

technical report

MTS. KAMBINLIW & REDONDO,
DINAGAT ISLAND, SURIGAO DEL NORTE

LORETO



HARIBON
FOUNDATION

Integrating Forest Conservation with Local Governance

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technical report

*Mts. Kambinliw & Redondo
Loreto, Dinagat Island, Surigao del Norte*

INTEGRATING FOREST CONSERVATION WITH LOCAL GOVERNANCE



Haribon Foundation



BirdLife International



European Commission



Royal Netherlands Embassy

Nature of Organization

The Haribon Foundation for the Conservation of Natural Resources, Inc. or Haribon is an organization dedicated to environmental protection, conservation of critical habitats, sustainable use of natural resources and the preservation of Filipino indigenous peoples' culture.

History

Haribon started in 1972 as a bird-watching society. Eventually, it evolved into a full-fledged conservation foundation under the energetic leadership of Dr. Celso R. Roque and Dr. Colin P. Rees. It was issued a certificate of incorporation as a non-stock, non-profit foundation on November 20, 1984 by the Securities and Exchange Commission.

Haribon, as it stands today, is the biggest Filipino non-government organization (NGO) dedicated to conservation and environmental issues. It is supported and endorsed by both the local and international conservation community. Haribon is a partner of BirdLife International and a member of the World Conservation Union.

Name, Logo and Slogan

The name "Haribon" was coined from two Filipino words, "Hari" and "Ibon" or "Haring Ibon", which loosely translates to "King of the Birds" or the Philippine Eagle. The name "Haribon" dramatizes the need to conserve the vanishing Philippine wildlife and their habitat. The stylized logo represents a balanced ecosystem and manifests the interrelatedness of the various ecosystems. Together with the name "Haribon", they represent the goals of Haribon Foundation. Haribon's slogan is "Protecting Nature, Preserving Life."

Vision and Mission

Haribon takes the lead in caring for nature with the people—for the people. It is a membership organization committed to nature conservation through community empowerment and scientific excellence.

Strategies

- Strengthen community-based resource management through community organizing, sustainable livelihood development and community empowerment.
- Build a constituency for biodiversity conservation through membership development, communication and public awareness raising, alliance building and networking, and advocacy.
- Conduct scientific and developmental and participatory research studies using globally-and locally-accepted standards for biodiversity conservation.
- Establish an education and training institution on natural resource management with world-class standards.
- Strengthen the institution through staff development, upgrading of facilities, establishment of "Pugad" Haribon or Haribon house, and continuous review of policies and procedures.
- Develop proactive and responsive policy advocacy mechanisms.
- Develop financial sustainability mechanisms.

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Haribon Foundation for the Conservation of Natural Resources and BirdLife International have chosen Dinagat Island as one of the 117 Important Bird Areas in the Philippines. Haribon believes that to conserve the natural resources in Dinagat, local stakeholders such as the local government units, people's organizations, other government agencies and communities must be able to sustainably manage their forests. They must be given a chance to reflect and participate in forest resource assessment, planning and management.

Dinagat is an island of immense biological wealth, yet it desperately needs protection from destructive activities such as mining and logging. While its remaining forests, Mts. Kambinliw & Redondo, continue to provide benefits to the local people, the rate of forest destruction remains indirectly proportional to the conservation efforts by concerned agencies in the area. Haribon therefore endeavored to facilitate the assessment of Dinagat's biophysical, socio-economic and institutional features. The results of such assessment are contained in this Technical Report.

Eight chapters comprise this report. It starts with an introductory chapter that relates how Dinagat has been selected as a Haribon project site. Chapters 2 and 3 describe the biophysical and socio-economic features of Mts. Kambinliw & Redondo. How the communities use their forest resources is the focus of chapter 4. The impact of mining in forest resources and conservation is discussed in chapter 5 while chapter 6 describes the management capacities and institutional arrangements in managing the forest areas. The last two chapters focus on the threats and provide recommendations how these can be hurdled.

Haribon appreciates the efforts of all men and women from Dinagat who made the production of this report possible. All readers are enjoined to critically read this document and share their views on how to advance the protection and conservation of one of the last refuge of biodiversity in the Philippines.

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executive summary

The Philippines' immense biological wealth and beauty is fast disappearing. There are many sad tales of unique plants and animals which have become threatened or extinct. Alarmed over the trend, Haribon Foundation and BirdLife International have moved to identify the last remaining forest frontiers in the country. They call these fragments the Important Bird Areas (IBA) in the Philippines – the key conservation sites for birds, habitats and people. These are the last natural heritage of the Filipinos, and the last beacons of hope for the country.

Dinagat Island is one of the 117 key conservation sites in the Philippines, and it is also recognized as an IBA. Only the vast Philippine Sea separates the beautiful Dinagat Island from Southern Leyte and mainland Surigao del Norte. The Island's rolling terrain and idyllic sceneries never fail to enthrall local and foreign seafarers and tourists. Just as the scarred mountains bearing traces of once verdant forests lost to mining and logging always draw regretful sighs.

The Haribon Foundation fielded its seasoned biologists, social workers and planners in 2001 to assess the conservation status and actions for Dinagat Island. The Haribon team used a combination of bio-physical survey methods, participatory rural appraisal techniques, and observations. A journey into the island would reveal nature's bounty, majestic yet unguarded against massive mining operations. The last remaining rainforests are in Mts. Kambinliw & Redondo – mythical, rich, isolated and defenseless against destruction. The forests are within the jurisdiction of the municipality of Loreto and barangays Esperanza, Kambinliw and Panamaon.

Mts. Kambinliw & Redondo tower at 929 meters above sea level. These mountains have 4 water basins whose stability depends on the remaining forest cover in Loreto. The water basins provide water for farm irrigation, domestic uses, and energy for hydroelectric power generation. The interrelatedness of water basins and forest cover has never been well understood and has always been downplayed by those who hold the power to decide in Loreto. Mining, logging and agricultural expansion have always been favored against forest protection and conservation.

The presence of forest cover is crucial for human survival, especially in a rain-drenched island like Dinagat which is frequently slammed by howling typhoons. Indeed, the remaining forests in Mts. Redondo & Kambinliw serve as natural barriers against floods, heavy wind and soil erosion. Whether the forests can maintain their ecological functions depend on the extent of mining

operations in the area that the national and local governments will allow in the future.

Not many people inhabit Loreto. The 3 barangays along the edges of the forests only have a total human population of 3,514 occupying 10,327 hectares or a population density of 0.4 person per hectare. Those old enough to work usually migrate to the mainland for economic reasons. Only those who are satisfied with tilling the land, fishing in the seas and raising livestock choose to stay in the island. From this livelihood, the local people derive a marginal monthly family income ranging from P1,000 to P6,000. The aggregate rice and corn yield in the area is not sufficient to supply the local needs. Fishing in the area is too underdeveloped to be profitable. Hand-to-mouth existence best describes the lives of those who surround the forest fringes. To have extra income, they harvest forest products and occasionally hunt wildlife. The local government gets unaccounted and very irregular income from tourism, especially from the Linaw Resort and Mt. Campintac. In the perception of many people from the area, what boosts the local economy is mining. Whether this is real or imagined, mining may always be favored over other existing economic options in Loreto. Those who hold the opposite view belong to a silent minority.

The Last Rainforest in Dinagat

The forests of the island present a scenic transition from mossy, montane, lowland, grassland and mangrove to beach forests. These are home to more than 100 bird species, 3 endemic species of mammals, and more than 400 plant species. Most of these species are found only in the Philippines and inhabit only the Mindanao faunal region.

Keeping the remaining forests in Loreto intact is critical not only for maintaining a source of water, food, shelter and medicine; it will also prevent natural disasters such as drought, landslides and flashfloods from claiming precious lives and properties.

Among the key species in Mts. Kambinliw & Redondo which illustrate the range of concerns in conserving biological diversity are: Mangkono, Yakal, Mindanao Bleeding-heart, Writhed Hornbill, Yellowish Bulbul, Philippine Cockatoo, Dinagat Cloud Rat, Dinagat Gymnure, Mindanao Tree Shrew, and Philippine Flying Lemur. These wonderful gifts of nature might soon be lost to mining, if the national and local government do not put a premium to forest protection.

The local government of Loreto has started taking steps toward protecting their environment. They have issued local ordinances on mangrove protection and waste management. But these are small steps and none yet cover the apparent need for forest conservation.

How to protect an area rich in natural wealth and biological diversity is the problem for Dinagat and its people. This challenge is complicated by a national policy that declared the whole Dinagat as a Mineral Resource Reserve, prompted by the people's simple wish for a livelihood source and by local government units that still need to possess the knowledge, the commitment and the will to protect the environment.

What remains of the forests in Dinagat are faced with various threats such as (1) open-pit, mining, (2) logging, (3) conversion of forestland to agricultural lands, (4) unregulated collection/harvesting of forest resources, and (5) small-scale charcoal making. Mining poses the greatest threat on the integrity of the remaining forests in the Island. The Island of Dinagat is known to keep the largest-layered chromite deposit in the Leyte-Samar-Dinagat region, a reality that makes the area attractive to mining companies.

The results of the threat analysis and ranking activity facilitated by Haribon suggest the need for urgent action to save the forests of Loreto and the whole of Dinagat from rapid destruction. After assessing the threats at different angles, Haribon forwards the following recommendations, which are believed to be the most strategic actions to keep our remaining rainforests alive: (1) Convene legal experts to resolve the conflict between mining and forest protection, (2) Conduct a resource valuation in Dinagat to see which between mining and forest conservation can sustain people's lives and genuinely propel their economic mobility, and (3) Identify and establish timber plantations for domestic and commercial use following the Rainforestation strategy (a reforestation technique that uses native and indigenous tree species to bring back biodiversity and the forest's ecological function). The results of these studies should be able to shape a direction for sustainable forest management and protection, and support programs such as communication and education, training, advocacy, and livelihood alternatives.

acronyms

ADP	Annual Development Plan
A&D	Alienable and Disposable (Land)
BDP	Barangay Development Plan
BHW	Barangay Health Workers
BMFI	Balay Mindanao Foundation, Inc.
BPLK	Barangay Pulis Laban sa Krime
BSWM	Bureau of Soils and Water Management
CAME	Coastal Area Managers for Esperanza
CBRMP	Community-Based Resource Management Project
CENRO	Community Environment and Natural Resources Office
CERD	Community Extension and Research for Development
CLOA(s)	Certificate of Land Ownership Agreement(s)
CPPAP	Conservation of Priority Protected Areas Project
CSC	Philippine Civil Service Commission
DAR	Department of Agrarian Reform
DAO	Department Administrative Order
DENR	Department of Environment and Natural Resources
DepEd	Department of Education
DILG	Department of the Interior and Local Government
EBA	Endemic Bird Areas
ECC	Environmental Compliance Certificate
ESRI	Environmental Systems Research Institute
ESSC	Environmental Science for Social Change
FGD	Focus Group Discussion
FPE	Foundation for the Philippine Environment
GIS	Geographic Information System
GPS	Global Positioning System
IBA	Important Bird Areas
ICE-CD	Information, Communication and Education - Community Development
IFCLG	Integrating Forest Conservation with Local Governance
IFI	Iglesia Filipina Independiente
ISF	Integrated Social Forestry
KAKA	Kahugpungan Alang sa Kalambuag Agraryo
KI	Key Informant Interviews
Krominco	Kromite Mining Company
LGC	Local Government Code
LGU	Local Government Unit
MADP	Municipal Annual Development Plan
MAKAMASA	Malambuog Katauhan Mag-uuma sa Santiago
MDCC	Municipal Disaster Coordinating Council

MGB	Mines and Geosciences Bureau
MPDO	Municipal Planning and Development Office
MPSA(s)	Mineral Production and Sharing Agreement(s)
NAMRIA	National Mapping and Resource Information Agency
NGO	Non-Government Organization
NIA	National Irrigation Authority
NIPAS	National Integrated Protected Areas System
NRDC	Natural Resources Development Corporation
NSO	National Statistics Office
PA(s)	Protected Area(s)
PAGASA	Philippine Atmospheric, Geophysical and Astronomical Services Administration
PAID	Panamaon Association of Implementers for Development
PBMA	Philippine Benevolent Missionary Association
PCAARD	Philippine Council for Agriculture, Forestry and Natural Resources Research and Development
PDC	Provincial Development Council
PAMUCO	Panamaon Multipurpose Cooperative
PBCPP	Philippine Biodiversity Conservation Priority-Setting Program
PENRO	Provincial Environment and Natural Resources Office
PO	People's Organization
PPDP	Provincial Planning and Development Office
PRA	Participatory Rural Appraisal
REACH	Rural Enterprise Assistance Center Foundation
RSA	Rapid Site Assessment
SAVE	Santiago Association of Volunteers for the Environment
SB	Sangguniang Bayan
SDMP	Social Development Management Program
UCCP	United Church of Christ in the Philippines
UNRFNRE	United Nations Revolving Fund for Natural Resources Exploration
WATSAN	Kambinliw Water Sanitation
WGS-84	World Geodetic System of 1984
WOFEL	Women's Federation of Loreto



introduction This chapter describes how Dinagat has been selected as an important forest conservation area by Haribon Foundation and BirdLife International. The objectives of this report, methods of data collection, approaches, scope and limitation of the study are discussed.

The Philippines is endowed with rich tropical forests that harbor a great diversity of plants and animals not found anywhere else on earth. Worldwide, the Philippines is recognized as an important forest conservation area because its highly endemic biodiversity is also threatened by the rapid rate of forest loss.

Despite the efforts of the Philippine government to strengthen the protection and conservation of protected areas, there are still over a hundred forest areas that are vulnerable to destruction. Many of these forest areas include those identified by Haribon Foundation and BirdLife International as vital to the conservation of critical and endangered biodiversity species. Because many of these forest areas are relatively small or fragmented, the concerned local governments may be in a better position to protect them.

Innovating on approaches to forest management, Haribon Foundation trailblazed the integration of forest conservation with local governance in these priority sites: Mt. Siburan in Sablayan, Occidental Mindoro; Mts. Kambinliw & Redondo, Dinagat Island, Surigao del Norte; and Sibalom Natural Park, Antique. This innovation had been conceptualized to address key issues affecting forest management in selected priority areas in the country such as centralized forest management strategies, limitations of national-level protected area initiatives, and limited capacity on forest conservation and governance.

Haribon Foundation aimed to improve the conservation of important forest areas by integrating this in local development planning and by strengthening local governance.

1.1 Importance of Dinagat Island

Presence of restricted-range birds together with other criteria is used to determine the Endemic Bird Areas (EBAs). Birdlife International's global analysis of birds' distribution patterns shows that species of restricted range occur together in islands or/and isolated patches of habitat. Globally, Birdlife International has identified 221 EBAs (Bibby, *et al* 1992) which are found around the world, but 77% of them are in the tropics and subtropics.

The Philippines is categorized into seven EBAs, namely: (1) Luzon which covers the northern portion of the Philippines and is considered the largest of the Philippine islands. It also includes the associated islands of Polillo, Marinduque and Catanduanes; (2) the whole island of Mindoro which lies southwest of Luzon; (3) the Negros and Panay islands which cover the central Philippine islands of Negros, Guimaras and Panay. They are also politically parts of the Visayas; (4) Cebu, which is also politically part of the Visayas group of islands; (5) Palawan and its group of islands (Calamian, Balabac and other smaller offshore islands), which are politically part of Luzon and are considered the easternmost extension of the Asian (Sunda) shelf; (6) the 400 or so islands of the Sulu archipelago stretching southwest from the southern Philippine island of Mindanao; and lastly, (7) the Mindanao and Eastern Visayas faunal regions to which Mts. Kambinliw & Redondo belong. Mindanao is the second largest Philippine island after Luzon. Also included in the Mindanao EBA are the islands of Samar, Leyte and Bohol (which are politically part of the Visayas) and associated islands such as Biliran, Dinagat, Siargao, Camiguin Sur and Basilan. This particular EBA has 51 restricted-range species, of which 22 are considered threatened. All the restricted-range species in this EBA depend on the primary lowland forests for their survival.

Dinagat Island lies east-southeast of the southern end of Leyte and directly north of the Surigao Peninsula of Northern Mindanao. It is politically administered by the province of Surigao del Norte, Mindanao. Zoogeographically, Dinagat is thought to have formed part of a land bridge between Northern Mindanao and Eastern Visayas (Leyte, Samar and Bohol) in the late Pleistocene epoch (Leviton, 1963). Dinagat and Siargao are northern extensions of the northeastern mountains of Mindanao, forming an island separate from the remainder of Mindanao during the Pliocene epoch (Dickerson, 1928; Taylor 1934). Dinagat and Siargao are considered part of the Mindanao biogeographic province, which includes Basilan, Leyte, Mindanao, Samar and numerous smaller islands (Heaney and Rabor, 1982; Ross and Lazell, 1990). They also belong to the Mindanao and Eastern Visayas Endemic Bird Area as shown in *Figure 1*.

A total of 102 bird species have been recorded in Dinagat Island. Nine of these are threatened and nine are endemic to the Mindanao faunal region; only eight are found in Mts. Kambinliw & Redondo (*Table 1*). Thirty-eight of the species are forest-dependent. According to Mallari, *et al* (2001), many of the threatened and restricted-range species of the Mindanao and Eastern Visayas EBA have been recorded in Dinagat. Most of these are also likely to have populations in Mts. Kambinliw & Redondo (*Table 1*). Dinagat Island is also believed to have three endemic species of mammals, a number considered very high for such a small island. These are the endangered Dinagat Gymnure (*Podogymnura aureospinula*), Dinagat Hairy-tailed Rat (*Batomys russatus*), and Dinagat Cloud Rat (*Crateromys australis*).

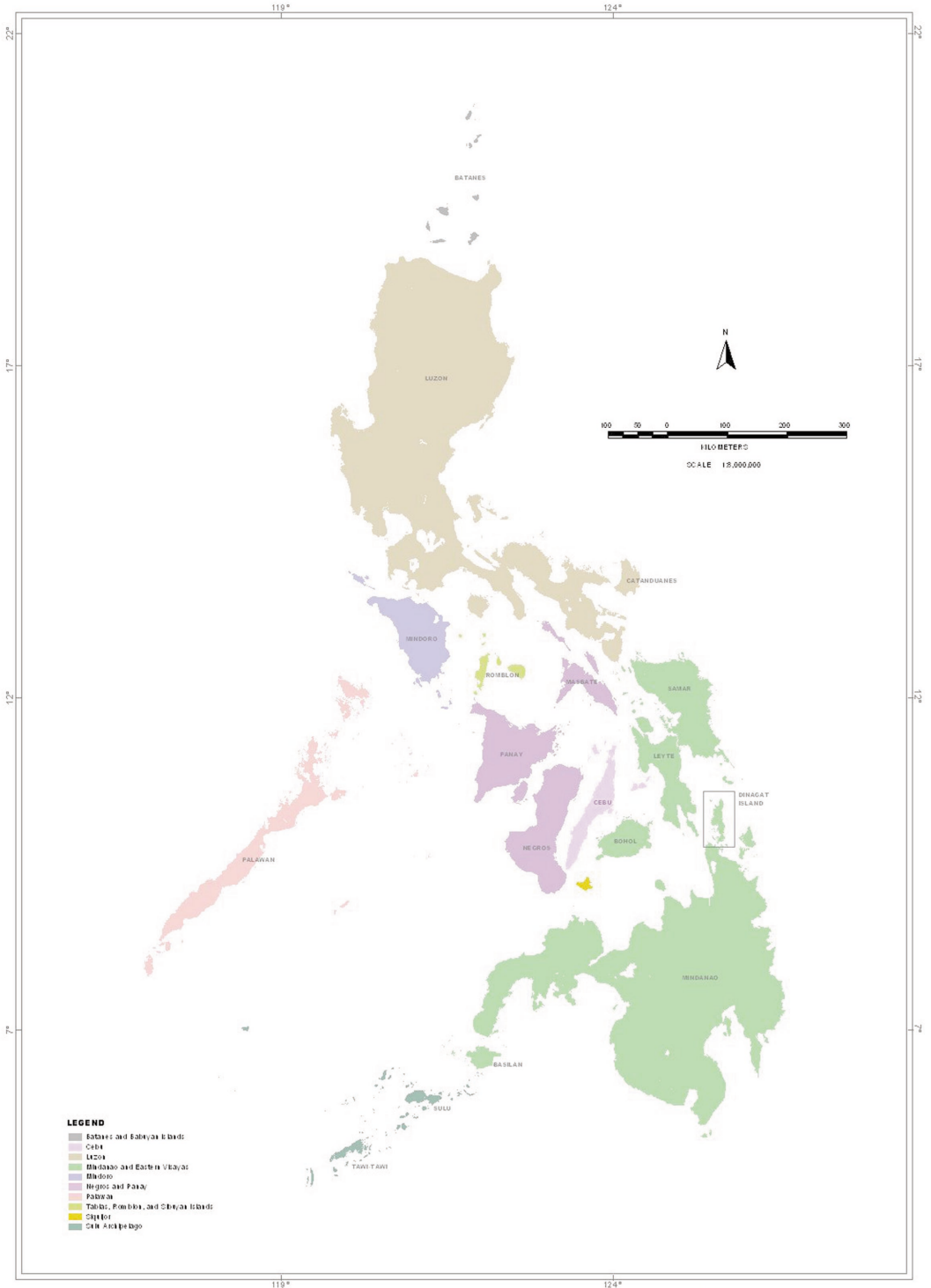
Table 1. Bird and Mammal Species in Mts. Kambinliw & Redondo that are Endemic to the Mindanao Faunal Region.

