



THE BATAAN SUSTAINABLE DEVELOPMENT STRATEGY

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1. FOREWORD

What is the Bataan Sustainable Development Strategy?

The Bataan Sustainable Development Strategy (BSDS) embodies the VISION and MISSION of the people of Bataan to chart a course for the preservation of Bataan's rich natural endowments. It is an optimistic statement by and for the people of Bataan to whom the province's natural resources, particularly the coastal environment, provide a source of livelihood, transportation, recreation, a sense of beauty, culture, and history.

The sustainable development strategy is a document covering the environmental, economic, and social aspect of Bataan's natural endowments to which Bataeños ascribe different values and threats – real or perceived – that impair those values. It is not easy to turn this knowledge and concern into concrete actions. It would take combined efforts of the local government – from provincial level to municipal and barangay levels – and the various sectors comprising the civil society, to work hand in hand in realizing this vision and mission. This would involve the changing of people's behavior and attitude, which is not a small task. The BSDS takes on this challenge by tasking every level of society with the responsibility of managing our God-given natural resources from our forest, rivers, and overall coastal environment. Dependence on a common resource will make it possible for us, stakeholders, to start realizing a common vision towards a sustainable natural resources management.

As a whole, the BSDS constitutes broad statements of activities for long term (20 years) implementation of Bataan Integrated Coastal Management Program. This would serve as a comprehensive environmental management framework that would provide directions in achieving targeted outcomes and formulating a series of specific action plans and programs involving the participation of both government and non-government sectors. The key in achieving the shared vision is the development of partnership among the stakeholders and synergy of effort of many different players with different skills and perspectives. At the end of the day, any action program within the coastal strategy framework, whether taken by an individual, a community, or sector, represent a contribution to the fulfillment of the shared vision and mission for Bataan.

What is the basis of the Bataan Sustainable Development Strategy?

The last three decades have seen the birth of a new object of inquiry – the coastal zone. Environmental planners and scientists have identified this strip of land and sea as a spatial area, which requires special study and treatment. The focus on coastal zone and planning and management has been brought about by two parallel developments – first, the changing orientation of human activities and second, an increasing awareness of environmental issues. The coastal zone may be defined in three ways: (a) “ecologically,” as the land area influenced by the sea; (b) “politically” by some arbitrary distance inland from the high tide level; or (c) “socially” as the area occupied by people dependent on the sea for livelihood. For any means, except setting an arbitrary distance, the exact extent of the coastal zone defines rigorous definition due to the interconnectedness of ecosystem and human activities within this productive strip.

The coastal zone is also a place where coastal communities exist. These are groups of people engaged in various sectoral activities. In perspective, coastal communities have multiple sources of income and though they live at the edge of the “bountiful sea,” they are ironically poor, live in crowded places and mostly merchandized. However, they are resourceful when resources are degraded. They may lack monetary resources but they do find ways to survive. Co-existing with coastal communities are different sectors who are also engaged in other activities, which define the socio-economic composite realities within the coastal zone. These include economic and commercial, religious, and political sectors, among others. Diverse activities also create diverse perspectives on how to use and manage the resources within the coastal zone.

Understanding the complexity of the overall coastal system including people and their coastal environment is the basis in forming the vision for the Bataan Sustainable Development Strategy. This would also facilitate the work context with which all the stakeholders in Bataan's environment can be involved. It is time that we “probe beneath the surface” and root the various ills and possible solutions to sustainably manage, protect, and conserve the coastal environment.

Destruction of coastal resources has been increasing. Degradation of coral reefs, mangrove forest, estuaries, seagrass beds – these are caused by poverty-driven over-exploitation, destructive fishing methods, pollution, wanton conversion, erosion, and other impacts of an ecologically unsound development process. As it is, very few coral reefs near populated areas can be considered healthy. Many mangrove forests are gone, giving way to brackish water fisheries and reclamation. Many estuaries have become sewers. These ecosystems are fast losing their biological and structural diversity and, consequently, the abundance of life they should support. Further impacts from the land area come in the form of water pollution from cities, industries, and intensive farmlands. Human movements and activities further compound this, creating a form of crisis due to overexploitation and population. Much of these crises are due to lack of proper management schemes over the use of resources, which brings about the common property dilemma – WHO OWNS THE SEA?

Various viewpoints, contentions, and claims have been put forward which simply underscored the tremendous diversity of systems throughout the world in determining who “owns” or who has the “rights to” coastal resources. For example, harvesting of fish stocks is often subject to competitive scramble in an open access system. There are very few tenurial system (if any) that governments recognize outside of national policies. It is difficult to determine informal rules for resource use. Uncertainty of access rights or tenure of coastal resources has often left the poor fishing communities with very limited choices except to take what they can, without even an assurance that young fishes left to grow will return benefits to those who practice conservation. There is simply very limited or no incentives for conservation of resources. However, it has been repeatedly demonstrated that when people have incentives and reasons to expect that investment in resource management, protection and conservation will bring future benefits, they do protect the environment.

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Now, although the coastal zone is currently seen as being seriously impacted, its potentials may be continuously tapped to support the well-being of the local people and other stakeholders. This productive area can and will continue to support many local communities, but control and management are essential. This is where efforts towards an integrated coastal

management (ICM) come in, including the formulation of an achievable and implementable coastal strategy. In this process, the following are necessary elements:

Partnerships. The Bataan Sustainable Development Strategy has been developed by major stakeholder groups from the public and private sectors, local governments, provincial and regional government agencies, civil society groups (NGO's, PO's, CBO's and religious groups), fisherfolks and farmers from Bataan. As such, these sectors would be working as partners in executing the coastal strategy.

Sustainability. Basically, the coastal strategy aims to strengthen the capacity and capability of the stakeholders to understand and overcome barriers to create “win-win” solutions and situations in achieving the shared vision in addition to balancing the values among resource users and beneficiaries. This will trigger well-founded commitment and consensus among stakeholders aside from participating actively in implementing action programs.

Synergy. As stated earlier, the diversity of perspective among stakeholders in Bataan was taken into context and was used as a source of strength and dynamism which would be crucial in executing the Bataan Sustainable Development Strategy. Combining sectoral inputs to promote province-wide and region-wide interests, enhance effective planning, development, and implementation can do this. The net result is a synergetic effect in realizing the shared vision and mission.

National and local policies. In line with other plans and programs, the Bataan Sustainable Development Strategy builds upon the directions defined by national and local policies. This is not designed to create new programs but rather consolidates sectoral programs and initiatives while providing a forum for inter-agency and multi-disciplinary information sharing and decision-making.

International Conventions and Agreements. International conventions and agreements provide guidance and actions within the framework of strategies.

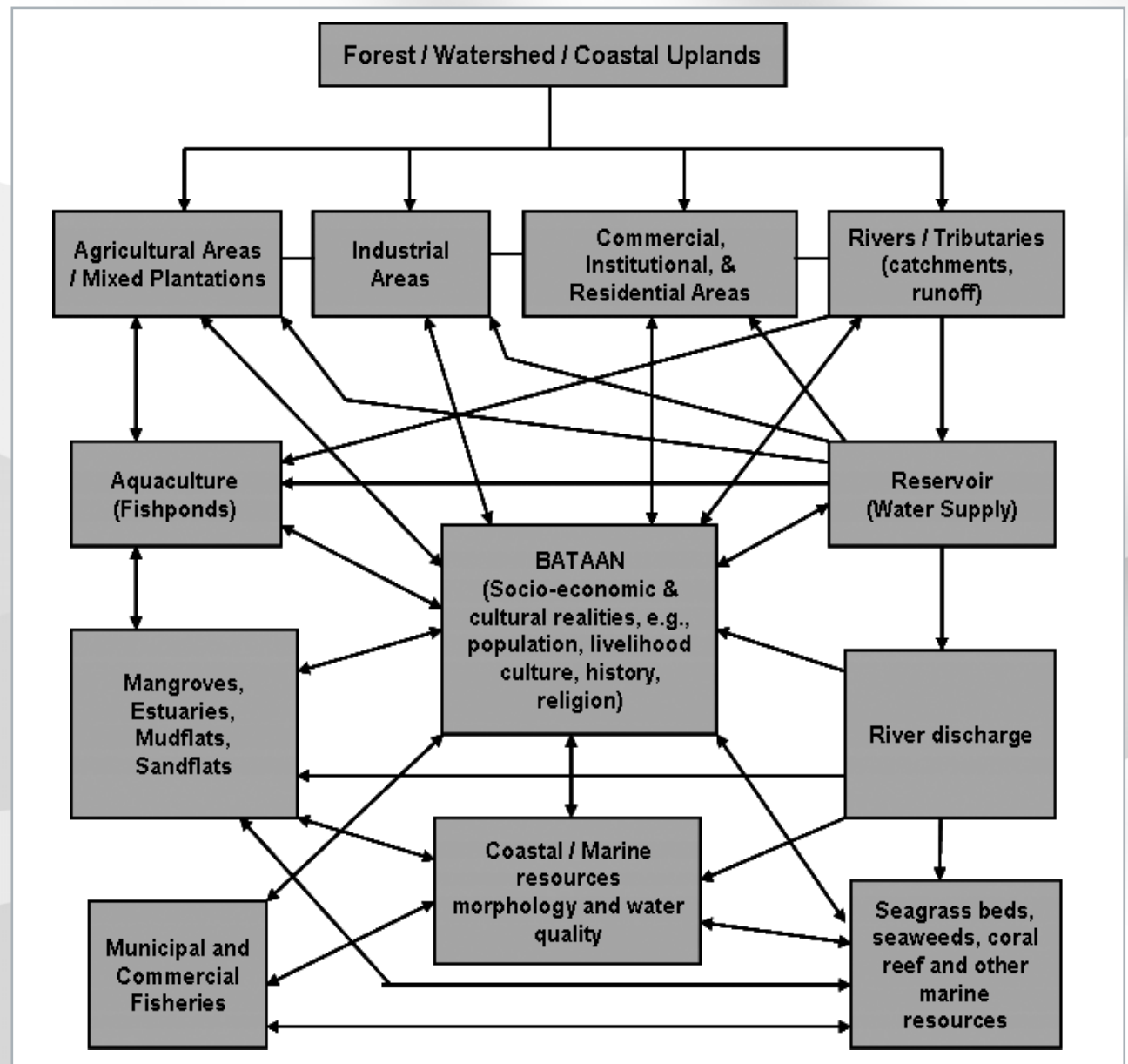


Figure 1. The Bataan Land and Coastal / Marine Ecosystem Interaction Network.

Why is the Bataan Sustainable Development Strategy different?

There are many programs and projects covering the management of our environmental resources, both social and natural. However, most of these are largely sectoral, some are duplicatory and some are just for gaining popularity mileage. This created a tendency for stakeholders to compete with each other in realizing a common goal. The BSDS provides a framework by which stakeholders can focus on specific action plans without stepping on each other's toes, but rather creating a synergistic effort in fulfilling a common goal. As such, the strategy differs from previous environmental management initiatives because:

- ³ It provides key roles for all sectors within a single management framework, including the central and local government agencies, the private or business sector, civil society groups, the academe or educational institutions and local communities, along with the UN and donor agencies as well as multilateral financial institutions;
- ³ It links economic planning and development programs to environmental and resource management goals;
- ³ It combines social issues such as poverty alleviation, food security, public health, gender mainstreaming, youth education and the welfare of marginalized groups of society with that of sustainable management and development of our natural resources;
- ³ It encompasses both land- and sea-based human activities which impact on the coastal and marine environment; and
- ³ It shifts financial model from government-supported environmental facilities and services to self-sustaining investment opportunities for the public and private sectors.

Scope of the Bataan Sustainable Development Strategy

The strategy covers the following spatial areas: a) the land and water on the seaward side of coastal watersheds, including the upland watershed boundaries of all 12 towns of Bataan; and b) the sea and seabed area within the maximum 15 km municipal waters limit as defined by Republic Act 8550 (The Philippine Fisheries Code of 1998). This is also the spatial area covered by the Bataan Integrated Coastal Management Program (BICMP).

Within this boundary, the scope of BSDS would include any activity or processes, which have an impact on the coastal marine environment both at the present and in the future. These include activities in the coastal uplands/watershed/forest areas, going down the catchment areas through the rivers and tributaries; then further down to the coastal areas where agricultural, aquaculture, industrial, commercial, institutional and residential areas are concentrated; then to the coastal marine environment from mangrove and mudflat areas, municipal and commercial fishing areas, sea grass beds and seaweeds, coral reef and other marine areas.

Figure 1 represents the schematic interaction of Bataan's land and coastal/marine environment linkage network. The network shows the various activity centers, which has an impact on the Bataan coastal and upland environments. Based on this, two broad impact categories can be identified. These are:

- ³ **CATCHMENT IMPACTS** – these are impacts of land-based activities as well as other resource use and management practices which affect the integrity of terrestrial ecosystems such as forest, watershed and its tributaries (rivers and waterways), arable and disposable lands, among others. Mostly, these activities affect the quality of water that enters our seas (Manila Bay and South China Sea) and cause sedimentation of estuaries. Most of these activities also generate garbage which litter our coastlines.
- ³ **NEARSHORE, FORESHORE AND OFFSHORE IMPACTS** – these include the effects of establishments and activities in land and sea such as garbage and sewage from residential and commercial areas, industrial waste, chemical and oil spill, waste and used oil from ships and boats, among others, which cause pollution of the marine and coastal environment.

The Bataan Sustainable Development Strategy is taking a broad view of the coastal and marine environment. This interaction network presents a simple schematic linkage of various activity centers to give stakeholders an idea of the different values of the Bataan coastal environment and their relationships. Furthermore, it shows the extent or area of concern covered by the Bataan Sustainable Development Strategy.

Shown in Map 1 is the operation area of the Bataan Integrated Coastal Management Program (BICMP). The program covers the whole Bataan Peninsula and its coastal waters.

There is no definite timeline identified in the sustainable development strategy. The adoption of work programs and time schedule to meet the desired outcomes will be included in the next stage of the BICMP, i.e., development of the Strategic and Implementation Plan for the Bataan Sustainable Development Strategy, and issue-specific/area-specific action plans. The stakeholders will determine how fast the shared Vision and Mission will be achieved by committing to the strategy and implementing action programs for which they will have ownership. This may take 20-25 years or more, and will require political will and steadfast devotion among stakeholders even if changes occur. The key indicator of progress will be the people's enjoyment and renewed interest in the marine and coastal environment of Bataan and this will not change overnight. It will take a gradual yet measurable change over time before we can see the outcome of the Sustainable Development Strategy.

Formulation of the Bataan Sustainable Development Strategy

The consultation initially covered the nine Bataan municipalities along the Manila Bay coastline — Hermosa, Orani, Samal, Abucay, Balanga, Pilar, Orion, Limay, and Mariveles — last August 1 to September 1, 2000. Results of these consultation workshops were then integrated with the larger Manila Bay Coastal Strategy. A provincial level integration workshop was later held in October 18, 2000. After synchronizing the BSDS with the baywide coastal strategy, three more municipal level consultation workshops were held in the three remaining Bataan municipalities — Dinalupihan, Bagac, and Morong — to make the BSDS whole and more appropriate to the Bataan situation covering both the Manila Bay and South China Sea coastline and the lone inland municipality (Dinalupihan). The process of formulating the Bataan Sustainable Development Strategy is shown in figure 2:

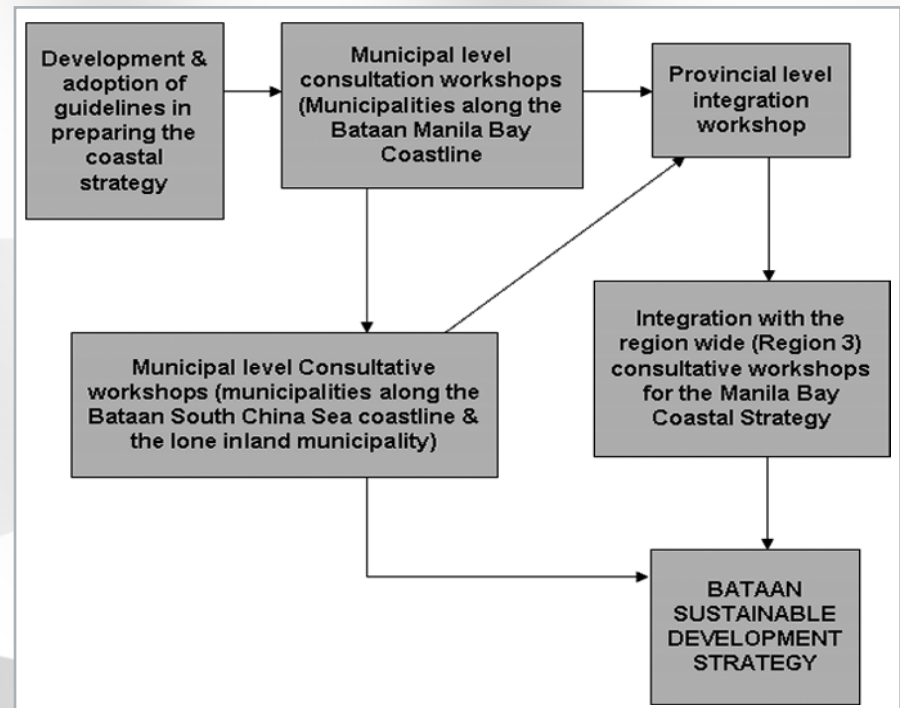


Figure 2. Schematic presentation of the consultation process for the Bataan Sustainable Development Strategy.





