

Chapter 3

Environment and Natural Resources

I. SITUATIONER

The underutilization and mismanagement of the country's abundant natural resources is a major cause of poverty, particularly in the countryside. Its potential to sustain poverty alleviation programs has not been fully explored. The productive use of the country's rich mineral resources, for one, has been affected by environmental and social distrust. Legal issues also continue to surround the constitutionality of some of the provisions of the Mining Act. Similarly, the management of watersheds has not been properly given attention. This has led to shortages of water supply needed for irrigation, industrial and domestic uses and thus, is likely to negatively affect future development initiatives. Moreover, this has negatively affected the function of watersheds to act as carbon sink to clean the air and prevent soil erosion and mitigate flooding.

Meanwhile, there is also the foregone income and welfare from biodiversity as the reduction and the lack of concrete basis into its potentials continue. The Philippines is considered to be a mega diverse country, but its biodiversity is also considered to be among the most threatened in the world. It should be noted that the latest environment indicators show that the various aspects of our environmental sustainability are rated either poor or low. Overall, the ability of the major ecosystems to provide and maintain a regular stream of economic goods and ecological services has been significantly affected due to declining stocks and reduced coverage and quality. Thus, there is an urgent need to properly manage the natural resources and protect the environment to improve our quality of life and that of the future generations.

The watershed and ecosystems approach to natural resources management and environmental protection provides an effective paradigm for its proper and sustainable development. It considers the dynamic and complex interactions of living organisms, their physical surroundings and the natural cycle that sustains them as a functional unit; managing any one of these affects other components in that system. This approach, therefore, provides a framework that balances the often conflicting and competing demands on natural resources and the environment so that the welfare of the succeeding generations are not sacrificed by present use.

A. Forest Ecosystem and its Resources

The Philippine upland/forest ecosystem refers to areas with at least a slope of 18 percent. It comprises an estimated 45 percent of the country's total land area and directly supports approximately 30 percent of the population, including the indigenous peoples. The forest cover is estimated at 7.168 million hectares or 23.9 percent of the total land area, based on 2002 satellite mapping. The forest ecosystem provides ecological benefits to agricultural production, industries, water and power needs. A watershed with adequate forest cover supports lowland agriculture by ensuring continuous supply of water for irrigation. They also prevent soil erosion and consequent loss of fertile topsoil and siltation of our coastal areas and water bodies. It also sustains the supply of surface and groundwater for domestic use in the lowlands.

Aside from ecological benefits, forest resources – particularly the production forest areas – can be a source of revenue and job generation. Timber production as well as agroforestry activities may be promoted in these areas to maximize their utilization.

However, the country's watersheds have been severely degraded, thus, reducing the capacity to provide vital ecological services and economic benefits. In fact, 140 priority watersheds with a total area of 4.5 million hectares nationwide, which directly support national irrigation systems, were identified as needing management, particularly rehabilitation and protection. Thus, a massive reforestation program to reclaim the bald mountains, particularly in the protection forests in the country, needs to be implemented. Revenue and job generation, on the other hand, can also be realized by promoting timber production and agroforestry in production forest areas.

B. Alienable and Disposable (A&D) Land Resources

Land as a resource contributes significantly to economic growth anchored on social equity. Equitable access to land encourages agricultural productivity, which in turn results to higher rural incomes. Increased rural incomes accelerate rural development, which, eventually, leads to overall economic growth and well being of a greater number of people. Access to land is an essential ingredient in providing equal opportunities, increased income and wealth. It is also considered a critical factor in achieving social justice.

Of the country's total land area of 30 million hectares, about 47 percent are classified as alienable and disposable lands, which are open for titling. Of these, about two-thirds have already been titled and only 1.1 million hectares have yet to be titled. Among the constraints in land titling, however, is the multiplicity of agencies involved in land administration with no appropriate mechanisms for coordination. Moreover, there is no overall institutional mechanism to resolve outstanding issues.