Species	Conservation Status	Habitat
Birds		
Mindanao Bleeding Heart <i>Gallicolumba criniger</i>	Endangered	Lowland Forest
Writhed Hornbill <i>Aceros leucocephalus</i>	Near-threatened	Lowland Forest
Little Slaty Flycatcher <i>Ficedula basilanica</i>	Vulnerable	Lowland Forest
Wattled Broadbill <i>Eurylaimus steerii</i>	Vulnerable	Lowland Forest
Celestial Monarch <i>Hypothymis coelestis</i>	Vulnerable	Lowland Forest
Rusty Crowned Babbler <i>Stachyris capitalis</i>	Least concerned	Lowland Forest
Yellowish Bulbul <i>Hypsipetes everetti</i>	Least concerned	Lowland Forest
Silvery Kingfisher <i>Alcedo argentata</i>	Vulnerable	Lowland Forest
Mammals		
Dinagat Cloud Rat <i>Crateromys australis</i>	Endangered	Known only from a single specimen; apparently from lowland forest
Dinagat Gymnure <i>Podogymnura aureospinula</i>	Endangered	Lowland Forest
Dinagat Hairy-tailed Cloudrat <i>Batomys russatus</i>		Lowland Forest
Philippine Tarsier <i>Tarsius syrichta</i>	CITES: Appendix II	Lowland Forest
Philippine Flying Lemur <i>Cynocephalus volans</i>	Vulnerable	Lowland Forest
Mindanao Tree Shrew <i>Urogale everetti</i>	Vulnerable	Lowland Forest

(Source: Kennedy *et al*, 2000; Hornskov J. & S. Jensen, 1987; Heaney *et al*, 1992; Heaney and Rabor, 1982; Mudder and Heaney, 1992; Haribon, 2002; IUCN, 2001.)

In the Philippine Biodiversity Conservation Priority-setting Program (PBCPP) spearheaded in 2001 by the DENR and conservation groups, Dinagat Island was identified as an extremely and highly-critical terrestrial conservation priority. Moreover, the rich biodiversity of Dinagat Island and the ecological

Figure 1. Map of the Endemic Bird Areas (EBA) in the Philippines.



stability of its forests are constantly under pressure and weakened by mining, *kaingin* and illegal commercial logging.

1.2 Site Selection Process

A total of 117 Important Bird Areas (IBA) has been identified throughout the Philippines, using a set of categories and criteria designed to identify areas that have been internationally agreed upon and are of global significance for biodiversity conservation (Mallari, *et al* 2001). From these 117 IBAs (*Annex 1*), 15 sites were included in Haribon's long list of priority sites, which was further reduced to 9 (with 3 constituting the first priority sites, and 6 the secondary priority sites).

During the site selection stage, two workshops of experts were held to shortlist the sites and thereafter, Rapid Site Assessments (RSA) were conducted in the 9 sites. The conduct of the RSAs saw the formulation and application of standardized methods using the following criteria for site selection: socio-economic, cultural and political importance (30%), biophysical importance (30%), management capacity (10%), and probability of success (30%). A multi-disciplinary team from Haribon lent its expertise and experiences during the RSA for the final selection of the priority sites for immediate conservation action.

1.3 Technical Report Preparation

1.3.1 Objectives of the Report

This Technical Report was put together as a result of extensive research in Dinagat Island. The Report contains research-based information on forest conservation status, management challenges and recommendations intended for local planners and decision-makers, local environmental organizations and concerned national agencies. Specifically, this report aims to:

- ☞ Help the local government set its priorities in forest management;
- ☞ Serve as reference for local government (barangay, municipal, provincial) development planning, particularly in integrating site and situation-specific forest conservation measures at the local level; and
- ☞ Build awareness among national and local stakeholders of forest conservation issues and possible interventions in managing the forests of Dinagat Island.

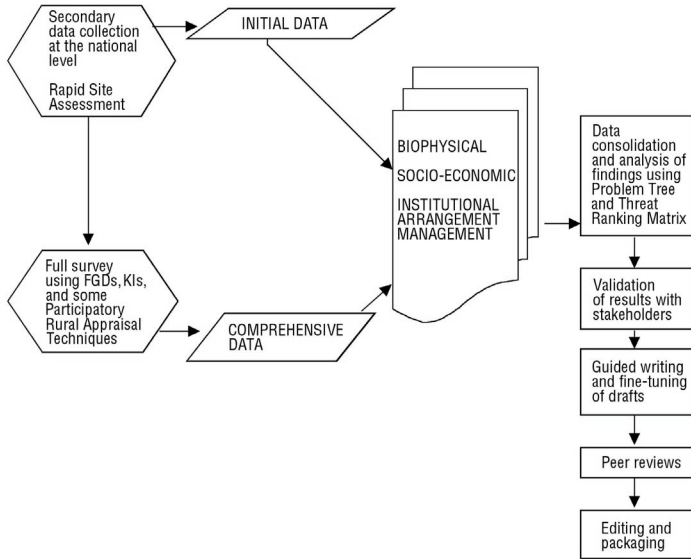
1.3.2 Approach, Scope and Limitations

This report was prepared by undertaking the following activities (see also *Figure 2*):

- ☞ Collecting and analyzing published and unpublished information on forest, biodiversity, resource use, and local development plans;
- ☞ Conducting RSA with focus on socio-economic, biophysical and institutional profiles of the sites, and establishing coordinative mechanisms with local stakeholders;

- ☞ Conducting full-blown situational analysis using a combination of various scientific and action research tools;
- ☞ Conducting participatory workshops to analyze and integrate the findings of the study as well as to rank the threats to each forest area, and identify doable recommendations for forest management planning;
- ☞ Guiding the report-writing process and peer review of outputs.

Figure 2. Sequential Flow of Data Collection, Analysis and Packaging.



The report borrowed to some extent from secondary data sources, particularly the data on local development initiatives and provincial and municipal development profiles. A multi-disciplinary team from Haribon conducted the study in the field for a year to complete the site analysis. They coordinated and consulted with local communities and concerned local authorities. The biophysical work centered on vegetation, habitat and forest types, and flora and fauna species assessment. It also identified the major river systems and assessed to some extent the watershed status in relation to forest cover. Biophysical surveys and ground-truthing included areas on the western side of Mts. Kambinliw & Redondo. The Pacific side, however, was not surveyed. The extent of mining in relation to the forest cover of Dinagat Island was partially verified on the ground. The National Mapping Resource Information Agency (NAMRIA) land cover classification dataset of 1988 was used in the entirety of this report. Although old, the data were still relatively accurate.

1.3.3 Methods of Data Collection

Socio-economic assessment

The survey aimed to determine the internal and external situation of the community in terms of its social, economic, political, cultural, environmental

and institutional dynamics in the context of forest conservation and local governance.

In Loreto, the study focused on representative barangays with jurisdiction over the forests of Mts. Kambinliw & Redondo. These are Brgy. Santiago (including Sitio Kambinliw) and Brgy. Esperanza (see *Figure 3*).

The Haribon socio-economic team composed of experienced social workers and community organizers facilitated the gathering of baseline information. They used standardized popular methods of RSA and Participatory Rural Appraisal (PRA), substantiated with secondary information from various stakeholders and line agencies working within and around Dinagat Island. The various participatory tools used in the study are the following: seasonal calendar, timeline, community resource mapping, livelihood matrix for agriculture, fishery, forestry and mineral resources, Venn diagram, Focus Group Discussions (FGD) and key informant interviews (KI). These tools were used and the results were triangulated to produce the following information:

- ☞ Perceived changes in the present land use of the area, and resource utilization by the local people;
- ☞ Relationships between the natural climatic conditions and socio-economic activities in the area;
- ☞ Major economic activities of the people, and extent of local use of low-land forests and fishery resources;
- ☞ Internal (community-based) and external (municipal, provincial, regional, national-based agencies or outside of the community) groups, organizations or projects that operate in the area and influence the decisions of the local people; and
- ☞ Issues, problems and threats on natural resource use and management.

Biological assessment

The biological study was done on the western side of Mts. Kambinliw & Redondo from April 17 to May 2, 2002. The assessment focused on habitats and biodiversity species in the area.

☞ *Habitat Assessment*

In analyzing the vegetation of the area on gradually sloping terrains with lower elevation, the biological team used the Quadrat Method. This refers to a semi-permanent 10 x 100 sq. m. plot divided into ten 10 x 10 sq. m. plots established to cover areas at lower elevation. Trees that are 10 cm. or more in diameter at breast height (dbh) were measured, mapped, their local names recorded, and field identification noted. Inner plots were established to record woody perennials, smaller trees, herbs and epiphytes. Other species outside the plot were also recorded to include the floristic composition of the study area.

In areas with higher elevations and located on steeper slopes, the Point Center Quarter Method was used. Canopy species with dbh of 10 cm. or more and were located nearest to the station point were measured and recorded for each quadrant. Those under canopy species were also identified and recorded.

The vegetational analysis was supplemented with on-site observation to assess habitat types and the presence of disturbance. Local field guides and local people were interviewed to determine the types and extent of resource utilization.

☞ *Bird surveys*

For the inventory of birds, the two-kilometer transect line method and systematic mist-netting were combined, supplemented with the encounter rate method and ethno-biology interviews with the local guides. Feather and fecal droppings and birdcalls were also noted. Birdcalls were recorded whenever possible. Identification of the species was based on Kennedy *et al* (2000).

☞ *Mammals Inventory*

Inventory of mammals was conducted using mist nets and cage traps to capture bats and small mammals. Direct and indirect observations were used to identify the presence of larger mammals and those not easily trapped. Identifications followed Ingle and Heaney (1992) and Heaney *et al* (1998). Classification of conservation status, endemicity and habitat followed those stated in Heaney *et al* (1998) and IUCN (2000).

☞ *Amphibians and Reptiles Inventory*

Herpetofaunal inventory techniques used in the survey included time-constrained searches, line transect and forest climbing searches, quadrat sampling, opportunistic method of collecting specimens, and bio-acoustics. Biometrics was recorded for each species captured. Species identification was based on Alcalá and Brown (1980).

All captured and collected species were identified, measured, photographed, recorded and released. Interviews with locals were conducted to gather indigenous information (i.e., local name, local use, and local importance) on faunal diversity in the area.

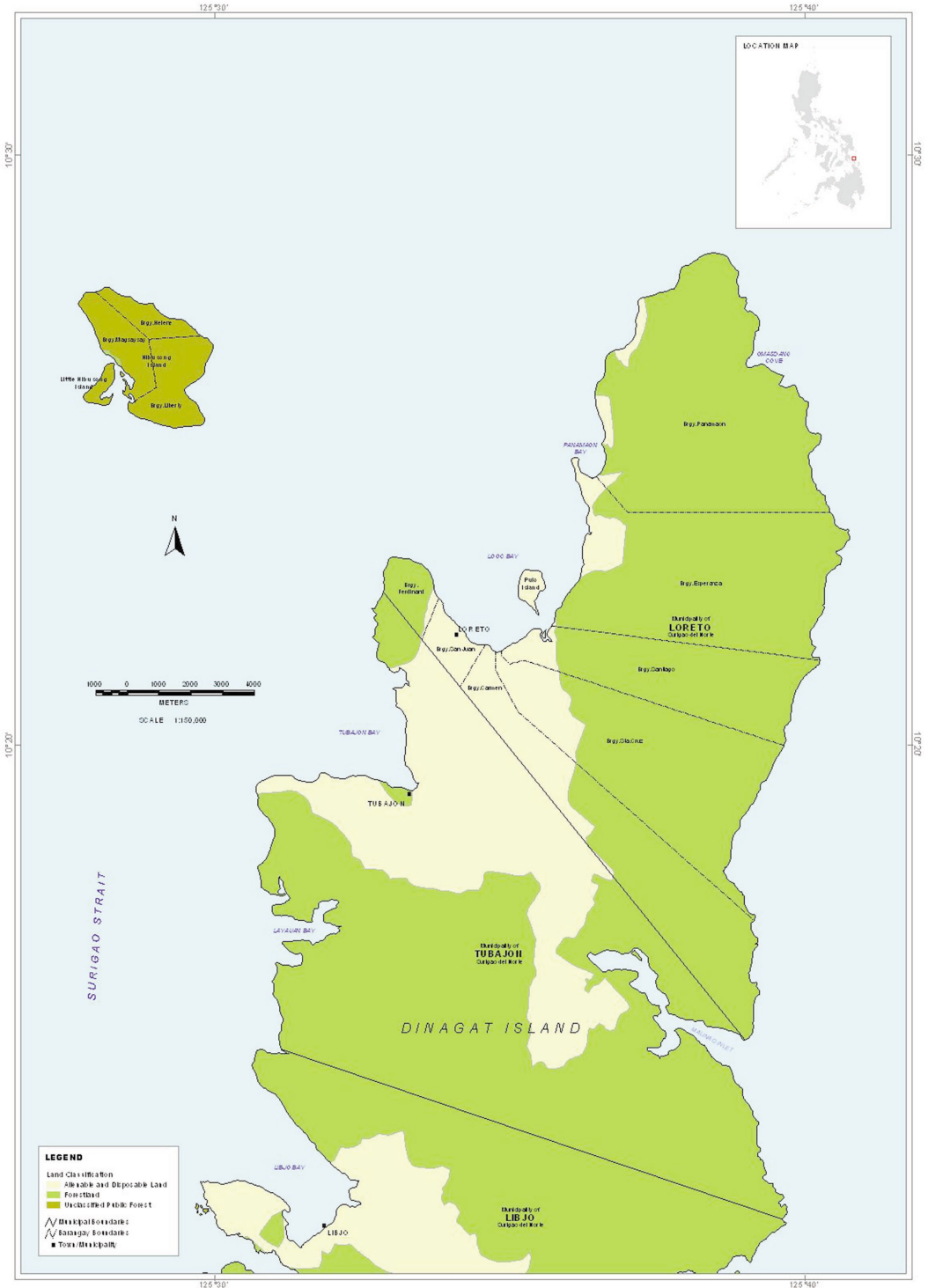
Land use assessment

This was aimed to analyze the different geographic information, relevant national policies and other ancillary data, provide inputs for the situational analysis of the area, and identify issues pertaining to land use.

☞ *Secondary Data Gathering*

Secondary data on the physical aspect was gathered to make a preliminary assessment on the existing land use of the area. These include data on topogra-

Figure 3. Barangay Location and Boundary Map of Loreto, Dinagat.



SOURCE: Barangay boundaries from the Municipal Planning and Development Office, Loreto, Dinagat Island, Surigao del Norte. Municipal boundaries and land classification data from the National Mapping and Resource Information Authority.

phy, climate, soils, geology, land cover, land classification, tenurial instruments, and administrative boundaries. Hard copies and even soft copies of maps were procured to support field activities and build on the Geographic Information System (GIS). Relevant national policies were analyzed to determine their provisions on land use. Available local land use plans were requested from the local government units for the purpose of review and integration in the land use assessment.

☞ *Community Resource Mapping*

Resource mapping was conducted primarily to obtain information on the current resource use, land cover status and patterns of the area through local knowledge. Key participants from the community were selected and invited to join the activity. The final resource map drawn by the community was digitized and presented again to the community for further revisions, if necessary.

☞ *Surveys and Field Validation*

Global Positioning System (GPS) surveys were conducted to validate secondary data (i.e., existing land cover maps), and the results of the resource mapping made by the community. The location and elevation of biological sampling methods, habitat types and the transition between types, and disturbed areas within the forest were taken and recorded. GPS readings were obtained using GARMIN GPS 12XL receivers. The receiver was set to the Geographic Coordinate System using the WGS84 datum. Readings were averaged at least twice in order to increase accuracy. Positions and elevations that could not be established (because of lack of satellite signals due to dense forest canopy) were interpolated from available 1:50,000 scale topographic maps. Collected data from field activities was documented daily in a field notebook.

All thematic data were processed using two different map projections. Computations were done using the Universal Transverse Mercator projection Zone 51 North on the WGS84 datum. Field data and map layouts used the Geographic Coordinate System using the WGS84 datum. ArcView, GIS extension tools such as *XTools* were used extensively for geoprocessing. Conversion between projections was done using the *ArcView Projection Utility* extension. Technical descriptions were plotted using the *Distance and Azimuth Tools* extension, when applicable. All spatial data inputs and analyses were done using ArcView, GIS software developed by the Environmental Systems Research Institute (ESRI).

Management capacity assessment

An environmental planner and a training specialist from Haribon attempted to look into the forest management institutional arrangements, capacities and capabilities of local stakeholders in Loreto. They used FGD and KI supplemented with secondary data to generate information from the LGU (barangay to provincial), DENR (local offices and concerned bureau), local NGOs, aca-

deme, mining companies and religious organizations. Task Analysis tool was used for the interviews to identify the basic competencies of targeted organizations and staff in executing their mandates and functions. A total of 21 respondents from key sectors were used as samples for the Task Analysis. Results of the assessment were presented to and validated by concerned stakeholders during the Stakeholders' Forum in Loreto in October 2002.

1.4.4 Analysis Framework

The results of the socio-economic, biophysical, and institutional studies served as the main reference in completing the situational analysis. Using the Threat Ranking Analysis tool, the core and secondary problems affecting local management of forest and wetland habitats and resources in the study site were drawn out. The assessment focused on the impact of human activities on the forest in general, and more specifically on the conservation status of biodiversity, and availability of resources for various uses. Problems, issues and constraints on local forest management were filtered, prioritized and provided with corresponding recommendations. The recommendations emerged from group discussions among Haribon staff and management, and consultations with local stakeholders and concerned individuals.



project site profiles: mts. kaminliw & redondo in loreto Both the biophysical and socio-economic and political profiles are discussed in this chapter. The biophysical profiles provide hard facts about the vegetative cover, land classification, soil types, watersheds and river system in Mts. Kaminliw & Redondo. Population, settlements, livelihood, and organizational structures and dynamics are among the relevant information featured under the socio-economic and political section.

2.1 Biophysical Profile

2.1.1 Site description

The municipality of Loreto lies on the northern portion of Dinagat Island in the province of Surigao del Norte. It is bound on the east by the Philippine Sea; on the west by the Surigao Strait; on the north by Leyte Gulf; and on the south by the municipality of Tubajon. The land area of Loreto is 215.87 km², or 21,587 hectares, which makes it the third largest municipality in the province and the largest in Dinagat Island (PDC 1993). For consistency in computations, the area figures used in this report is 15,644.13 hectares, excluding municipal waters, as computed from the NAMRIA data.

There are several islands within the municipality's jurisdiction, including Kayasa Islands, Puyo Island within Looc Bay, and Hibuson Islands. Dinagat is composed of 10 barangays, seven on the mainland, namely: Ferdinand, San Juan, Carmen, Sta. Cruz, Santiago, Esperanza and Panamaon; and three on Hibuson Island, namely: Helene, Liberty and Magsaysay. Of the seven mainland barangays, three are located in the fringes of Mts. Kaminliw & Redondo where good forest cover and supply of water abound (see *Figure 3*). These barangays are Esperanza, Santiago and Panamaon.

2.1.2 Topography

The terrain is characterized as generally sloping and mountainous, with Mt. Kaminliw at 903 meters above sea level (masl) and Mt. Redondo at 929 masl.

Table 2. Slope Categories of Loreto, Dinagat Island, Surigao del Norte.

Slope Category	Description	Area	% to Total
0 – 3%	Level to gently sloping	1,431.58	9.15
4 – 8%	Gently sloping to undulating	916.98	5.86
9 – 18%	Moderately sloping	5,654.23	36.14
19 – 30%	Steeply sloping	2,770.33	17.71
31 – 50%	Very steeply sloping	3,254.01	20.80
Over 50%	Mountainous	1,617.00	10.34
TOTAL		15,644.13	100.00

(Source: NAMRIA, 1988)

2.1.3 Land cover and forest habitat types

About 60% of the municipality are covered by forests (Table 3). Mangrove vegetation may have been underestimated or misclassified as other vegetation types. Data from PDC (1993) approximately quantifies 175 hectares of mangrove areas in Loreto. Agricultural areas are mostly dedicated to rice cultivation, especially in Brgys. Carmen, Sta. Cruz, and Santiago. The National Irrigation Administration (NIA) has constructed irrigation canals and a dam in Brgy. Santiago that serve most of its cultivated areas. Other barangays in Loreto, however, still lack irrigation systems. The Kambinliw River supplies the water for the irrigation needs of Brgy. Santiago. Locals continue to practice *kaingin* agriculture mostly on elevated and sloping areas.

Table 3. Land Cover Types of Loreto, Dinagat, 1988.

Land Cover Type	Area (has.)	% to Total
Arable land, crops mainly cereals and sugar	1,227.29	7.85
Cropland mixed with coconut plantations	1,598.02	10.21
Cultivated areas mixed with brushlands/grasslands	3,307.07	21.14
Forests		
Open canopy, mature trees covering < 50%	1,494.41	9.55
Closed canopy, mature trees covering < 50%	8,016.09	51.24
Mangrove Vegetation	1.18	0.01
TOTAL	15,644.06	100.00

(Source: NAMRIA, 1988)

Ground-truthing and habitat assessments showed that the forests in Mts. Kambinliw & Redondo are further classified into forest types, as shown in Table 4.

Since Mts. Kambinliw & Redondo occupies the highest elevations in Dinagat Island and plant diversity increases as elevations become steeper, it is likely that some of the forest habitat types in Loreto are found nowhere else in Dinagat Island (Haribon Biological Survey, 2001). The forest types are described fully in *Chapter 3*.

Table 4. Forest Habitat Types of Mts. Kambinliw & Redondo, Loreto, Dinagat.

Forest Types	Area (has.)	% to Total
Lowland Tropical Rainforest	6,930.36	72.87
Montane Forest	1,528.64	16.07
Mossy Forest (and bonsai forest within the mossy forest)	1,051.90	11.06
TOTAL	9,510.90	100.00

(Source: NAMRIA, 1988)

2.1.4 Land classification

Land classification under the Revised Forestry Code of the Philippines (PD 705) was done to classify lands for forest purposes. Slope 18% and above were areas classified as forestland while those areas below 18% were treated as alienable and disposable (A&D) lands. These forestlands include public forests, permanent forests or forest reserves, and forest reservations. However, PD 705 is silent in indicating if forestlands should be forested on the ground or not. Public forests are lands that have not been subjected to the land classification system pursuant to PD 705 but are still treated as forestlands. *Table 5* shows the land classification categories present within Loreto (see also *Figure 4*).

Table 5. Land Classification Categories of Loreto, Dinagat.