2. OVERVIEW

GEOGRAPHY

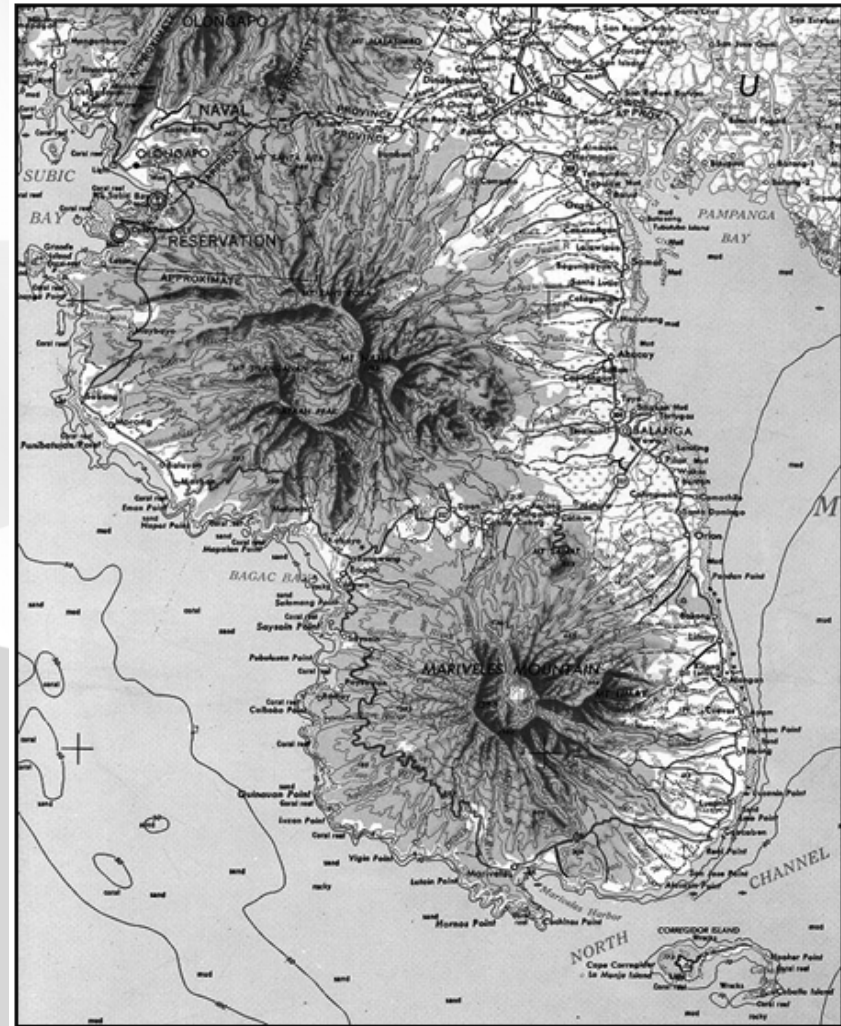
Location

Bataan lies in the southwestern part of the Central Luzon Region. It is a strategic peninsular province bounded in the west by the South China Sea and in the east by the Manila Bay — the gateway to the Philippines' political, social and economic center. It is bounded inland by the province of Zambales in the north and by the provinces of Pampanga and Bulacan in the northeast. Its capital is Balanga City, about 124 kilometers from Metro Manila and 31.30 nautical miles from Manila across the Manila Bay.

The province is composed of 12 municipalities covering a land area of 137,296 hectares (1,373 sq km). Eleven of these towns are coastal areas. Nine municipalities are located along the Bataan-Manila Bay coastline, namely: Hermosa, Orani, Samal, Abucay, Balanga, Pilar, Orion, Limay, and Mariveles in the southern tip where waters from the Manila Bay and the South China Sea meet. Two municipalities, Morong and Bagac lie in the Bataan-South China Sea coastline. Dinalupihan is the lone landlocked municipality, which is the entry point to Bataan coming from Pampanga and Zambales. The province's coastline is approximately 177 kilometers from Hermosa looping up to Morong, excluding the Subic Bay Metropolitan Area.

Physical Setting

Bataan is divided by two mountain groups of volcanic origins. The northern side is composed of Mt. Natib, Mt. Sta. Rosa, and Mt. Silangan. The southern group is composed of Mt. Mariveles, Mt. Cuyapo, and Mt. Samat. The topography of the province is classified as generally hilly and mountainous with a narrow plain on the eastern side (see **Map 2**. Bataan Topographic Map). In the entire land area of the province, only the limited plain on the eastern part offer soil areas for planting food crops. As such, most of Bataan's agricultural production areas are concentrated in this area. Although Bataan is generally classified as rugged terrain, 98% of its surface area actually lies on less than 30% percent slope and more than 60% have slopes ranging from 0-18%. The highest elevation is in the Mariveles mountains at 1,388 meters above sea level (masl).



Map 2. Bataan Topographic Map
(Source: NAMRIA 1:250:000 Map).

Bataan has abundant water resources in the form of rivers, streams, creeks, waterfalls, and springs. There are more than 100 rivers in the province radiating from the two aforementioned mountain groups. These are important not only for irrigation but also for navigation and fishing as well. Talisay and Almacen Rivers are the two major rivers in Bataan. Talisay has its headwaters in the Mariveles mountain group extending up to Pilar and Balanga into the Manila Bay. Almacen River has its headwaters in the Natib mountains extending down to Hermosa and exits through the Orani Channel to the Manila Bay. The status of most watersheds in Bataan is shown below.

Status of watershed areas.

| Drainage Way | Area (has) | Total Eroded Area (has) |
|----------------|---------------|-------------------------|
| Abo-abo River | 31,704 | 8,061 |
| Batalan River | 19,408 | 5,833 |
| Lamao River | 13,385 | 7,759 |
| Saysayin River | 11,999 | 6,835 |
| Agloloma River | 10,718 | 5,217 |
| Mamala River | 9,665 | 4,349 |
| TOTAL | 97,179 | 38,054 |

Source: PENRO-DENR

Table 1. Land Area, Electoral Districts, and Number of Barangays

| First District | | | Second District | | |
|----------------|-----------------|------------------|-----------------|------------------|------------------|
| MUNICIPALITY | LAND AREA (has) | NO. OF BARANGAYS | MUNICIPALITY | LAND AREA (has.) | NO. OF BARANGAYS |
| Dinalupihan | 9,252 | 46 | Balanga City | 11,163 | 25 |
| Hermosa | 15,700 | 23 | Pilar | 3,760 | 19 |
| Orani | 6,490 | 29 | Orion | 6,541 | 23 |
| Samal | 5,630 | 14 | Limay | 10,360 | 12 |
| Abucay | 7,970 | 9 | Mariveles | 15,390 | 18 |
| Morong | 21,920 | 5 | Bagac | 23,120 | 14 |
| TOTAL | 66,962 | 126 | TOTAL | 70,334 | 111 |

Total Land Area

Bataan has a total land area of 1,373 square kilometers or 137,296 hectares. This land area constitutes 0.5 % of the total land area of the Philippines. Compared to other provinces of Central Luzon, Bataan has the smallest land area and represents 7.63% of the whole land area of Central Luzon.

Among the twelve (12) municipalities in Bataan, Bagac has the largest land area of 23,120 has., while Pilar is the smallest with an area of 3,760 has (see table 1).

Climate

Bataan has distinct dry and wet seasons categorized as Type I in the Coronas system. The dry season begins in November and ends in April while the rainy season starts in May and ends in October. The most rains come in June to August. Mean average rainfall in August is heaviest at 633 mm. Bataan is often visited by typhoons. Farming systems in the province follow these climatic cycles. Most crops, including fruit trees and other perennials, are planted during the rainy season so that the young plants receive as much rain water before the dry months.

History

Several villages in the coastal plains of Bataan were already thriving communities when Spanish missionaries found them in the 1570s. Bataan, then known as Vatan, was part of the vast Capampangan Empire that included the provinces of Pampanga, Nueva Ecija, and Tarlac and some portions of Bulacan, Zambales, and Pangasinan. Natives who were predominantly fishermen, farmers, and craftsmen inhabited these coastal villages. Meanwhile, Aeta tribes occupied most of the hillsides. Governor General Pedro Manuel Arandia established the province of Bataan in 1754. This was composed of San Juan de Dinalupihan, Llana Hermosa, Rani, Samal, Abucay, Balanga, Pilar, Orion, Mariveles, Bagac, and Morong. The first eight towns previously belonged to the Spanish provinces of Pampanga, while the last three, along with Maragondon in Cavite, were part of the Corregimiento de Mariveles. Limay, the twelfth town was established only in 1917 (*Bataan SEP*, 1999).

When the Pacific War broke out in 1941, the selection of the Peninsula as the Filipinos' last defensive stand against invading Japanese brought fame and infamy to Bataan. When the United States entered World War II, Bataan Peninsula was the scene of bitter fighting between the combined forces of Filipinos and Americans against the Japanese Imperial Army. On April 9, 1942, Bataan defenders surrendered, but a small force remained on Corregidor Island and continued fighting until May 6, 1942. About 37,000 Filipino and American soldiers were captured in Bataan and forced into the infamous 70-mile "Death March" from Mariveles to a concentration camp in Capas, Tarlac. US Forces in February 1945 retook Bataan from the Japanese. Today, the battlefields of Bataan and Corregidor are considered as national shrines (*Bataan SEP*, 1999).

The rehabilitation of Bataan proceeded slowly after the war. Disastrous floods wrought havoc in the province in 1960 and 1972 and caused big economic dislocation. Bataan was also not spared from the problem of insurgency, which added to its concerns. However, the economic growth of Bataan persisted through an excruciating pace (*Bataan SEP*, 1999). Today, Bataan is at the midst of accelerated development and before her lies a future full of promise and challenges both to her leaders and populace.

COASTAL CHARACTER

Muddy tidal flats along with alluvial sandbars characterize the coastline along the Manila Bay. Mangrove areas can be observed from Orani to Orion, along with seaweed areas and seagrass patches areas from portions of Balanga and Pilar down to Mariveles. The deeper portions are the coastal areas of Orion to Mariveles. Poor coral reef patches, mixed with sandy-rocky bottom can be found in the Mariveles area, where the coastline begin to take on a rocky character looping from the mouth of Manila Bay to the western side of the province. The South China Coastline is interspersed with pristine beaches with rocky portions and fringes of coral reef in good condition from Bagac to Morong, which is a haven for marine turtles and other marine animals.

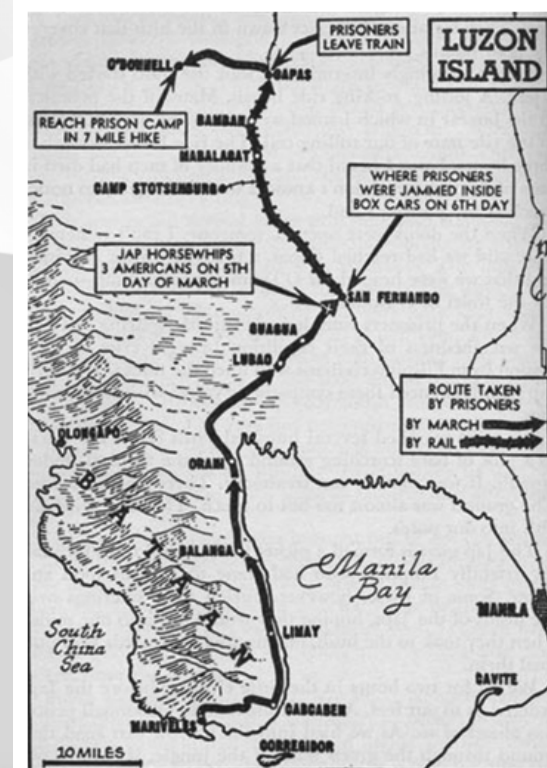


Table 2: Coastal Character of Bataan

| Coastal Character | Location | Description |
|--|---|---|
| 1. Brushland/Industrial | Southern Bataan(Mariveles & vicinities) | <ul style="list-style-type: none"> ■ coral reefs, seagrass, and seaweeds ■ special economic zone |
| 2. Urban/Fisheries and Aquaculture Agricultural | Bataan(from Limay & northwards) | <ul style="list-style-type: none"> ■ urban centers ■ natural spawning area ■ mangroves and mudflats ■ large agricultural areas inland ■ large tracts of fishponds and mussel culture farms |
| 3. Fisheries/Agricultural/ Coastal Tourism | Western Bataan(Bagac and Morong) | <ul style="list-style-type: none"> ■ pristine beaches ■ coral reefs, seagrass, and seaweeds ■ marine turtle nesting sites ■ breeding grounds of giant clams ■ mountainous terrain |





3. THE PEOPLE OF BATAAN

Bataan province received the 1999 “Gawad Sa Makataong Pag-unlad” achievement award for attaining the highest level in human development index since 1994. The award was given to Bataan in recognition of the province registering the highest levels in life expectancy and basic education based on the increase in gross school enrolment and per capita income in the past 5 years. The province ranked number one among the ten outstanding provinces – Cavite, Batanes, Bulacan, Rizal, Batangas, Laguna, Pampanga, Ilocos Norte, and Benguet. The Human Development Network (HDN) in cooperation with the United Nations Development Programme (UNDP) and National Economic Development Authority (NEDA) gave the award. The HDN is a group of the foremost names in development practice, research and advocacy.

Demography

Bataan’s population annually increases at the rate of 2.74%. This rate was recorded as the highest in Region III and even higher than the national average of 2.2%. The rapid growth in population could be attributed to migration factor. Opportunities for employment and livelihood brought about by the economic development in the province entice people to settle in Bataan. As of 2005, the projected population was computed at 638,700. The municipalities of Mariveles (with 96,800) and Dinalupihan (with 89,900) have the highest recorded population followed by Balanga City (with 83,900), which is the seat of the Provincial Government. The least populated towns are Morong (with 24,300) and Bagac (with 24,000).

Population tends to grow rapidly in the municipalities of Hermosa, Dinalupihan, and City of Balanga with annual growth rates of 3.86, 3.40, and 3.37 percent, respectively. Least growth rates are associated in the towns of Bagac (1.44%), Orani (1.63%), and Abucay (1.79%). Densely populated areas are Orani, Pilar, and Dinalupihan with population density of 9 persons/hectare for each municipality.

The province also has 87 coastal barangays distributed in the ten coastal municipalities and one coastal city. The population in coastal barangays is approximately 220,032 or 34.45% of the projected population

of the province for CY 2005. Coastal settlers, mostly fishermen, dwell near the seacoast and majority of them are migrants from other provinces.

Family Income and Expenditures

Based on the 2000 report, total number of families is Php 110,190. The average annual income of these families was Php 183,976 while their average annual expenditure was Php 155,002. This indicates a low incidence of poverty in the province.

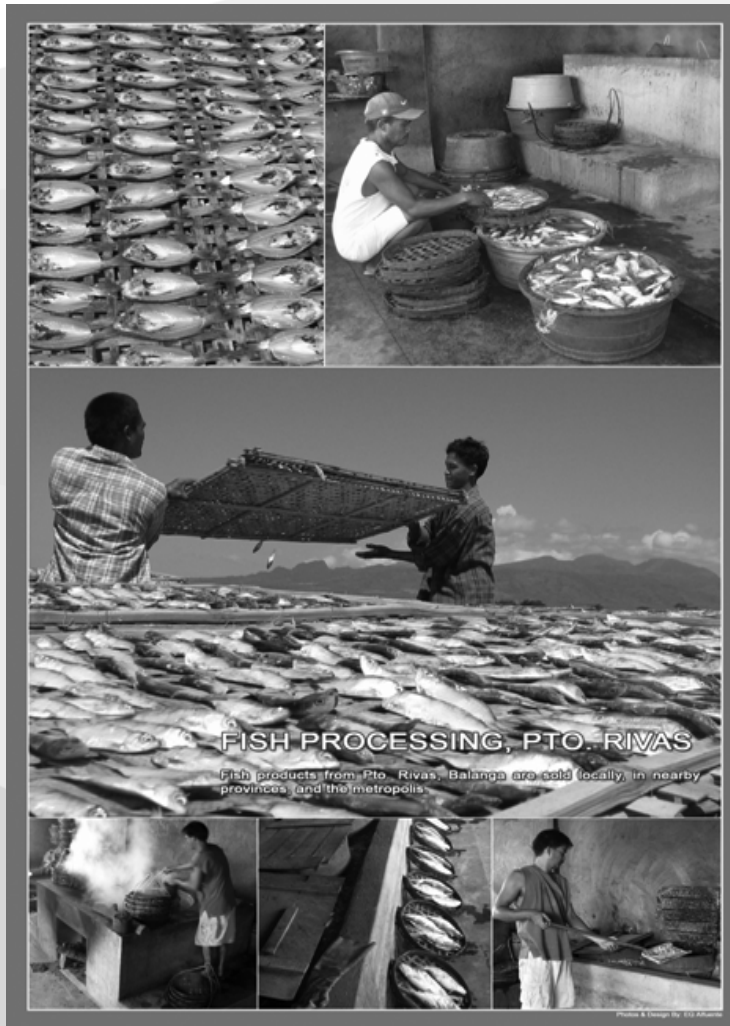
Labor and Employment

In 2003, labor force participation was 65.3% of the total 374,000 population of 15 years old and above. Employment rate was computed at 83.9% while unemployment rate is high at 16.1%. Employment is mainly related to the presence of industrial and economic zones including business opportunities and resources in the province.