C. Biodiversity

The Philippines is considered as one of the 17 megadiverse countries in the world. These countries hold about 70 percent of the world's total diversity in flora and fauna. In the Philippines alone, there are over 52,000 species. Of these, 13,500 are plants comprising 5 percent of the world's total flora. About 68 percent of the country's reptiles, 78 percent of amphibians, 64 percent of the mammals and 44 percent of birds are considered unique in the Philippines. In terms of uniqueness or endemism, many of the country's species rank in the top ten in the world. Considering land density and density of flora and fauna, the Philippines may even be considered to be the most megadiverse country. However, the species in the Philippines are considered to be among the most threatened in the world. The Philippines, together with Madagascar, is considered as the hottest of the hotspots or the most severely threatened of the megadiverse countries. The destruction of the original forests, freshwater and marine ecosystems have led to an unmatched biodiversity crisis.

Biodiversity resources offer many economic opportunities such as ecotourism, sources of raw ingredients for pharmaceutical and industrial products, and genetic materials for the development of crops and animals for food and commerce. Biodiversity also nourishes our forests and is largely responsible for forest regeneration. However, continued degradation of forests, wetlands and marine areas have caused substantial biodiversity loss in the country.

D. Mineral Resources

The Philippines is considered to be a highly mineralized area. Geological estimates showed that mineral resources cover about 9 million hectares or about 30 percent of the total land area. Presently, less than half a million hectares are under exploration or development. This means that 8.5 million hectares or 94.4 percent of mineralized areas have yet to be developed.

For 2003 alone, the mining sector employed 104,000 workers and provided PhP4 billion to PhP5 billion in wages and benefits. For each direct job in the mining sector, 4 to 10 allied jobs are created. The minerals industry still offers huge potentials. The country's mineral wealth is estimated to have an approximate value of US\$800 billion to one trillion dollars, as against the current Philippine external debt of US\$57.0 billion. It is expected that the industry will generate US\$4-6 billion of investments, US\$5-7 billion of annual foreign exchange and at least 240,000 jobs for the next six years.

However, despite these huge potentials, mineral development has been on the decline: from 27 mines in 1997 to only 12 mines in 2004. Correspondingly, its share to total exports also declined to only 1.5 percent as of last year. These are due to a host of factors: the decline in mineral prices that affected the economic viability of many mining projects; the perceived policy inconsistencies and instabilities, especially the land use conflicts and, recently, the Supreme Court ruling that adversely affected the industry that relies heavily on foreign investments; the strong opposition to mining, and the lack of domestic capital.

A policy decision – including a favorable decision from the Supreme Court – to rebuild the industry would open its enormous economic potential, and employ hundreds of thousands of people. China, Australia, Canada and the US would be major players in a revived Philippine mining industry. Currently, the revitalization of the mining sector is being pursued through Executive Order (EO) No. 270, issued in 16 January 2004, as amended, or the National Policy Agenda on Revitalizing Mining in the Philippines and its Minerals Action Plan (MAP).

E. Coastal and Marine Ecosystem

The coastal and marine ecosystems include coral reefs, sea grass and algal beds, mangroves, a variety of productive fisheries, beach systems, estuaries and lagoons. In terms of area, Philippine coastal zone extends to an area of about 11,000 sq. km. of land and 267,000 sq. km. of water. Thus, the coastal and marine ecosystems are considered an important source of livelihood for about 70 percent of the country's municipalities and compose 80 percent of the country's territory. This serves as a rich source of fish and aquatic products used for food, habitat for countless underwater wildlife, and natural areas for recreation, tourism and related activities. However, the productivity of the coastal and marine ecosystems has continuously been threatened by destructive fishing methods, siltation and pollution, among others. It is estimated that only 5.0 percent of the country's coral reefs are in excellent condition, mangroves have declined by as much as 57.0 percent in the last 23 years and sea grass losses have been estimated at 30-50 percent over the last 50 years. The widespread loss of mangroves, living corals and sea grass beds has severely eroded the capacity of this particular ecosystem to support life. There is considerable biodiversity loss and population decreases among the pelagic and crustaceans as well as soft-bottomed organisms. In addition, an increasing number of coastal communities and lands have become more vulnerable to tidal surges and waves highly associated with the country's seasonal typhoons.