Land Classification Categories	Area (has)	% to Total
Alienable and Disposable	1,938.52	12.39
Forestland	12,640.78	80.80
Unclassified Public Forest	1,064.77	6.81
TOTAL	15,644.07	100.00

(Source: NAMRIA, 1988)

Loreto, especially Mts. Kambinliw & Redondo, is dominantly classified as forestland. Extensive A&D lands are found mostly in Barangays San Juan, Carmen, and Sta. Cruz. Smaller areas of A&D lands are found in Brgys. Panamaon, Esperanza, and Sitio Kambinliw in Brgy. Santiago.

A major limitation of the land classification system under PD 705 is its failure to categorize lands for forest purposes on the basis of forest cover tangibly

found on the ground. The land classification map shows that the entire Mts. Kambinliw & Redondo range is classified as forestland. However, slope data reveals that there are areas in Mts. Kambinliw & Redondo that are below the 18% slope. If the provisions of PD705 were to be strictly followed, these areas should automatically fall under A&D lands, but for some reasons were classified otherwise. This only shows that even the existing land classification maps are not strictly based on slope data – the sole basis for the PD705 land classification system.

Data shows that only 68% of the total forest cover of Loreto is found on slopes 18% and above, which means that there are actual forests situated on supposedly A&D lands (*Figure 4*). In fact, there are forests on Mts. Kambinliw & Redondo that are found on slopes 18% and below. This is one major reason why the PD705 land classification system is inadequate in identifying and classifying lands for forest purposes.

2.1.5 Land use

Forests occupy more than half of the total land area of Brgys. Santiago, Esperanza, and Panamaon. Grasslands and brushlands, which also occupy a considerable portion of these barangays, are categorized as idle lands. These also include mangrove areas located on riverbanks and the coastline, specifically the declared mangrove sanctuary between Esperanza and Panamaon, and a small portion near the barangay proper.

Due to the low human population in the communities near Mts. Kambinliw & Redondo, built-up areas for settlements and commercial uses are still negligibly small compared to the total area of the barangay.

Plantation areas and agricultural areas are considered as separate land-use categories. Plantations include coconut, orchards and fruit trees, which are present in Santiago and Esperanza. Agricultural land includes mainly rice fields and cultivated crops.

Mining areas were not reflected due to lack of available data on the extent of mining operations per barangay. In Brgy. Santiago, Krominco Inc. is primarily the mining concession conducting mining operations on the higher elevation of the northwestern face of Mt. Redondo. NAREDICO Inc. is primarily the concession doing mining operations in Brgy. Esperanza. In Brgy. Panamaon, there are two mining companies engaged in open-pit mining, which covers a total land area of 854 hectares. It is also a target Comprehensive Agrarian Reform Program (CARP) area because there are an estimated 73 hectares of tilled farm lots on this site.

The major land uses in Barangays Santiago, Esperanza and Panamaon are shown in *Table 6*.

Table 6. Derived Land Uses in Brgys. Santiago, Ezperanza, and Panamaon.

Land Use	% to Total Barangay Land Area		
	Santiago	Esperanza	Panamaon
Plantations	6.93	11.43	15.38
Agricultural areas	10.27	0.16	0.00
Idle lands	13.16	20.32	14.96
Forest lands	69.64	68.10	69.65
TOTAL	100.00	100.00	100.00

2.1.6 Soil types

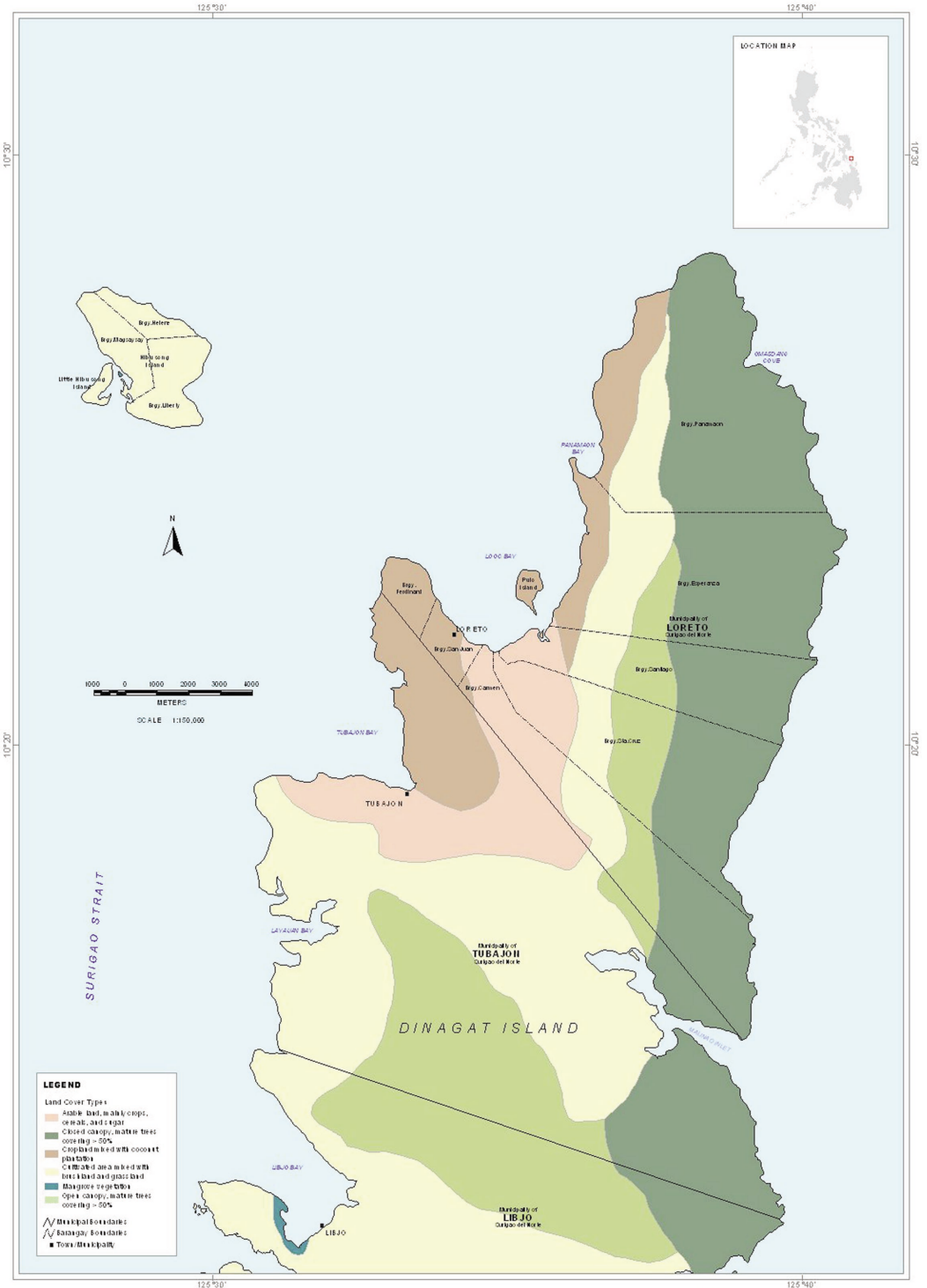
In 1997, the Bureau of Soils and Water Management (BSWM) collected soil samples in Loreto for testing and analysis. The results showed that the soil in Loreto is neutral to acidic (pH 4.8 to 6.9); organic content averages 2.25%; phosphorus content is 1 to 37 ppm. The study concluded that the soil in Loreto generally needs supplemental nitrogen and phosphorus in order to productively grow crops. The low natural fertility and presumed low-water holding capacity of the soil, together with the pronounced rainy season, present serious limitations to the agricultural production of various economically important crops in the area (CERD, 1997).

Due to lack of natural fertility of the soil, farmers tend to expand their farming areas by converting portions of forest areas to agricultural lands. Ocular observations, however, suggest that Mts. Kambinliw & Redondo forests are ultramafic or forests over substrate, predominated by ultrabasic or serpentine soils. Substrates of these forest types produce high concentration of iron and magnesium and are unproductive when erosion occurs.

2.1.7 Hydrology (Watershed areas)

Dinagat Island has 19 major watersheds (*Table 7*), following the definitions of PCAARD *et al* (1995) and Selby (1985), categorized under medium (10,000-50,000 has.) and small (1,000-10,000 has.) types. Of these major watersheds, 14 are still forested. The five other watersheds are already devoid of forest cover.

Figure 4. Land Classification Viz. Forest Cover of Loreto.



SOURCES: boundaries from the Municipal Planning and Development Office, Loreto, Dinagat Island, Surigao del Norte; Municipal boundaries and land cover data (1988) from the National Mapping and Resource Information Authority.

Table 7. Major Watersheds in Dinagat Island.

Drainage	Covered Municipalities	Watershed Area (> 5,000 has.)	Perimeter (km.)
San Jose River-Gaas Inlet	Libjo, Cagdianao, Rizal	14,223	113.47
Malinao River	Loreto, Tubajon	12,027	96.56
Gaboc-Kantiasay-Awasan	Cagdianao, Surigao City	8,819	144.92
Guadalupe-Hibata	Cagdianao	5,873	44.66
Ponikian-Tagabaca-Tagababui	Rizal, Dinagat	5,508	86.10
Kambinliw-Looc-Panamaon	Loreto	5,305	58.69

Loreto on the other hand, has six major watersheds shown on *Table 8*. The forests of Mts. Kambinliw & Redondo serve as headwater for most of the watersheds of Loreto, except for the Tubajon-Lisub and the Malinao river watersheds. Kambinliw and Hinubasan Rivers are among the major rivers of Mt. Redondo (*Figure 5*).

Table 8. Major Watersheds in Loreto.

Drainage	Covered Barangays	Area (has.)	Perimeter (km.)
Malinao Inlet	Carmen, Sta. Cruz	12,027	96.56
Kambinliw-Looc-Panamaon	Panamaon, Esperanza, Santiago, Sta. Cruz, Carmen, San Juan, Ferdinand	5,305	58.69
Omasdang	Panamaon, Esperanza	2,474	26.66
Tubajon-Lisub	Ferdinand	1,468	31.61
Unnamed basin 1*	Santiago, Sta. Cruz, Carmen	2,733	31.89
Unnamed basin 2*	Esperanza, Santiago	1,861	19.90

* Name of basin cannot be derived from existing maps

The watersheds of Mts. Kambinliw & Redondo supply water for irrigation and dams, for daily domestic and potable use, and for hydroelectric power generation. The watershed also provides clean water for ecotourism sites such as the Linaw Spring Resort in Brgy. Esperanza. The Arlalejo Creek, which runs from Mt. Kambinliw. Presently, however, the watersheds are threatened by large-scale mining operations.

In 1997, The Community Environment and Research Extension (CERD) observed that rivers were used for mine washing and also as important passage-ways for transporting logs and mine products at the peak of mining operations. In the ocular survey atop Mt. Kambinliw conducted by Haribon on April 23 and 28, 2002, it was observed that the mining sites of Krominco and NAREDICO are strategically located along the slopes of Mts. Redondo & Mt. Kambinliw, respectively. The mine tailings of Krominco inevitably flow down the gully leading to the Pacific Ocean, while those of NAREDICO go towards the river of Esperanza. Thus, mining including conversion of the uplands to agricultural lands and unabated illegal logging and cutting activities continue to put pressure on the watersheds of Loreto.

2.1.8 Climate

The climate in the region is categorized as Type II – meaning, it has no dry season but with a very pronounced maximum rainy period from November to February. Loreto is prone to typhoons because of its exposure to tropical cyclones from the North Pacific Ocean. It is affected by the inter-tropical convergence zone and is exposed to experiencing 1 or 2 typhoons of the average 20 tropical cyclones that hit the country every year. The average monthly rainfall ranges from about 0.10 – 0.68 m. and annual rainfall averages about 3.70 m. similar to that of Baguio City and Eastern Samar, which receive the greatest amount of rainfall in the country. Temperatures range from 23.50°C in October–February to 32.0°C in March–September. Relative humidity ranges from 80 to 90%. Maximum wind gustiness goes beyond 200 kph.

As a result of the prolonged rainy period and the constant exposure to typhoons, Loreto is vulnerable to soil erosion and flashfloods. The remaining forests, which lie in Mts. Kambinliw & Redondo, serve as a natural barrier for Loreto and the entire Dinagat Island against calamities such as floods, and soil erosion.

2.1.9 Geology and mineral resources

Dinagat Island, which lies between the Philippine Fault and the Philippine Trench, hosts the largest layered chromite deposits in the Leyte-Samar-Dinagat region (MGB *et al* 1990). The whole province boasts of metallic and non-metallic deposits, mostly chromite and gold with other byproducts in appreciable amounts (PDC, 1993). Because of the mineral endowments of the area, the islands of Surigao province, including Dinagat Island, were declared a mineral reservation by Executive Order No. 63 (June 25, 1914) and also by Presidential Proclamation No. 391 (March 13, 1939).

Deposits of chromite ore in Mt. Redondo are typically layered and massive. According to the mineral resources map of the United Nations Revolving Fund for Natural Resources Exploration (UNRFNRE), mineral deposits found within the Mts. Kambinliw & Redondo complex include:

- ☞ nickel mines and deposits, and occurrences with large-tonnage nickel-cobalt bearing ferruginous laterites;
- ☞ chromite deposits and occurrence of lumpy and sandy ores of metallurgical and chemical grade (50,000 to 500,000 tons);
- ☞ epithermal gold deposits and prospect mines up to five metric tons at 5g/t gold; and
- ☞ ferruginous laterites with more than 40% iron.

Despite the relatively large number of critically-threatened fauna and headwaters in Dinagat, the ecological importance of the remaining forests in the island has not been valued against the benefits derived from mining. The extent of mining in relation to forest cover is discussed fully in *Chapter 5* of this report.

2.1.10 Potential hazards

The presence of forest cover is definitely crucial in conserving the soil and in maintaining an average surface run-off. Soil erosion will tend to increase if the forests continue to be depleted. Precipitation over Dinagat Island is known to be above average due to the rainy season almost all-year round. The terrain is characterized by high slopes and inherent rock and soil types with low water-holding capacities. This indicates a high probability of a similarly high surface run-off (high water discharge with transported sediments) that could be detrimental to agriculture. Mining activities further increase the potential for soil erosion by exposing the ground to the elements through quarries and excavations that eradicate the forest.

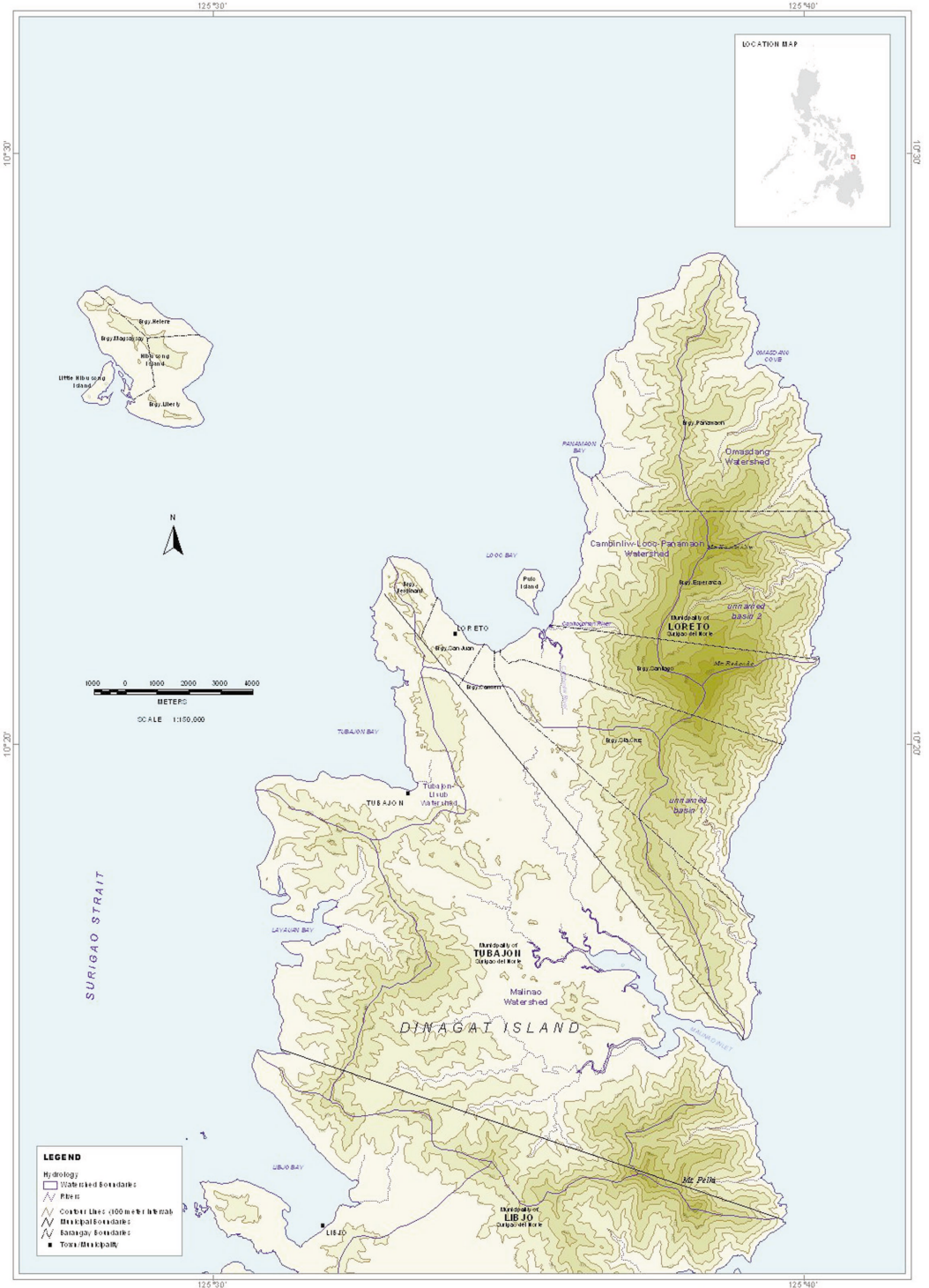
2.2 Socio-Economic Profile

2.2.1 Population and settlements

Loreto has a human population of 8,751 with households numbering 1,840 as of May 2000 (NCSO). It has the second smallest population among the seven municipalities of Dinagat Island. With its land area of 21,587 hectares, Loreto can be said to have a population density of 0.4 persons per hectare.

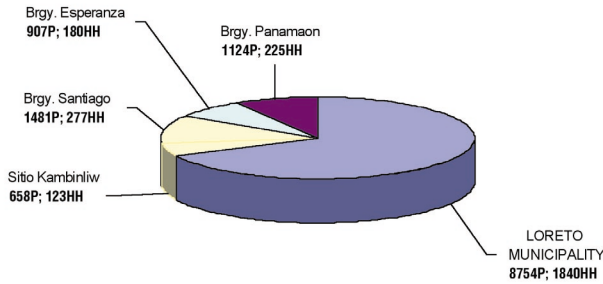
Of the 10 barangays in Loreto, three island-barangays have the lowest population. The three barangays around Mts. Kambinliw & Redondo rank second (Santiago), fourth (Panamaon) and fifth (Esperanza) in terms of low population. These are forest-edge communities heavily dependent on forest resources. *Figure 6* shows the population of the different communities near the mountains of Kambinliw and Redondo as of year 2000.

Figure 5. Hydrology (Watershed) and River System Map of Loreto, Dinagat.



SOURCES:
 Hydrology, boundaries: from the Municipal Engineering and Development Office, Loreto, Dinagat Island, Surigao del Norte.
 Major roads, contours and topographical data from the National Mapping and Research Institute, Manila.
 Watershed boundaries: courtesy, the Haribon Foundation for the Conservation of Natural Resources.

Figure 6. Human Household Population of Communities Near Mts. Kambinliw & Redondo. Loreto, Dinagat Island.



A major size of the estimated 4,170 population or 805 households in the three forest-edge barangays is gradually expanding its agricultural farms inside the forest areas. For the last 20 years, the uplands have been denuded as a result of agricultural activities by the quasi-religious group, the Philippine Benevolent Missionary Association (PBMA), whose members have cultivated the forests and watersheds.

In Barangay Panamaon alone, household-families of PBMA have been growing in number for the last 5 years. Some members of the community have alleged that the influx of PBMA could not be contained because local politicians are protecting them. These families have built new settlements and conducted *kaingin* in erosion-prone areas along the tributaries of Looc-Panamaon watershed.

The population density data show a relatively low ratio of persons per available land area (Table 9). In reality, however, the municipality’s center of trade and commerce is also where settlements have been built, thereby causing congestion in these areas. A large portion of Loreto has likewise been allocated to mining concessions.

Table 9. Population Density of Communities Near Mts. Kambinliw & Redondo, Loreto, Dinagat.

Communities Near Mts. Kambinliw and Redondo	Total Land Area (hectare)	Total Human Population	Population Density (person per hectare)
Barangay Esperanza	3,496	907	0.3
Barangay Panamaon	3,957	1,126	0.3
Barangay Santiago	2,784	1,481	0.5

(Source: Haribon RSA, 2001)

Loreto has a generally young population. Combined ages of less than one year old to 14 years old and 15 to 29 account for more than half of its total

population. This also means that the working and reproducing population of the municipality is high. However, many in the labor-age group usually migrate to the mainland for economic reasons.

Male population is slightly higher than female. Although there is a high fertility-age group among women, population increase is unlikely since most of the male-group migrate to the mainland in search of jobs.

The out-migration and immigration patterns in Loreto are directly connected with mining activities in the province of Surigao and the Dinagat Islands. From 1980 to 1990, at the height of mining activities in Loreto, the population surged. Immigration was deeply felt during those years in Barangay Esperanza and Barangay Santiago, where most of the logging and mining concessions were located. In 2000, population growth rate went down after the mining companies closed their operations due to the low price of chromite in the world market. Most of the migrants left the island to look for livelihood opportunities in the mainland. Only those owning small rice fields and houses stayed on the Island.

