government's Framework for Engagement in APEC and other international fora	Appropriate SD language incorporated in: <ul style="list-style-type: none"> • Declaration of APEC leaders • APEC Framework for Development Cooperation • RP positions in different levels of APEC and other international fora 	1996 1996 1996- onwards	DFA, DTI, DENR, NEDA

Source: PCSD (1997)

List 4. Action Agenda, Targets and Timetable Under the Issue of Policy Reforms, Forestry

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
1. Adopt an integrated package of intervention in addressing the underlying causes of deforestation			
a) conduct a comprehensive review of tenurial instruments with the end in view of integrating them into one instrument and further strengthening such instruments against encroachment	Policy decision made, integrated into legislative and administrative instruments	by 1996	DENR, LGUs, NGOs/POs private sector
a.1) conduct policy studies on tenurial arrangements	Policy on tenurial arrangements formulated	1997-2000	DAR, DOST, DA, DENR, ERDB, ERDS, LGUs, CENROs, PENROs, NGO/POs, Academe
b) prepare a development plan prior to issuance of Certificate of Ancestral Domain Claims (CADC)		1998	
2. Recognize Ancestral Domains Claims			
a) prior to the enactment of the Ancestral Domain Law continue recognition of IP's ancestral domain			

List 4. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
b) enact the Ancestral Domain Law	Passage of Ancestral Domain Law	by 1997	DENR, DAR, NGOs/POs, communities, Congress
c) provide support in the development of Ancestral Domain plans/programs	Trainings in management, development and planning provided	continuing	DENR, LGUs, NGOs/POs
3. Pass the New Forestry Code which provides support to community management of forest resources	Passage of the New Forestry Code for old growth forests and critical watersheds	Before 1998	LGUs, NAMRIA, NGOs/POs, institutions, Congress
4. Pass the National Land Use Act that rationalizes land allocation along ecological protection and social equity principles	Passage of the National Land Use Act Nationwide land classification and sub-classification activities undertaken	Before 1998	LGUs, NAMRIA, NGOs/POs, institutions, Congress

Source: PCSD (1997)

List 5. Action Agenda, Targets and Timetable Under the Issue of Absence of a National Agriculture Land Use Policy, Lowland/Agriculture Ecosystem

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
1. Formulate and strictly implement a national agricultural land use policy/plan through ecoprofiling and physical framework planning at the national, regional, provincial and local levels, based on a thorough assessment of the DA's MTADP	<p>A comprehensive land use policy that considers the adverse effect of agrarian reform on the collateral value of agricultural land shall be pushed</p> <p>Agricultural lands which are not negotiable for conversion identified/designated</p> <p>Regulations on land use conversion circularised</p> <p>Tenurial rights over agricultural lands being tilled by farmers formalized</p>		
2. Institute an integrated policy framework in the planning and management of lowland/agricultural ecosystems to attain sustainable agriculture	<p>DA will exert pressure toward influencing public expenditure in rural infrastructure and HRD and in shaping an appropriate macroeconomic environment by becoming an active member of the economic policy team of the Government.</p> <p>Irrigation facilities like small water impounding systems, communal irrigation systems, shallow tube wells, deep irrigation, etc. promoted and sustained</p>	1997-1998	DA, DAR, DENR, NEDA, LGUs, NGOs/POs, Cooperatives
3. Constitute a committee for regional land use master plan with no less than 50% of members coming from NGOs/POs based in the region	Land use master plan committee established per region	1997 onwards	DAR, DENR, POs, NGOs, Cooperatives

List 5. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
4. Review taxation policies on idle agricultural lands/impose idle land tax	Idle lands developed into integrated production area		DAR, DA DOF, POs, NGOs, Cooperatives
5. Implement measures on the rational conversion of agricultural lands			
a) Expand membership of Technical Committee for Land Use Matters (TeCLUM)	Special order on the expansion of TeCLUM membership improved	1996-1997	DA-TeCLUM
b) Strict compliance to the set of guidelines prohibiting conversion of agricultural lands with existing or planned irrigation facilities	DA Admin. Order on the Guidelines on the Certification of Viability/Non-Viability of Agricultural Land (CVAL/CNVAL) approved	1996-1997	DA-TeCLUM
	Application for CVAL/CNVAL processed	1996 onwards	DA, DENR, LGUs
c) Update the Network of Agricultural Area for Development (NAAD)	Inventory and mapping of prime agricultural lands of 76 provinces conducted	1997-2005	DA-BSWM, DENR, LGUs
d) Establish Land Resource Information System (LRIS) as guide for land use planning	LRIS to 1,600 LGUs implemented	1997-2005	