F. Environment

1. Air

Air pollution remains a problem in Metro Manila and major urban centers the last two decades. A 1992 report estimated that 80 percent of Metro Manila residents and 31 percent of residents in Metro Cebu are exposed to Total Solid Particulates (TSP) in the air above normal standards. It is projected that the volume of air pollutants (e.g., TSP, Particulate Matter (PM₁₀), Sulfur Oxide (SO_x), Nitrogen Oxide (NO_x)) will continue to increase due to increasing industrial activity, traffic and the number of vehicles plying the streets including the many smoke-belching public utility vehicles. Majority of TSP concentration is contributed by motor vehicles. Increasing air pollution load was reported by World Health Organization (WHO) in 1996 to contribute to the high incidence of upper respiratory tract diseases in major urban centers like Metro Manila. Especially vulnerable are public utility drivers and pedestrians.

2. Water Resources

It is estimated that the total population served by potable water in the Philippines is about 80 percent. Water is distributed through the MWSS and the water concessionaires in Metro Manila, the water districts, the local government units (LGUs), the cooperatives, the private sector and bulk water supplier. The reach of these systems, however, are limited and many Filipinos still do not have access to water that is clean and affordable.

Despite the high average rainfall, the Philippines is estimated to have second to the lowest per capita freshwater in Asia, as of 2000. The supply of freshwater is diminishing due to over extraction of groundwater, water pollution, denuded forests/watersheds and lack of catchment basin and, occasionally, the El Niño phenomenon. There was already a shortage of water in Metro Manila and nearby areas from January to July 2004. This is due to the low water level in the Angat Dam, as a result of lack of rains in the area in 2003.

The issues besetting the water sector include disparities in water supply coverage across regions, depletion of groundwater especially in Metro Manila and Metro Cebu, lack of cost recovery on investments, institutional weaknesses and low willingness of consumers to pay.

In addition, pollution of water sources such as rivers and lakes is evident in many parts of the country. About 457 water bodies have already been classified by the Department of Environment and Natural Resources (DENR). Of these, however, about 51.0 percent still meet the water quality standard, as of 1996. About 16 rivers nationwide are considered biologically dead during the dry months. About half (48.0%) of water pollutants are domestic waste, about a third (37.0%) are agricultural wastes, and the remainder are industrial wastes (15.0%). Pollution of rivers, streams and lakes contaminate ground and surface waters, thus, exposing the population to environmentally-related diseases. Water pollution is decreasing the primary productivity of many water bodies. Heavy loads of inorganic pollutants have made water increasingly a threat to life. A report by the WHO in 1996 cited the rise in morbidity rate caused by gastrointestinal diseases from 502 in 1982 to 5,151 per 100,000 population. Other types of water-borne diseases are also expected to increase as water quality further deteriorates.

With increasing water demand – water being such a critical factor to the country's socioeconomic development and global competitiveness – there is a need to adopt a more integrated

and holistic management of our water resources such as the Integrated Water Resources Management (IWRM) approach. This approach involves the coordinated development and management of water, land and related resources within the hydrological boundaries, to optimize economic and social welfare without compromising the sustainability of vital ecosystems.

3. Waste

Solid waste generation in Metro Manila is estimated at 5,345 tons per day. This is expected to double by 2010. Waste collected in Metro Manila is only about 65-75 percent of total wastes generated and the recycling level is estimated to be about 13 percent. The 25 to 35 percent uncollected wastes are just thrown anywhere, especially in esteros and creeks. These threaten the health of the population and contribute considerably to flooding.

Urbanization has inevitably increased the use of chemicals, which resulted in an increasing number of incidents involving chemicals, particularly the release of ammonia and chlorine over the years. Presently, only about 45 percent of the total industries using chemicals such as cyanide, mercury, asbestos and ODS have been registered. For polychlorinated biphenils or PCB's (e.g., coolant or oil for transformer), only 25 percent have been inventoried.

Based on the JICA Study (2001), about 700 industrial establishments in the Philippines generate about 273,000 tons of hazardous wastes per annum. It was further estimated that with 5,000 potential hazardous waste generators, about 2.41 million tons of hazardous wastes will be generated. An ADB study on hospital wastes reported that there are about 30,000 tons of hospital wastes generated per annum.