2.2.2 Population and settlements adjacent to Mts. Kambinliw & Redondo

There are 20 to 30 families living at the foot of the southeastern (Sitio Busay, Barangay Carmen) and northeastern portions (Sitio Omasdang, Barangay Panamaon) of the mountains. Settlements are, however, concentrated at the foot of the western portion of the mountains.

Human settlements usually start near rivers, creeks, coastlines and other ecosystems where there is access to food and water. This is true as well for Panamaon, Esperanza and Santiago – the barangay communities within or adjacent to Mts. Kambinliw & Redondo – which are also located along the coasts.

The nearest barangays in Mt. Redondo is Sitio Kambinliw in Brgy. Santiago and Brgy. Sta. Cruz; Brgys. Esperanza and Panamaon, on the other hand, are very near Mt. Kambinliw. All these barangays are accessible from the Poblacion, except for the eastern portion of Brgy. Esperanza, which is occupied mostly by Mt. Kambinliw. Access to this eastern portion is restricted because of the steep terrain. It may be reached, however, by traversing the mountain or traveling by boat and passing around the northern tip of Loreto.

2.2.3 Social services

Transportation and Communication

The roads in the town center and going to Brgy. Santiago are cemented. Mobility in the municipality and other mainland municipalities is provided by almost 100 transport vehicles such as jeepneys, motorcycles, tricycles, pedicabs and bicycles, mostly owned by private individuals. Regular motorboats and ferries ply the Loreto-Surigao City-Loreto route daily, except on Sundays.

There is only one post office and one FM radio station in the municipality supervised by the Roman Catholic Church but it had stopped operation. There are three telephone companies, one telegraph, two VHF and 17 hand-held radios serving the entire municipality's communication needs. News from the mainland are transmitted to the Island through radio and television. Radio news broadcast from Cebu, Surigao and Metro Manila could be heard in the Island. Television is limited to a few households in the town center.

2.2.4 Health and water systems

Health

Three barangay health stations, one hospital, two dental clinics and one drugstore cater to the health needs of Loreto. These facilities are managed by 9 health workers (2 doctors, 1 nurse, 1 dentist, 1 dental aide, 1 sanitary inspector, and 3 midwives), who go around the 10 barangays. Some are stationed at the barangay health centers. The Loreto District Hospital is also managed by a doctor, 4 nurses, 3 health attendants, an administrative officer, a clerk, a janitor, a security officer, a cook and a laundry person.

For the last two years, coronary artery disease, malnutrition, pneumonia, respiratory failure, and cancer have been the common causes of mortality. Bronchitis, dermatological disorders, pneumonia, gastroenteritis, hypertension are the five most common causes of morbidity. According to the municipal health officer, predisposing factors attributed to causes of morbidity cases include poverty, poor water sanitation, and weather changes.

Water Systems

There are about seven water systems throughout the entire municipality. Serving a total of 1,686 households, they consist of protected springs and wells, communal faucets and piped water systems. The local water system is managed and maintained by the LGU with no users' fee imposed upon household users.

2.2.5 Education

Loreto has a total of 25 schools: 22 elementary and pre-schools, and 3 secondary-level schools. The secondary-level schools are the Liberty Barangay High School in Gibusong Island, the Loreto Municipal High School and the Loreto Academy. The last is a private non-sectarian school. There is one LGU-managed sports complex, which also serves as a training center and a tennis court. There are no tertiary schools in Dinagat. Those who can afford college education have to go to nearby cities like Surigao, Butuan, Cebu or even Metro Manila.

Environmental education, although part of the Department of Education curriculum, is not yet included in the local teachers' lesson plans. In both the local and private schools in Loreto, there is a lack of education materials on

Philippine biodiversity in general, and information about the importance of Mts. Kambinliw & Redondo in particular.

2.2.6 Livelihood activities

The major economic activities in Loreto are agriculture, fishing, livestock raising and commercial trading. From these, the local people derive an average monthly family income ranging from P1,000 to P6,000. Most residents have an average monthly income of P1,500 (FPE-CBRMP 1999). Communities near Mts. Kambinliw & Redondo also harvest forest products and occasionally hunt wildlife. Housing materials, firewood, *nito* and edible products are regularly collected from the forest for household consumption.

Agricultural production

Agriculture is one of the major sources of income of the people, especially in the mainland. Coconuts are the most extensively-cultivated crop in Loreto, with the dense lands confined mostly to the coastal areas (Rural Enterprise Assistance Center Foundation-Coastal Resource Management Plan or REACH-CRMP, 1998 Report). Other crops produced are rice, cash crops and vegetables. The aggregate yield for rice and corn in the area is not sufficient to supply the needs of the local people. Hence, rice is also bought from other parts of Mindanao and the Visayas. The low yield for rice and other agricultural crops can be attributed to the high mineral content of land in the area. To increase crop yield, the people resort to the heavy use of inorganic fertilizers.

Due to the intensive use of inorganic fertilizers and other production inputs, agricultural crops such as rice, coconut, and root crops are abundant in Brgys. Santiago, Esperanza and Panamaon. In Panamaon, coconut covers more than 300 hectares of land and is extensively grown along the coastal plains. Rice and banana are second major crops and these are planted twice a year. Supplemental crops include corn, guava and *malunggay* in Santiago; and *payaw*, cassava, yam and sweet potato in Panamaon.

The crops are raised for market and household consumption. Inorganic fertilizers are applied to all agricultural crops except for vegetables such as *payaw* and *malunggay* (*Annex 2a. Livelihood Matrix on Agriculture*).

Livestock production

The three barangays on the forest edges engage in livestock production for additional income. Poultry production is the highest (60.47%) followed by swine (18.12%), goat (17.78%) and carabao raising (3.62%). The animals are mostly native breed and are raised for local consumption. Except during fiesta months, demands for such products are limited. They are mostly bought from Surigao City and re-sold in Loreto at lower prices.

Fish production

Fish production is said to be active in the areas adjacent to the Surigao Strait, and several bays on the coastline of Dinagat Island. There are also some inland fishponds and swampy areas. The fish production in Loreto is 295,968 kg/yr (FPE-CRMP 1999 Report) which is supposed to be high. The best-quality fish, however, is sold in Surigao City and other nearby towns and provincial centers. Only low quality, small fishes are left in Loreto for family consumption. Income from fish sold outside the area is not brought back to improve the fishing industry in Loreto. Worse, fish in the traditional fishing grounds are reportedly experiencing a decline in quality and quantity (CERD-AESTSCC, 1997).

Marine and fresh water fishes, shells and seaweeds are abundant in Brgys. Santiago, Esperanza and Panamaon. Marine fishes are sold in the public market while fresh water fish are mostly for household consumption. Shells and seaweeds are both for household consumption and commercial use. Marine and fresh water fishes are available all throughout the year, except during the typhoon season.

In Santiago, among the most common marine fishes are the parrotfish (*molmol*), barramundi (*bulgan*), rabbitfish (*danggit*), emperor (*katambak*), goatfish (*timbangun*), scad (*adlo*), tuna (*bulis*), and anchovy (*domodoot*); Fresh water fishes include the murrel (*haloan*), catfish (*pantat*) and climbing perch (*puyo*); shells include the dog conch (*dalo-dalo*), spider conch (*sang*), sea urchin (*suwakî*), and seaweeds include sea grapes (*lato*) and sargassum (*samong*). Among the fishes found in the waters of Panamaon are the grouper (*lapu-lapu*), shark, parrotfish (*molmol*), tuna (*barelis*) and emperor (*katambak*). Sea turtle (*parwikan*) is also occasionally caught in the waters of Panamaon and Hibusong Island. Local people may be aware of the restriction regarding the collection of this species but its meat remains a preferred food for them.

The commonly-used fishing gears in Santiago are hook and line, fish traps, fish cage, spear fishing and fishnets. Hook and line and fishnets are also commonly used in Esperanza. In Panamaon, the fishing gears used by the residents include the *pasol* and *bingwit*, the most affordable tools for the residents. Motorized fishing boats can only be bought by those with financial capital. As indicated in the 1998 Barangay Profile and Development Plan of Panamaon, *buso* is becoming rampant in the area, and is considered to be one of the major threats to the fishery resources of Panamaon.

Chromite mining

Chromite mining, which is principally small-scale (artisan), has been a traditional source of employment for many inhabitants in the island, particularly during the industry's peak in 1981-1991, when more than 20,000 small scale miners were engaged in this activity. However, as a result of the combined ef-

fects of market depression and legislation issues, this economic activity has drastically declined (CERD-AESTSCC 1997).

2.2.7 Ecotourism potential

The Arlalejo Creek is the source of water for Linaw Spring Resort, a natural spring resort that was developed by the Barangay Local Government of Loreto. The resort is known for its crystal clear waters and beautiful ambiance, which make it a perfect place for gatherings.

Other attractions and ecotourism potentials of Dinagat Island include the bonsai forests atop Mts. Kambinliw & Redondo; a potential surfing site and a crystal, free flowing river that empties to the sea in Sangay, Carmen; the white sandy beaches of Hibuson Island and Pulo Island which have become very popular summer destinations. Hibuson Island is approximately an hour's boat ride from Carmen, the municipality's main port area while Pulo Island is approximately 10 minutes of motorized boat travel from the nearest barangay of Santiago.

The Black Beach of Campintac, Brgy. Panamaon is the seat of the historic Battle of Surigao Strait during World War II. It was also the entry point for the American forces before the return of Gen. Douglas MacArthur in Leyte (Department of Tourism.html). The municipal government built a multipurpose center (Bahay Turista) and a local museum (Friendship Hall) in Campintac to accommodate local tourists and visitors. The Black Beach is at its most festive on October 17 when the municipality commemorates MacArthur's landing in Loreto prior to his final stop in Palo, Leyte.

Dinagat Island is also a site for the PBMA's annual religious gathering. The pilgrimage is attended by followers from all over the world (PBMA Master.html).

The community celebrates the Araw ng Loreto every year where they feature a street dancing competition among the 10 barangays and an annual beauty pageant.

Despite these attractions, however, there are still very few tourists in the area. The remote location of the island contributes to its poor tourism industry. Transport facilities are also lacking and weather conditions are sometimes not favorable for sea travel. Visitors usually come in from March to May when most families hold reunions.

2.2.8 Socio-cultural structure

Respect for older members of the family and community leaders is strong. Community relations may be generally characterized as clannish. In politics, there is a patron-client relationship that brings about leader-centeredness even in decision-making processes. Personality-based and patron-client considerations

characterize decisions on community issues rather than well-founded information.

While there is recognition of the need for the community's participation in matters that affect the people's lives, little if any value for participation is currently provided.

This relationship is reinforced by a culture of poverty, which fosters dependency on leaders in exchange of economic, political and social favors to the people (e.g. employment opportunities, financial assistance, social responsibility, etc). To some extent, this situation stands in the way of social mobilization for environmental protection as experienced by NGOs that have been extending their services in the area.

Concretely, people will wait for their leaders to give the go signal before they act on issues affecting their welfare. A more reflective and participatory social preparation is needed to mobilize people for forest conservation.

2.2.9 Socio-political structure

The Barangay Local Government (BLGU) seems to appreciate the value of protecting the forest. However, they cannot translate their appreciation to concrete actions as it is constantly swayed by political considerations. The local chief executive exerts strong influence as it decides on the appropriation of barangay funds. In Barangays Panamaon and Santiago for example, only P1,000 per annum is appropriated for the implementation of the environment projects on tree planting and solid waste management. According to the BLGU in these two barangays, the appropriated amount is insignificant compared to the amount spent for the lavish celebration of the town's Foundation Day.

Although the Local Government Code (LGC) empowers the Barangay Council to legislate and implement environment-related projects, budget approval for such projects still rests with the local chief executive. Low level of education and the limited capacity of most BLGUs to assert their devolved functions contribute to ensure that the community continues to leave decision-making to their leaders.

2.2.10 Ethnolinguistic groups

The original settlers in the northern part of Dinagat Island trace their roots to the provinces of Samar and Leyte. Most of the new settlers, on the other hand, come from the Mindanao mainland while a number migrated from Panay, Cebu, Bicol, Bohol, Southern Tagalog and the Ilocos provinces.

About 95 percent speak Surigaonon as a major dialect. Influences of the Cebuano and Boholano dialects with a Tausug accent can be detected. A few speak Waray and Tagalog. Majority can speak English.

At the height of logging and mining operations in the '80s to the '90s, families of Kungskings, a sub-tribe of Manobos inhabiting northeastern Mindanao, migrated to Dinagat Island. After the logging and mining have stopped, some of them crossed over to Samar island as hired workers of logging companies. There is only one household-family of Kungsking left in Sitio Omasdang, Panamaon, but its subsistence is now influenced by the local culture.



status and distribution of forest habitats and species The vegetation and habitat types in Mts. Kambinliw & Redondo are described in this chapter. The ecosystems, ranging from lowland tropical rainforest to coral reefs are characterized as well as the different key species that represent the biodiversity in the forests. Also described are the uses of the different ecosystems and wildlife, and their conservation status.

The vegetation and habitat types of Mts. Kambinliw & Redondo and its adjacent vicinities are classified as lowland tropical rainforest, montane forest, shrub forest, mangrove forest, beach forest, rivers and estuaries and coral reefs. These forest types are described in detail below.

3.1 Major Ecosystems, Status and Distribution

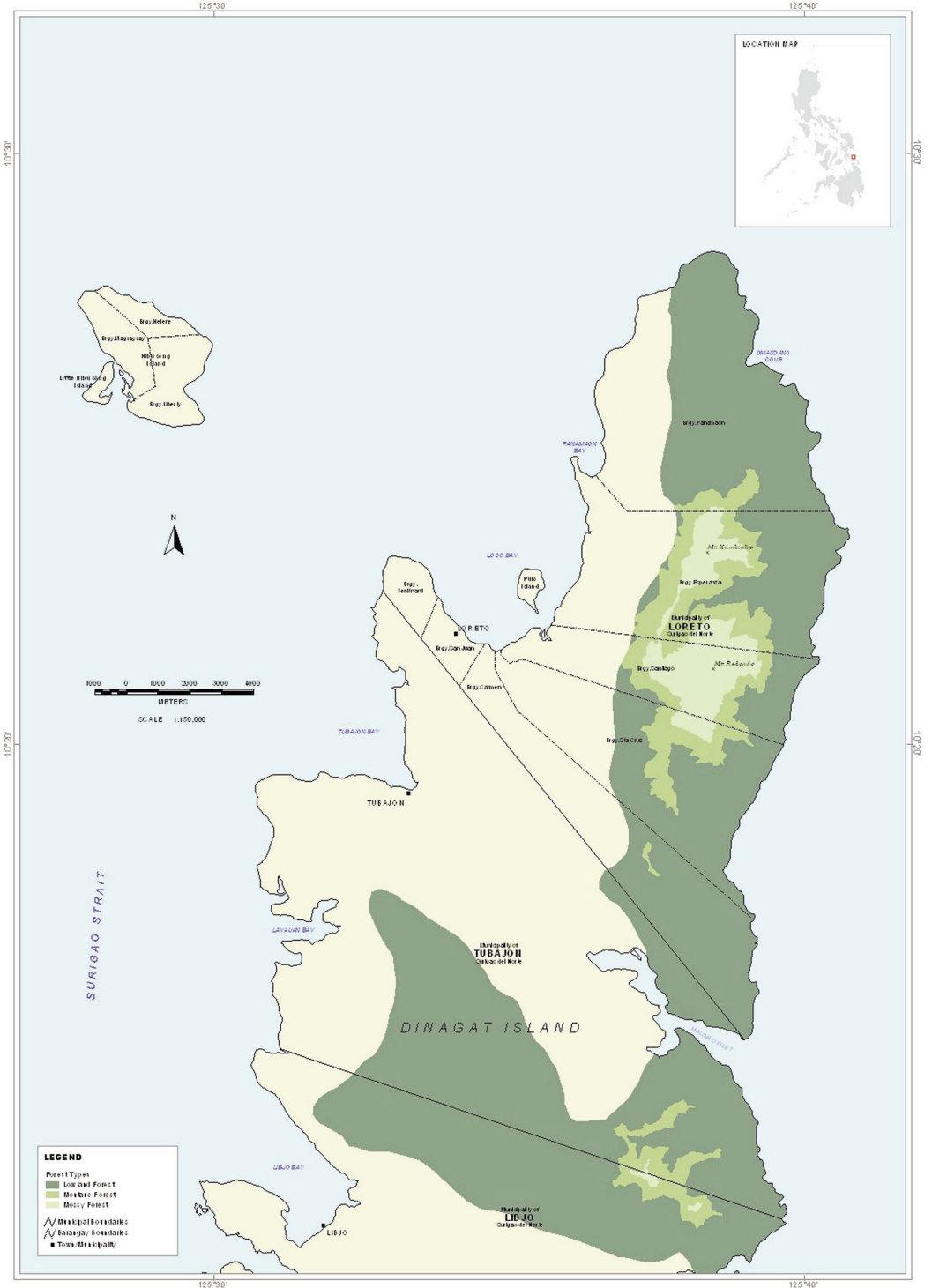
Mts. Kambinliw & Redondo cover the northeastern part of Loreto, with coordinates of 10°12' N 125° 35' E. These are also the remaining significant forests of Loreto and the whole Dinagat Island (*Figures 7 and 8*).

3.1.1 Lowland tropical rainforest

Most of the forest types of Mts. Kambinliw & Redondo are lowland forests. The altitudinal transition between lowland forests and montane forests were determined to occur within 450 to 500 meter elevation. The lowland tropical rainforest, which covers the 0 to 400-meter elevation of Kambinliw & Redondo mountain range, is the most species-rich and the most complex structurally. This lowland forest has three levels of trees: the emergent species of Dipterocarps that are approximately 100 feet tall; the canopy species with heights ranging from 30 to 45 meters tall, with lots of epiphytes and lianas; and the understorey species. Species composition varies according to local soil and drainage conditions.

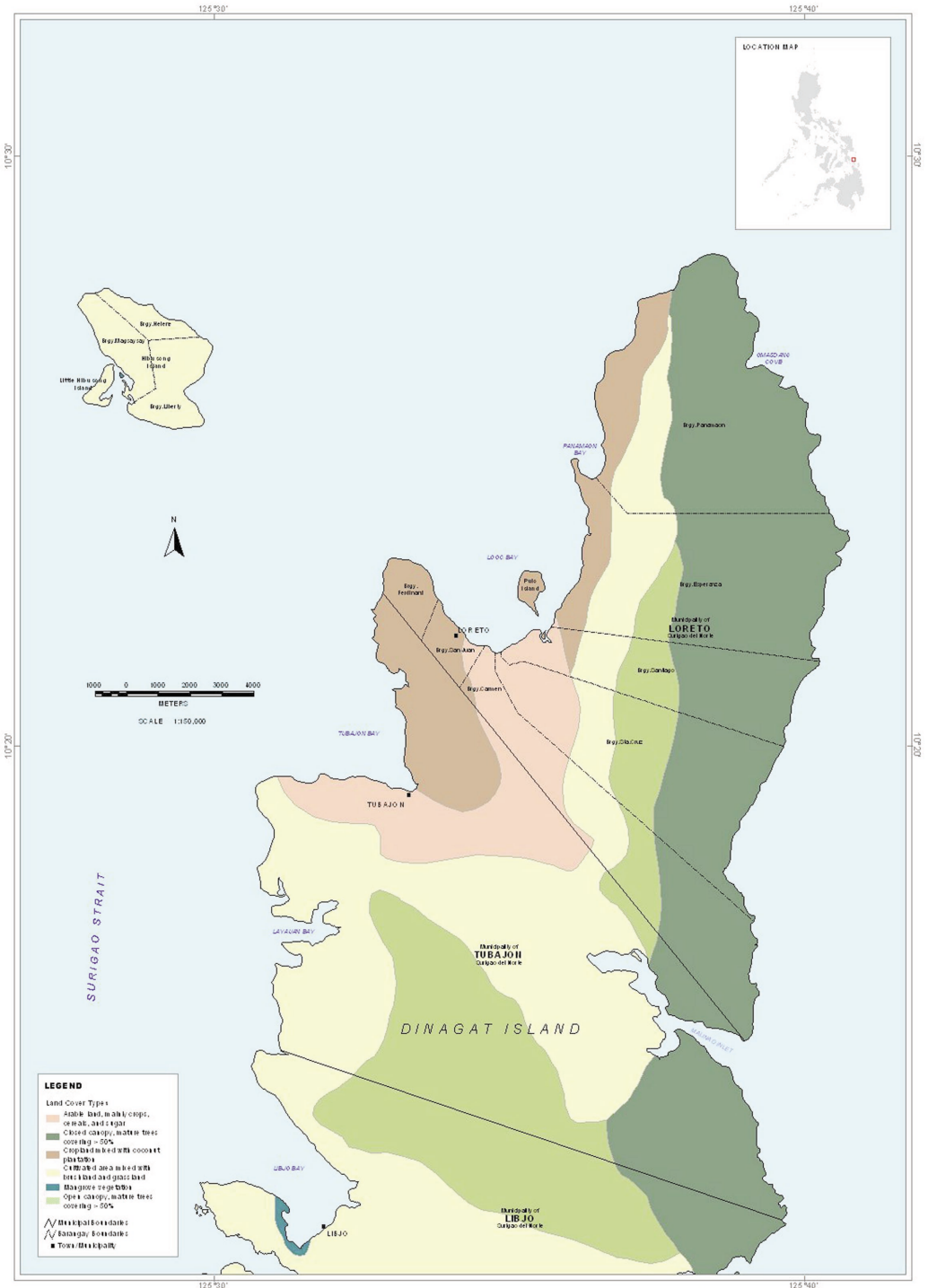
Trees in the lowland tropical rainforests of the island are predominantly of the Dipterocarpaceae family. The common dipterocarp species include White Lauan, Yakal, Hagak-hak, Sahung-sahungan (*Vatica mangachapoi*), Balau (*Dipterocarpus validus*), Tanguile (*Shorea polysperma*), Almon and Apitong. The most dominant species observed is Tiga (*Tristanopsis micrantha*), while Tarungating, Maribuhok, Dugong-tawo, Wakatan, Bairan, Lanete, Nangka-nangka and Hambabwood are also widespread. The lower level is composed of *Ardisia sp.*, *Gymnostoma sp.*, *Pittosporum sp.*, *Polycias sp.*, *Neonauclea sp.* and mem-

Figure 7. Forest-Type Map of Mts. Kambinliw & Redondo, Loreto, Dinagat.