In terms of different employment categories, the service sector has the biggest share of employed persons with 55.88%. Around 25.49% is with the industry sector and 18.63% is with the agriculture, forestry and fisheries sectors.

Education

As of SY 2004-2005, literacy rate in the elementary level is 91.52% and 97.44% in the secondary level. Access to educational opportunities is being provided by 183 elementary schools, 48 secondary schools, and 20 tertiary schools, owned and operated by the government and private persons/groups. Technical vocational schools also operate in the province offering trade courses, Computer Education, Health Care, Hotel and Restaurant Management, and other short-term courses. Non-formal education for out-of- school youth and adults is also conducted in various district schools in the province.



Fish processing industry in Balanga City.

Ethno-Linguistic Groups and Indigenous Communities

Based on the 2000 Census on Language and Dialect, there are 419,041 or 96.16% Bataeños who speak Tagalog. About 31,508 (2.04%) speak Kapampangan (or Pampango), 11,923 (0.61%) speak Ilocano and the rest speak Waray, Cebuano, Bikolano, and other Philippine dialects.

Aetas and Negritos are two indigenous cultural groups living in the upland areas of Bataan. In 1991, they numbered around 18,423. After Mt. Pinatubo erupted in 1991, Aetas from the nearby province of Zambales migrated to Bataan. Most of them stayed in Dinalupihan, some in Morong, and a few in Bagac. These groups are known for their dependency on the environment for their subsistence. They used to practice slash-and-burn farming, thus, contributing to upland degradation. At present, they are learning sustainable agricultural practices.

Religion

About 85% of Bataeños are Roman Catholics, followed by Iglesia ni Cristo (4.21%) and Aglipayans (2.40%). Other religious groups (8.39 %) in the province are the United Methodists, Baptists, Born Again Christians, and other religious organizations.



An Aeta father hunts for food in the rich river inside the Bataan Natural Park.





4. THE VALUE AND IMPORTANCE OF BATAAN

During the municipal consultation workshops, the stakeholders identified the different aspects of Bataan to which certain values are ascribed. These include the: (a) Natural values which cover natural resources and habitats; (b) cultural, tourism and recreational values; and (c) settlement and development values.

A. NATURAL VALUES

Protected Areas

The Bataan Natural Park. The Bataan Natural Park (BNP) has a total area of 18,335 hectares. It covers portions of Hermosa, Morong, Orani, Samal, Abucay, and small areas of Balanga and Bagac.

The *Bataan Natural Park* has a dendritic radial drainage system that is covered by six major watersheds - Morong River Watershed; Almacen Watershed; Talisay Watershed; Bagac Watershed; Sutuin Watershed; and Bayandati Watershed. The watersheds of BNP are the main sources of ground and surface water that supply the domestic, industrial, and agricultural needs of communities around the Protected Area. Lowland agricultural lands found along the eastern (Manila Bay's side) and western coasts (South China Sea's side) of Bataan draw its irrigation water from the surface water that originates from BNP. Similarly, the communities of Bataan source water from springs, rivers, and wells for domestic supply. The fresh surface and subsurface water that flow down from the elevated areas of BNP also contribute significantly to the preservation of brackish water environment found along the coastal margins of Bataan, which is vital to the survival of aquaculture, Bataan's most important industries.

Of the BNP's total area, at least 5,623 hectares or 30.67% are grasslands and agricultural areas. Grasslands cover much of the deforested areas not under agricultural production consisting largely of grassy patches and residual forests. The lowland forest occupies 10,990 hectares or 59.94% of the protected area. Much of the lowland forest is partially logged. Dipterocarp species are common in this habitat type. The canopy range of the largest trees is from 20 m to 25 m with occasional

trees reaching up to 30 m. The average diameter range from 50 cm- 100 cm. Vines, including rattans, climbing bamboos, and climbing ferns, are also abundant including tree saplings, arborescent palms, and herbaceous vegetation. There are also species of gymnosperms and angiosperms. A 1998 BNP survey recorded 211 species of wildlife.

Towards the northwestern side of BNP, there is a patch of forest that is characteristically dry and water-stressed during dry season. Deciduous trees occur along the evergreen species. Montane forests occur on several peaks over 1,000 masl within BNP. Climbing bamboos remain abundant in many areas. Mossy forest is confined along the peripheries of Mt. Natib's Peak at 1,100 masl up to near the peak's summit. In this forest, the vegetation is dominated by dwarf stands of trees. Climbing pandans and rattans are common.

The BNP's coasts are characterized by an irregular series of alternating peninsulas, small embayments, and sandy beaches. A marine study recorded at least 74 species of benthic algae, 3 genera of sea grasses, 123 species of phytoplankton, 254 species of benthic invertebrates, and 155 species of fishes.

There are several sitios located within or partly occupied by BNP, having a total population of 3,514 or 1,701 households. Approximately 90% of the said population are migrants from Southern Luzon, the Bicol Region, and the Visayas. The remaining 10% is composed of Aetas and Negritos (Nordeco/DENR, 1998).



The Roosevelt Protected Landscape.

Based on Proclamation No. 273 dated April 2000, the Roosevelt National Park (RNP) was declared to be under the National Integrated Protected Area System (NIPAS) and to be known as the Roosevelt Protected Landscape (RPL). It is within the territorial jurisdiction of the municipalities of Dinalupihan and Hermosa, having a total land area of 786.4 hectares. The national road going to Olongapo City traverses the area.

Grassland comprises 87% of the area dominated by cogon and *talahib* while the remaining 13% are remnants of old growth forest and teak/mahogany plantation. At present, RPL is an important refuge for game animals and rare endangered species, such as python, monitor lizard, cloud rat, quail, kingfisher, flycatcher and fruit bats. Furthermore, this area has been the favorite place of local townfolk for weekend picnics, camping, and excursions.

Forests, Watershed, and Coastal Uplands

There are three big watershed groups in Bataan, namely: (a) Subic watershed from Morong including half of Bagac, (b) the Mt. Natib watershed from Dinalupihan down to Balanga, and (c) the Mariveles watershed from Mariveles to Limay, Orion, Pilar and the other half of Bagac (Bataan Profile, 2000). Smaller watershed areas constitute these three watershed groups. The province is drained by more than 100 rivers and small tributaries radiating from these watershed areas and serves various purposes, such as irrigation, navigation, and water reservoir. The province's water supply comes from these freshwater sources and an extensive water reserve, extracted by numerous deep wells and free flow areas in all municipalities.

The coastal upland of Bataan is composed of rocky hills, brush lands, grasslands, and plantation forests planted to various fast growing forest species, such as giant ipil-ipil and gmelina. These can be found mostly in the sloping areas of Mariveles and nearby towns. These areas are also planted with mix orchards, such as cashew and mango plantations, among others. Coastal uplands gently slope down to the coastal plains where most agricultural areas are located.



The Mariveles watershed that supplies water for the whole municipality.

Coastal and Marine Ecosystems

Bataan has an extensive estuarine area where the tides flow in and meet the freshwater from the river system. The towns of Hermosa and Orani are the best examples of estuarine areas in Bataan as the waters of the Manila Bay enter through the Orani Channel up to the Almacen and Orani rivers.

Mangroves in Bataan can be found in patches from Orani to Orion and certain parts of Limay and Morong. There are 135.30 hectares of mangroves in the province and the healthiest stands can be found in Samal and Balanga. The mudflat areas can be found from Orani to parts of Orion, with Samal having the most extensive mudflats where muscles, oysters, mud crabs and other shellfishes abound. The mangroves and mudflats are also breeding and feeding grounds of waterfowl and migratory birds.

Thick mangrove areas can be found along the shorelines of Abucay, Balanga City, Pilar, and Orion.



*Table 3: Mangrove Area Per Municipality
Mangrove Area Per Municipality
(As of July 2005, Mun. Agriculturist Office)*

| MUNICIPALITY | AREA (HAS) |
|--------------|------------------|
| Abucay | 20 has. |
| Balanga | 33 has. |
| Limay | 2 has. |
| Orani | 30 has. |
| Samal | 36 has. |
| Pilar | 1.9 has. |
| Orion | 12.4 has. |
| TOTAL | 135.3 has |



Migratory birds can be found in the mangrove areas of Bgy. Puerto Rivas and Tortugas in Balanga City.

Bataan boasts of pristine and rocky beaches with coral reefs, seaweeds, and seagrass beds. Coral reefs are found in coastal areas of Mariveles near the mouth of Manila Bay North Channel looping to Bagac, Morong and the Subic Bay Metropolitan Authority along the Bataan-South China Sea coastline.

The coastal waters of Bagac and Morong abound with numerous fish species, coral reefs, seagrass and seaweed beds, and breeding areas of marine turtles, (olive ridleys and green turtles commonly known as the *pawikans*). A turtle sanctuary was established in Brgy. Nagbalayong in Morong. This is co-managed by a non-government organization, with the support from the DENR-Protected Areas and Wildlife Bureau (DENR-PAWB). Seaweeds also abound in the coastal areas of Balanga City to Orion, while seagrass patches can be found in Orion, Limay and Mariveles. The windowpane oyster, locally known as *capiz*, used to be abundant in Manila Bay, but still can be found along the coast of Samal. There are also giant clams in Morong.



Baby turtles (olive ridleys) may be found nesting along the shores of Bagac and Morong.



B. SOCIO-CULTURAL, TOURISM, AND RECREATIONAL VALUES

Every town in Bataan has a feast day, historical landmark, and religious links to a glorious past.

Cultural and Historical Sites

Among the most notable historical landmarks is the *Dambana ng Kagitingan* in Mt. Samat, Pilar which was completed in 1970, consisting of colonnade and a huge memorial cross at the mountain's summit. Annually, Bataan Day or *Araw ng Kagitingan* is celebrated nationwide every 9th of April. Veterans from World War II and their families come and gather at the Shrine of Valor to commemorate the bravery of Filipino soldiers who offered their lives to regain freedom from the Japanese and peace. There are two 0-km Death March markers (one in Mariveles and the other in Bagac), which indicate the points where the Death March started. Every kilometer along the Roman Highway and MacArthur Highway, from Bataan to Capaz, Tarlac are Death March Markers to show the extent of the march wherein thousands of soldiers died.



Religious Establishments

Century-old churches that bespeak of a colonial past, where Christianity made a lasting impression to most Bataeños, characterize Bataan's religious values. The most notable of these old churches is the 414-year old Sto. Domingo Parish Church at Abucay, one of the few churches in the country that has withstood nature and man's propensity for change. The church is also the site of the first printing press in the country established by Tomas Pinpin at around 1610. Another cultural and religious icon is the Nuestra Señora Virgen del Rosario in Orani, which is said to be miraculous as typified by devotees who pay tribute to her especially on her feast day, celebrated every second Sunday of October. Each municipality in Bataan has its own feast day in honor of a patron saint. *Cenaculo* or plays about the life and passion of Christ are held in most municipalities during the Holy Week.



The 418-year old church in Abucay, Bataan.

Tourism and Recreation

Bataan has a high potential for investments in tourism and recreation. Tourism and recreation sites include: (1) the Dinalupihan Nature Center within the Roosevelt Protected Landscape, ideal for picnics, camping, swimming, hiking, trekking, and other recreational activities; (2) Mt. Malasimbo, a conical-shape mountain in Dinalupihan; and (3) Mt. Natib, which is a favorite destination of mountain climbers and nature trekkers. Other notable sites are Dunsulan Falls at the backhills of Mt. Samat in Pilar; the Sibul Spring and Pasukulan Falls in Abucay; the Balon Anito hot springs and Mt. Tarak Ridge in Mariveles; Pilis Falls in Samal; and Mt. Silangan in Morong, which boasts of Pintong Alipi, an 80-foot high waterfall cascading to a pool of refreshing cool water. This is again a site inside the Bataan Natural Park fit for eco-tourism.

Pristine beach resorts are found in Bataan, such as the Montemar Beach Resort in Bagac, the Waterfront Beach Resort in Morong and the Bay Spring Resort in Mariveles. These beach resorts offer complete amenities for weekend relaxation. Numerous inland resorts from Hermosa to Mariveles complement these leisure areas.



Adventure trekking in one of the cool streams inside the Bataan Natural Park.

The white sand beach of Montemar Resort in Bagac, Bataan.

C. SETTLEMENT AND DEVELOPMENT FEATURES

Agriculture and Fisheries

Agricultural and fishery productions are major sources of income for the people of Bataan. Productions range from palay, vegetables, fruits, fish, shellfish and other marine species. The municipalities of Dinalupihan, Hermosa, Orani, Samal, Abucay, and Pilar are targeted to become the main contributors for agro-industrial production. The rest of the municipalities also contribute significantly to the agricultural productivity of Bataan.

The entire agricultural land of the province is devoted to ricelands, croplands, and fishponds. Total effective area for palay production is 14, 514 hectares as of CY 2004.

Aquaculture production is common in the province where brackishwater and freshwater fishponds having total area of 4,288.65 hectares produce

good quality tilapia and milkfish, tiger prawns and mudcrabs. From the coastal areas, bivalves such as mussel, oyster, halaan, kabia, and capiz (which thrive only in Samal) are bountiful.

The coastal waters of Bagac and Morong are noted as milkfish fry ground areas. Spearheading the drive for sustainable fishery production in the province, a square kilometer fish sanctuary was established in Orion in 1999. Among the different species caught in Bataan fishing grounds are: acetes (alamang), anchovies, mullet, white shrimps, whiting (asohos), thread fin bream bisugo, blue crab sardines, mackerel, bivalves or shellfish, big eyed and yellow fin tuna, slip mouth (sapsap), squid and siganids (samara and kitang).

Table 4: Agricultural and Fisheries Profile

Source: *Socio-Economic Profile, 2004, PPDO*

| Agriculture | Production |
|----------------------|----------------------------------|
| Palay | 114,139 metric tons (2004) |
| Corn | 1,202 metric tons (2004) |
| Aquaculture | |
| Milkfish and tilapia | 2,725 metric tons (June 2005) |
| Fishery | |
| Municipal fishing | 4,124.15 metric tons (June 2005) |
| Commercial fishing | 2,366.49 metric tons (June 2005) |



Fishing is one of the leading sources of income of Bataños.



Forestry

Forestland in the province covers 65,430 hectares or 48% of the total land area. This is classified as timberland, forest reservation, watershed, national shrine/national parks, military/naval reservation, and civil reservation. Forest area is characterized as mixed forest composed of patches of old growth and mostly residual forest of dipterocarps (red and white Lauan, Apitong, etc.) and other prime species of Narra, Mahogany, Molave, Teak, Akle, giant Ipil-Ipil, Eucalyptus, Yemane/ Gmelina, A Margius, A. auriculiformis, etc. Minor forest products include bamboo, bulio, rattan, hingiw, and other vines suitable for basket making and small cottage industry. Fruit trees are also abundant such as mango, cashew, coconut, avocado, star apple, coconut, banana, coffee, and others.

The forest land also serve as refuge for wildlife such as wild boars, wild chickens, wild ducks, snakes, birds, etc. Patches of open land is dominated by cogon and talahib and serve as grazing land for cattle, goat, and carabao.

Lowlands and plains are devoted to agriculture. Major crop is palay wherein production was recorded at 114,139 MT as of 2004. Other crops are corn, with a total production of 1,202 MT; legumes like mungo, peanuts, cowpea, pole, and bush sitao; rootcrops such as sweet potato, cassava, arrowroots, and others. Fruits such as mango, banana, cashew, and vegetables like eggplant, tomato, squash, bitter melon, and leafy vegetables are also produced.

Mangrove forests serve as spawning grounds for fish and marine life. It also serves as refuge for migratory birds like white heron (Kanaway) found in Barangays Puerto Rivas, Sibacan and Tortugas, Balanga City. Mudflats, on the other hand, contain mussels, oysters, mud crabs, and other shellfishes.

Commercial, Industrial, Shipping, and Ports

The province has various commercial establishments in all its municipalities, with Balanga City as the center of trade and commerce. It also hosts industries such as the Petron Bataan Refinery (PBR) Petrochemical Industrial Complex, Total Petroleum Philippines, UniOil Philippines, Philippine National Oil Company-Petrochemical Development Corporation (PNOC-PDC), Philippine Resins Industries, Inc (PRII), Bataan 2020 Papermills, Ammunition Plant in DND Arsena, Orica Philippines, Inc., Herma Group of Companies, different locators at Bataan Economic Zone in Mariveles, Hermosa Economic Zone, and Bataan Techno Park in Morong, and other light to medium industries in other municipalities. These establishments are complemented by the existence of ports to facilitate the transport of raw materials, products, and people. There are ten private ports/discharging and loading points in the different parts of the province and three national ports under the jurisdiction of Philippine Ports Authority (PPA).

The Port of Orion (formerly Port Capinpin) in Barangay Putting Buhangin in the Municipality of Orion has a total area of 499,764.80 sq.m. more or less with an initial reclaimed area of three hectares. A 120-meter long rock breakwater protects the entire length of the port. The structure/facilities include the berthing areas for RORO vessels; multi-purpose wharf

and fast craft vessels. A temporary passenger terminal shed with a capacity of 100 passengers has been provided in addition to the elevated water steel tank and a temporary parking area. As a fast craft ferry terminal, Port of Orion caters to the daily average of 1,200 embarking and disembarking passengers. The 22-nautical mile distance can be covered in one hour from Bataan to Philippine International Convention Center complex.