At present, there is no integrated treatment facility for hazardous wastes in the country. However, there are about 95 small to medium-scale treatment facilities that treat hazardous wastes (i.e., used oil, sludge). There is approximately 50,000 tons of hazardous wastes stored on or offsite due to lack of proper treatment and landfill facilities. Other hazardous wastes are exported to other countries for recovery and disposal (i.e. metal bearing sludge and used solvents) and treatment (e.g. PCB.). However, this entails additional costs to industries, which consequently affects their international competitiveness, especially locators in economic zones.

G. Across Ecosystems

The Philippines, due to its geographical location, is highly vulnerable to natural disasters such as tropical cyclones and earthquakes, which result to flooding and landslides. Moreover, flooding and landslides are aggravated by heavy amount of rainwater, lack of forest cover and loose soil. For landslides alone, conservative estimates recorded that 18,339 lives were lost in 2000 and PhP42 million worth of property were damaged in 2003.

There is therefore a need for geohazard mapping in order to determine the most vulnerable areas to landslides and guide development plans on settlements, industries and production areas. More importantly, this will guide the relocation and serve as an alert system for existing settlements located in highly vulnerable areas. Presently, the geohazard mapping for regions that are most frequently visited by typhoons (Bicol and Eastern Visayas) or experience excessive rainfall (CARAGA) have been initiated.

II. GOALS, STRATEGIES AND ACTION PLANS

For the medium term (2004-2010), the Environment and Natural Resources Sector will pursue the following five major thrusts, consistent with the 10-Point Agenda of the President:

A. Thrust 1- Sustainable and more productive utilization of natural resources to promote investments and entrepreneurship

1. Across Ecosystem

- a. Maximize physical planning as a development tool for greater and sustained job creation
 - Full implementation of the Philippine Reference System (PRS '92) to facilitate the conduct of land surveys
 - Completion of the land classification by December 2010
 - ❖ Conduct ground validation/verification of forestland boundaries covering a total of 78,450 kms within 79 provinces and push for the legislation of permanent forest lines of these provinces
 - ❖ Pursue the disestablishment of portions of reservations and initial components of protected areas no longer suitable for original purpose
 - Accelerate distribution/titling of A&D Lands
 - ❖ Survey the remaining 1.4 million hectares of A and D lands in the 72 unsurveyed municipalities and 2.4 million hectares in the 289 partially surveyed cities and municipalities
 - ❖ Distribute 760,080 hectares of A and D lands through land patents prioritizing areas in Bulacan, Cavite and Laguna
 - Ensure the integrity of land titling system in order to promote the development of a mortgage market for lands and prevent illegal titling
 - ❖ Integrate the various agencies involved in land titling (LMB, LRA-DOJ, DAR) through legislation
 - ❖ Accelerate and expand the campaign against fake titles
 - ❖ Strengthen the system for registration and monitoring of land titles through digitization of land records
 - Promote the lease/rental of open forestlands and foreshore areas to investors and entrepreneurs
 - ❖ Conduct nationwide inventory of foreshore and open forestlands

- ❖ Develop a system for marketing and appropriate pricing for these areas.
 - Relaunch major reclamation projects for shorelines of highly built-up urban areas that are not classified as marine reservation provided that technical and environmental soundness of these projects are ensured.
- b. Create a climate conducive for investments and production
- Liberalize/streamline and refocus the Environmental Compliance Certificate (ECC) system to increase the efficiency and the development facilitation function of the system without lowering the environmental standards it seeks to promote (e.g., delegate issuance of ECCs in the Laguna Lake Region to the Laguna Lake Development Authority (LLDA) to avoid duplication between LLDA and Environmental Management Bureau of DENR);
 - Implement at least 10 Clean Development Mechanism (CDM) Projects;
 - Shift from technology generation to technology transfer;
 - Expand the use of market-based instruments, proper pricing of natural resources and other incentives/disincentives mechanisms; and
 - Provide business-related and technical/extension services to investors and clients:
 - ❖ Assist applicants in securing permits from other government agencies, such as National Commission on Indigenous People (NCIP) and LGU clearances;
 - ❖ Link community-based programs and small/medium scale projects to sources of finance and markets; and
 - ❖ Provide technical assistance, best suitable practices and technologies and improved planting materials.