SOURCES:
 Barangay boundaries: from the Municipal Planning and Development Office, Loreto, Dinagat Island, Caraga de Norte,
 Municipal Boundary and Forest Cover Data, 1988; from the Habitat Mapping and Resource Information Authority,
 Forest type: from the Habitat Foundation for the Conservation of Natural Resources.

Figure 8. Vegetative-Cover Map of Mts. Kambinliw & Redondo, Loreto, Dinagat Island.



Source: Barangay boundaries from the Municipal Planning and Development Office, Loreto, Dinagat Island, Cagayan de Oro. Municipal boundaries and land cover data (1988) from the National Mapping and Research Institute Authority.

bers of the family Palmae. Sagimsiman (*Syzygium brevistylum*) is the most dominant among the understorey species.

The forest area is the refuge of 102 bird species and a great number of biologically significant mammals. Thirty-seven percent (37%) of the 102 bird species are dependent on the lowland forests for their survival, particularly the critically endangered Philippine Cockatoo or Abucay (*Cacatua haematuropygia*) and the nine restricted-range birds of the Mindanao faunal region. Among those mammals are Mago (*Tarsius syrichta*), Kagwang (*Cynocephalus volans*), Buot (*Urogale everetti*), and the three species of rodents that are endemic to Dinagat Island. It was reported that Mts. Redondo and Kambinliw are being considered as possible sites for the release of captive-bred Philippine Eagles *Pithecophaga jefferyi*. Historically, no record of the Philippine Eagle has ever been reported on Dinagat Island.

The area is also a source of food, wood for domestic use and medicines for the community. The forests also play an important role in regulating the local water drainage system.

Particularly important is the “sponge effect” by which rainfall is trapped by dense ground vegetation cover, leaf litter and soils. The ground vegetation cover and the soils hold the rain water and allow it to drain out slowly and evenly into the local river systems, thereby reducing the likelihood of floods during heavy rainfall and ensuring that water continues to be released regularly during periods of dry weather. The water sponge effect is lost when the ground vegetation cover is destroyed. On sloping land, any form of forest utilization which removes the ground cover and exposes bare soil to the impact of rain and surface movement of the water causes erosion. (NORDECO & DENR, 1998)

These forests have largely been reduced due to the activities of logging concessions in the 1960s to the 1970s. At present, unregulated collection of forest products, mineral extraction and expansion of agricultural lands on the forested areas have further degraded this habitat type.

3.1.2 Montane forest

As the elevation progresses further from the lowland rainforest, a new type of forest structure is observed. Montane forest in the Kambinliw & Redondo mountain range occurs at an elevation of 450 to 750 meters. At elevations 750 masl, it is distinguished by sparsely-distributed and irregularly-shaped tree species with heights ranging from 6 to 10 meters. The common vegetation genera include Combretaceae, Myrtaceae, Thymeleaceae, Verbenaceae, Sapotaceae, Fagaceae and Guttiferae. Vines, and ferns (*nito*), palms (*pantod*), and screw pines (*pandan*) grow abundantly as understorey.

Montane forest also contributes to the “sponge effect” function of the forest, thus ensuring adequate supply of water in the river systems and ground water. Some medicinal plants are also sourced from this habitat. Although the montane forest has little commercial timber, carabao logging has also encroached into this area. Forest stability is affected by unregulated harvesting of non-timber forest products like *nito*, and greatly threatened by strip mining.

3.1.3 Mossy and shrub forests

Mossy forests characterized by stunted-growth trees occur next to the montane forests and occupy areas up to the mountain summits. Two distinct vegetation types were identified in this particular habitat. The *mossy forest* is characterized by dense growth of mosses, liverworts, ferns, pandan and calamus species. Progressing in elevations of 70 to 90 meters above the originally observed mossy forests, a unique kind of mossy forest exists. With shrub-like trees ranging from 2-3 meters in height, the local people call it “*bonsai forest*”. This vegetation type is dominated by species of family Rubiaceae, Flacourtiaceae, Podocarpaceae and Lauraceae. This “*bonsai forest*” is confined to exposed slopes near and surrounding the peaks of Mts. Kambinliw & Redondo.

Despite the ecological importance of this forest type, a large portion of it has been cleared for mineral extraction.

3.1.4 Mangrove forest

Mangrove forest is located near the boundary of Barangay Panamaon and Esperanza (Layunggan River). The most dominant mangrove species are Bakawan babae (*Rhizophora mucronata*). Other species found scattered throughout the mangrove area are Pototan lalake (*Bruguiera cylindrical*), Kulasi (*Limnizera racemosa*), Bakawan lalaki (*Rhizophora apiculata*), Tabigi (*Xylocarpus granatum*), *Nauclea sp.*, and *Pandanus sp.* Nipa palms (*Nypa fruticans*) are found in patches near waterways and along the main roads.

Mangrove forest is the community’s source of marine products such as crabs, fishes and shells. It also serves as a breeding ground for marine fishes. Bakhaw, a tree species that grows in this forest, is a good source of firewood and charcoal for local communities. However, small-scale charcoal making for domestic and commercial use (as supply for local bakeries and Surigao City) is not yet regulated. Tabagi (*Xylocarpus granatum*) can also be crafted into furniture. Harvesting of these mangrove species, land reclamation for human settlements, and heavy silting caused by mining, especially in Layunggan River, have depleted and degraded this particular forest type.

3.1.5 Beach forest

Patches of naturally-growing beach forest are slowly being replaced by strips of coconut trees planted by the community along the coastline and along the beaches of Brgys. Panamaon and Esperanza. Among the existing beach forest

species which are sparsely distributed in these areas are *Barringtonia sp.*, and *Morinda citrifolia* L. The area of the beach forest could hardly be located on the map, and is insignificant compared to the area with mangrove forest.

Beach forest not only functions as a shoreline stabilizer but it also provides local people with food and firewood for domestic use. Degradation of the montane and lowland forests could affect the quality and functions of the mangrove and beach forests.

3.1.6 Grasslands

Barangay Esperanza & Kambinliw have grassland habitats that are mostly open lands colonized by *Imperata sp.*, *Lygodium sp.* and other sedges, herbs and shrubs. The grassland vegetation in Barangay Esperanza used to be part of the old-growth dipterocarp forest. But logging had stripped this portion of the old forest of its trees; the stumps of dead trees are now being used by the community for charcoal. Although the grassland habitat is classified as A & D, the community finds it unproductive because the soil, which is rocky and lateritic, is not suitable for planting. Thus, farmers are forced to clear the steep and open slopes of Mt. Redondo by using the kaingin system. Grassland vegetation is present in Mt. Kambinliw near the mangrove area although this is also found in much higher slopes. It is dominated by the *Imperata sp.*

3.2 Flora and Fauna Status and Distribution

3.2.1 Flora and faunal species

Previous studies and this baseline survey indicate that Mts. Kambinliw & Redondo have at least 129 floral species, 31 species of mammals, 102 species of birds, and 75 herpetofaunal species. A detailed listing of mammals, birds, reptiles, amphibians and plants can be found in *Annexes 3a-3b*. While these data have highlighted the presence of a range of floral and faunal species, it should not be taken as a comprehensive list. Many other important species may yet be found in future studies, especially on mammals and herpetofauna.

It must be noted that a large number of flora and fauna found in Mts. Kambinliw & Redondo are endemic to the Philippines and the species are range-restricted to the Mindanao faunal region (*Table 10*).

Table 10. Total Number of Recorded Species in Mts. Kambinliw & Redondo, Loreto, Dinagat.

Species	Total (previous study and recent baseline study)	Philippine- endemic	Restricted-range species in this	Threatened Species
Flora	444	247	Data deficient	32
Mammals	35	24	13	7
Birds	102	42	51	12
Herps and Reptiles	75	41	13	3

(Source: Haribon RSA, 2001)

A list of flora and fauna species was selected to illustrate the range of concerns associated with conserving the biodiversity of Mts. Kambinliw & Redondo (see discussions in 3.2.2 to 3.2.4 of this report). These species have been chosen because they are either significant to the local people or are dependent on Mts. Kambinliw & Redondo for their survival. Photos of selected species are shown in *Figure 9*.

3.2.2 Plants

Xanthosthemon verdugonianus (Mangkono)

Conservation status according to IUCN (2000): Critically endangered.

Description: Mangkono is a medium-sized tree reaching a diameter of 50 cm or more, with very irregular trunk. It has simple leaves of about 8 to 12 cm in length and 3 to 5 cm wide. Its fruit contains tiny half-moon shaped seeds. Mangkono is known to be the hardest Philippine hardwood species. Because of its inherent hardness and high density, it has long been recognized as a substitute for the world-famous *Lignum vitae* (*Guaicum officinale* L.) (ARCBC, 2000). This species is commonly used in Loreto as poles and piles for wharfs and bridges, tool handles, fences and for house construction, usually as posts or other installations that require durability and strength. Charcoal from this wood is reportedly of fine quality. It is the largest hardwood tree recorded on Mt. Redondo. Although the population of this tree in Loreto is relatively abundant, unregulated harvesting of Mangkono can lead to its depletion. The species is endemic to the Philippines and is known to have a very limited distribution. It is indigenous only within the “Mangkono Triangle” area, consisting of Dinagat Island, Surigao del Norte; Homonhon Island, Samar; and Babatngon, Leyte, as well as in Palawan.

Conservation action: Since Mangkono is a rare species, establishing a gene bank for this in Loreto to ensure the stability of its population is recommended.

Figure 9. Photos of Selected Flagship Species in Dinagat.

Birds



Wreathed Hornbill
(*Aceros leucocephalus*)



Philippine Cockatoo
(*Cacatua haematuropygia*)



Mindanao Bleeding Heart
(*Galliolumba criniger*)

Mammals



Dinagat Cloud Rat
(*Crateromys australis*)



Tarsier
(*Tarsius syriacta*)



Mindanao Tree Shrew
(*Urogale everetti*)



Dinagat Gymnure
(*Podogymnura aurospinula*)

Yakal *Shorea astylosa*

Conservation status according to IUCN (2000): Critically endangered.

Description: A medium to large-sized tree, 25 to 30 meters tall, with moderately tapering trunk. Its bark is light grayish brown with a yellowish hue. This tree is classified as Philippine endemic; it can be found in Luzon (Quezon and Camarines), Samar and Negros, and Mindanao. The wood is usually used for high-grade construction, bridges and wharves, mine timber and other installations that require durability and strength.

Conservation action: Yakal is confined only to lowland dipterocarp forests, thus allowing easy access to harvesting of these species. Yakal is recommended as a Rainforestation tree species for forest restoration. Immediate propagation of this species is necessary.

White Lauan *Shorea contorta*

Conservation status according to IUCN (2000): Critically endangered.

This is large tree, about 40 to 50 meters high and 100 to 150 cm dbh. It has a cylindrical trunk and a large crown. The bark is gray to dark gray with cracks 2 to 3 cm apart. The White Lauan is endemic to the Philippines and is the commonest and most widely distributed species of the Dipterocarpaceae in the country. The wood is used for furniture and cabinet making, interior finishing, veneer and plywood, flooring, boat planking and framing. Logging of these species has caused the decline of its population.

Conservation action: White Lauan is recommended as a Rainforestation tree species for forest restoration as well as for private-tree plantation. Immediate propagation of this species is necessary.

3.2.3 Birds

Mindanao Bleeding Heart *Gallicolumba criniger* (Puñalada) Endemic.

Conservation status according to IUCN (2000): Globally-endangered.

Description: The Mindanao Bleeding Heart is a Philippine endemic restricted to the Mindanao and Eastern Visayas faunal region. It is a shy, secretive, medium-sized dove with three distinct gray wing bars. The back is chestnut, while the throat and breast are white. It has a remarkable deep orange patch on the breast, creating an illusion of a bloody wound. It is usually found alone or in pairs in forests floors of primary and secondary growth forests. The species from Dinagat and Mindanao is considered to be a separate race (*Gallicolumba criniger criniger*) from the Leyte-Samar and Basilan species. Destruction of its habitat, the lowland forest, could lead to the extinction of this species in Dinagat. Its population is also being threatened by hunting because it is a popular captive bird.

Conservation action: Further study on the population and conservation requirements for this species is recommended.

Wretched Hornbill *Aceros leucocephalus* (Kalaw) Endemic.

Conservation status according to IUCN (2000): Near threatened.

Description: The Kalaw is a large bird with a high, short casque and grooves on the base of the red bill. The tail of this bird has a buff with a distinct terminal black band. The crown and hind neck are dark rufous brown, while the wings and the back part are greenish. Nesting requires the female to be enclosed in a tree cavity for about three months, with the male providing the food all the time.

Overhunting of the bird during the 1960s and forest degradation led to the decline of the Kalaw population (Haribon PRA, 2001). Since it feeds mostly on fruits, Kalaws play a very important role in the dispersal of many forest plants.

Conservation action: Further study on the population and conservation requirements for this species is recommended.

Yellowish Bulbul *Hypsipetes everetti* (Miit) Endemic.

Conservation status according to IUCN (2000): Least concern.

Description: It is a medium-sized noisy, olive-yellow bird that is frequently heard in the interior forests, secondary forests and occasionally on forest edges. Due to its conspicuous call that can be heard even in nearby forest patches, this species is actually popular among locals. The distribution is restricted to the Mindanao and Eastern Visayas region. This bird is dependent only on the low-land forests for survival. It feeds mainly on berries and other small fruits, and occasionally on small insects. The Bulbul helps in the dispersal of seeds of many species of forest plants and in a minor way, also aids in the control of insect populations, including insect pests. (Rabor, 1986)

Conservation action: Restoration and protection of bird habitats.

Philippine Cockatoo *Cacatua haematuropygia* (Abukay) Endemic.

Conservation status according to IUCN (2000): Critical.

Description: It is a white, large land bird with a conspicuous wash of yellow on the tail and underwing; its tail covert is vermilion pink. In 1972, it was reported that there was still a relatively large number of this critically-threatened bird. To date, there are no recent sightings reported about this species, specifically on the western portion of the Mts. Kambinliw & Redondo range. There are reports, however, of its sightings on the eastern portion of the mountain range, particularly from April to May. Local farmers usually hunt down this bird species because it eats up their corn. The Abukay is also commonly sold as pets.

Conservation action: Strengthen the regulation against wildlife trade and launch an awareness campaign on keeping wild birds in the wild.

3.2.4 Mammals

Mindanao Tree Shrew *Urogale everetti* (Buot/Tarababoy) Endemic.

Conservation status according to IUCN (2000): Vulnerable.

Description: This species resembles a squirrel. The upper part of the head,

neck, body, tail and outer sides of its legs are dark brown to blackish brown. It stays mostly on the ground and on the sides and edges of a clearing, preferably in the vicinity of creeks and streams. As an insect and fruit feeder, it helps in controlling the insect population and in dispersing various forest plants. The Mindanao Tree Shrew is found only in the Philippines and is endemic to the Mindanao faunal region. It is common in the forests of Dinagat but its survival is dependent on the lowland forest. Locals sometimes keep these animals as pets but only to die due to their poor adaptation outside of their habitats.

Conservation action: Disseminate more information about the importance of this species.

Philippine Flying Lemur *Cynocephalus volans* (Kagwang) Endemic.

Conservation status according to IUCN (2000): Vulnerable.

Description: The Flying Lemur shows the highest development of gliding adaptation in mammals. Its thin-furred membrane does not actually provide any motile power. It is a nocturnal mammal that feeds on young leaves, buds and ripening berries. This species is found only in the Philippines, and its distribution is confined to the Mindanao faunal region. It is common in primary and secondary forests. The Philippine Flying Lemur is widespread and common in its range; frequent sightings in Loreto indicate that its population is stable. Nevertheless, locals hunt this species for food. The widespread destruction of lowland forests make it somewhat vulnerable, but its ability to persist in disturbed forest makes them more resilient to these changes.

Conservation action: Plan and implement restoration and protection measures for the remaining habitat of this species.

Philippine Tarsier *Tarsius syrichta* (Mago) Endemic.

Conservation status according to IUCN (2000): Vulnerable.

Description: It is a small monkey-like animal, with the head and body shorter than the tail and restricted to the Mindanao faunal region. The body is typically smaller than that of a large rat. It has a rounded head and remarkably large eyes and ears. The fur on the entire body is predominantly reddish brown. Specimens from Dinagat were noted to be remarkably larger and having shorter and broader fingers than the other Mindanao specimens (Heaney and Rabor, 1982). The Philippine Tarsier is a nocturnal animal. It survives in primary and secondary growth forests largely because of its tolerance to second growth habitats. Though a recent biological study by Haribon has confirmed the presence of the Mago, locals rarely see this in the forest. It feeds mainly on insects, especially large grasshoppers, small lizards and snakes. As an insect-feeder, it helps control the insect population. This species has been declared by President Fidel V. Ramos on June 30, 1997, as a Specially Protected Faunal Species of the Philippines (Proclamation No. 1030). The proclamation stipulates that the hunting, killing, wounding, taking away and the conduct of the activities destructive of its habitat are prohibited. Despite this, depletion of the lowland and secondary forests as a result of mining and logging makes this species vulnerable in Loreto.

Conservation action: Strengthen the regulation against wildlife trade and the advocacy for forest restoration and protection.

Dinagat Cloud Rat *Crateromys australis* Endemic.

Conservation status according to IUCN (2000): Critically endangered.

Description: According to Heaney and Rabor, 1982, this species is endemic in Dinagat Island. It differs from the other cloud rats in Southern Philippines on the basis of size and pelage characteristics. This species has not been seen by the Haribon Team during its recent survey in Mts. Kambinliw & Redondo.

Conservation action: Conduct a research study on the population of this species. Plan and implement forest conservation and protection measures to save the remaining Dinagat Cloud Rats from extinction.

Dinagat Gymnure *Podogymnura aureospinula* Endemic.

Conservation status according to IUCN (2000): Critically endangered.

Description: Dinagat Gymnure is an island endemic. According to Heaney and Rabor, 1982, this species is an insectivore with a relatively large body size compared to *Batomys* and *Crateromys*. It has spiny dorsal pelage, inflated frontals and well-developed crests. This species was not seen by the Haribon Team during its recent survey in Mts. Kambinliw & Redondo.

Conservation action: Conduct a research study on the population and protection needs of this endangered species.

Dinagat Hairy-tailed Cloudrat *Batomys russatus* Endemic.

Conservation status according to IUCN (2000): Critically endangered.

Description: This species is easily distinguished from their closest relative, *B. salomonseni* Sanbord, 1953, on the basis of its small size and reddish color (Heaney and Rabor, 1982). This is endemic to Dinagat Island. The other species *Batomys salomonseni* is known only from Mindanao. Its remaining population, which has not been validated during the Haribon survey in 2001, is threatened by further opening of the forest due to mining.

Conservation action: Conduct a research study on the population and protection needs of this endangered species.



human use of forest ecosystems and resources This chapter provides a short description of the local communities' social and economic dependence on the forest ecosystem and its resources. Only those aspects regarded as important for forest management planning are included. The information is based on the full situational analyses in Brgys. Panamaon, Esperanza and Santiago.

4.1 Local perception on status of the ecosystems

4.1.1 Changes in land use

It is the perception of the communities that the reduction and degradation of natural resources have significantly affected the balance of the ecosystem. As local population increases, human activities such as mining, logging, expansion of agricultural areas, have affected the functioning of the ecosystem. Mining and logging are perceived to be the major causes of destruction.

Thirty years ago, forest cover was just three kilometers away from the shore, according to the local communities. When logging and mining companies started operating in the area, conversion of forestlands to agricultural land became rampant (Haribon Survey, 2001).

In Brgy. Esperanza alone, 10 to 15 hectares of mangroves and rice fields were affected by NAREDICO (an MPSA or Mineral Permit Sharing Agreement holder) operation from 1985-1990. Small-scale gold panning, locally known as *bali-bali*, had practically poisoned the rice fields.

However, in Santiago, the PRA participants observed a decline in environmentally-destructive activities such as small-scale mining, logging, firewood gathering, overfishing and *kaingin*.

The people of Esperanza value their forest and water resources. This is shown by their support for and recognition of environment-related resolutions and ordinances made by their barangay officials. They have already established and enforced the protection of their mangrove sanctuary. Forest protection is done through the Task Force Kinayahhan, a forest protection group represented by the local police and other community residents. Also for the purpose of forest protection, a people's organization called the Coastal Area Managers of Esperanza (CAME) was established with the assistance of Reach Foundation, a local NGO.

4.1.2 Observed changes in resources

The selected communities are aware of the importance of natural resources as sources of food and water. However, since the whole island is a mineral reserve and covered by MPSA, the people can only conduct small undertakings on resource protection and management such as the establishment of mangrove sanctuaries and protection of marine resources.

There is a perceived increase in fish production in Brgys. Esperanza and Santiago, because of the establishment of a mangrove sanctuary and the Bantay Dagat. The enforcement of strict policies on illegal fishing is another factor that is believed to have brought about the decline in illegal fishing activities.

The people of Santiago and Esperanza have, however, observed a decline in the wildlife resources in the forests. This they attribute to logging, timber poaching, mining and *kaingin* farming. Likewise, hunting of pigs, birds, monitor lizards and snakes for food or for commercial purposes, are perceived to have contributed to the decline of wildlife population.

They believe that *kaingin* is no longer practiced in the area. The people are aware that clearing and burning of the forest is illegal and punishable with imprisonment. They are also aware that some parts of Mts. Kambinliw & Redondo are denuded not only because of mining but also because of illegal logging. As a result, they do not want to contribute to the further destruction of the forests.