The Port of Mariveles is categorized as a municipal port in Mariveles, Bataan. The terminal office is located within the 32-hectare Herma Industrial Complex (formerly BASECO) in Mariveles, Bataan. The berthing facility is a two-finger pier measuring 7.00 m x 12.00 m and 7.20 x 62.30 m. It lies 14 26.0' latitude on the East and Westside entrance of Manila Bay.



Table 5 : STORAGE FACILITIES (PRIVATE PORTS /TERMINALS IN BATAAN)

| LOCATION | TYPE | CAPACITY |
|---|-------------------------|---------------------|
| LIMAY Petron Bataan Refinery | Crude Oil Storage Tanks | 1,000,000 barrels |
| | LPG Storage Tanks | 100,000 barrels |
| PPI/ Limay Bulk | Warehouse | 53,000 metric tons |
| | Open Storage Area | 180,000 m |
| PNOC PDC | Warehouse | 3,000 m |
| | Open Stacking Area | 4,000 m |
| OILINK | Storage Tanks | 455,000 barrels |
| | Open Storage Area | 10,000 m |
| MARIVELES Total-Liquigaz | Storage Tanks | 180,000 barrels |
| | LPG Storage Vessels | 12,000 metric tons |
| SMC-BMT | Vertical Silos | 18,000 metric tons |
| | Star Bins | 2,500 metric tons |
| | Intermediate Bins | 320 metric tons |
| | Loading Bins | 120 metric tons |
| ATI-MGT | Vertical Silos | 110,000 metric tons |
| | Warehouse | 50,000 metric tons |

The Bataan Economic Zone in Mariveles, Bataan caters to major industries that export their products to Asia and the United States.

| Pier/Terminal | Length & Width | Ave. Draft | Berth | Cargo System |
|-----------------------|---------------------------|-------------------|--------------|---------------------|
| PBR | | | | |
| Product Pier | 439 m x 15.90 m | 3.98-13 m | 8 | Loaders/ Pipelines |
| Causeway | 85.36 m | | | |
| LPG Pier | 24.6 m x 3.0 m | 5.40 m | 1 | Loaders/ Pipelines |
| CBM | 305 m x 49 m | 15.85 m | 1 | Submarine Pipes |
| SBM | 341.38 m x 53.35 m | 22.86 m | 1 | Submarine Pipes |
| PPI/ LBHTI | | | | |
| T-pier | 426.7 m x 411.4 m | 14.0 m | 2 | Unloader/ Conveyor |
| Causeway | 299 m x 4.5 m | 4.50 m | 1 | Pipelines |
| PNOC/PDC | | | | |
| Causeway | 13 m wide | | | |
| Pier Head | 178 m x 5.0 m | 14.0 m | 2 | Loading Platform |
| Protective beam | 18.0 m x 20.0 m | | | |
| OILINK | | | | |
| Sea berth | 260.0 m x 40.0 m | 11.0 m | 1 | Pipelines/tanks |
| Finger pier | 60.0 m x 4.0 m | 3.50 m | 2 | Pipelines/tanks |
| Total-Liquigaz | 530.0 m x 5.0 m | 20.0 m | 3 | Pipelines/ tanks |
| Edison Bataan | 50.0 m x 6.0 m | 6.0 m | 1 | Pipelines |
| Robust Rocks | 200.0 m x 7.0 m | 6.0 m | 4 | Loading Ramps |
| Herma Port | 358.0 m x unlimited | 7.50 m | 3 | Graving dock/crane |
| SMC-BMT | 217.0 m x 15.0 m | 14.50 m | 1 | Portalino unloader |
| ATI-MGT | 156.0 m x 10.0 m | 14.50 m | 2 | Vacubators/silos |

**BERTHING FACILITIES:
(PRIVATE PORTS/TERMINALS
IN BATAAN)**

**PORT SERVICES
CARGO-HANDLING
SERVICES**

| Name of Cargo Handler | Area of Operation | Type of Equipment |
|----------------------------|---------------------|---|
| DJ Roque Const.Co.Inc. | Lamao Anchorage | Special equipment for stevedoring work |
| Ace Technical | Mariveles Anchorage | Equipment for bulk cargo and grains |
| Herma Port Terminals | Mariveles | Equipment for explosives and dangerous cargos |
| PBR | Limay | Special equipment for petroleum products |
| Planters Products Inc. | Limay | Shovel grab, conveyors |
| Oilink International Corp. | Lucanin | Pipelines, storage tanks |
| Total-Liquigaz | Alas-asin | Pipelines, storage tanks |

Mining and Quarrying

Quarrying

Quarrying areas are composed of gravel and sand and boulders found in the municipalities of Balanga and Mariveles. In Balanga, the quarrying area is found in Barangay Cupang where rocks used for building construction and other use abound. In Mariveles, the Sisiman point is the source of boulders, gravel and sand. It has an anchorage area, has a depth of 20 ft. at a distance of 10 ft. from the shore. Robust Rocks Resources Corporation owns this.

Sisiman Point is a coastal upland area, a rocky hill and grassland area with patches of brushland species.

The Provincial Government of Bataan through the Provincial Environment and Natural Resources Office (PENRO) regulates quarrying activities.

Mining and quarrying are also sources of income for the people of Bataan. The province is rich in quarry resources such as sand, gravel, basalt, boulders, armour rock, and mineral like diatomaceous earth.

These resources are usually extracted from the riverbeds, private lands, and coastal uplands of Mariveles. Diatomaceous earth, however, are not allowed to be extracted due to its location which is within the SBMA area.

The Sisiman Point in Mariveles, Bataan is a key quarrying area of the province.



Such quarry materials supply the demand for housing and construction materials for the various government infrastructure projects such as roads, bridges, private and public ports, and piers located within the coastal municipalities of Hermosa down to Mariveles, Bagac, and Morong.

Presently, there are only 6 operational industrial permittees and no quarry permittees due to the expiration of their permit. These permittees are supplying the quarry requirements of the three operational crushing plants namely Acumen Construction and Development Corporation (ACDC), D’New Bataan Concrete Products (BCP), and Rockmix, Inc.all located in Pilar.

Institutional and Residential Values

The increasing population in Bataan has spurred the development of residential areas in the province. These are located both in urban and rural barangays particularly the low-lying flat areas. Institutional areas include churches and religious centers, schools and colleges, hospitals and health centers, government offices, public market, public sports complex, etc.



The Provincial Capitol is home to the various agencies of the provincial government.



The Bataan People’s Center is the ideal venue for large events like concerts and graduations with a seating capacity of over 6,000.

Bataan School of Fisheries and Maritime Academy of Asia and the Pacific (MAAP)

One of the educational institutions which aim to provide training in the field of Fishery Production and Processing is the Bataan School of Fisheries in the Municipality of Orion. The curricular offerings include four-year high school education, three-year Fishery Technology, Hotel and Restaurant Technology, Garments and Two-Year Computer Secretarial. As a government educational institution, more students enroll year after year, gaining adequate and quality training.

The Maritime Academy of Asia and the Pacific (MAAP) is a private tertiary educational institution located at Kamaya Point, Alas-asin, Mariveles, Bataan. The Associated Marine Officers and Seamen's Union of the Philippines (AMOSUP) is funding its operation. The school aims to produce highly trained and competitive seamen, marine engineers and deck officers and workers for them to qualify for international ocean vessels. Courses offered are Bachelor of Science in Marine Engineering and other related short-term courses. Cadets and other trainees of MAAP apply the theories they have learned at the training ship of the school named T/S Kapitan FELIX OCA.



One of the premiere schools in the country is the Maritime Academy of Asia and the Pacific (MAAP) in Mariveles, Bataan.

Philippine Economic Zone Authority

BATAAN ECONOMIC ZONE





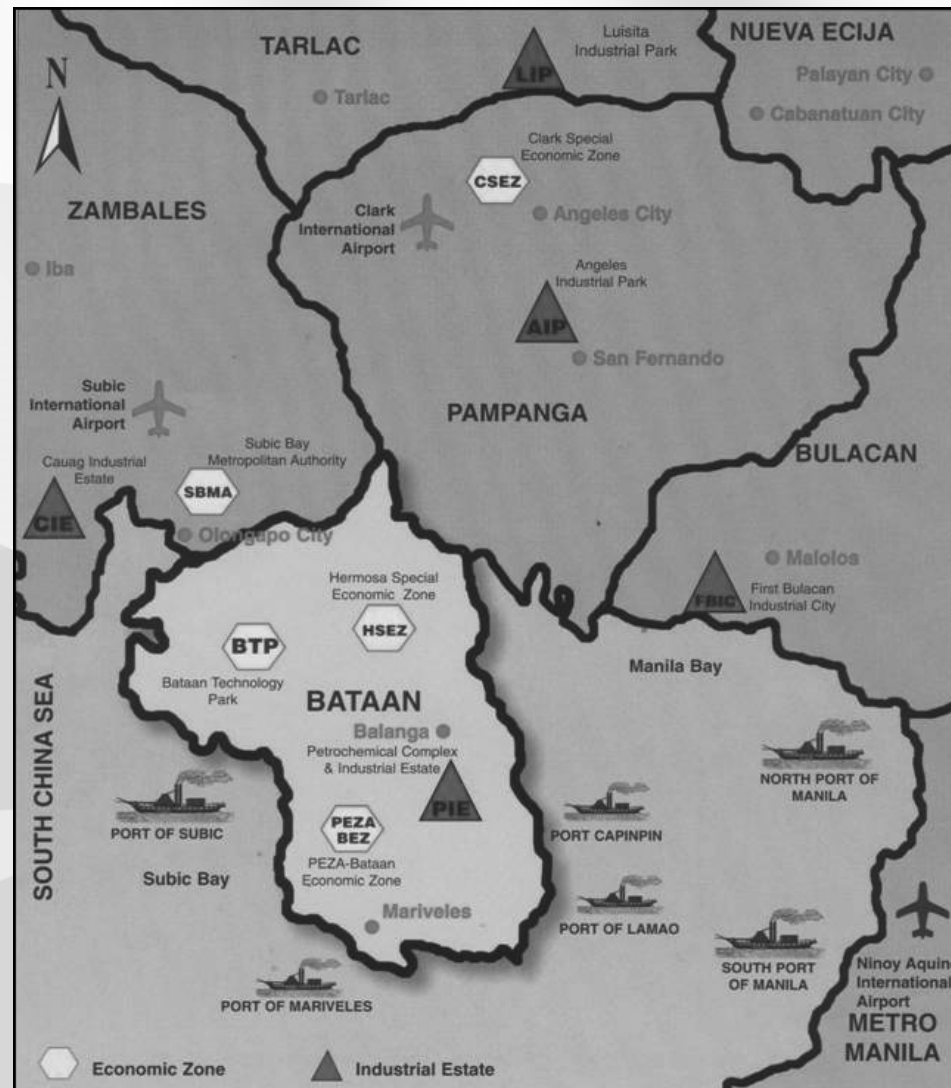
5. ECONOMIC SIGNIFICANCE OF BATAAN

A. STRATEGIC ROLE IN THE CENTRAL LUZON AND MANILA BAY REGION

Bataan is one of the most progressive provinces in Central Luzon and Manila Bay Region. The province plays a significant role in the region because it is strategically located right in the middle of the country's growth triad corridor of SBMA, Clark Special Economic Zone and Metro Manila. It plays a major role in the Central Luzon "W" Growth Corridor, as the region's industrial heartland owing to the presence of anchor industries within the Province. It is also a strategic transport route and transshipment point linking SBMA area and other Central Luzon provinces to Metro Manila. In addition, the province is a key contributor to the overall economic productivity in Central Luzon.

Bataan hosts several industries and companies that produce diverse products such as Petroleum, petrochemicals, plastics, fiberglass, sportswear, footwear, soya oil, tennis balls, paper, ammunition, and many more. Diverse marine, agriculture, and aquaculture products are likewise produced. With the completion of the Bagac-Mariveles road and the opening of SBMA Morong Gate, transshipment business within the province would be cost efficient which in turn could boost the Central Luzon "W" economic growth center.

Pristine beaches and natural parks complemented by scenic springs and waterfalls as well as historical markers provide a setting for a healthy tourism investment in the province.



B. DEVELOPMENT TRENDS

Potential investors are currently eyeing Bataan's vast lands. The province is undergoing major improvements in anticipation of a growing industrial market. Moreover, a world-class recreational facility in Morong is underway which Ayala Land, Inc is developing. In addition, the San Miguel Corporation Feed Mill Project is being constructed in Mariveles that will utilize cassava, corn, and other agricultural products as raw material for feed production. The province was chosen as its site because of the vast plantation area and rich soil suited for the crop.

The competitive market value, abundance of skilled workers and the availability of more lands and port areas make Bataan an attractive site for economic zones in the country. Presence of economic zones ensures that the province lives up to the expectations of all its investors as a primary

investment capital of the country. The first economic zone in the country was put up in Mariveles in 1972.

As Bataan positions itself at the center of our country's economic upheaval, the men and women of the province are gearing up for the expected turn-over of new jobs, better labor scenarios, and the establishment of the province as the hub of economic activities in Central Luzon. Bataan, the choice of today's investors, promises potential opportunities as the peninsula open its doors to economic progress.

With such development trends, comes another task – that of protecting, maintaining, and conserving the bounties of nature amidst new technologies and changing patterns of modern living.





6. ISSUES AND CONCERNS

The coastal zone is the most productive area in the marine environment but studies reveal that this is also the most exploited ecosystem. Human and economic activities in the coastal area put pressure on the marine environment. The province is endowed with two fishing grounds – Manila Bay and South China Sea – once considered to be among the richest traditional fishing grounds with some of the most diverse aquatic resources. In Manila Bay, fishing effort has already exceeded the maximum sustainable yield or MSY (Manila Bay Refined Risk Assessment, 1994). Sustenance fishermen and fish workers depend primarily on fishing as source of income. The marginal fishermen are considered to be the poorest populace living in the coastal areas. The major environmental problems in Bataan as viewed by the various stakeholders are:

- Pollution from land-based activities
- Habitat and resource degradation
- Over-fishing and destructive fishing
- Oil spills and other sea-based sources of pollution
- Siltation and sedimentation
- Multiple resource use conflicts and governance
- Transboundary issues

Following are the consequences of unregulated use of the coastal and marine resources:

- ✘ Massive harvest of marine resources for consumption, ornamental and building materials has further depleted the already dwindling resources.
- ✘ Catch per unit effort (CPUE) has declined tremendously, resulting in lower income especially for small fisherfolks.
- ✘ Continued operations of destructive fishing method and rampant dynamite fishing have caused the depletion of fish stocks and destruction of the marine ecosystem. The flora and fauna have been

damaged causing the deterioration of the ecosystem. Around seventy percent (70%) of the coral reefs have been destroyed.

- ✘ The open access to fishing areas has resulted in conflicts between municipal and commercial fisheries which have to be resolved.
- ✘ Only five percent (5%) of the mangrove forests remain in existence. Mangroves are being cut for charcoal and firewood, and converted into aquaculture projects, thereby depriving the nursery and spawning grounds for some commercially important fish food and invertebrates, and shoreline protection for coastal municipalities.
- ✘ Seagrass beds are being scraped, resulting in loss of stabilizers for beach areas and habitat for marine species. Seaweeds are also over-harvested. Capiz or the windowpane oyster, which used to be abundant, is facing extinction.
- ✘ Pollution, siltation and sedimentation contribute to the degradation of marine resources.
- ✘ Health issues (e.g., paralytic shellfish poisoning due to Red Tide, incidence of waterborne diseases)

The serious degradation of the marine resources has greatly affected the economic condition and quality of life among the coastal inhabitants. This lamentable situation is a result of ineffective and poor management of the coastal area. It is high time that something is done about the catastrophic trend of pollution, over fishing and other activities that deplete our fisheries and aquatic resources.

Discharges cause this to happen. A non-point source delivers pollutants indirectly through environmental changes. Pollution arising from non-point sources accounts for a majority of the contaminants in streams and rivers.

A. POLLUTION FROM LAND-BASED ACTIVITIES

Pollution is a common problem in all municipalities and city of Bataan. Water pollution occurs when a body of water is adversely affected due to the addition of large amounts of materials to the water. When it is unfit for its intended use, water is considered polluted.

Two types of water pollution exist: point source and non-point source. Point source includes emissions of harmful substances directly into the body of water. Garbage dumping and sewage and industrial wastewater discharges cause this to happen. A non-point source delivers pollutants indirectly through environmental changes. Pollution arising from non-point

sources accounts for a majority of the contaminants in streams and rivers and on to seas. Example is when fertilizer from a field or wastes from poultry and livestock are carried into a stream by rain, in the form of run-off, which in turn affect aquatic life.

The technology exists for point source pollution to be monitored and regulated but need to be fully supported by the local government. Non-point source is much more difficult to control. The following are the major causes of pollution in Bataan and their overall impact to the socio-economic life of the people and the environment.