2. *Forest Ecosystem*

- a. Open up more forestlands that are denuded or no longer suitable for protection forest for development
- Delineate 8.4 million hectares forestlands nationwide for agroforestry and other environmentally sustainable production activities; and
 - Undertake inventory and evaluation to determine suitable uses such as for agriculture, agroforestry, ecotourism and other development projects.
- b. Promote investments in permanent production forest areas
- Issue the following tenurial instruments: Community Based Forest Management Agreement (CBFMA) covering 1.8 million hectares; (Industrial Forest Management

Agreement (IFMA) covering 36,365 hectares; and Socialized Industrial Forest Management Agreement (SIFMA) covering 39,350 hectares; and

- Pursue area development for corporate and community-based economic activities covering 300,000 hectares for CBFMA, 262,000 hectares for IFMA, 37,530 hectares for SIFMA, 14,000 hectares for Timber License Agreement (TLA) and 55,000 hectares for Forest Land Grazing Lease Agreement (FLGMA)

3. Biodiversity

Initiate the development and sustainable utilization of biodiversity resources (e.g., promote the establishment of 15 wildlife farms and zoos)

4. Coastal and Marine Ecosystem

Clearly delineate areas for protection, exploration and utilization through the survey and mapping of maritime zones starting in 2005 with particular emphasis on expediting the delineation of municipal waters in coastal areas with offshore islands.

B. Thrust No. 2 -Promote responsible mining that adheres to the principles of sustainable development: economic growth, environmental protection and social equity. Responsible mining reduces poverty and benefits local and indigenous communities

- 1. Launch a major program to revive the mining industry.** We need to revitalize the mining industry and pursue the implementation of responsible mining through the Minerals Action Plan (MAP) (see Box 1);
- 2. Pursue and assist in the development of 18-23 large scale mining projects** that will bring an estimated U.S \$4.0-6.0 billion in investments, U.S \$5.0-7.0 billion in foreign exchange, PHP 5.0-7.0 billion in excise taxes alone, and about 210,000 in direct and indirect employment; and
- 3. Resolve the issues involving mining accidents in abandoned and idle mine areas.**
 - a. Address remaining issues pertaining to the Marcopper Mine Tailing Spill accident
 - b. Construct the final Mabatas tailings dam covering some 30 hectares
 - c. Conduct assessment of 7 abandoned mines and implement stop-gap measures/ rehabilitation of 3 abandoned mines
- 4. Develop incentive schemes to attract international and local investors in Mt. Diwalwal**
 - a. Conduct core drilling within 1.5 to 2 years to determine the mineable resources of Diwalwal; and
 - b. Mobilize international and local investors to develop the underground wealth of gold, employ the tens of thousands of miners who might be given additional incentives of partnership or profit-sharing arrangements.

C. Thrust No. 3 - Focus and strengthen the protection of vulnerable and ecologically fragile areas, especially watersheds and areas where biodiversity is highly threatened

1. Forest Ecosystem

- a. Rehabilitate and strengthen protection of critical watersheds
- Rationalize and prioritize reforestation of 1 million hectares in 140 critical watersheds, especially those areas supporting the Pampanga and Bicol River Basins, to preserve rivers and other fresh water systems in support of providing adequate and reliable water for irrigation, domestic and industrial uses;
 - Augment forest protection through partnership with other government agencies, LGUs and nongovernment sectors (e.g., NGOs, Integrated Bar of the Philippines, civic groups, etc.); and
 - Pursue the incorporation of forest protection as a key result area for Philippine National Police or PNP and military contingents covering watershed areas.

2. Coastal and Marine Ecosystem

- a. Expand coverage and strengthen protection of coastal and marine ecosystem
- Extensively implement mangrove replanting, covering 10,500 hectares and establishing 128 marine sanctuaries in cooperation with LGUs;
 - Create 14 coastal law enforcement alliance with non-government sectors and communities; and
 - Provide technical assistance to 570 LGUs in coastal protection and management, especially in participatory planning, zoning and standard setting.