List 5. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
6. Promote effective soil and water through conservation activities that would:			
a) Ensure that land is used for suitable crops or whatever purpose	Soil suitability classification for Key Commercial Crop Areas identified in MTADP	1996-1998	DA-BSWM
b) Improve organic matter content and soil structure, crop cover, crop rotations	Researches on accumulated effects of organic matter application on fertility and physico-chemical and biological properties of soils conducted	1996-2001	DA-BSWM, Research Institutions
c) Management of rainwater	Small scale water resource development projects established and monitored	1996-onwards	DA-BSWM, LGUs
d) Intensify efforts to reduce run-off before attempting to control its flow	Integrated Soil Conservation Projects "Guided Farm" established and monitored	1996-onwards	DA-BSWM, LGUs
e) Maintain adequate plant cover	do		
f) Provide incentives to farmers	do		
g) Promote cooperation between technical staff and local communities	Memorandum of Agreement among DA, LGUs, and communities forged Government permits and licenses to conform with environment-friendly activities examined and reviewed	1996-onwards	DA-BSWM, LGUs

Source: PCSD (1997)

List 6. Action Agenda, Targets and Timetable Under the Issue of Absence of a National Policy Framework for the Sustainable Use of the Country's Freshwater Ecosystem, Freshwater Ecosystem

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
1. Formulate and adopt a policy framework for the sustainable use of the country's freshwater ecosystems taking into consideration the Philippine Biodiversity Country Study Report, the Philippine Strategy and Action Plan for Biological Diversity Conservation, the 1992 Philippine Wetland Action Plan and the Philippine Water Code	Policy framework for freshwater ecosystems formulated, adopted and operationalized	1997	DENR, DA, LGUs, NGOs Communities
a) Conduct studies such as carrying capacity and economic valuation of lakes, rivers and freshwater wetlands to support policy formulation process	Studies conducted/ completed	1997	DENR

List 6. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
b) Identify and inventory watershed areas and other sources of potable water	Memorandum of Agreement among concerned parties/ entities forged	1997-1998	DENR, DA, MWSS, LGUs, LWUA, Communities, NGOs/POs
c) Institutionalize/ strengthen arrangements that would operationalize the freshwater ecosystems management approach			
d) Conduct massive information dissemination campaign on national and local programs			

Source: PCSD (1997)

List 7. Action Agenda, Targets and Timetable Under Policy and Legal Issues, Coastal and Marine Ecosystem

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
1. Review National Marine Policy to harmonize with provisions of the UNCLOS and other conflicting policy issuances at the national and local levels, involving stakeholders	National Marine Policy adopted	1996-2002	DENR, DA, LGUs, DFA, NEDA, NGOs
2. Work for the passage of the Fisheries Code that recognizes the primacy of fishing communities in the management of and access to marine resources	Draft Fisheries Code reviewed and revised in consultation with congress	1997	DA, DENR, NGOs/POs, communities
3. Prepare a Comprehensive Coastal Zone Management Plan at the national, regional and local levels with genuine participation of communities (delineating areas for household, residential and business) in all phases of the planning, implementation, monitoring and evaluation processes	Comprehensive Coastal Zone Management Plan implemented to include establishment of marine protected areas, promotion of community-based resource management and eco-tourism	1997	DENR, DA, NEDA, LGUs

List 7. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
4. Formulate policies regarding nearshore areas which can be delineated for various purposes, including mangroves, reclamation and tourism	Relevant policies formulated	1997	DA, DENR, DILG, NGOs
	Guidelines on the responsibilities/jurisdiction of various agencies regarding mangroves, coastal and offshore resources formulated	1997	DA, DENR, DILG, NGOs, POs, communities
5. Identify priority areas and set targets for:	10% of degraded area rehabilitated per year depending on existing local situation		
a) Coral reef rehabilitation			
b) Mangrove reforestation			
c) Seagrass rehabilitation			
d) Swampland			
6. Evaluate FLAs to determine their productivity with the objective of cancelling unsustainable ones and reverting these to mangroves	Unsustainable/unproductive fishponds reverted to mangroves/public domain	1998	DA, DENR, DILG, NGOs, POs, communities
	Provision of FLA enforced		
	Unproductive FLAs cancelled		
7. Review intensively existing bilateral agreements especially those affecting fisheries management and immediately	Review completed and recommendations forwarded to appropriate bodies	1997	DFA, DND, Communities, LGUs
	EO 473 cancelled		

List 7. Continued

Strategy/ Action Agenda	Targets	Time Table	Institutions Involved
institute measures to correct such violations			
8. Evaluation of existing fishing methods in relation to the sustainability of the fisheries resource	Rules and regulations on fishing methods revised		LGUs
9. Evaluation of culture technologies in relation to the sustainability of the resource and its impact to the environment	MCS implemented in strategic areas		DA, DILG, NGOs
10. Develop anti- poaching/illegal fishing plans funded by municipal resolutions, and developed in a participatory manner		1997	
11. Adoption of Monitoring, Control and Surveillance (MCS) system for the country	New rules on the industry formulated and enforced	1998	
12. Review rules/regulations onshells, shellcraft and livefish trade			

Source: PCSD (1997)