The discharge of solid wastes and nutrients into coastal waters is a major cause of eutrophication.



| CAUSES | IMPACTS |
|--|--|
| <ul style="list-style-type: none"> ■ Rapid growth of population due to increased birth rate and migration. ■ The discharge of soil, solid wastes, and nutrients into coastal waters is a major cause of eutrophication (an aging process that slowly fills in the water body with sediment and organic matter) especially areas of limited water circulation. ■ Lack of monitoring system and environmental facilities and services to collect and treat discharges of raw sewage, toxic and hazardous waste, and untreated and inadequately treated wastewater generated by domestic, agricultural, and industrial sources. The province has no sewerage system and sanitary landfill yet. ■ Lack of local ordinances and laxity in implementation of environmental laws, rules, and regulations. ■ Lack of awareness, enforcement, and inadequate facilities and equipment for solid waste management. All municipalities and city are practicing only the method of garbage collection and dumping. Republic Act 9003 or the Waste Management Act however, requires all LGUs to convert their open dumpsites into controlled dumpsites by 2005, establish recycling and composting facilities and operate sanitary landfills for residual waste by 2007. | <ul style="list-style-type: none"> ■ Increased population will generate increased volume of waste. This will require a more extensive waste management system and greater financial allocation on the part of the government. ■ Certain marine organisms are capable of accumulating chemicals within their bodies from prolonged exposure, making possible contraction of poisons by humans. Also, certain contaminants such as heavy metals are non-biodegradable and constitute permanent additions to the environment. Heavy metals found in fish and shellfish tissue eventually affect humans. ■ Phosphates and nitrates from sewage, agricultural waste, and excess use of feeds in aquaculture result in algal bloom, eutrophication, and fish kills. Periodic algal bloom of Pyrodinium known as “red tide” and other harmful algal species has resulted in morbidity and mortality cases of paralytic shellfish poisoning (See <i>Manila Bay Refined Risk Assessment</i>). ■ The presence of pathogens, such as <i>E. coli</i> causes illnesses, ranging from diarrhea, typhoid, and dysentery to minor respiratory and skin diseases. Swimming in polluted water is also unsafe. ■ Solid and toxic wastes in the rivers, waterways, and marine areas are detrimental to marine life. There are cases when glass and hypodermic needles cause injuries and death among marine mammals, fishes, turtles, and others. Improperly disposed wastes are often mistaken by marine turtles as jellyfish. |

B. HABITAT AND RESOURCE DEGRADATION

Habitat of an animal means the place where it is able to live. It has a physical (e.g., temperature, areal extent); chemical (e.g., salinity, dissolved oxygen); and biotic (food availability) components. It is important that the biophysical integrity of habitats is maintained, and they are adequate and suitable to support the flora and fauna living within. Habitats and biodiversity should be protected and preserved, and these are threatened by factors such as chemical pollution, biological or physical destruction, until the quality of the ecosystems becomes unsustainable.

For the past years until the present time, there has been an increasing number of activities that affect marine, coastal, estuarine, and riverine environment. Corollary to this are the tremendous growth in urban areas and industrial development in or adjacent to the coastal zones.

In Bataan, degradation of habitats such as forest and upland areas, mangroves, mudflats, seagrass beds, coral reefs and other marine habitats are also evident. The causes and negative impacts on the environment and the life of the residents are identified as follows:



Habitat degradation affects the growth of different marine organisms/species which affect livelihood sources.

| CAUSES | IMPACTS |
|--|---|
| <ul style="list-style-type: none"> ■ Rapid population growth and migration factor put pressure on the utilization of resources for basic needs and livelihood. ■ People engage in unsound agricultural and forestry practices, mismanagement of watersheds, exploitation of mangroves, earth-moving activities for construction and dumping of wastes and effluents. ■ Some municipal and commercial fishers use illegal fishing methods/practices and explosive fishing techniques. ■ Reclamation, scraping, siltation, and sedimentation destroy seagrass ecosystem and benthic organisms/species. Sand movement affects their distribution and growth. ■ Coastal land conversion for aquaculture is one of the major causes of loss of coastal vegetation. Brackish water aquaculture is being developed at the expense of vast tracts of coastal land, including mangroves and mudflats. ■ Upland areas are habitats that serve as watershed and source of water and raw materials for various economic and recreational activities. Forests and upland areas, such as the Roosevelt Protected Landscape, has been stripped off of vegetation due to encroaching, migration, illegal cutting, and improper upland agricultural practices. However, most of the upland areas in Bataan are already in an advanced state of degradation and only a fraction remains. ■ Open access to resources results in over-fishing, and excessive collection of turtle eggs along beaches, corals, giant clams, and capiz shells for housing and ornamental handicrafts, and mangrove wood for charcoal, fuel, and Christmas trees. ■ Permanent settlements in coastal areas are unregulated by the government. ■ There is apathy and lack of awareness among the public and a tendency to implement short-term solutions addressing only the symptomatic causes rather than taking a holistic viewpoint in addressing environmental concerns. | <ul style="list-style-type: none"> ■ Rapid growth in population brings forth increased demand for basic need resources, settlement areas and livelihood opportunities. Resource depletion is expected because of over-exploitation. ■ Destruction and loss of biodiversity in the upland, coastal, and marine areas create ecological imbalance. ■ Habitat degradation affects the growth and reproduction of different marine organisms/species, which affect livelihood sources. It also reduces the potential for eco-tourism development in the coastal areas. Destruction of mangroves and coral reefs result in loss of shoreline protection for coastal communities. ■ Seagrasses are smothered and displaced into depths beyond their ability to survive. Seagrass beds serve as nursery, shelter, and food for fish and invertebrates. They also reduce sedimentation, contribute to stabilization of shores, and interact with coral reefs and mangroves in reducing wave energy and regulating water flow. ■ Explosions during blast fishing are devastating. In coral reefs, re-colonization of damaged habitats is very low and complete recovery may take several decades. Coral reefs serve as important habitats of marine species, and their loss subsequently affect fishery productivity and income of fisherfolk. ■ Lesser trees and other sturdy vegetative cover will decrease water-holding capacity, which will result in loss of protection from heavy rains and devastating floods. ■ Conversion of mudflats results in loss of habitat for shellfish, crustaceans and benthic communities, and feeding grounds of waterfowl and rare and endangered migratory birds. Bird watching can be a major eco-tourism activity. |

C. SILTATION AND SEDIMENTATION

Natural processes such as weathering and erosion normally cause siltation and sedimentation. However, inappropriate development activities (i.e., forest denudation, conversion, reclamation) in the uplands, critical watersheds, and coastal uplands hasten the process of siltation and sedimentation.

Uncollected solid wastes accumulate in waterways and riverbanks.



| CAUSES | IMPACTS |
|--|---|
| <ul style="list-style-type: none"> ■ Deforestation due to illegal cutting of trees, shifting cultivation and unsustainable agricultural practices are common in all municipalities in the province and are identified as primary causes of siltation in the coastal plains and in coastal areas. ■ Reclamation of coastal areas and conversion of critical areas such as mangrove stand into other uses, are mostly unsustainable in nature. ■ Uncollected solid wastes from domestic, agricultural, commercial, and industrial sources accumulate in waterways and riverbanks. ■ Unregulated quarrying for sand, gravel, rocks, and other materials causes erosion and sediment deposits that flow to the river system thus also worsen these problems in the province. | <ul style="list-style-type: none"> ■ Shallowing and clogging of rivers and waterways result in flooding and affect navigation system. ■ Increased sedimentation and water turbidity can cause a variety of impacts on coral reefs. These include screening out light needed for photosynthesis and natural growth of aquatic species; scouring and smothering of corals by sand and other transported sediments, which result to poor survival of juvenile corals due to loss of suitable substrata. ■ With siltation, sedimentation, and eutrophication, fish respiration becomes impaired, plant productivity and water depth become reduced and aquatic organisms and their environment becomes suffocated. |

D. OVER-FISHING, ILLEGAL AND DESTRUCTIVE FISHING METHODS

Over-fishing occurs when the rate or level of fishery removals jeopardizes the ability of the resource (i.e. species or stock) to produce the maximum sustainable yield on a continuing basis.

The need for fishers to provide food for themselves and their families is a major reason for continued exploitation of marine species. The open-access regime for fishing is the biggest problem. With the lack of policies and programs geared toward sustainable use of resources or the ability and funding to effectively enforce such regulations, there is little incentive

for local fishers to change their destructive fishing practices. Lack of alternative livelihood often drives people to encroach upon productive inland and upland areas to pursue other avenues for subsistence.

Majority of the coastal waters in Bataan are over-exploited and its resources are depleted. This situation necessitates the kind of management intervention that will help regenerate and enhance these at the rate faster than its natural healing.

Illegal fishing takes the form of blast or dynamite fishing



CAUSES

- Increasing coastal population, high dependence on fishing as the primary source of income, and lack of alternative livelihood options.
- Open access to fishery resources and lack of ordinances concerning catch limit practices.
- Management problems and lack of equipment and other resources to support the implementation of laws and ordinances, as well as fish wardens and Bantay Dagat volunteers.
- Improper process of handling cases and weak punishment and penalties imposed on those who are caught using banned fishing methods and practices such as cyanide and blast fishing.
- Easy access to raw materials for illegal fishing such as ammonium nitrate and poisonous substances.
- Few maritime policemen to monitor fishing activities.
- Lack of public awareness concerning various fishery policies and the impacts of over-fishing and destructive fishing practices.

IMPACTS

- Lack of alternative livelihood results in higher in-migration rate leading to illegal settlements in critical areas thus, adding more ecological and socio-economic stress to the already fragile coastal environment.
- Open access and no catch limit practices breed unfair competition between commercial and municipal fishermen leading to economic dislocation. The net effect is the overexploitation of fishery resources and encouragement of using illegal and destructive methods to get more catch and short-term profit.
- Management problems lead to social unrest. Improper implementation of laws gives confidence to illegal fishers to continue their practice because they know they can go around the rules. It is necessary to institutionalize bodies that will help fish wardens and small fisherfolks in their legal concerns and monitor the sales of raw materials being used in making dynamites and poison.
- Profit motive and easy money schemes include conversion and reclamation for intensive fishpond operations, thus, leaving smaller fishing areas for small fisherfolks and clogging of estuarine areas such as the case of Orani Channel. This increases fishing effort but with diminishing returns - catching lesser quantity of fish per unit of time spent in fishing. This is largely unsustainable as easy money making schemes often involve short-term but highly destructive production methods, which means more economic losses in the long run.
- Increasing demands for local governments to provide alternative livelihood options, develop appropriate infrastructures, compensate for fishing losses, rehabilitate damaged habitats and fishing areas, and attend to the welfare of fisherfolks to prevent ignorance and apathy toward sustainable management of fishery resources.

E. OIL SPILL AND SEA-BASED SOURCES OF POLLUTION

Manila Bay is considered a primary gateway of economic development of the country. This is because of its characteristic as natural harbor, wherein shipping and navigational activities are being associated.

The presence of several operating ports and harbors both government and privately owned, including their amenities and facilities, encouraged large scale development along the bay. This means that the bay is envisaged to catch up more shipping and navigational activities to support the several industrial firms operating along the bay, particularly at the coastal side of Bataan

Due to the enormous number of shipping activities at the bay, the possibility of oil spill is always present. According to the records of the

Philippine Coast Guard, the largest oil spill incidence in Manila Bay happened in Mariveles, Bataan in 1999 when MT Mary Anne spilled a total volume of 747,991 liters of oil. From February 1998 to December 2004, out of 18 oil spill incidences in Manila Bay, 9 or 50% happened in the Bataan area.

In addition, operational and accidental oil spill can also be attributed to the 6,715 units of motorized bancas/fishing boats operating at the municipal waters of Bataan. Other sources of sea based pollution such as transport flush out and dumping of solid and liquid waste, septage and dredge materials from industrial, commercial, and domestic activities aggravate the state of water pollution of the bay.



Due to the enormous number of shipping activities at the bay, the possibility of oil spill is always present.

Table 6: Oil Spills in Manila Bay

| DATE | SPILLER | VOLUME IN LTRS | LOCATION |
|--------------|---------------------------------|-----------------------|-------------------|
| 31-Mar -98 | PBRC Limay Bataan | 600 | Limay, Bataan |
| 17-May-98 | Herma Shipping | 30 | Limay, Bataan |
| 2 -May-98 | M/T Ocean Pride | 30 | Limay, Bataan |
| 09-Feb-99 | M/T Bocaue | 40,000 | Limay, Bataan |
| 19-Mar-99 | M/T Sea Brothers | 420,000 | SH, Manila |
| 23-Jul-99 | M/T Mary Anne | 747,991 | Mariveles, Bataan |
| 04-Jan-00 | M/T Christian Albert | 400 | SH, Manila |
| 25-May-00 | Baseco Shipyard | | Engr Island, Mnl |
| 21-Jul-01 | MV Super Ferry | 210 | NH, Manila |
| 25-Aug-01 | MT Sea Mark | 300 | Limay, Bataan |
| 22-Nov-01 | MV Princess of New Unity | 100 | NH, Manila |
| 26-Aug-02 | MV Pulilan | 100 | Limay, Bataan |
| 08-Aug-02 | MT Deborrah Dos | 200 | Limay, Bataan |
| 10-Feb-03 | MV New Vigor | 500 | Limay, Bataan |
| 07-Jun-03 | Super Ferry 5 | 150 | NH, Manila |
| 05-Jul-03 | Tacoma svc port | 840 | NH, Manila |
| 29-Jan-04 | MV Piya Bhum | 200 | MICT, Manila |
| 15-Feb-04 | MV Hanjin Kwangyang | 50 | MICT, Manila |
| Total | | 1,211,101 | |
| | Total Volume in Bataan | 789,751 | |
| | Total Volume in Manila | 421,950 | |
| | Total Number of Spill in Bataan | 9 | |
| | Total Number of Spill in Manila | 9 | |

F. MULTIPLE RESOURCE-USE CONFLICTS AND GOVERNANCE

Everyone depends on one common natural resource base for all our socio-economic activities. Different groups have different needs and priorities, which mean varied interests and methods of resource use, thus leading to competition for a limited resource and conflicting resource uses. For example, conflict arises among fisherfolks in the town of Orion because fishermen from Samal and Limay were caught using destructive fishing gears in the municipality of Orion. Fisherfolks in Orani resorted to mass actions because of the proliferation of fishponds, both legal and illegal, in

the Orani Channel, which impede navigation in the area going to the municipal fishport and thus affect fishing areas for subsistence of small fishermen. In Morong and Bagac, the proliferation of beach resorts threaten the natural habitat of an endangered marine creature, the pawikan and further compounded by poaching activities in the area. Aside from this, the bangus fry collection areas of small fishermen are also affected. The issues and concerns in Bataan center upon the following:



All forms of pollutants threaten not only the ecosystem but also the aesthetic value of Bataan coastline

Overfishing, illegal, and destructive fishing methods lead to over-exploitation of fishery resources.



CAUSES

- Unregulated establishment of fishing and mussel culture areas.
- Increasing population and open access to resources. This constitutes various users deriving different benefits from a limited resource and therefore, numerous interests and priorities which create numerous conflicts (e.g., municipal vs. commercial fishing; aquaculture vs. municipal fishing; habitat vs. residential development; tourism vs. municipal fishing; shipping vs. fisheries and aquaculture; agriculture vs. residential and commercial development; habitat vs. industries; etc.).
- Lack of integrative management approaches, sea-use plan, improper zoning scheme, and differences in priorities bring about multiple-use conflicts in the province. This is reflected by the loose coordination between local governments and agencies which have different mandates, thus, creating overlapping and sometimes conflicting priorities accorded to the use of resources.
- With the passage of RA 8550 known as the Philippine Fishery Code, coastal municipalities are given a free hand to define the limits of their municipal waters up to the 15 km. limit. In terms of jurisdiction, particularly in Manila Bay and other semi-enclosed areas, there are overlaps between municipalities in the 15-km municipal waters boundary.
- Differences in political viewpoints and priorities, as well as lack of awareness, tend to make people become unconcerned about the problem, which of course affect the process of making the right decisions to solve the problem.
- Absence of coastal zoning and sea-use plans adversely affect the way natural resources are being used. In cases where comprehensive development and physical framework plans exist, their implementation are subject to lapses and inconsistencies. There is no integration of land- and sea-use plans.
- Apathy, lack of awareness, and resolve to implement existing rules and ordinances are the usual culprits in the degradation of resources and the environment. This often leads to uncontrolled or unmonitored conversion and reclamation of critical areas into other uses – an unsustainable development pattern.
- Absence of monitoring of resource uses also result in unregulated habitat conversions.
- Coastal zones are also utilized as residential areas because of the rapid growth of fisherfolk population. The trend of agricultural land conversion into subdivisions has been prevalent in almost all parts of the province. Coastal uplands are also inhabited.
- Fishermen blame low catch to over fishing in the municipal waters and the influx of transient fishermen while the unavailability of housing facilities and lack of permanent residence have forced some fishermen to squat near the coastal area. Squatting has become rampant in these areas because they are undeveloped.
- Illegal fishing bring forth easy moneymaking scheme and more fisherfolks are attracted to it.

IMPACTS

- Increasing resource users with varied interests and priorities accorded to a limited resource, results in further decline in resources, lower productivity and potential for other development in both agriculture and fishery, and other economic activities.
- Unresolved resource use conflicts mean unregulated resource use, leading to more land conversion and reclamation of critical areas, overfishing, coupled with illegal and destructive fishing.
- Increased demands for the government from the national to the local level to act and intervene in resolving conflicts in resource use.
- If there are continuous and rampant lapses in implementation of existing rules and ordinances relating to resource use, constituents tend to lose confidence in the governance process and will not cooperate in managing critical habitats.
- Lack of awareness means lack of cooperation and disinterest in active participation to manage and protect critical habitats. This must be overcome by continuous information, education and communication campaign leading to social mobilization to sustainable development of natural resources and protection of critical habitats.