3. Biodiversity Resources

- a. Delineate 6.336 million hectares nationwide for protection
- Conduct assessment and classification of 57 caves;
 - Conduct inventory of wildlife in the areas for protection;
 - Manage 39 priority wetlands; and
 - Develop protected area management plans for areas for protection.
- b. Develop Protected Areas into viable management areas
- Conduct zoning of 77 Protected Areas to delineate areas suitable for development (i.e., buffer and multiple-use zones);

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- Fully establish the Protected Area Management Boards (PAMB) in all proclaimed Protected Areas;
- Equip LGUs and communities with the tools necessary for better management of Protected Areas;
- Promote ecotourism in 29 protected areas that are included in the National Ecotourism Master Plan;
- Develop water user fee and plowback mechanism for forest protection and management of Protected Areas;
- Facilitate the remittance of the Integrated Protected Areas Fund (IPAF) or the funds generated inside Protected Areas, to the PAMB;
- Conduct carrying capacity studies for 29 protected areas, especially those that will host development projects; and
- Develop Ninoy Aquino Parks and Wildlife Center into a premier ecological destination and People's Center in Metro Manila.

D. Thrust No. 4 - Create healthier environment for the population

1. Air

- a. Improve air quality in major urban centers and reduce air pollution (total suspended particulates or TSP) in Metro Manila by 90 percent to bring air quality within acceptable standard.
 - Establish 19 airsheds nationwide for better management of air quality
 - Complete the establishment of state-of-the-art air quality monitoring stations and 20 air quality advertisement boards, especially in Metro Manila
 - Pursue urban greening in area sources in Metro Manila and other major urban centers
 - ❖ Pursue the establishment of 309 mini forests
 - ❖ Undertake roadside planting covering 612 kilometers
 - Promote the use of clean fuel through the use of Coco Methyl Ester or coco bio-diesel (CME1% Blend) in government vehicles
 - Promote use of Compressed Natural Gas (CNG) Fueled Buses

2. Water Resources

- a. General Strategy: Adopt the Integrated Water Resources Management Approach

- Identify/establish Water Resources Regional Councils (WRRCs)/River Basin Organizations (RBOs) while strengthening existing RBOs to promote devolution of decision-making processes to the lowest appropriate levels capable of handling such tasks, normally to local government and community-based institutions;
- Pursue raw water pricing to effect efficient allocation and conservation. Raw water is not currently priced to reflect its real value leading to wasteful practices and allocations that are not in the best interest of the country. Water should be priced and allocated according to its economic value so as to attain efficiency and sustainability in the development and allocation of the resource;
- Maintain and sustain data collection and database for water resources (i.e. rainfall, stream flow, groundwater and water quality, etc.); and
- Conduct water assessment in terms of availability and demand for prioritized water constraint areas as identified in the 1998 Master Plan Study on Water Resources Management in the Philippines.

b. Specific Strategies

- Potable water for the entire country by 2010
 - ❖ Provide potable water to the entire country by 2010, with priority given to at least 200 “waterless” barangays in Metro Manila and 200 “waterless” municipalities outside Metro Manila through private sector or public investment. (Note: Waterless is defined as areas with less than 50 percent water supply coverage). To achieve the priority target of 200 waterless municipalities without access to potable water, it is estimated that PhP1.90 billion and PhP10.77 billion are needed to construct 38,097 level I and 7,696 level II systems for these municipalities, respectively;
 - ❖ Ensure that all barangays/municipalities that will be provided with water supply services have the corresponding sanitation facilities for proper disposal of wastewater/septage;
 - ❖ Continue to provide capacity building programs and technical assistance on water supply and sanitation planning, management and project implementation for all Water Service Providers (WSPs) needing assistance;
 - ❖ Develop technology options for water supply (e.g. solar desalination for isolated islands, windmill technology, etc.);
 - ❖ Promote private sector or public investment in the provisions of water to waterless barangays and municipalities;
 - ❖ Conduct groundwater resources and vulnerability assessment covering 310 priority LGUs;
 - ❖ Monitor drinking water of selected poor communities through the Tap Watch Program
 - ❖ Complete the groundwater resource inventory/assessment in major urban areas and surface water in rural areas, control extraction through moratorium/stringent requirements in the grant of water permits in water-deficient areas and complete registration of all water pumps, metering of water pumps, etc.