In Esperanza, the local people observed that there used to be more birds in the forest. But overhunting, both for food and commercial use, logging, and mining (especially blasting of mountains and moving of heavy mining equipment) resulted in reduced wildlife population.

They related that from the 1980s to 1990s, large mining companies used to buy sandy ores and lumps from small-scale miners to increase their supply of chromite. Small-scale mining for gold and chromite was reportedly rampant in Busay, the western portion of Brgy. Carmen, and in Omasdang, Brgy. Panamaon. Such livelihood activity was so lucrative that it reportedly caused a large influx of migrants from different areas of the country. But when the price of chromite went down, so did the number of small-scale miners.

Small-scale mining operations are being tagged as the culprit of the heavily-silted Layungan River in Panamaon. The small miners' method of extraction is crude and labor intensive (CERD, 1997). It is, however, interesting to note that the area is also covered by NAREDICO, Inc., which has been operating in the area as of mid-2002 to 2003. Small-scale mining activities, on the other hand, have stopped for the past two years. The community perceives that mining causes landslides.

4.2 Community's Use of Forests and Wetlands

4.2.1 Most commonly-used forest resources

Timber

Red and White Lauan, Sudyang, Yakal, Mangkono, Pagsayagon, Kulipapa and Lapnisan are among the most utilized and commonly marketed tree species by local communities. These are also among the premium species of forest trees. The cutting season for Lauan, Sudyang, Yakal and Pagsayagon is from November to June; White and Red Lauan from April to May; and the rest are cut anytime, or whenever there is a specific demand for these. Prices per board-foot range from P12 to P16.

These wood species are commonly used for building boats, houses and furniture. They are usually made into window jamb, sala and dining sets, dividers, balusters, tables, chairs, cabinets, window frames, windows, doors, walls and ceilings, posts, boat hulls, ports and bridges. Kulipapa and Pagsanayon are principally used for firewood, but are sometimes also used for posts and walls; Sudyang for furniture and handicraft; and Lapnisan and Lauan for decorations.

At present, most of the community members log for domestic consumption only. Although selling of lumber outside of Loreto is prohibited and punishable by law (a local ordinance was passed in 1992 prohibiting illegal logging in the watershed), local informants revealed that small-scale illegal logging still exists for commercial purposes.

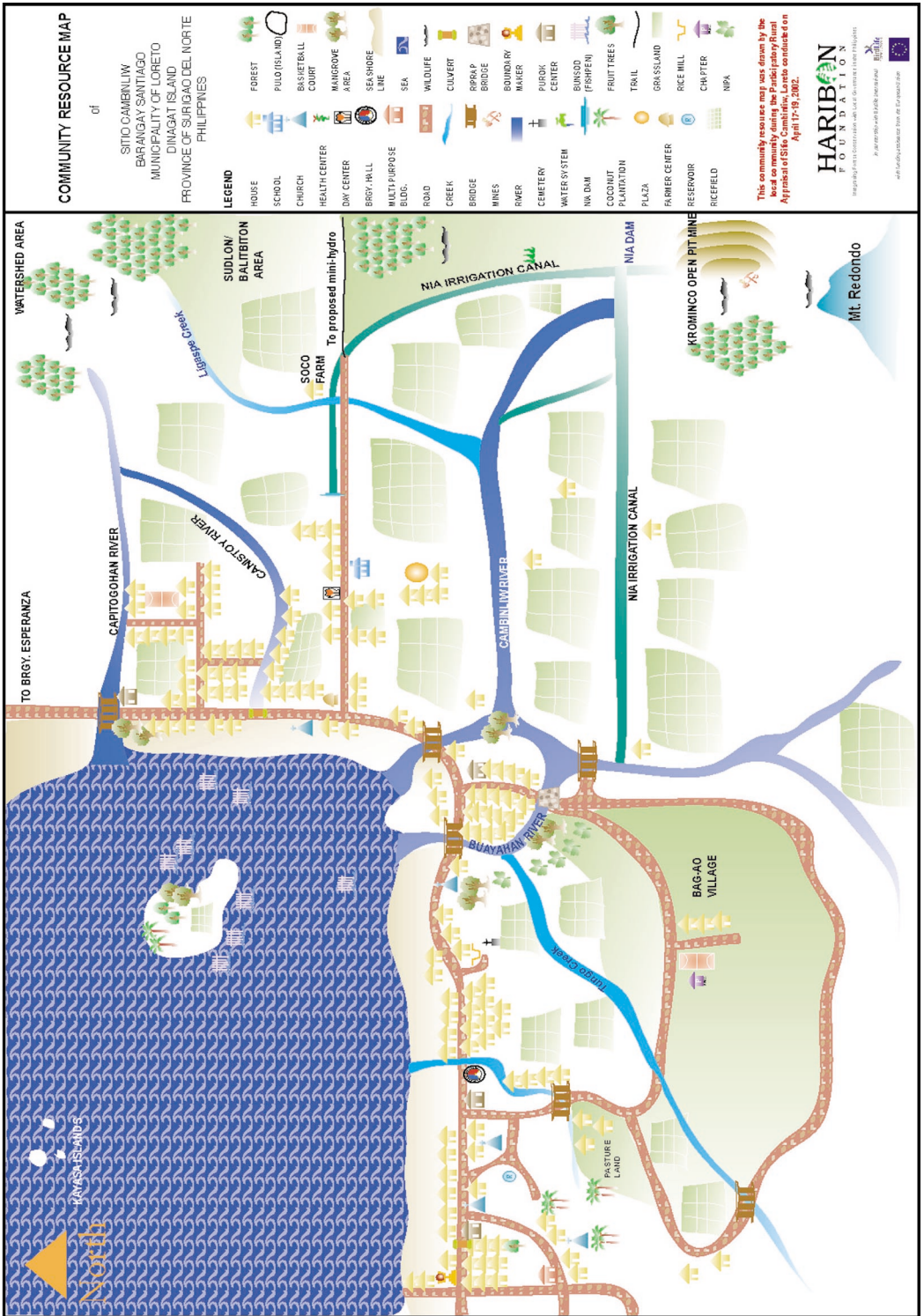
The community resource maps of selected communities are shown in *Figures 10* and *11* while the list of community-used timber and Non-Timber Forest Products (NTFPs) are in *Annexes 4*.

Non-timber forest products or resources

Non-timber resources and wild animals have become rare in Brgy. Santiago. Though scarce, rattan, *romblon*, *baliw*, *pandan*, *nito*, orchids, pitcher plants and honeybee can, however, still be found in the area. Rattan is used for furniture, while *nito* is made into handicraft and souvenir items. Honeybee is primarily collected for its medicinal value and a small bottle is usually sold at P70 to P120. *Romblon*, *baliw* and *pandan* are usually used for weaving mats with prices ranging from P150 (single) to P280 (double) and P300 (family size). Prices also depend on the design required by a customer. Orchids and pitcher plants are gathered as house decorations or sold for P20 to P50 each.

Karwayan (bamboo), rattan, *urway*, *nito* and orchids are among the non-timber resources found in Esperanza. *Uway* and *nito* are the most widely extracted and they serve a variety of uses from furniture to housing materials and decors. Bamboo is usually cut from April to May, and rattan, from May to September. Other non-timber resources are cut any time of the year.

Figure 11. Community-Resource Map of Sitio Cambinliw, Barangay Santiago, Loreto, Dinagat.



Wildlife

Wild pigs, snakes, monitor lizards and birds like *kalaw*, *antolibaw*, ducks and *alimukon* are among the wildlife resources found in Santiago. They are commonly hunted for food. Wild animals include forest mice (*ilaga sa lasang*), kite (*banog*), python (*sarwa*), flying fox (*kabog*), hornbill (*kalaw*) and fruit dove (*alimukon*).

Kaingin

Kaingin is no longer practiced in the area. The people are aware that clearing and burning of the forest is illegal and punishable with imprisonment. They are also aware that some parts of Mts. Kambinliw & Redondo are denuded not only because of mining but also because of illegal logging. As a result, they do not want to contribute to the further destruction of the forests.

4.3 Non-local users of resources

Leading the list of the non-local users are mining companies that have applied for and were granted MPSAs in Dinagat Island (details in *Chapter 5*). Other users are buyers of timber, non-timber products, and fishery resources for commercial market.



status of mining claims in relation to forest cover Discussed in this chapter is the extent of mining applications and claims in Mts. Kambinliw & Redondo. The impact of mining in the conservation of the remaining forest areas, particularly in the protection of the remaining watershed areas is also discussed here.

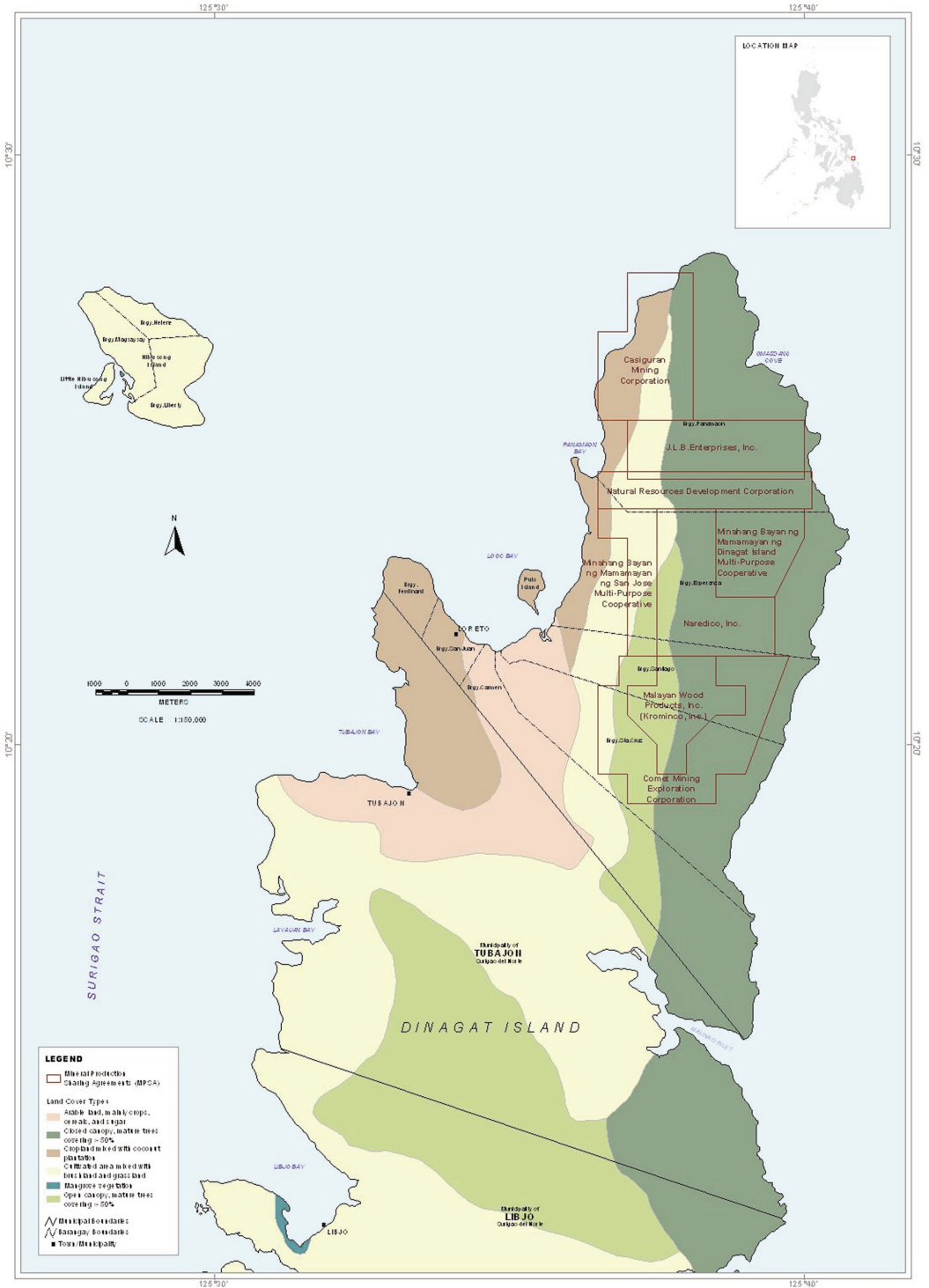
The DENR-Mines and Geosciences Bureau (MGB) approved 23 MPSAs in the province of Surigao del Norte, which would allow holders to explore and extract mineral resources within the reservation as well as in non-mining areas (PDC, 1993). Of the 23 approved MPSAs, 10 are operating in and exploring the mineral potential of the province, particularly the mineral areas in Loreto. Table 11 shows the existing MPSAs in Loreto alone.

Table 11. Existing MPSAs within Loreto, Dinagat Island.

MPSA No.	Contractor	Date Approved	Area (has.)
002-90-X	J.L.B. Enterprises, Inc.	May 15, 1990	972
003-90-X	Comet Mining Exploration Corp.	May 28, 1990	1,296
025-94-X	Minahang Bayan ng Mamamayan ng San Jose Multi-Purpose Cooperative	October 14, 1993	486
O.C.*	Malayan Wood Products, Inc.**	February 21, 1977	729
011-92-X	Minahang Bayan ng Mamamayan ng Dinagat Island Cooperative, Inc.	May 14, 1992	648
008-92-X	Naredico, Inc.	February 21, 1992	1,134
010-92-x	Casiguran Mining Corporation	May 7, 1992	1,198
M.O.A.***	Natural Resources Development Corp.		
			TOTAL 7,090

* Operating Contract ** Currently recognized as Krominco, Inc. *** Memorandum of Agreement (Source: MGB, 2002)

Figure 12. Map of MPSAs and Mining Claims in Loreto, Dinagat.



SOURCES:
 Barangay boundaries from the Municipal Planning and Development Office, Loreto, Dinagat Island, Cebu del Norte.
 Municipal boundaries and data cover data 1995, from the National Mapping and Research Institute, Ateneo.
 Mining products sharing agreements (MPSAs) from the files and Google Earth, August 2009.

5.1 Mineral production-sharing agreements and boundary conflicts

Figure 12 shows the mining claims of existing MPSAs in Loreto, Dinagat Island. The total area of approved mining claims is 70.90 sq. km., or 7,090 hectares, which covers 45.32% of the total land area of Loreto. The mining claims cover practically the whole of Mts. Kambinliw & Redondo range. Should all of the above-mentioned mining concessions actively operate using the strip mining technique, Mts. Kambinliw & Redondo will virtually be gone in the next few years.

Two mining sites, particularly Krominco, Inc. (formerly known as Malayan Wood Products, Inc.) and NAREDICO, were visited during the full biophysical survey in Mts. Kambinliw & Redondo. Open-pit mining or quarrying was the primary technique employed for mineral extraction. NAREDICO also has a tunnel excavation for the extraction of gold. Some mining companies such as Acoje Mining and Mauban-Loreto Mining have already ceased operations. Community consultations during the participatory rural appraisals point out that some companies with MPSAs from the MGB data have either ceased operations (e.g. J.L.B. Enterprises) with no indication if this was permanent or temporary. Some MPSAs were even totally unknown to them (e.g. Comet Mining Exploration Corp.).

Before Krominco, Inc. temporarily shut down because of the low price of chromite in the world market, its operations covered about 50 hectares of forest in Brgy. Esperanza. Its mining wastes flowed through the rivers and creeks from Mts. Kambinliw & Mt. Redondo to the Pacific Ocean and not to the Looc Bay of Loreto. Over the last 12 years, a total of 607,663.28 metric tons of rock wastes was produced by Krominco and Mauban-Loreto Mining, two of the largest mining companies (CERD, 1996). Quarrying is extensive and has unearthed large areas of forests. Since mining claims last for as long as 25 years and are renewable for another 25 years (Peña, 1995), the adverse effects of mining are likely to be severe and the damage beyond measure.

The area of each mining claim was recomputed and the results were compared with their declared areas (Table 12). Computations show that the size of the actual mining area is larger by 370 hectares than what was declared to the LGU of Loreto. These undeclared coverages have implications on revenues derived from occupation fees of mining concessions, the most apparent being that of a reduced collection of revenues.

Section 86, Chapter 15 of R.A. 7942 provides for the imposition of annual occupation fees on holders of a mineral agreement, exploration permit, and financial/technical agreement, in addition to other taxes and fees, where applicable. Since Dinagat Island is a declared mineral reservation, occupation fees amount to P100 per hectare of each mineral agreement. Based on Table 12, annual revenues collected from occupation fees alone should be P746,026 (as

opposed to P709,000), 30% of which shall go to the province and 70% to the municipality.

Table 12. Area computation of Mining Concessions in Loreto, Dinagat Island.

Contractor	Computed Area (has.)	Declared Area (has.)	Discrepancy in Area (has.)
Casiguran Mining Corp.	1,199.91	1,198.00	1.91
Comet Mining Exploration Corp.	1,370.20	1,296.00	74.20
J.L.B. Enterprises	1,010.58	972.00	38.58
Malayan Wood Products, Inc. (Krominco, Inc.)	758.09	729.00	29.09
Minahang Bayan ng Mamamayan ng Dinagat	673.79	648.00	25.79
Minahang Bayan ng Mamamayan ng San Jose	505.32	486.00	19.32
Naredico, Inc.	1,179.15	1,134.00	45.15
Natural Resources Development Corp.	763.22	627.00	136.22
TOTAL	7,460.26	7,090.00	370.26

A boundary overlap can also be observed between the mining claims of J.L.B. Enterprises and the Natural Resources Development Corp. (NRDC). The NRDC is the corporate arm of the DENR. This overlap, measuring 126.35 hectares, also presents a conflict between the two contractors concerning occupation fees that are due the province and the municipality. Adjacent claims obviously share at least one common boundary. It is also interesting to note that the mining claim of Krominco, Inc. is completely enclosed by other mining claims, with Comet Mining Exploration Corp. almost totally surrounding Krominco's perimeter (with the exception of the northern portion).

There are no on-the-ground delineated boundaries for each mining claim, which poses a problem in the safety net measure monitoring of the community. Moreover, affected communities were not informed of the mining claims that cover their area.

Mining contractors are also entitled to auxiliary mining rights. Such rights include timber rights, water rights, rights to possess explosives, easement rights,

and access to private lands and concession areas. These auxiliary rights are, however, subject to further approval by the DENR. Timber rights are almost equivalent to a timber concession since it grants the contractor the right to cut trees within the approved mining area. Contractors also have priority access to water resources. Most of these auxiliary rights may completely destroy the environment, including the soil, rivers, and forests if these are permitted without precaution.

The stockpiles of some mining companies, particularly of NAREDICO's and Krominco's, were situated near the estuaries in Brgy. Esperanza. The JLB stockpile is in Brgy. Panamaon near the mouth of the Layunggan River. These facilities initially served as depot for timber and mineral ores prepared for shipment to Surigao City. At present, only old heavy equipment are kept at abandoned stockpiles (except the Krominco stockpile which still stores gravel, sand and asphalt).

5.2 Forest cover vis-à-vis watersheds and mining concessions

Out of the 19 major watersheds at Dinagat Island, 14 are still forested, but some of them almost completely forested. Five other watersheds, however, are already devoid of forest cover. *Table 13* shows the forested watersheds of Loreto.

Table 13. Forested Watersheds of Loreto, Dinagat.

Watershed	Watershed Area (has.)	Forest Cover (has.)	% of Forest Cover	Area covered by MPSA (has.)
Cambinliw-Looc-Panamaon	5,305.39	1,239.65	23.37	3,011.102
Malinao River	12,026.70	5,589.47	46.48	360.831
Omasdang	2,474.77	2,372.82	95.88	1,518.320
Unnamed basin 1	2,733.93	2,658.44	97.24	1,310.276
Unnamed basin 2	1,860.98	1,847.37	99.27	1,029.000
TOTAL	24,401.77	13,707.75		7,229.529

Note: Only watersheds with remaining forest cover are indicated.

Figure 13 projects the values indicated in *Table 13* and compares the areas with forest cover against the watershed and existing mining concessions. Five out of the six watersheds of Loreto are still forested, especially those situated on the Pacific side of the municipality. Omasdang and the two other basins indicate watershed areas that are almost completely forested, possibly due to its inaccessibility. The low percentage forest cover of the Kambinliw-Looc-Panamaon watershed may have something to do with the pressure exerted by human activities in that area of Loreto.