G. TRANS-BOUNDARY ISSUES

Bataan is one of the four coastal provinces that share the semi-enclosed Manila Bay Region with the National Capital Region (NCR).

On the northwestern side of Bataan, it shares Subic Bay with the province of Zambales. There are also other non-coastal provinces that affect Bataan through the river systems. Geographical limits define the seaward

boundaries among these provinces in terms of area exploitation as embodied in the existing Fishery Code. Lapses in implementing policies also contribute to the breaching of defined boundaries. As a result, transboundary issues adversely affect the provinces and NCR, which surround Manila Bay. This water body has been the catch basin for all kinds of refuse and unwanted by-products of modern living.



This water body has been the catch basin for all kinds of refuse and unwanted by-products of modern living

Mangroves are among the critical habitats that must be maintained in the Bataan Coastal Areas



| CAUSES | IMPACTS |
|--|--|
| <ul style="list-style-type: none"> ■ Domestic, industrial, and agricultural wastes find their way into water bodies such as tributaries, creeks, and rivers, as well as coastlines. These pollutants go beyond defined boundaries across time. Garbage and sewage from Metro Manila affect those living in Bataan and Cavite because of tidal movements and water current. ■ Manila Bay and other open water areas are common property resources to government and private sectors, down to individual fisherfolk. No single ruling entity or group exercises control over it. The Fisheries Code sets a minimum 15-km limit for municipal fisheries. However, this results in overlapping jurisdictions among municipalities. ■ There is also the continuous encroachment of commercial fishing vessels into municipal waters, which is a source of conflict with municipal fishers. In addition, there is unrestricted access to commercially valuable species that is the prime cause of overexploitation of fishery resources. ■ Habitats spread across political boundaries. Among the critical habitats within the Manila Bay Region are mangroves, upland forests, mudflats, coral reefs, and seagrass beds. These habitats are already in an advanced state of degradation. ■ Numerous ships enter Manila Bay and some of them dock in ports of Bataan. Should these ships dump ballast water, that may contaminate marine organisms and affect not only the coastal waters in Bataan but the whole Manila Bay. | <ul style="list-style-type: none"> ■ All forms of pollutants threaten not only the ecosystem but also the aesthetic quality of Manila Bay and Bataan coastline. This would make tourism development in the area a high-risk investment if unresolved. Health risks will also continue to mount and will only add more pressure on the government and other sectors to put into more resources – time, money, and manpower – for the provision of health and other services. ■ Destruction of mangroves and coral reefs result in loss of shoreline protection to coastal communities, while upland deforestation causes erosion, siltation and sedimentation, clogging and shallowing of waterways, shoreline changes, and more flooding incidences that affect human lives and property. Without the natural protection provided by these habitats and resources, impacts of coastal hazards and natural calamities are aggravated. Moreover, more financial resources have to be spent for economic recovery, restoration of habitats and damaged properties and infrastructure, construction of seawalls and dikes, etc. ■ Overfishing in the bay area as a result of transboundary conflicts leads to economic dislocation and depleted fish stocks. Results show the dwindling mature fish population and pressure put on younger species. Some fishermen even claim that some species are no longer caught at present. This is supported by the <i>Manila Bay Refined Risk Assessment</i>, which show the change in dominant species composition in the bay. Windowpane oysters or capiz, which used to be abundant, has practically disappeared in Manila Bay, except in Samal, Bataan where it can still be found. ■ Ballast water, if released untreated, may contain alien, exotic and invasive species, including red-tide causing organisms. Red tide has affected the health and income of people dependent on Manila Bay for living. |







OUR VISION

A well-developed community with an abundant natural resource, clean environment and responsible citizenry empowered and committed to care for nature and its bounty.

Magkaroon ng isang maunlad na pamayanan na may masaganang likas-yaman, malinis na kapaligiran at mga mamamayan na may pagmamalasakit at pananagutan sa kalikasan.

OUR MISSION

To clean the environment, develop it sustainably and make it safe from harmful human activities for use to live peacefully, blissfully and honorably amidst nature's bounty through active participation in integrated resource management efforts.

Gawing malinis, maunlad at ligtas ang kapaligiran mula sa pinsalang gawa ng tao upang makapamuhay ng mapayapa, masaya, masagana at marangal sa pamamagitan ng aktibong pakikilahok sa nagkakaisang paraan ng pangangasiwa sa ating likas-yaman.

OUR DESIRED CHANGES AND OUTCOMES

In the next 20 years, Bataeños envision a well-managed environmental resource, which consider the relationships between ecosystem & socio-economic systems, with an institutionalized proactive participation of various interest groups. The following are the desired outcomes:

- ⌘ Restored and well-managed critical habitats. This includes well-maintained and sustained physical environment and biological community, integrity, and diversity.
- ⌘ Well-established waste management system including control of pollution sources.
- ⌘ Restored and well-maintained cultural, historical, and religious establishments to preserve the sanctity of Bataan's glorious role in history.
- ⌘ Resolved multiple resource-use conflicts and improved potential for sustainable development through proper implementation of relevant laws, ordinances, and control measures
- ⌘ Sustained watershed productivity and conformity of water resources to water quality standards for public water supply (class AA) & recreation (Class B for rivers and SB for coastal and marine waters) along with the navigability and fishability of waterways and coastal waters.
- ⌘ Economically viable activities and food sufficiency with healthy ecosystem and healthy human population.
- ⌘ A responsible, well-informed, well-educated citizenry effective of empowered communities and committed stakeholders as well as strengthen capacities and capabilities of local government units to manage natural and economic resources, based on well-informed decision-making process with due consultations with concerned stakeholders.

In relation to the desired outcomes, a set of expectation for various stakeholder groups was also listed during the consultation process. These expectations are fully anchored on the basis of formulating the Bataan Sustainable Development Strategy.





8. STRATEGIES

MANAGEMENT is a rational human activity directed towards controlling the use of available resources in order to achieve certain objectives in the most socially acceptable, economical and profitable manner. This, in essence, is the general principle behind the Bataan Sustainable Development Strategy (BSDS). Attuned to the **VISION** and **MISSION**, residents of Bataan would like to be part of making the Manila Bay Region and parts of the South China Sea as center for a sustainable coastal management and development scheme where diverse resource use is regenerated and enhanced through systematic strengthening of institutional support network, pro-active partnership of all stakeholders, and a view point that the environment will ultimately direct the path of progress and development.

In recognition of the fundamental and natural, socio-cultural, economic and strategic values of Bataan's coastal environment and the various risks it faces from human activities, steps have to be taken to take care of this heritage for both the present and future generations. The coastal strategy also aims to ensure that our Vision and Mission would be realized and accomplished. The strategies identified by the stakeholders to attain the **VISION** and **MISSION** are:

- ⌘ **INFORM** the stakeholders of their rights and responsibilities and make them highly aware of the issues and problems concerning the coastal environment of Bataan, for them to be mobilized towards a sustainable and active participation in environmental management programs.
- ⌘ **MITIGATE** pollution and other damaging activities through integrated approaches and measures to lessen the ecological, economic and social impacts, and sustain the range of values found in Bataan.
- ⌘ **PROTECT AND PRESERVE** the significant natural, cultural, historical and socioeconomic values and features of Bataan's coastal environment for present and future generations through integrated planning and management.
- ⌘ **DEVELOP** opportunities within Bataan's coastal areas as well as directions for future uses of resources in partnership with various sectors and stakeholders.



INFORM the stakeholders of their rights and responsibilities and make them highly aware of the issues and problems concerning the coastal environment of Bataan, for them to be mobilized towards a sustainable and active participation in environmental management programs.

PRINCIPLES

1. People need to understand the interrelationships and interaction between the different life-support systems within Bataan's coastal environment and the impact of different human activities.
2. Education and information are essential in making people fully aware and committed to act towards sustainable use, prevention of risk and continued enhancement of values of Bataan's coastal environment. Public involvement and consensus building through inter-sectoral and inter-agency cooperation shall be advanced.
3. Policies and decisions shall be based on reliable, understandable and accessible scientific and technical information concerning the use, development and management of Bataan's coastal and marine areas.
4. Strengthening and building local capacities through information and education are crucial in sustaining environmental management programs.
5. Rights of coastal communities and affected indigenous communities shall be respected and observed.
6. Appreciation of the importance of natural, historical and cultural sites can only be achieved through continuing education and information drive efforts.
7. Educational curricula regarding the sustainable use, prevention of risk, and continuous protection of the environment shall be developed and applied in partnership with the schools and academe.

THE PARTNERS

- National Government Agencies
- Local Government Units (Provincial, Municipal, and Barangay)
- Non-government Organizations, People's Organizations and other Community-based Organizations
- Religious Organizations
- Civic Organizations
- The Private Sector
- Academic and Educational Institutions
- National and Local Media
- Communities / Households

OBJECTIVES

1. Raise understanding and level of awareness on coastal and marine processes, features of geological, ecological, cultural, historical and economic significance, environmental, economic, and social impacts of damaging human activities, management issues, policies and regulations, population management, health and sanitation.
2. Recognize the rights of coastal communities and strengthen communication links with them and other key stakeholder groups concerned with the range of values supported by Bataan's coastal environment.
3. Develop capacity-building programs through training and formal and non-formal educational opportunities for local coastal and marine environment managers and planners.
4. Develop and integrate subjects on ecology and environment into primary, secondary, and tertiary educational curricula, and include resource and environmental management activities as part of the community work program of schools and universities.
5. Promote information and knowledge management and sharing of experiences, lessons learned, good practices, and technical and scientific information to enhance planning, decision- and policy-making, and influence actions of communities and other stakeholders.

ACTIONS

Objective 1: Raise understanding and level of awareness on: coastal and marine processes; features of geological, ecological, cultural, historical and economic significance; environmental, economic, and social impacts of damaging human activities; management issues; policies and regulations; roles and responsibilities; population management; and health and sanitation.

- 1.1 Update the Bataan ICM communication plan and develop, produce, and disseminate a wide range of information, education and communication (IEC) materials in partnership with NGOs, government agencies, media, and other stakeholders.

IEC campaign and materials on:

- ✧ ICM, Bataan Sustainable Development Strategy, integrated land- and sea-use zoning plan
- ✧ impacts of human activities that cause damages to ecosystem and human health (e.g., unregulated quarrying, destructive fishing, domestic, industrial and agricultural wastes, unregulated development, illegal logging, etc.)
- ✧ waste minimization, segregation, recycling, re-use, monitoring of water use & waste discharges, use of fertilizers & pesticides
- ✧ restoration and protection of habitats, resources, and historical, cultural, religious and tourism sites
- ✧ conservation of water
- ✧ roles, duties, and responsibilities of different sectors
- ✧ corporate environmental and social responsibility
- ✧ population and environmental management, including safe motherhood, family welfare, and child survival
- ✧ reducing health risks among women and children, proper sanitation, prevention of diseases, and other health consequences of environmental threats.

- 1.2 Educate stakeholders and conduct regular public awareness campaigns on existing environmental and resource policies, laws and ordinances, the need for compliance and cooperation, as well as regular reviews of zoning policies.
- 1.3 Conduct fora and symposia to discuss and assess resource and environmental management issues, research, and development programs along with preservation and management of cultural and historical sites.
- 1.4 Mobilize stakeholders to participate actively in managing and sustaining the natural and cultural heritage of Bataan by implementing activities, such as coastal and river clean-up, mangrove reforestation, tree planting, clean-and-green projects, monitoring of illegal fishing, commemoration of Bataan Day, Earth Day, World Environment Day, and others.

TARGET AUDIENCE

- National and local governments, decision / policy-makers
- Industries / Business Sector
- Non-government Organizations, People's Organizations and Civic Groups
- Academe and Educational Institutions
- Parents
- Youths and Schoolchildren
- Fisherfolk and Farmers
- Gender Groups (Women / Men)
- Media

Objective 2. Recognize the rights of indigenous peoples and coastal communities and strengthen communication links with them and other key stakeholder groups to encourage their involvement in planning and decision-making.

- 2.1 Raise level of community awareness of the ancestral and traditional knowledge and heritage of indigenous peoples, and promote mechanisms to protect their rights and get their support.
- 2.2 Conduct regular consultations, discussions and consensus building with fisherfolk, People's Organizations, community-based organizations, NGOs, and other stakeholders concerning resource and environmental management policies and programs, alternative livelihood projects, and other economic development plans.

Objective 3. Develop capacity-building programs through training and educational opportunities for local coastal and marine environment managers and planners, in coordination with research and educational institutions, NGOs, and other concerned agencies.

3.1 Develop and conduct short courses and training programs and workshops on ecosystem dynamics, integrated river basin and coastal area management approach, and related issues to enhance management and technical skills of environmental planners and managers.

Short courses and training programs and workshops on:

- ✧ ICM as a primary tool to manage Bataan's coastal environment and the range of values it supports.
- ✧ environmental management, waste management, business and technology for local government and the private sector
- ✧ participatory approach on data gathering, sustainable resource use, environmental protection and management
- ✧ public service and communication standards and skills of agencies tasked with resource, environmental and economic development planning and management responsibilities, along with monitoring, feedback, and response mechanisms
- ✧ international conventions and instruments, national and local laws, legal procedures and regulations pertaining to environmental and resources management

3.2 Strengthen networks and linkages among government agencies, private sector, NGOs, donor agencies, and other concerned sectors to coordinate and sponsor short courses, training programs and workshops, and educational opportunities in environmental and resource management.

Objective 4. Include subjects on ecology and environment in the primary, secondary, and tertiary educational curricula, and environment-related activities in the school programs.

4.1 Develop lessons, syllabi and other educational materials on environment and ecosystems, waste management, and protection of historical and cultural sites, and integrate them in the curricula of the primary, secondary, and tertiary schools.

4.2 Coordinate with the educational sector and other stakeholders for the conduct of resource and environmental management activities as part of the community work program of schools and universities.

4.3 Develop programs on resource and environmental management activities for the National Service Training Program (NSTP) and Civic Welfare Training Service (CWTC).

4.4 Organize and implement activities for school children and youth, such as essay-writing contest, painting contest, waste characterization, tree planting, clean-up activities, to build awareness and mobilize their participation.

Objective 5. Promote knowledge management and sharing of experiences, lessons learned, good practices, and technical and scientific information to enhance planning, decision- and policy-making, and influence actions of communities and other stakeholders.

- 5.1 Document and disseminate materials on experiences, lessons learned, good practices on ICM and sustainable development using a range of communication strategies (community organizing, multi-media, print and broadcast, folk media, etc.).
- 5.2 Develop multi-media (e.g., print, radio, TV, video and internet) materials and other materials using traditional methods to promote and share information about ecosystem dynamics, environment, ICM and other lessons and good practices.
- 5.3 Develop an integrated process and mechanism for accessing, processing and disseminating information on values, corresponding environmental issues (e.g., pollution, habitat degradation, etc.), and management response.



MITIGATE pollution and other damaging activities through integrated approaches and measures to lessen the ecological, economic and social impacts, and sustain the range of values found in Bataan.

PRINCIPLES

1. The desired outcome of mitigating damages to and sustaining the values of Bataan's coastal environment will support the same range of values in the future for a healthy condition, and ideally, these values will offer a better experience than at present.
2. Restoration, rehabilitation, and management of critical priority areas (values) are necessary and essential to sustain the life support systems of Bataan's environment for the benefit of present and future generations.
3. Establishment of guidelines, criteria, and standard of environmental quality must consider the cumulative effects of various resource utilization process on the environment, its values, and sustainable use.

OBJECTIVES

1. Control pollution from land-based activities that threaten Bataan's coastal and marine environment.
2. Minimize the risks from destructive coastal and sea-based activities that threaten Bataan's coastal and marine environment and the range of values it supports.
3. Regulate activities that result in erosion, siltation and sedimentation, and shoreline changes, and implement plans and projects that will address these issues.

THE PARTNERS

- National Government Agencies (PPA, Coast Guard, Phil. MARINA, DENR)
- Local Government Units
- FARMCs
- Private Sector
- NGOs and Civil Organizations
- Recyclers, Junk Dealers
- Communities and Households

ACTIONS

Objective 1. Control pollution from land-based activities that threaten Bataan's coastal and marine environment

1.1 Enact and implement environmental protection policies and decisions that will maintain water quality sufficient to sustain existing and future beneficial uses in marine and estuarine waters.

- ✧ Characterize different water resources and develop criteria for their utilization.
- ✧ Establish guidelines, rules, regulations, and ordinances, including monitoring and enforcement mechanisms governing the use of water resources as waste receptacles.
- ✧ Formulate and issue policy guidelines, rules, and regulations on discharges of municipal sewage, industrial and agricultural wastewater, solid waste collection and disposal, dumping of dredged materials, use of fertilizers and pesticides, and use of feeds in poultry, livestock and aquaculture farms, and establish monitoring and enforcement mechanisms
- ✧ Promote Integrated Pest Management (IPM) for agricultural production

1.2 Develop and implement integrated pollution management system with comprehensive program that defines targets, supporting policies, legislation, and budget to reduce long term loads of garbage, nutrients, toxic and hazardous substances, sediments, pathogens, and other air and water pollutants.

In partnership with concerned sectors, establish and operate:

- ✧ integrated ecological solid waste management facilities
- ✧ sewerage system for domestic and commercial waste
- ✧ in-farm waste treatment facilities and recycling and recovery facilities for agricultural waste (e.g., animal waste from piggery, poultry, and ruminants recycled into bio-gas or composted into fertilizers)
- ✧ toxic and hazardous waste management system
- ✧ air pollution control devices



Guidelines on use of water resources must be developed including monitoring of water quality.