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- Ensure clean water resources for the entire country through full implementation of the Ecological Solid Waste Management Act and the Clean Water Act
 - ❖ Improve water quality through close and regular monitoring of 18 priority rivers nationwide and reduce the biochemical oxygen demand (BOD) in Pasig River and other priority rivers by 50 percent to provide for adequate oxygen for aquatic life to survive;
 - ❖ Reclassify the remaining 202 unclassified principal water bodies nationwide, based on their best and most suitable uses, for better water quality management; and
 - ❖ Complete the water analysis and monitoring of 162 bathing areas nationwide through the “beach watch” program.

3. Waste

- a. Improve management of solid waste especially in Metro Manila by fully implementing the Ecological Solid Waste Management Act (RA 9003)
 - Provide technical assistance to LGUs on: closure and/or conversion of 868 open dumpsites to controlled dump facilities; construction of 14 sanitary landfills/waste processing facilities; complete the implementation of LGU-wide integrated waste management system (segregation and collection at source, materials recovery facilities, recycling and composting) in 48 model sites to serve as model for other LGUs;
 - Assist LGUs in providing storage facilities and markets for compost and recyclable materials;
 - Conduct geological assessment of potential solid waste and disposal sites for 200 LGUs;
 - Support waste recycling and recovery through ecolabelling of eight products in Metro Manila; and
 - Pursue the opening of cluster sanitary landfill sites with material recovery facilities (MRFs) for Metro Manila and other highly urbanized centers.
- b. Clean and rehabilitate *esteros*, especially in eight major *esteros* in Metro Manila and 32 prioritized *esteros* in other urban centers that contributes significantly to flooding, on a sustained basis
 - Undertake sustained metro-wide clean-up of *esteros* through the active involvement of LGUs, concerned communities, private sector and NGOs; and
 - Include clean-up of *esteros* as part of the civic requirements for students and ROTC cadets.

- c. Establish management system and facilities for toxic and hazardous wastes
 - Complete the inventory of toxic and hazardous wastes;
 - Complete registration of all establishments utilizing toxic and hazardous wastes and closely monitor 500 companies utilizing cyanide, mercury, asbestos and other highly toxic chemicals like the polychlorinated biphenils (PCBs);
 - Initiate the establishment of the first facility for the treatment of toxic and hazardous wastes, especially for those located in economic zones;
 - Establish a mechanism for the retrieval and disposal of millions of cellphone batteries by 2007;
 - Pursue efficient health care waste collection in 197 accredited hospitals in Metro Manila and increase by 40 percent the health care waste collection and treatment outside of Metro Manila; and
 - Conduct clean up of former military bases in Region 3 (approximately 50 percent clean up of identified contaminated sites).
 - d. Total phase-out of ozone depleting substances (ODS) consumption nationwide
 - Convert production systems to ozone-friendly technologies;
 - Develop a system for recovery, reclamation and recycling of used refrigerants which utilized ODS and strictly monitor their operations; and
 - Closely monitor and regulate the importation, sale, manufacturing and use of ODS products and ban the use of ODS in the manufacturing sector by January 2005.
- E. Thrust No. 5 - Mitigate the occurrence of natural disasters to prevent the loss of lives and properties**
1. *Nonstructural measures*
 - a. Complete the geo-hazard mapping of the remaining 13 regions;
 - b. Conduct soil stability measures (e.g., reforestation and planting in river banks) for landslide-vulnerable areas; and
 - c. Ensure integration of disaster preparedness and management strategy in the development planning process at all levels of governance. This shall be done through the following activities, namely, among others: periodic risk assessments, updating of respective land use policy based on the assessment, conduct of disaster management orientation/training among LGU officials and concerned local bodies, institutionalization of community-based mechanisms for disaster management (e.g. inclusion of legitimate disaster management organization at various Disaster Coordinating Councils), and advocating for the bill on “Strengthening the Philippine Disaster Management Capability”.