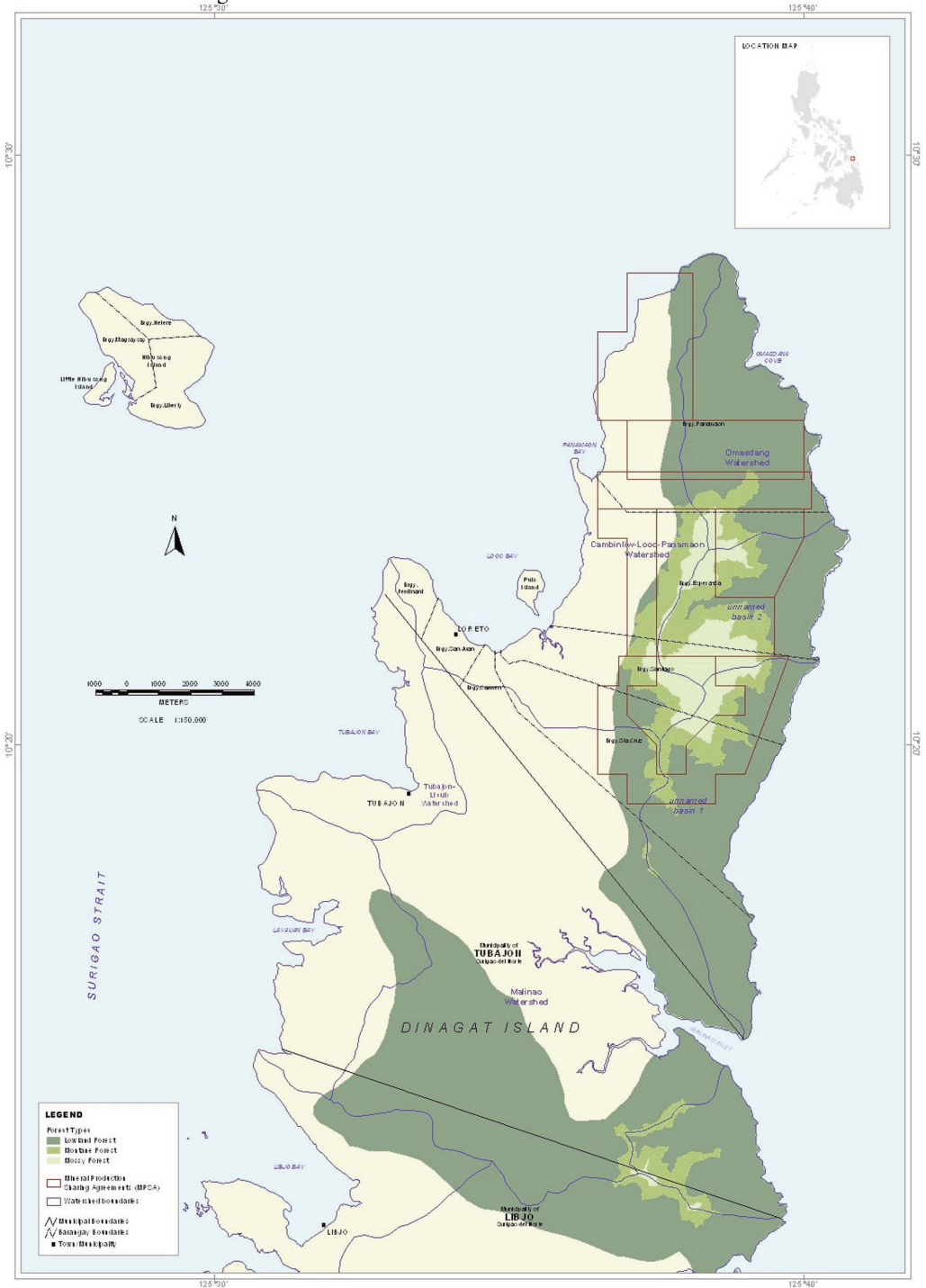
The MPSAs cover almost 55% of the total forest cover of Loreto. *Table 14* shows the forest area occupied by each mining agreement present in Loreto.

Table 14. Forests in Loreto, Dinagat Covered by Mining Agreements.

Contractor	Computed Area (has.)	Forest Area Occupied (has.)
Casiguran Mining Corp.	1,199.91	186.17
Comet Mining Exploration Corp.	1,370.20	1,186.76
J.L.B. Enterprises	1,010.58	769.94
Malayan Wood Products, Inc. (Krominco, Inc.)	758.09	758.09
Minahang Bayan ng Mamamayan ng Dinagat	673.79	673.79
Minahang Bayan ng Mamamayan ng San Jose	505.32	101.41
Naredico, Inc.	1,179.15	1,053.54
Natural Resources Development Corp.	763.22	516.56
TOTAL	7,460.26	5,246.25

What should be pointed out here is the presence and impact of these mining concessions on the watershed areas. While the forest cover of Kambinliw-Looc-Panamaon is critically below 25% of the watershed area, this percentage will continue to worsen with the mining concessions covering the watershed area. This is aggravated by the fact that the remaining forests of the watershed are all within the concessions and that most of the communities are situated within the Kambinliw-Looc-Panamaon watershed. Since mining agreements are valid for 25 years and renewable for another 25 years (Section 32, Chapter 5 of the Philippine Mining Act of 1995), the remaining forests are placed under tremendous pressure or threat. It is even highly probable that the forest will continue to diminish at an increasing and alarming rate every year.

Figure 13. Map Showing the Forest Cover, Watershed Areas and Mining Areas in Dinagat Island.



SOURCES:
 Watershed boundaries from the Watershed Mapping and Development Office, Loreto, Dinagat Island, Cagayan de Oro,
 Mindanao, and from the 1985-1986 National Mapping and Resource Information Authority,
 Watershed boundaries from the National Mapping and Resource Information Authority,
 Forest types and topographic data from the National Foundation for the Conservation of Natural Resources.



present forest management levels and institutional arrangements This chapter looks into the institutional arrangements vis-à-vis forest management in the project site. It also presents some of the forest management interventions by local stakeholders in Loreto, and an assessment of their capacities to implement devolved natural resource management functions.

6.1 Institutional arrangements

The Local Government Code of the Philippines (LGC) or RA 7160 sets the philosophy of decentralization and local autonomy as enshrined in the 1987 Constitution. It allows certain operating mechanisms to local governments in meeting the communities’ priority needs and service requirements through the active implementation of national programs and projects. The LGC further empowers the LGUs from barangay to provincial levels to share responsibility with the national government in the management and conservation of natural resources. With the devolution of the DENR’s environmental functions to the LGU (*Table 15*), the Code is seen here as laying the groundwork for local governance to pursue measures for the protection of their forests.

Table 15. DENR Functions Devolved to the LGU in Non-NIPAS Areas.

• Integrated social forestry projects
• Regular reforestation projects
• Forest Land Management Agreements
• Foreign-assisted community forestry projects
• Communal forests less than 5,000 hectares to be converted into community forest projects
• Management, protection and rehabilitation of small watersheds
• Enforcement of forest laws and protection of community forests and small watersheds
• Establishment of tree parks, greenbelts and tourist attractions
• Rehabilitation of conservation “hot spots” and protection of endangered species in areas identified by DENR
• Issuance of Environment Compliance Certificates
• Implementation of Solid Waste Disposal plans
• Issuance of permits and enforcement of small-scale mining in areas of less than 20 hectares

-
- Regulation of import and export of flora, including permit for industries and businesses, e.g. orchid farming and nurseries
 - Enforcement of fishery laws in municipal waters, including the conservation of mangroves
-

(Source: NORDECO-DENR, 1998.)

By virtue of the Code, no program or project may be implemented in the territorial jurisdiction of LGUs without the latter's prior endorsements. These include activities governed by other national laws such as the National Integrated Protected Areas System (NIPAS) Act, Indigenous Peoples Rights Act (IPRA), Mining Act, and Community-based Forest Management Agreement (CBFMA). A joint Memorandum Circular (MC No. 98-01) between the DENR and the Department of the Interior and Local Government (DILG) outlines the procedures for partnership on devolved and other forest management functions.

6.2 Local Government Units

Mts. Kambinliw & Redondo fall under the administrative jurisdiction of the local government of Loreto. As local chief executive, the mayor heads the municipal government. The Sangguniang Bayan, composed of elected officials, serves as the lawmaking body of the municipality. The barangay government, as the smallest local government unit, has been established by virtue of the Code.

6.2.1 Municipal Local Government of Loreto

Two important offices under the direct supervision of the mayor are the Municipal Planning and Development Coordinator (MPDC) and the Municipal Environment and Natural Resources Office (MENRO). The MENRO has not yet been created because the mayor believes that the MPDC can do the functions of the former. However, based on the results of the task analysis conducted by Haribon, the MPDC has not yet received sufficient orientation on the DENR-devolved functions to the LGU. Its environment-related projects are therefore limited to solid waste management and tree-planting activities covering 20 hectares in Sitio Kambinliw, Brgy. Santiago. The municipal LGU has allocated a budget to implement these projects along with major infrastructure and social development projects (*Table 16*).

The budget was taken from the Annual Development Plans (ADP) CY 2000-2002. For CY 2000, PhP50, 000 was allocated for projects on Environment and Natural Resources Protection and Preservation under the Social Development Program. From CY 2000-2002, environment projects have received less than four percent (4%) budget support from the LGU's overall financial allocation. Priorities were given to infrastructure development, maintenance and repairs.

It must be noted that the LGU derives much of its revenues from mining companies. At the same time, these companies are also heavy users of infrastructure such as roads and bridges.

Table 16. Loreto's Annual Budgetary Appropriation for the Environment.

Year	Annual Budget (Php)	Annual Growth Rate	Appropriated for Environment (Php)	% Share	% Increase
2000	4,435,244.63		50,000	1.13	
2001	5,820,499.00	31.23%	200,000	3.44	300
2002	6,429,045.24	10.47%	250,000	3.89	25

(Source: Annual Development Plans of Loreto, CY 2000-2002)

Municipal Development Plan

The LGC mandates the creation of a Municipal Development Council, a body composed of representatives from the LGU, other government offices and civil society. Its task is to ensure that the Municipal Development Plan (MDP) is formulated, coordinated and consulted with concerned groups. However, participation in the preparation of the existing MDP of Loreto was limited to the mayor and the MPDC. The MDC of Loreto has yet to convene to update the Annual Development Plan (ADP).

The LGU gauges the progress of Loreto through eco-tourism, agriculture, and extraction and utilization of their mineral resources. Its current ADP focuses on the social, economic and physical sectors. The only environment-related development strategy integrated in the ADP under the physical sector is the water conservation campaign. The municipal plan or proposal includes the construction of a small hydroelectric power facility on Mt. Redondo to augment the power shortage and increasing demands for electricity.

In Loreto, the recommendations stated in the Provincial Framework Plan of 1993 as enumerated in *Chapter 3*, have not yet been implemented, particularly the creation of buffer zones around watersheds, and the delineation of boundaries of production and protection lands within mineral reservations.

Some factors that contribute to the lack of integration of forest conservation-related programs in the municipal ADP are as follows: a) limited training and exposure of key officials of the LGU on conservation strategies and opportunities, b) limited consultations with concerned sectors, c) low political will to integrate; and, d) limited technical support from DENR in the implementation of forest conservation measures.

Local legislation

The Sangguniang Bayan enacts ordinances, approves resolutions and appropriates funds for the general welfare of the municipality and its inhabitants. It also exercises corporate powers in the municipality as provided under Sections 445, 447 and 469 of RA 7160 (LGC, 1991).

Loreto has two barangay ordinances dealing with solid waste management, one resolution on marine ecosystem management, three resolutions on forest conservation and one resolution on tourism. Examples of these resolutions are shown in *Table 17*. A more detailed list is in *Annex 5a*.

Table 17. Examples of Municipal Resolutions in Loreto, Dinagat Island.

Municipal Resolutions
• Establishment, maintenance and enforcement of a fish sanctuary
• Adoption of a Philippine Eagle Foundation program
• Declaration of tourist spots
• Solid waste management
• Prohibition on illegal logging and illegal fishing
• Approval of a Disaster Preparedness Plan
• Granting authority for the application of an ECC
• Regulation of sand and gravel extraction
• Appointment of a MENRO
• Creation of Barangay Ecological Solid Waste Management Committee
• Request for DENR assistance in delineating the watershed area
• Request for DENR assistance in implementing Presidential Decree No. 1153 requiring the planting of one tree every month for five consecutive years by every citizen of the Philippines

Of the 21 environment and related resolutions, two are enforced and 7 are not. The enforcement status of the rest is unknown due to the absence of a monitoring and evaluation system. The enforced resolutions refer to Clean and Green Program and proper disposal of garbage. These are also the projects directly handled by the MPDC.

While there are many attempts to protect the environment and natural resources of Loreto, none is directly focused on the conservation of the remaining forests in Mts. Kambinliw & Redondo. The delineation of watershed areas could be an initial step towards forest management, but this has not yet been acted upon by the DENR.

The Sangguniang Bayan initiated most of the pieces of legislation. This top-down process of policy formulation and legislation is replicated at the barangay government level. Hence, majority of those interviewed during the study were not familiar with municipal initiatives and resolutions.

6.2.2 Barangay LGU

DENR-DILG Joint Memorandum Circular No. 98-01 recognizes the important role of the barangay in protecting the forest and in rehabilitating degraded forestlands. As such, it authorizes the DENR to deputize barangay officials as Environment and Natural Resources Officers locally known as Bantay Gubat. No barangay official in Loreto has been deputized by the DENR until now.

The Barangay Council consists of committees in the following areas: sports, appropriation, agriculture, tourism, education, environment, peace and order, health and infrastructure. All environment-related concerns and proposed legislation go through the environment committee.

The three forest-fringe barangays – Santiago, Esperanza and Panamaon – have formulated their respective 5-Year Barangay Development Plan (BDP) with assistance from Balay Mindanao Foundation, Inc. (BMFI). All their BDPs include environment-related programs such as the protection and rehabilitation of forests, watersheds and mangroves. Support ordinances have already been formulated, examples of which are shown in *Table 18*. A more detailed list is in *Annex 5b*.

Table 18. Examples of Barangay Ordinances in Santiago, Esperanza and Panamaon.

Ordinances and Projects	Status of Implementation
Brgy. Santiago:	
<ul style="list-style-type: none"> • Prohibition on the use of fine mesh nets and “buso” in fishing • Prohibition against “tapsay” fishermen from Polo Island to Kayasa Island • Establishment of mangrove sanctuary 	Seasonal enforcement; no regular monitoring
Brgy. Esperanza:	
<ul style="list-style-type: none"> • Prohibition on illegal occupation and destruction of forests, especially along watershed area • Establishment of a four-hectare mangrove sanctuary • Organizing of Barangay Solid Waste Management Committee • Prohibition on illegal fishing and use of illegal fishing materials such as mesh net, liba-liba, etc. • Prohibition on cutting of 	Still with reported cases of illegal fishing and mangrove cutting

mangrove and collection of corals	
Brgy. Panamaon:	
<ul style="list-style-type: none"> • Establishment of mangrove sanctuary • Prohibition of logging within the watershed • 2-hectare reforestation project (planting of Mangkono, Lauan and fruit trees) • Protection of marine ecosystem 	Weak enforcement of logging prohibition but strong and regular monitoring of marine ordinance

(Source: Haribon Survey, 2002)

The barangay residents said that cutting of mangroves and forest trees as well as the gathering of NTFPs continue in spite of the resolutions passed for the protection of the forest. As of this writing, the barangay residents have no other sources of wood.

6.3 Department of Environment and Natural Resources

6.3.1 Provincial Environment and Natural Resources Office (PENRO)

Functions

The PENRO has the following duties and functions (DAO 01-88):

- Planning, coordinating, controlling, preparing and/or updating plans for the protection of the environment, and development and conservation of natural resources;
- Coordinating environmental and natural resources management activities in the provinces;
- Enforcement of environment and natural resources laws, rules and regulation;
- Investigating and recommending appropriate action to resolve claims and conflicts involving natural resources;
- Supervising activities of holders of environment and natural resources permits, leases and/or licenses; and
- Evaluating the performance of personnel to determine efficiency and effectiveness and performing other administrative and financial services to help CENRO operations.

The activities of the PENRO include providing forest management services, land management services, developing protected areas and wildlife resources, and providing ecosystem and research development services. Moreover, the PENRO has a Biodiversity Conservation Program to undertake protected area and wildlife resources development.

Staffing

The PENRO is composed of the Provincial Environment and Natural Resources (PENR) officer, information officer, community development officer,

and Community Environment and Natural Resources Offices (CENROs) for Dapa, Siargao Island and Surigao City. The PENR officer has the highest authority in the PENRO. The information officer and community development officer function as staff members. The CENRO of Dapa and Surigao City, on the other hand, functions as a line office.

Overall, the PENRO has 71 staff including those from CENRO-Dapa and CENRO-Surigao. They manage a forestland of about 130,000 hectares or 78% of the land area of Surigao del Norte (DENR-CENRO Profile, Surigao City 2001).

One of the CENROs is assigned in Surigao City and Dinagat Island. A forester is assigned in the Tubajon municipality to help monitor illegal forest activities in Dinagat Island. In 1996, the PENRO had organized a Multi-sectoral Forest Protection Council in Loreto with 20 members (now inactive).

With the large area coverage and scope of work, PENRO, just like any other government office, is experiencing problems such as insufficiency of staff, logistics and financial support.

Level of implementation

There are no DENR projects in the municipality of Loreto since the whole island of Dinagat has been declared a mineral reservation pursuant to Presidential Proclamation No. 391. According to the CENRO, there is an Integrated Social Forestry (ISF) project in Tubajon. However, the land allotted by the LGU for the project was already deforested, so the ISF project did not push through.

The activities of the PENRO-CENRO in Loreto are limited to the apprehension of illegal logging activities. Despite the designation of a forest protection officer and deputation of Bantay Gubat, illegal logging activities are not being monitored in Loreto, according to concerned barangay officials. No patrols are conducted by the Bantay Gubat in Mts. Kambinliw & Redondo. There are also no reports or feedback mechanism in place to inform the LGU of Loreto and communities about the extent of illegal logging in their remaining forests.

6.3.2 Mines and Geosciences Bureau (MGB) Region 13

Functions

The MGB is responsible for the following:

- Formulating and recommending policies, regulations and programs on mineral resources development and geology;
- Advising the DENR Secretary thru the Undersecretary for Natural Resources on the granting of mining rights and contracts over areas containing metallic and non-metallic natural resources;
- Advising field operations on the effective implementation of mineral de-

velopment and conservation programs as well as geological surveys; and,

- Developing and formulating standards and operating procedures on mineral resources development and geology (DAO 01-88).

One of the major thrusts of the MGB, according to the DENR Regional Director, is to promote the Social Development Management Program (SDMP) under the DAO 2000-99 of R.A. 7942. The MGB through its Information, Communication, Education-Community Development (ICE-CD) Division, monitors and validates the implementation of the technical aspects of mining and the promotion of the SDMP of mining companies.

Staffing

MGB Region 13 is composed of the Regional Director's Office and an Attorney's Office. It has four divisions: Administration and Finance; Geosciences; Mines and Management; and Mining, Environment, Health and Safety. The regional director has the highest authority in MGB Region 13. The ICE-CD Division, Administration and Finance, Geosciences, Mines and Management, and Mining, Environment, Health and Safety divisions function as line offices. The Attorney's Office functions as a staff office. The MGB has a total of 78 staff as of 2002.

The regional director said they are in need of additional staff and training on community organizing since they see the need for community development.

Level of implementation

As presented in Chapter 5, the MGB has approved 10 MPSAs in Surigao del Norte. Two mining companies conducting mining operations in Loreto are the Krominco and NAREDICO.

The community affairs officer assigned in Loreto facilitates and acts as back-up staff for the community-organizing task of the community relations officer of the mining companies. Krominco has organized the Community Technical Working Group Speakers Bureau (CTWGGSB), a multisectoral stakeholders' group that monitors the implementation of SDMP by mining companies. Both the DENR and Krominco are represented in this multi-sectoral group that monitors and assesses the status of mining operations.

The forest-fringe barangays, however, have received limited information about the SDMP of mining companies. Except for the locals employed by mining companies, most barangay residents have little knowledge on the extent of forest clearing and hazards posed by mining operations.

6.4 Local non-government organizations

According to the Local Government Code of 1991, LGUs shall promote the establishment and operation of people's organizations, NGOs and the pri-

vate sector, to make them active partners in the pursuit of local autonomy. People's organizations, NGOs, and the private sector should be directly involved in the plans, programs, projects, or activities of LGUs. However, at present, there are no existing NGOs in Loreto and majority of the POs are inactive.

Two local NGOs that previously operated in Loreto are BMFI and REACH Foundation. Both NGOs have contributed to the development of Loreto and have implemented environment-related initiatives. Their projects in Loreto have been completed and some of the POs they have organized are still existing, although inactive.

BMFI is a Mindanao-based non-government organization whose main thrust is sustainable area development. BMFI started its organizing activities in the communities of Loreto in 1998 and focused on organic seed dispersal of *Masagana* rice. It also provided training in organic farming technologies, biogas and aquaculture. Local politics and dynamics, as well as opposition to mining in Loreto have affected the project implementation of BMFI until it ceased operating in the area.

Among the important contributions of BMFI, which are significant building blocks for local governance, are the assistance to Panamaon, Esperanza and Santiago in conducting situational analysis, preparing their BDPs, and skills training. BMFI may play an important role in the campaign against destructive mining in Dinagat Island.

REACH is an NGO organized and funded by the Federation for the Philippine Environment (FPE). The organizing of POs, conduct of community development activities, establishment of the mangrove sanctuary and organizing of Bantay Dagat were the major environment-related initiatives implemented by REACH Foundation. It also established a rural enterprise to provide loans for livelihood to the barangay residents.

Among the relevant trainings provided by REACH, which can either be enriched or directed toward forest management and local governance, are: Community Resource Management Planning, Environmental Impact Assessment, Paralegal Training for Environmental Defense, Basic Leadership Skills Training, Community-based Radio Broadcasting, Bantay Dagat Deputation, and Field Exposure to Sustainable Projects. The POs organized by REACH, particularly those interested and willing to pursue environmental protection, could serve as partners in advocating for the protection and conservation of Mts. Kambinliw & Redondo.

6.5 Local people's organizations

There are various People's Organizations (POs) in Barangay Panamaon, Barangay Santiago and Barangay Esperanza (*Annex 5c*) that have been organized by different groups for different purposes. Among these many POs, six are environmental organizations, with four of them concentrated in Santiago and Esperanza (*Table 19*).

Table 19. Environmental People's Organizations in Loreto, Dinagat Island.

Environmental POs	Organizer	Status
• HEAD - Health Environmental Association Development	DSWD	Not operational
• Bantay Gubat	DENR	Not operational
• Bantay Dagat	REACH	Existing
• Coastal Area Managers of Esperanza (CAME) in Brgy. Esperanza	REACH	Existing
• Barangay Police Laban sa Krimen (BPLK)	REACH	Existing
• Santiago Association of Volunteers for the Environment (SAVE) in Sitio Kambinliw	REACH	Existing

The Health Environmental Association Development, or HEAD, is an organization in Brgy. Esperanza composed of fathers who support health and environment development programs. The Bantay Dagat and the Coastal Area Managers of Esperanza (CAME) were organized to monitor and protect the shorelines of Brgys. Esperanza, Santiago and Panamaon. CAME was organized in 1997 for biodiversity and conservation interventions. Livelihood projects, like capital lending for business, are also implemented through this organization. The counterpart of CAME in Barangay Santiago is the Santiago Association of Volunteers for the Environment (SAVE).

Barangay Esperanza has a BPLK that was organized to protect the forests of Mt. Kambinliw. Sitio Kambinliw in Barangay Santiago also has a BPLK which functions as fish wardens. The fish wardens and BPLK were merged in year 2000.