Objective 2: Minimize the risks from destructive coastal and sea-based activities that threaten Bataan's coastal and marine environment and the range of values it supports.

- 2.1 Implement sustainable fisheries and aquaculture production and management systems.
 - ✧ Aqua-silviculture and other mangrove-friendly aquaculture
 - ✧ Proper use and application of pesticides and feeds in aquaculture farms
- 2.2 Establish an oil/chemical spill response system to prevent extensive damage to coastal and marine systems along the Bataan's coastline, in coordination with the Oil Spill Contingency Plan for Manila Bay and in coordination with existing private facilities in the province.
- 2.3 Implement guidelines for discharges of operational waste from ships, and use of anti-fouling chemicals and harmful paints.
- 2.4 Evaluate feasibility and establish and operate a shore reception facility to mitigate dumping of ballast water and shipping waste in Manila Bay and nearby areas around Bataan's coastline.
- 2.5 Identify dumping activities (e.g., dumping of dredged materials, septage sludge, solid waste, toxic and hazardous waste, etc.) along waterways and into the sea, and issue guidelines and ordinances prohibiting such activities.
- 2.6 Operate and maintain navigational aids and vessel traffic scheme to avoid accidents and ensure safety and efficient shipping and port operations.

Objective 3. Regulate activities that contribute to erosion, siltation and sedimentation, and shoreline changes, and implement plans and projects that will address these issues.

- 3.1 Prepare detailed plan for priority rehabilitation and restoration of habitats and other areas with extensive erosion and damages to sustain and enhance the productivity and values of Bataan's coastal environment.
 - ✧ Reforestation of upland watershed and catchment areas
 - ✧ River- and stream-bank stabilization
 - ✧ Reforestation of mangrove areas and abandoned fishponds
 - ✧ Dredging of heavily silted rivers
 - ✧ Delineation of buffer zones
- 3.2 Implement sustainable upland agricultural production and forest management systems
 - ✧ Sloping Agricultural Land Technology (SALT) and agro-forestry system in watershed and catchment areas
 - ✧ Monitoring system for slash-and-burn farming in upland areas
 - ✧ Integrated forestry development and management plan (IFDMP)
 - ✧ Socialized industrial forest management agreement (SIFMA)
- 3.3 Establish setback and buffer zones along riverbanks, beaches, and coastal shoreline
- 3.4 Regulate and monitor reclamation activities, mining and quarrying, over-extraction of groundwater, and logging/cutting of trees in the watershed, mangrove, and protected areas.



PROTECT AND PRESERVE the significant natural, cultural, historical and socio-economic values and features of Bataan's coastal environment for present and future generations through integrated planning and management.

PRINCIPLES

1. Protection and preservation of significant natural and cultural features of Bataan's coastal environment will ensure the long-term viability of values supported by the coasts, especially those significant to the integrity of biological community (flora and fauna) and the physical environment (geological, geomorphological) as well as aesthetics (cultural and visual).
2. The condition or state of the environment should be protected from potential damages because it provides the basis of human health and welfare, sound ecological and cultural resources, and the direction of future development activities.
3. Precautionary measures, guidelines, criteria, and standards to maintain and sustain protection and preservation efforts should be established and defined.
4. Strict and consistent enforcement of laws is necessary to ensure that the environment and the natural and cultural heritage of Bataan are protected and preserved.

OBJECTIVES

1. Maintain and sustain the integrity of resources, habitats, and biodiversity
2. Delineate reserved public lands, protected and sensitive areas and foreshore areas based on their functional and other potential uses.
3. Ensure that indigenous communities, various cultural, historical, and religious establishments, recreational sites and unique geological features are protected against inappropriate development.
4. Ensure equitable, sustainable harvesting and conservation of fish stocks as well as other key resources.
5. Protect aquifers and water sources from over-extraction and contamination.

THE PARTNERS

- National Government Agencies
- Local Government Units
- FARMCs, Fisherfolk, Farmers
- Private Sector
- NGOs and other Civil Society Groups
- Academic & Educational Institutions
- Indigenous Communities
- Communities and Households

ACTIONS

Objective 1. Maintain and sustain the integrity of resources, habitats, and biodiversity.

- 1.1 Develop integrated planning and monitoring to enhance and improve management of wetlands, coastal habitats, watershed areas, estuaries, and bays.
- 1.2 Establish and manage system of marine protected areas and sanctuaries for key habitats and rare and endangered species.
 - ✧ mangroves and mudflats
 - ✧ coral reefs
 - ✧ marine turtles
 - ✧ waterfowl and migratory birds
 - ✧ giant clams
 - ✧ capiz or windowpane oyster
 - ✧ other indigenous rare and endangered species found in Bataan
- 1.3 Establish fishery reserved areas, fish sanctuaries, and bangus fry collection points for small fisherfolk.
- 1.4 Rehabilitate habitats and other areas with extensive damages to sustain and enhance the productivity and values of Bataan's coastal environment.
 - ✧ upland watershed and catchment areas
 - ✧ natural parks and protected areas
 - ✧ coastal habitats (mangroves, mudflats, seagrass beds, coral reefs)
- 1.5 Apply integrated environmental impact assessment and risk assessment for activities that cause or may cause irreversible damage to critical features of Bataan's coastal environment.
- 1.6 Restore abandoned fishponds back into mangrove areas.

Objective 2. Delineate reserved public lands, protected and sensitive areas and foreshore areas based on their functional and other potential uses.

- 2.1 Establish a register and accounting system for sensitive and reserved public lands, titled and untitled mangrove and mudflat areas, as well as sensitive geomorphological, historic and cultural areas; unstable areas subject to erosion, inundation and land slips; areas of high visual integrity; foreshore areas; wilderness and remote areas.
- 2.2 Establish sustained protection and integrated management of the Bataan Natural Park, Roosevelt Protected Landscape as areas where settlement and development activities will be limited or banned to preserve its inherent ecological integrity and cultural value.

Critical features of Bataan's coastal environment, traditional fishing areas and other critical habitats must be protected and preserved against inappropriate development processes.



Objective 3. Ensure that indigenous communities, various cultural, historical and religious establishments, recreational sites and unique geological features are protected against inappropriate development.

- 3.1 Establish and implement programs and policies for the protection and management of indigenous sites in accordance with their culture and traditions, and develop education and economic opportunities for indigenous peoples.
- 3.2 Manage and preserve various cultural, historical, archaeological and religious establishments, recreational sites and unique geological features, and zoning of these areas
 - ✧ management plan (together with the integrated land- and sea-use plan)
 - ✧ criteria and guidelines for restoration and restoration plan (for damaged sites)
 - ✧ legal and financing mechanisms
 - ✧ users fee system
 - ✧ monitoring and enforcement system
- 3.3 Incorporate zoning, protection, and maintenance of indigenous, cultural, historical, archaeological, religious and unique geological sites into local development plans and land-use plans
- 3.4 Include criteria and guidelines for the protection of indigenous, cultural, historical, archaeological, religious and unique geological sites in the Environmental Impact Assessment (EIA) criteria for evaluation of development, infrastructure, and tourism projects.

Objective 4. Ensure equitable and sustainable fish harvesting and conservation of fish stocks and other key resources.

- 4.1 Review the status of commercial and municipal fisheries as well as aquaculture and mariculture areas in order to identify future sustainable management options.
- 4.2 Establish sustainable use and production schemes for fishery resources.
 - ✧ allowable catch limit according to type of fishery (municipal or commercial) and fishing gear and quota system
 - ✧ allowable fishing methods
 - ✧ open and closed fishing season to allow regeneration
 - ✧ no-catch zones
 - ✧ areas for harvesting commercially and ecologically important species
 - ✧ permitting and licensing system
 - ✧ appropriate technology, methods, practices, feeds, and specifications for aquaculture and mariculture production
- 4.3 Control illegal, unregulated, and destructive fishing practices and prevent easy access to raw materials used for dynamite and cyanide fishing.
- 4.4 Develop fisheries management plans (in accordance with the Fisheries Code), appropriate indicators for all major fish species, commissioning of stock assessment, monitoring and research programs, as well as provision of extension facilities and services.
- 4.5 Monitor and control the introduction of alien and invasive species.

Objective 5. Protect aquifers and water sources from over-extraction and contamination.

- 5.1 Identify all existing and potential sources of water supply (surface water and groundwater) and determine current use and demand
- 5.2 Establish water rights and users fee system, and apply demand-side management and water-use reduction technologies to promote recycling and regulate extraction and use of water
- 5.3 Determine aquifer capacity and establish limits to deepwell construction, groundwater extraction, and free flowing water systems
- 5.4 Construct water supply system from surface water in accordance with the conservation of habitats and ecosystems
- 5.5 Construct/rehabilitate irrigation systems and multi-purpose water reservoirs to increase water availability for agricultural, domestic, and industrial use.

DEVELOP opportunities within Bataan's coastal areas as well as directions for future uses of resources in partnership with various sectors and stakeholders.

PRINCIPLES

1. Development processes should occur at varying and applicable scales – from the dense urban form to low scale infrastructures, designed to protect and enhance the natural environment from commercial ventures, which provide employment opportunities to public ventures designed to enhance community use and benefits.
2. Development in coastal locations should recognize existing settlements and new settlements should be properly planned and implemented based on a strategic planning and management processes.

THE PARTNERS

- National Government Agencies
- Local Government Units
- Shipping and Ports Sector
- Fisheries Industry
- Private Sector
- NGOs and other Civil Society Groups
- Academic & Educational Institutions
- Financial Institutions
- Inter-governmental Institutions
- Donors
- Indigenous Communities, FARMCs, Fisherfolk, Communities and Households

OBJECTIVES

1. Develop Implementation Plan for the Bataan Sustainable Development Strategy to address issues and areas of concern such as habitat degradation and wanton conversion, illegal/destructive resource use methods, and pollution.
2. Establish a clear system of facilitating major developments in suitable coastal locations, through integrated environmental impact assessment (IEIA) and risk assessment, integrated planning and management, and systematic approval processes for development in coastal areas.
3. Develop and/or improve facilities for public use and recreation.
4. Develop alternative livelihood options that would benefit and accommodate the needs of communities and reduce habitat and resource over-exploitation and destruction.
5. Encourage the adoption of innovative partnership arrangements among the public and private sectors, civil society and communities for the development and operation of environmental infrastructure, and effective delivery of services.

ACTIONS

Objective 1. Develop Implementation Plan for the Bataan Sustainable Development Strategy, and identify action plans with clear targets, timeframe, budget and financing strategy, institutional arrangements, and supporting policies and laws.

- 1.1 Together with various sectors and stakeholders, formulate and adopt the Operational Plan for the Bataan Sustainable Development Strategy to protect the natural and cultural heritage, address issues and areas of concern such as habitat degradation and wanton conversion, illegal/destructive resource use methods and pollution, and ensure sustainable development.
- 1.2 Develop project proposals for financing and implementation of the actions plans, and meet the targets within the given timeframe.

Guidelines for development of critical areas for varied uses such as tourism and recreation should be enhanced.



Objective 2. Establish a clear system of facilitating major developments in suitable coastal locations, through integrated land- and sea-use planning, integrated environmental impact assessment (IEIA), risk assessment and management, and systematic approval processes for development in coastal areas.

- 2.1 Develop and adopt integrated land- and sea-use plan, including base map, Atlas and geographical information system (GIS) to guide and support decision-making of local officials, planners, and environmental resource use managers.
 - ✧ Define management boundaries and area of responsibilities to achieve proper and sustainable development.
 - ✧ Consider and incorporate Bataan's coastal character into the process of municipal and provincial development planning
 - ✧ Apply planning schemes and ordinances uniformly and systematically over defined areas such as wetlands, estuaries and coastal, and marine waters.
- 2.2 Identify areas for development and provide direction for site selection, scale of use and scope of development activities in critical areas such as upland (>15% slope), coastal and foreshore areas, and other key habitats.

Ensure appropriate port infrastructure and coastal dependent industrial development. Commercial developments in and around fishing facilities, fishing grounds and ports will respect the rights of access of current users.

Proposals for new industries, tourism and real estate developments or large scale expansion must demonstrate that cumulative and long-term effects on the environment are manageable and provide appropriate compensation for any net loss of access to the foreshore.

Ensure that sensitive sites are identified to protect against inappropriate development and use.

- ✦ Develop criteria and standards to provide clear guidance for appropriate investments along the coasts.
- ✦ In accordance with the integrated land- and sea-use zoning plan, identify areas where development activities will be restricted or prohibited.
- ✦ Identify investment priorities to ensure that Bataan does not lose the chance to capitalize on major coastal development proposals, but at the same time, will not compromise or destroy its resources in the process of investment and development activities.

Strict zoning along with comprehensive land- and sea-use plans must be developed to ensure that development processes do not impinge on critical areas in the province.



- 2.3 Establish review, approval, and monitoring system for major developments through a single coordinating agency to ensure consistent and non-conflicting use and advice (e.g., Integrated EIA/EIS system, Risk Assessment and Risk Management).
- 2.4 Formulate guidelines to develop and direct the future use of critical resources and to improve engineering designs of buildings & infrastructures in critical coastal areas through an integrated zoning plan.

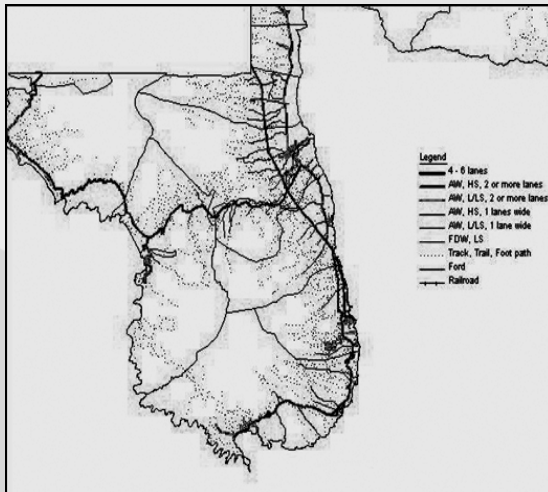
Guidelines and standards for:

- ✦ locating, designing, and developing plans for urban centers and residential areas, industrial areas, tourism and recreation establishments and protected areas, among others.
- ✦ buildings in foreshore areas, including priorities for improvement, or for removal or relocation to less biophysically- socially- and visually-sensitive inland sites
- ✦ design of infrastructures, including waste treatment and disposal systems, which should be incorporated into the integrated land- and sea-use plan.
- ✦ proper reclamation and conversion of agricultural areas and coastal habitats
- ✦ design and construction of coastal and mountain-side roads

- 2.4 Enforcement of strategic priorities to improve facilities and livelihood in human settlements.
 - ✦ Avoid proliferation of built-up areas in critical areas, key habitats, and protected areas
 - ✦ Integration of drainage and waste collection and disposal systems into building plans
 - ✦ Development of a long-term forward plan to maintain and replace infrastructure facilities (e.g., every 25 years).
 - ✦ Development and maintenance of scenic coastal roads and transport corridors without affecting the ecological integrity of critical areas.

Objective 3. Develop and/or improve facilities for public use and recreation.

- 3.1 Allocate areas along beaches and natural parks to ensure public access and enjoyment of amenities.
- 3.2 Establish forest and mangrove parks and bird-watching areas.
- 3.3 Upgrade facilities in historical, cultural and tourism sites, and enforce policies and regulations against vandalism and other acts of desecration.
- 3.4 Enhance historical- and nature-based tourism and ensure that tourism developments are in suitable locations, and designed to have minimal impacts ecologically and aesthetically.
- 3.5 Develop guidelines for the operation of permanent or temporary venues for staging major coastal activities, sporting and cultural events in conjunction with major users, with emphasis on the protection of the environment and promotion of public awareness.



Base maps, such as the road network map of Bataan are important tools in decision making.

Objective 4. Develop alternative livelihood options that would benefit and accommodate the needs of communities, and reduce habitat and resource over-exploitation and destruction.

- 4.1 Undertake research and development programs to identify and support resource use for coastal communities
- 4.2 Establish and develop indigenous industry among the indigenous coastal communities of Bataan.
- 4.3 Formulate and implement alternative livelihood programs for upland, lowland, and coastal communities.
 - ✕ community-based forest management and socialized industrial forestry development and management arrangement and programs
 - ✕ community-based mangrove reforestation
 - ✕ culture of capiz or window pane oysters, mussels, mudcrabs, and seaweeds
- 4.4 Provide stewardship contracts to primary resource users (e.g., indigenous and upland communities in critical watershed areas; communities in coastal areas) to sustain productivity of critical resources and to prevent destructive and illegal use of resources.
 - ✕ Resource tenure improvement and alternative livelihood development
 - ✕ Community-based forest and coastal resources management
- 4.5 Carry out eco-tourism programs together with the indigenous communities and coastal communities.
- 4.6 Implement plan for the relocation of illegal/informal settlers along the coast and waterways, and develop livelihood programs for relocated settlers.

Objective 5. Encourage the adoption of innovative institutional mechanisms and partnership arrangements among the public and private sectors, civil society and communities for resource conservation and management, the development and operation of environmental infrastructure and effective delivery of services, protection of natural, cultural and historical and socioeconomic values, and implementation of actions identified in the Bataan Sustainable Development Strategy and the Operational Plan.