2. Structural Measures

- a. Keep at the optimum the conveyance capacities of existing river channel floodways, drainage canals, esteros through riverbank protection, dredging/desilting, observance of river easements, relocation of informal settlers, proper disposal of garbage, and efficient maintenance in coordination with LGUs;
- b. Provide adequate flood control and drainage facilities in all flood/sediment disaster prone areas to mitigate flooding as well as rehabilitate and improve existing facilities. The priority flood management projects are as follows:
 - Mt. Pinatubo Hazard Urgent Mitigation II;
 - ❖ Total Project Cost: PhP4,500 Million
 - ❖ Remaining Balance: PhP516 Million
 - ❖ Percentage of Accomplishment: 98 percent (as of May 2004)
 - Mt. Pinatubo Hazard Urgent Mitigation III;
 - ❖ Total Project Cost: PhP4,890 Million
 - Iloilo Flood Control;
 - ❖ Total Project Cost: PhP4,150 Million
 - ❖ Remaining Balance: PhP3,440 Million
 - ❖ Percentage of Accomplishment: 21 percent (as of June 2004)
 - Lower Agusan Flood Control Project Stage 1, Phase 2;
 - ❖ Total Project Cost: PhP4,870 Million
 - ❖ Remaining Balance: PhP2,080 Million
 - ❖ Percentage of Accomplishment: 60 percent (as of June 2004)
 - Bicol River Basin and Watershed Management;
 - ❖ Total Project Cost: PhP1,680 Million
 - Agno and Allied Rivers Flood Control;
 - ❖ Total Project Cost: PhP3,250 Million
 - ❖ Remaining Balance: PhP41 Million (for winding-up operations)
 - ❖ Percentage of Accomplishment: 100 percent (as of September 2003)
 - KAMANAVA Flood Control;
 - ❖ Total Project Cost: PhP4,870 Million
 - ❖ Remaining Balance: PhP2,990 Million
 - ❖ Percentage of Accomplishment: 3 percent (Civil Works only - as of March 2004)
 - Metro Manila Flood Control Project – West of Manggahan Floodway;
 - ❖ Total Project Cost: PhP3,140 Million
 - ❖ Remaining Balance: PhP400 Million
 - ❖ Percentage of Accomplishment: 75 percent (as of July 2004)

- Pasig-Marikina River Channel Improvement Project Phase II;
 - ❖ Total Project Cost: PhP4,160 Million
- Cagayan River Flood Control Project;
 - ❖ Total Project Cost: PhP2,390 Million
- Panay River Flood Control Project;
 - ❖ Total Project Cost: PhP3,870 Million
- Lower Cotabato River Flood Control Project;
 - ❖ Total Project Cost: PhP1,430 Million

Box 3-1 Policy Agenda of the Minerals Action Plan

- (a) Government recognizes the critical role of investments in the minerals industry for national development and poverty alleviation and shall provide support mechanisms for a sustained mineral exploration program (including the streamlining of procedures of concerned government agencies and instrumentalities relating to the grant of mining tenements, responsive research and development priorities and capability building for industry manpower).
- (b) Clear, stable and predictable investment and regulatory policies shall be instituted to facilitate investments in mining, leading to a prosperous minerals industry.
- (c) Value adding as a measure of optimizing benefits from minerals shall be pursued through the development of downstream industries to achieve greater productivity and efficiency.
- (d) Small scale mining shall be promoted as a formal sector of the minerals industry and as part of the development initiative for both down stream and upstream industries.
- (e) Efficient technologies shall be adopted to ensure the judicious extraction and optimum utilization of non-renewable mineral resources to enhance sustainability.
- (f) Protection of the environment shall be paramount consideration in every stage of mining operation; mitigation and progressive rehabilitation measures shall be integral components of mining operations. Decommissioning and/or final mine rehabilitation shall be supported by the most appropriate environmental surety.
- (g) The ecological environmental sustainability of areas affected by mining operation (including biodiversity resources and small island ecosystem) shall be safeguarded in order to protect public welfare, safety and environmental quality. The rights of affected communities (including the rights of indigenous cultural communities, especially the free and prior informed consent requirement) shall be protected.
- (h) Mining operations shall be pursued within the framework of multiple land use and sustainable utilization of mineralized areas.
- (i) Remediation and rehabilitation of abandoned mines/sites shall be accorded top priority to address the negative impacts of past mining projects.
- (j) The economic and social benefits derived from mining shall be equitably shared by and among various units of government as well as the affected communities
- (k) Sustained information, education and communication campaigns shall be vigorously pursued, jointly with the industry stakeholders about the minerals industry for purposes of enhancing public awareness and respect for the rights of communities, reaching informed decisions on mining and related projects both at the national and local levels.