- 5.1 Establish and institutionalize a working Project Coordinating Committee to oversee the implementation of ICM program and the activities and actions plans identified in the Operational Plan of the Bataan Sustainable Development Strategy.
- 5.2 Set-up and operationalize an integrated river basin and coastal area management system for the province.
- 5.3 Undertake ICM activities, resource conservation, pollution reduction and other actions identified in the Bataan Sustainable Development Strategy, and replicate best ICM practices through inter-governmental, inter-agency and intersectoral approach.
- 5.4 Develop investment plans and public-private partnership arrangements for the establishment and operation of environmental facilities and services, such as water supply and sanitation, integrated solid waste management system, sewerage system, toxic and hazardous waste management system, etc.
- 5.5 Establish shared-ownership system for municipal fisheries and aquaculture, forest and upland areas, and other resources through cooperatives and partnership agreements.

Objective 6. Ensure that data collection, research, environmental and socio-economic monitoring, information management and analysis, and program/project monitoring and evaluation (M&E) are coordinated and integrated and will provide concrete direction and support to management, policy- and decision-making.

- 6.1 Establish and operate an integrated information management system (IIMS) with GIS capability as a centralized data collection, service and information processing system, as well as environmental and socio-economic monitoring system to improve management capacity through decisions and policies based on scientific/technical data.
- 6.2 Conduct of program audits to assess research and development requirements to improve management of Bataan's coastal resources and its values.
- 6.3 Direct research efforts and monitoring activities towards priority areas through data analysis and risk assessment (e.g., effects of pollution on fisheries and coastal waters, etc.)
- 6.4 Conduct of carrying capacity studies on priority areas (e.g., critical habitats, aquaculture, pollution loading), resource & fish stock assessment & monitoring.
- 6.5 Conduct environmental and resource mapping, assessment, and valuation.
- 6.6 Implement the Eco-Watch and Blue Flag System to monitor beach and coastal water quality.
- 6.7 Monitor Red Tide occurrences and indicators of algal blooms and fish kills.
- 6.8 Establish and put into operation a monitoring and evaluation system to assess performance, results/outcomes and impacts of ICM activities, actions identified in the Bataan Sustainable Development Strategy, and the action plans under the Implementation Plan of the Sustainable Development Strategy.

Objective 7. Formulate and implement ordinances, monitoring and law enforcement mechanisms, penalties, and complementary system of incentives and market-based instruments to address the adverse effects of pollution and unsustainable resource use.

- 7.1 Enact policies and ordinances that would limit conversion and reclamation of traditional fishing grounds, bangus fry collection areas, mangroves and mudflats, and the mining and quarrying of sand and rocks from beaches and rocky shores.
- 7.2 Enact 'polluter pays' penalties along with various economic or market-based instruments that will add strength to existing laws and regulations on pollution and resource use.
- 7.3 Issue sanctions and stiff penalties on illegal, unregulated, and destructive fishing activities.
- 7.4 Strengthen maritime police, 'Bantay-Dagat' volunteers and fish wardens' capability to enforce policies, rules, and regulations.
- 7.5 Establish a legal office that would assist fish wardens in dealing with legal impediments in filing cases against violators of established policies.
- 7.6 Establish property rights system to ensure optimal allocation and use of resources, and reduce multiple-use conflicts.
- 7.7 Enact local ordinances for the adoption and implementation of the integrated land- and sea-use plan, priority actions (identified in the Bataan Sustainable Development Strategy and Implementation Plan) as well as for the implementation of national laws and International Conventions, Protocols and instruments related to pollution and development of areas that will affect biodiversity, wetlands and other key habitats and resources.
- 7.8 Adopt users fee system to maintain natural parks, recreational areas, and historical and cultural sites.
- 7.9 Formulate and implement policies and ordinances prohibiting the cutting of mangroves and filling in of mudflat areas for resettlement, tourism, commercial and industrial areas and development of ports and jetties.

Objective 8. Develop and implement incentive and recognition systems to promote excellence in using, managing, and sustaining productivity of the different values of Bataan's coastal environment.

- 8.1 Promote and give recognition to voluntary work and accomplishments.
 - Cleanliness contest, etc. (e.g., Clean and Green Contests)
 - Awards for Kontra-Kalat sa Dagat and mangrove reforestation activities
 - Gawad Galing Pook
- 8.2 Promote ISO 14000 compliance certification for private companies, industries and local government units, and assist them towards the implementation of Environmental Management Systems (EMS).



Banan Coastal Care
Foundation, Inc.

PATAAN

EGREED COASTA

AGREEMENT OGRA





9. EXECUTING THE BATAAN SUSTAINABLE DEVELOPMENT STRATEGY

PARTNERSHIP APPROACH

The Bataan Sustainable Development Strategy is a partnership. This means that in executing the strategy, every stakeholder groups have to do their part. Everyone has a specific role to play at various levels and degrees. The following are some of the actions expected from the various stakeholder groups in Bataan:

✧ **National, Provincial, and Municipal Governments**

It is expected that provincial and municipal local government units, with support from the National government, would: (a) develop and implement local plans of action and support of the sustainable development strategy; (b) institutionalize local administrative and financial support, including planning and approval systems consistent with the sustainable development strategy; (c) establish partnerships with the private sector and civil society groups; (d) mobilize local stakeholders and empower them to become stewards of environmental resources; (e) identify opportunities for economic development that will support the strategy; (f) identify and integrate existing programs and activities of LGUs into action plans; and (g) establish monitoring and evaluation systems.

✧ **Private Sector**

The private sector, as part of their social responsibility to their host, are expected to: (a) exercise corporate responsibility in relation to the sustainable development of Bataan's natural resources; (b) work in partnership with the provincial and municipal government units, including civil society groups and communities in implementing the strategy; and (c) invest in the environment and in developing opportunities that would benefit the people and the environment.

✧ **Civil Society Groups**

NGOs, POs and religious groups can do the following: (a) organize and mobilize communities along with other sectors/stakeholders to implement action programs outlined in the strategy; (b) formulate and

implement environmental information, education, and communication campaigns; (c) strengthen linkages between environmental and social programs and their execution, e.g., poverty alleviation, alternative livelihood credit / extension services as well as gender issues; (d) ensure that the rights of indigenous communities and marginalized groups are known, respected, and observed; and (e) raise funds in support of identified Action Programs.

✧ **Communities**

Communities being the end beneficiaries of the Bataan Sustainable Development Strategy, are expected to: (a) be informed of issues and responsibilities; (b) support and participate in the development and implementation of action programs; (c) volunteer as communicators, educators, and advocates of the environment in various activities such as *Kontra Kalat sa Dagat*, *Linis Barangay*, *Bantay Gubat*, *Bantay Pawikan*, *Bantay Dagat*, environmental monitoring activities among other worthy community-based activities.

✧ **Academe and Educational Institutions**

Being the center of knowledge and education, academic and educational / research institutions are expected to provide or assist in: (a) providing expertise and advice on relevant information from the national to the local levels; (b) interpret monitoring data and research/development information to be used by local stakeholders; (c) undertake research and development programs that would address information gaps and uncertainties in relation to policy and management issues in the province; (d) participate actively in policy and decision-making processes both at the national, regional, and local levels; (e) build and strengthen local capacities through training and formal / non-formal education; and (f) develop and coordinate environmental education programs and events focused on schoolchildren and the youths.

UN, International Agencies, and Donors

The United Nations, along with other international agencies and donor groups, can support the execution of the Bataan Sustainable Development Strategy by providing both technical and financial assistance in such areas as: (a) capacity building; (b) training and education; (c) demonstration projects and preparation of working models; (c) case studies, transfer of experiences, and information sharing from other regions; (d) networking among regular and parallel ICM sites and support groups; (e) new technologies and approaches (e.g., information technology and biotechnology); (f) effective implementation and monitoring of international conventions; (g) addressing transboundary issues; (h) forging partnerships between foreign investors, operating companies, and local stakeholders; and (i) leverage financing for environmental investments.

Financial Institutions

Financial institutions can support the implementation of the Bataan Coastal Strategy by providing expert advice and assistance on the following: (a)

establishing sustainable environmental facilities and services; (b) soft loans; (c) grants; (d) loan guarantees; (e) bonds and securities; (f) setting aside of green fund or environment fund; and (g) establishing micro-credit programs for micro-businesses and small-scale enterprises involving local communities and marginalized groups.

INSTITUTIONAL MECHANISMS

Existing institutional mechanisms need to be identified along with the responsible agencies/sectors and the legal instruments associated with various social and economic activities in the coastal area. By doing these, existing conflicts between agencies, overlapping of functions and lack of uniformity between provincial and municipal ordinances as well as between municipalities. There are also cases when there are national laws with provisions for local implementation, but local government units are hardly aware of such. There were also cases when municipal ordinances exist, but are not known to the people. This will also assess the capability of an agency's enforcement capability.

Table 7. Essential Institutional Mechanisms by Sector.

| SECTOR | INSTITUTIONAL MECHANISM | RESPONSIBLE AGENCY | AREA OF RESPONSIBILITY | ENFORCEMENT CAPACITY | FACILITIES / SERVICES | AREAS OF OPPORTUNITIES FOR PARTNERSHIPS |
|-------------|--|--------------------|---|----------------------|-----------------------|---|
| Fisheries | RA 8550 Fisheries Code | LGU, DA-BFAR | Province of Bataan & various municipalities | Limited | Limited | NGOs, POs & other civil society groups can provide additional help. e.g.: Bantay Dagat/monitoring of fishing activities and IEC |
| Environment | Various PDs and DAOs | LGU, DENR, | Province of Bataan & various municipalities | Limited | Limited | Private Industries, NGOs, POs & other civil society groups can provide additional help. |
| Shipping | International & National Maritime Laws | LGU, PPA, PCG | Bataan, Manila Bay & South China Sea Coastline & Adjacent areas | Limited | Limited | Shipping & Private Industries can help LGUs, PPA & PCG; NGOs & Civil society groups can also support |

| SECTOR | INSTITUTIONAL MECHANISM | RESPONSIBLE AGENCY | AREA OF RESPONSIBILITY | ENFORCEMENT CAPACITY | FACILITIES / SERVICES | AREAS OF OPPORTUNITIES |
|-------------|--|----------------------------------|---|----------------------|-----------------------|--|
| Waste Mgt. | National Laws & Municipal Ordinances | LGU, DPWH | Province of Bataan & various municipalities | Limited | Inadequate | NGOs, POs & other civil society groups can provide additional help. |
| Tourism | National Laws & Municipal Ordinances | LGU (Prov'l Tourism Office), DOT | Province of Bataan & various municipalities | Limited | Adequate | NGOs, POs & other civil society groups can provide additional help. |
| EIA | DAO 34 & other Env't'l Laws & Municipal Ordinances | LGU, DENR, | Province of Bataan & various municipalities | Limited | Adequate | Private industries can provide big support along with NGOs & other civil groups. |
| Forestry | Forestry Code & other National Laws & Municipal Ordinances | LGU, DENR, | Province of Bataan & various municipalities | Limited | Adequate | NGOs, POs & other civil society groups can provide additional help. |
| Agriculture | National Laws & Municipal Ordinances | LGU, DA-OPA | Province of Bataan & various municipalities | Limited | Adequate | NGOs, POs & other civil society groups can provide additional help. |
| Education | National Laws & Municipal Ordinances | LGU, DECS | Province of Bataan & various municipalities | Good | Adequate | NGOs, POs & other civil society groups can provide additional help. |
| Recreation | National Laws & Municipal Ordinances | LGU (PTO), DOT | Province of Bataan & various municipalities | Good | Adequate | NGOs, POs & other civil society groups can provide additional help. |
| Planning | National Laws & Municipal Ordinances | LGU (PPDO, MPDO) | Province of Bataan & various municipalities | Limited | Limited | BICMP, NGOs can provide inputs for planning |

| SECTOR | INSTITUTIONAL MECHANISM | RESPONSIBLE AGENCY | AREA OF RESPONSIBILITY | ENFORCEMENT CAPACITY | FACILITIES / SERVICES | AREAS OF OPPORTUNITIES |
|--------------|--------------------------------------|--------------------|---|----------------------|-----------------------|---|
| Econ. Dev't. | National Laws & Municipal Ordinances | LGU | Province of Bataan & various municipalities | Limited | Limited | NGOs, POs & other civil society groups can provide additional help. |

Overall, planning in relation to the Bataan Sustainable Development Strategy and its implementation should consider three major sectors — economic, society, and environmental/human health sectors. These sectors influence each other and efforts of agencies toward this end should be well-coordinated. The lack of coordination in these efforts often leads to conflicts in policies and other negative effects. Thus, there is unbalanced development, unstable and short-lived effort — one that cannot be sustained for a long-time. Hence, if Bataan is to pursue an integrated coastal management program, the stakeholders concerned agencies and various sectors with mandates to care for nature and its bounty should have coordinated and stable efforts which can be sustained over a long period.

The ultimate end of the Bataan Sustainable Development Strategy is to balance the development and management efforts of the different sectors and agencies. It also seeks to balance people, localities, and generations. This is in line with the three dimensions of sustainable — economic, social, and environmental — supported by growth with equity, people empowerment, and maintenance of ecological integrity. With this effort, the strategy can work simultaneously at the top, on the policy level and at the bottom on the program or project level. Overall, the Bataan Sustainable Development Strategy provides the framework for a more in-depth environmental management plan and other action plans.



10. MONITORING THE SUSTAINABLE DEVELOPMENT STRATEGY

Several indicators have been established to assess the level of progress regarding the implementation of the Bataan Sustainable Development Strategy (BSDS). The indicators provide a systematic method for each stakeholder and the community to track the movement of the Bataan coastal and marine environment toward management arrangements, systems and processes that are identified in the strategy.

The attainment of desired outcomes achieved by the objectives, strategy and action plans of the BSDS can be classified into:

- ✧ Institutional activities – these include the individual and collective policy, legal and administrative action of national and local governments in accordance with the sustainable development strategy.
- ✧ Operational activities – this refers to the measures taken by the stakeholders for the mitigation, protection and preservation of the coastal and marine resources and the values/benefits that the community derive from them.
- ✧ Environmental state – this refers to the quality and quantity of natural resources, and the state of human and ecological health. Indicators in this type reflect the functional status of the coastal and marine environment for human, industrial, and tourism purposes.

One of the early initiatives to implement the Bataan Sustainable Development Strategy involves the signing of a manifesto of support and commitment of stakeholders. This manifesto categorically implies to attain the desired outcomes and changes stipulated in the strategy. In the interim, the institutional, operational and environmental indicators will be adapted to the Bataan Sustainable Development Strategy and the changes and revisions will be done from time to time as the monitoring and reporting system develops based on the capacity of various stakeholders, both national and local level increases. An Implementation Plan for the BSDS will also be developed to identify action programs and activities with clear, measurable targets and responsible sector/agency/institution. This will help in the tracking of activities being undertaken to implement BSDS and the outputs and outcome being generated as a consequence.

TEMPLATE FOR MONITORING THE STRATEGY

| INDICATOR DESCRIPTION | CURRENT STATUS | MILESTONE TARGET | REMARKS |
|--|----------------|------------------|---------|
| <p>Institutional</p> <p>1. Inter-agency, multi-sectoral councils established at local levels.- number of coastal and non-coastal LGU councils</p> <ul style="list-style-type: none"> ■ Proposed ■ In-place <p>2. Formulation of the Integrated Coastal Zoning and Sea-use Plan.- number of LGUs with duly approved ICZSUPs</p> <ul style="list-style-type: none"> ■ Proposed ■ In-place <p>3. Adoption of national and local coastal and marine policies and ordinances.- number of policies and/or ordinances</p> <ul style="list-style-type: none"> ■ Proposed ■ In-place <p>4. Multi-sectoral voluntary agreements.- number of agreements</p> <ul style="list-style-type: none"> ■ Proposed ■ In-place | | | |

| INDICATOR DESCRIPTION | CURRENT STATUS | MILESTONE TARGET | REMARKS |
|--|----------------|------------------|---------|
| <p>Operational</p> <p>1. <i>Coastal land- and sea-use zoning scheme along the Bataan coastline.</i> - length of coastline (km)</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place <p>2. <i>Catchments areas with environmental coastal management plans.</i> - total catchments area (km)</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place <p>3. <i>Coastal and marine areas with environmental management programs.</i> - total coastal and marine area (km²)</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place | | | |
| <p>Environmental</p> <p>1. <i>Industries and private enterprises secure certification of ISO 14000 compliance or other similar environmental standards certification</i> *.</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place <p>2. <i>Integrated Solid Waste Management System (materials recovery facility and centralized sanitary landfill)</i> - number of LGUs with solid waste management system</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place <p>3. <i>Sewage treatment facility</i> - percentage of coastal population with treatment facilities</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place <p>4. <i>Drinking water</i> - percentage of population with access to safe drinking water</p> <ul style="list-style-type: none"> ▪ Proposed ▪ In-place <p>*Voluntary</p> | | | |

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PHOTO CREDITS

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Bataan Coastal Care Foundation, Inc.

The BCCFI aims to act as a catalyst and provide counterpart funding for the Bataan Integrated Coastal Management Program (BICMP) to build better coastal governance, explore ways for a dynamic and sustainable public-private partnerships in environmental management, increase awareness, and promote community participation in coastal resources management.

Member Companies

- Ayala Land, Inc.
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- Planters Products, Inc.
- PNOC - Alternative Fuels Corporation
- San Miguel Corporation
- Total Petroleum Philippines, Inc.
- Oilink International

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