6.6. Local religious organizations

There are seven local religious organizations in Brgy. Esperanza and Sitio Kambinliw, Barangay Santiago (PRA of the Socio-Economic-Political-Cultural Profile, Sitio Kambinliw and Brgy. Esperanza, Loreto, 2002). The existing local religious organizations in the area are the Iglesia Filipina Independiente (IFI), Roman Catholic Church, Iglesia Ni Cristo, United Church of Christ in

the Philippines (UCCP), Seventh Day Adventists, Baptist Church, and the PBMA. The IFI is the first religious organization established in the area during the 1960s. Roman Catholicism and PBMA were also established in the 1960s. PBMA is a religious organization that originally came from the municipality of San Jose in Dinagat Island.

In the 1970s, the Iglesia Ni Cristo and the UCCP established a foothold in the area. In 1980s and 1990s, the Seventh Day Adventist and Baptist Church were established in Dinagat.

All religious groups support the projects and programs of the LGU. The large following of these religious organizations make them good partners in advocating for the protection of the remaining forests in Loreto.



forest management challenges and possible interventions This chapter presents the problems associated with the use of forest ecosystem and resources, and their impact on the remaining forests of Mts. Kambinliw & Redondo. Each problem or threat is described according to causes, effects and possible management interventions.

7.1 Ranking of Threats

Human activities that threaten the stability of forest ecosystem and resources, as well as the sustainable supply of these resources to meet human needs, are ranked according to the magnitude of their impact on the forest (*Table 20*) using the Threat Ranking Matrix. These threats were filtered from the integrated assessment of biophysical, socio-economic and management capacity of primary stakeholders in Loreto, particularly in Brgys. Santiago, Panamaon and Esperanza.

Possible interventions are identified for each problem or threat. These interventions are attempts to include forest management options in local governance. These are not, however, ranked according to priority.

Table 20. Threat Ranking for Mts. Kambinliw & Redondo.

HUMAN ACTIVITIES	I M P A C T O N F O R E S T			
	Threatened Species	Threatened Habitat	Availability of Resources for Local People	Watershed Functions
1. Mining	3	3	3	3
2. Logging/ Timber Collection	2	2	2	2
3. Conversion of forestland to agricultural lands	3	3	3	3
4. Unregulated collection/ harvesting of forest resources	3	2	2	1

5. Small-scale charcoal making	2	3	3	1
6. Excessive use of inorganic fertilizers/pesticides for agricultural production	2	1	0	0

Magnitude of Impact: **3**=highest impact; **2**=moderate impact; **1**=least impact; **0**=no impact

7.2 Discussion of Threats

7.2.1 Mining

The adverse effects of mining in Mts. Kambinliw & Redondo are likely to be severe and the damage almost irreplaceable. The Type II climate in the region implies a high probability of soil erosion if the forest cover continues to be depleted due to excavations for mining and quarrying activities. In Loreto where the terrain is mostly moderately sloping to extremely sloping, the risks associated with soil erosion are very high. With the pronounced rainy season, the risks of soil erosion and flash floods are greater.

The impact of mining activities to the sedimentation and pollution of streams and coastal areas cannot be determined due to lack of information and reliable hydrological data. However, sediments of chromite ores were observed in certain bodies of water (CERD, 1996). Rivers and streams are used for washing chromite and gold ores. Wastes are then carried down to the Pacific side of Dinagat. Mining affects not only the forests but the fishing grounds as well. With the extractive open-pit or strip mining techniques being practiced by mining companies in Loreto, watershed stability faces risk of disruption. This has implications, too, on the sustainability and quality of water supply in the whole Dinagat Island.

It must be noted that the legislation related to mining is not supportive of forest conservation. Mts. Kambinliw & Redondo are the refuge of 355 Philippine endemic flora and wildlife fauna, of which 2 are considered in the Appendix II of CITES and 50 are in the IUCN threatened list (Critically Endangered: 8; Endangered: 10; Vulnerable: 32). Considering the number of biologically important species in this area, one can consider Mts. Kambinliw & Redondo a potential protected area as prescribed by Republic Act 7586.

In contrast, Presidential Proclamation No. 391 on March 13, 1939 (Declaration of Dinagat Island as a Mineral Reservation) and the Mining Act of 1995 or Republic Act 7942 openly encourage mining applicants to explore, utilize and quarry large areas in Loreto.

Possible Interventions

- ☞ The DENR-FMB-PAWB and LGU must link up with credible academe or research institutions to conduct a resource valuation and determine options for trade-offs between mining and forest conservation;
- ☞ The LGU with support from the DENR-FMB to delineate watershed areas in Loreto; and to include its protection under the Comprehensive Land Use Plan for Dinagat;
- ☞ The DENR-MGB and the multi-stakeholders group in Loreto to define a clearer parameters for monitoring of mining operations in the area;
- ☞ The national DENR-Office for Legal Affairs in cooperation with MGB, FMB and PAWB, to provide legal experts to review the existing mineral policies and forest conservation laws; and
- ☞ Local communities in consultation with scientists or experts, DENR-Region 13 and PENRO and the LGU to prescribe appropriate habitat management for the conservation of the endemic flora and fauna species in the area.

7.2.2 Logging/Timber collection

As of 1997, large tracts of old-growth forest throughout the island have been deforested due to logging activities. Politically-powerful organized groups and individuals have allegedly been involved in this activity. Small-scale logging activities are still reportedly happening in the lowland forests of Mts. Kambinliw & Redondo, particularly in areas near Brgy. Panamaon. There is an existing local ordinance prohibiting logging activities but enforcement and monitoring are weak. The absence of strict implementation of the law and limited sources of income of the communities in the area, especially during typhoon months, will continue to exacerbate the loss of forest cover. There are no data on the number of local households depending on the forests of Mts. Kambinliw & Redondo for domestic use. However, it was noted during the survey that wood is used as material for constructing bridges and schools. Wood is preferred over cement because the latter has to be bought from the mainland and is, therefore, very expensive.

Forest destruction due to logging and mining leads to deterioration of watershed functions, which eventually affects the supply of water in Loreto. Destruction of the forest also leads to sedimentation of rivers, coastal waters and coral reefs. Eventually, the fishing community of Loreto will suffer from declining stocks of fish and lower fish catch.

Possible Interventions

- ☞ DENR-FMB, barangay and municipal LGUs to identify and establish communal woodlots in every barangay to serve as local wood source and reduce pressure on the forests;
- ☞ LGU in coordination with Haribon Foundation to strengthen the capacity of the community to use Rainforestation Farming Technology as an approach to reforesting grasslands and establishing woodlots in their communities;

⇒ DENR-FMB, Region 13 and PENRO to review the effectiveness and soundness of current forest protection ordinances; and to define the most feasible forest protection strategies;

⇒ DENR-FMB, Region 13 and PENRO, and the Armed Forces of the Philippines (Region 13) together with the barangay LGU to identify communities and specific areas that are hot spots in illegal/unregulated collection of timber and strengthen law enforcement in these areas.

7.2.3 Conversion of forestlands to agricultural lands

Agricultural expansion reaches the lowland forests of Mts. Kambinliw-Redondo. Abandoned areas with MPSAs, which were previously forested areas, are also being tried for agricultural production. More cultivation is being done near riverbanks. Two families in the forest-fringe barangays own about three hectares of farms, but most local farmers on the average own .25 hectares of farm lots. Hoping to increase their farm harvest, they open new areas for agriculture. However, soil fertility in Loreto is poor due to its high mineral content, which means the land cannot be maximized for agricultural production.

Possible Interventions

⇒ DENR-FMB, Regional office and PENRO, including the Provincial and Municipal LGU to review the current land uses in Loreto, determine which areas are suitable for agriculture outside of Mts. Kambinliw and Redondo, and formulate clear guidelines and prescriptions on appropriate land uses and activities;

⇒ CERD to coordinate with the Municipal LGU-DA and to disseminate the results of its soil analysis and suitability study in Loreto, and help provide options for agriculture in Loreto;

⇒ DA and the Department of Trade and Industry (Region 13) to study the possibility of diversifying the livelihood options in Loreto based on product market studies.

7.2.4 Unregulated collection and harvesting of forest resources

Commonly-harvested forest resources in Mts. Kambinliw & Redondo are *nito*, rattan, orchids and birds. Extraction of these forest resources depends greatly on the season. Timber extraction for domestic use is reportedly heavy during summer and moderate during the wet season. Local communities near the forests said that collection of birds, particularly the hornbill or *kalaw*, was rampant during the 1960s. Bird collectors could harvest as much as three sacks of birds then (Haribon, FGD in Panamaon, 2002). Now hornbills are already endangered. Other non-wood species are sold outside of Dinagat Island. No study has been done yet to inventory the population of commonly-used forest species in Mts. Kambinliw & Redondo.

Possible Interventions

- ☞ DENR-Ecosystems Research and Development Bureau (ERDB) and its Regional Office in consultation with the LGU and communities to:
 - conduct an inventory of NTFPs that are important to local communities;
 - establish barangay woodlots as local wood source;
 - identify indigenous fast-growing trees in the area, which can be raised in nurseries for tree plantation; and
 - study other livelihood options such as agroforestry, rattan plantation, coconut enterprise, etc. and draw lessons from the experiences of BMFI in identifying livelihood projects for Loreto.
- ☞ DENR-ERDB-FMB, and Regional Office to disseminate information on the importance of sustainable use of forest resources and conservation; and
- ☞ DENR-PAWB and Regional Office to disseminate information about the Wildlife Act and the penalties against trapping and hunting of birds.

7.2.5 Small-scale charcoal making

Small-scale charcoal makers have denuded significant portions of the western highlands of the island. Mangroves and other trees were also illegally cut for firewood and house construction (FPE, 1999). Local bakeries also use mangrove species for fuel. There are no estimates of the volume of charcoal being shipped outside of Dinagat to mainland Surigao. The mangrove forests of Loreto, especially those not included in the mangrove sanctuary, may eventually be lost if cutting is not regulated. Destruction of mangrove leads to the weakening of breakwater protection; loss of crustaceans and fishes, which are part of the local diet; and sedimentation of coastal areas and coral reefs. Eventually, the fishing community of Loreto will be deprived of food and income.

Possible Interventions

- ☞ DENR-FMB, Regional office and PENRO, and LGU to conduct participatory zoning and delineate sustainable resource-use areas with clear and doable guidelines and prescriptions on possible activities;
- ☞ DENR-PENRO and LGU to formulate an ordinance that regulates harvesting of mangrove species with clear guidelines on permit requirements for charcoal producers;
- ☞ DENR, Bureau of Fisheries and other concerned environmental group to enhance the capability of POs that support mangrove and coastal resource protection, and encourage them to share their success stories with local communities in Loreto;
- ☞ LGU to organize an association of charcoal makers/producers, assist them in rehabilitating mangrove areas and identify portions that can be allotted for sustainable use/harvest; and
- ☞ LGU in coordination with Haribon Foundation to strengthen the capacity of the community to use Rainforestation Farming Technology as an ap-

proach to reforesting grasslands in their communities and establishing their communal woodlots.

7.2.6 Excessive use of inorganic fertilizers and pesticides for agricultural production

To get high yields from agricultural production, the local farmers resort to excessive use of inorganic fertilizers. Their dependence on fertilizers is due to the poor quality of the soil. Fertilizers are sourced from Surigao City and are therefore very expensive. But due to limited sources of income in the Island, local farmers invest on fertilizers to increase their farm yield. The use of inorganic fertilizers, however, adds to the degradation of soil quality and even poisons freshwater ecosystems. Food produced from inorganic materials such as fertilizers and pesticides causes health hazards to both animals and humans.

Possible Interventions

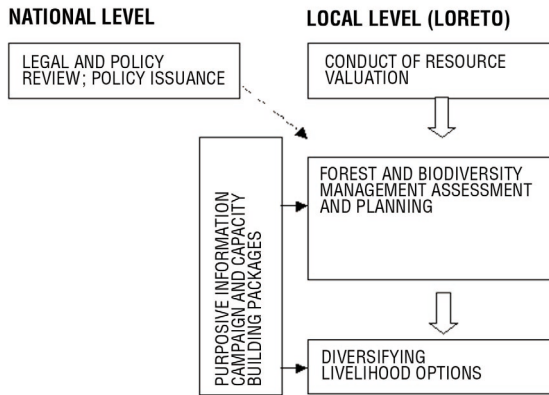
- ☞ DA-Region 13 and LGU-Agriculture Officer to promote proven sustainable agriculture technologies such as composting, soil and water conservation, use of botanical pesticides, and alternative pest management technologies;
- ☞ DA-Region 13 and LGU-Agriculture Officer to study the possibility of establishing an organic composting facility in Loreto;
- ☞ LGU-Agriculture Officer to identify crops that grow best in the type of soil in Loreto; and
- ☞ LGU-Agriculture Officer to conduct purposive information and education activities targeting farmers, local officials and other concerned stakeholders.



recommendations Haribon Foundation puts together in this chapter its recommendations to address the problems and threats confronting the conservation of Mts. Kambinliw & Redondo. These recommendations are directed to key institutions, communities and individuals with stake in the management and sustainable development of the remaining forests in Loreto.

The results of the threat analysis and ranking activity suggest the need for urgent action from the different stakeholders to save the Mts. Kambinliw & Redondo forests and the area’s biodiversity from total destruction and loss. *Figure 14* shows the most strategic actions that could lessen and eventually prevent the destruction of this rich haven of biodiversity.

Figure 14. Major Recommendations to Conserve Mts. Kambinliw & Redondo, Loreto, Dinagat Island.



The details of these recommendations are discussed below.

8.1 Legal and policy review

The DENR at the national level should be able to provide legal experts to review, identify and harmonize the conflicting provisions of the Mining Act and the Wildlife Act, Forestry Code and NIPAS Act. Meantime, the President of the Philippines should be able to issue an Executive Order to stop commercial logging and mining in all natural forest areas like Mts. Kambinliw & Redondo.

8.2 Resource valuation

Valuation of natural resources in Mts. Kambinliw & Redondo is needed to determine costs and benefits of different economic activities such as mining, fisheries, forest management and eco-tourism. This will also clarify the best options for forest resource use. The DENR and the LGU should be able to tap credible academic and research institutions from the region which might be interested to do the valuation study. This should be done soonest as the succeeding recommendations would be anchored on the results of said study.

8.3 Forest and biodiversity conservation assessment and planning

Barangay watersheds must be delineated first by the LGU and determine prior vested rights, published mining claims, under-process mining claims, and approved mining claims. Thereafter, watershed management planning workshop should be conducted.

Among the forest conservation strategies that should be considered include:

- ☞ Communal woodlots establishment to provide wood source and lessen the pressure on the forests. The DENR should be able to facilitate this activity with the LGU and communities along the forest fringes;

- ☞ DENR-PENRO, LGU and selected communities to adopt the reforestation strategy to restore open and denuded areas in Mts. Kambinliw & Redondo. Potential and appropriate sites for reforestation should be identified. The BLGU and MLGU should ensure that funds for reforestation and other related forest conservation activities should be allotted;

- ☞ The DENR-FMB Municipal and barangay LGUs should review the effectiveness and soundness of current forest protection ordinance, devise effective law enforcement strategies and ensure stricter law enforcement, and designate and assess the performance of personnel who will be tasked to handle law enforcement and forest patrol.

8.4 Diversification of livelihood options

Government agencies such as the DENR, DA and DTI should provide assistance to LGUs in accessing livelihood fund (co-financing scheme). Building on the experiences of BFMI and other groups in the area that have provided livelihood assistance to local communities in Loreto will be helpful. A plan to improve the fishing industry in Loreto and to develop and promote Loreto as an eco-tourism destination, as alternative to mining, can boost local economy and provide good income opportunities for the local people. Other sustainable livelihood technologies that are compatible with the local situation and needs of the local people should be identified.

8.5 Purposive and strategic information and education campaign

There is a need for concerned environmental organizations in the area to sensitize municipal and barangay planners to forest-watershed management by: a) developing resource materials based on surveys and resource valuation;

b) hosting participatory planning workshops to present the results of the studies; c) identifying conservation options for sustainable use of forest and marine resources; and d) educating mining companies about their social responsibilities and the impact of mining on the environment as well on the community.

8.6 Advocacy and monitoring work targeting mining companies

Krominco and other mining companies should come up with a rehabilitation plan for the restoration of natural forests. The obligations of the various parties (DENR, LGU, mining company) should be clearly stipulated in a memorandum of agreement with regulatory and monitoring parameters in place.

An incremental cost analysis to determine investment portfolio on natural resource management-related interventions of different national government agencies like DAR, NIA, DA and DENR should be conducted.

8.7 Capacity-building for LGU and local stakeholders

The LGU should be assisted in reviewing and enhancing their Municipal Comprehensive Land Use Plan (CLUP) by providing more updated information on appropriate land uses in areas within and around Mts. Kambinliw & Redondo. LGUs should be supported at the municipal and barangay levels in preparing zoning plans with clear guidelines and prescriptions on land uses. Other training courses recommended for these LGUs are Rainforestation Farming Technology and establishment of nurseries.

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Annex 1. Important Bird Areas of the Philippines.

CODE	NAME
PH001	Batanes Islands Protected Landscape and Seascape
PH002	Kalbario - Patapat National Park
PH003	Balbalasang-Balbalan National Park
PH004	Mt. Pulag National Park
PH005	Zambales Mountains
PH006	Camp O'Donnel
PH007	Candaba Swamp
PH008	Bataan Natural Park and Subic Bay Forest Reserve
PH009	Mariveles Mountains
PH010	Manila Bay
PH011	Mt. Palay-Palay - Mt. Mataas na Gulod National Park
PH012	Buguey Wetlands
PH013	Mt. Cagua
PH014	Mt. Cetaceo
PH015	Northern Sierra Madre Natural Park
PH016	Central Sierra Madre Mountains
PH017	Maria Aurora Memorial Park
PH018	Mt. Dingalan
PH019	Angat Watershed
PH020	Mt. Irid - Mt. Angilo
PH021	Polillo Islands
PH022	Mt. Makiling Forest Reserve
PH023	UP Laguna Land Grants (Pakil and Real)
PH024	Mt. Banahaw - San Cristobal National Park
PH025	Quezon National Park
PH026	Pagbilao and Tayabas Bay
PH027	Lalaguna Marsh
PH028	Ragay Gulf
PH029	Mt. Labo
PH030	Mt. Kulasi
PH031	Mt. Isarog National Park
PH032	Caramoan Peninsula
PH033	Catanduanes Watershed Forest Reserve
PH034	Bacon - Manito
PH035	Bulusan Volcano National Park
PH036	Central Marinduque
PH037	Mt. Calavite Wildlife Sanctuary
PH038	Puerto Galera
PH039	Mt. Halcon
PH040	Naujan Lake National Park
PH041	Iglit and Baco Mountains
PH042	Siburan
PH043	Malpalon
PH044	Bogbog, Bongabong and Mt. Hiding
PH045	Mt. Hinunduang
PH046	Apo Reef Marine Natural Park
PH047	Calauit Island
PH048	Busuanga Island
PH049	Culion Island
PH050	El Nido Managed Resource Protected Area

PH051	San Vicente - Taytay - Roxas Forests
PH052	St. Paul's Subterranean River National Park
PH053	Victoria and Anapalan Ranges
PH054	Mt. Mantalingajan
PH055	Ursula Island
PH056	Balabac Islands
PH057	Tubbataha Reef
PH058	Mt. Guiting-guiting Natural Park
PH059	Balogo Watershed, Tablas Island
PH060	Northwest Panay (Pandan Peninsula)
PH061	Central Panay Mountains
PH062	Mt. Silay and Mt. Mandalagan
PH063	Mt. Canlaon National Park
PH064	Ban-ban
PH065	Hinoba-an
PH066	Cuernos de Negros
PH067	Mt. Bandila-an
PH068	Tabunan
PH069	Olango Island Wildlife Sanctuary
PH070	Mactan, Kalawisan, Cansaga Bays
PH071	Nug-as and Mt. Lantoy
PH072	Mt. Kangbulagsing and Mt. Lanaya
PH073	Mt. Cabalantian - Mt. Capotoan Complex
PH074	Mt. Yacgun - Mt. Sohoton Complex
PH075	Southern Samar Mountains
PH076	Biliran and Maripipi Islands
PH077	Anonang - Lobi Range
PH078	Mt. Nacolod
PH079	Calituban and Tahong-tahong Island
PH080	Rajah Sikatuna National Park
PH081	Mts. Kambinlio & Redondo
PH082	Siargao Island Protected Landscape and Seascape
PH083	Mt. Hilong-hilong
PH084	Mt. Diwata Range
PH085	Agusan Marsh Wildlife Sanctuary
PH086	Bislig
PH087	Mt. Agtuuganon & Mt. Pasian
PH088	Mt. Puting Bato - Kampalili - Mayo Complex
PH089	Tumadgo Peak
PH090	Camiguin Island
PH091	Mt. Balatukan
PH092	Mt. Kaluayan - Mt. Kinabalian Complex
PH093	Mt. Tago Range
PH094	Mt. Kitanglad Range Natural Park
PH095	Kalatungan Mountains
PH096	Munai/Tambo
PH097	Lake Lanao
PH098	Mt. Piagayungan
PH099	Mt. Butig Mountains
PH100	Mt. Sinaka
PH101	Mt. Apo Natural Park
PH102	Liguasan
PH103	Mt. Daguma

PH104	Mt. Matutum Protected Landscape
PH105	Mt. Busa - Kiamba
PH106	Mt. Latian Complex
PH107	Mt. Malindang National Park
PH108	Mt. Dapiak - Mt. Paraya
PH109	Mt. Sugarloaf
PH110	Mt. Timolan Protected Landscape
PH111	Lituban - Quipit Watersheds
PH112	Pasonanca Natural Park
PH113	Basilan National Biotic Area
PH114	Mt. Dajo National Park
PH115	Tawi-tawi Island
PH116	Simunul and Manuk-Manka Islands
PH117	Sibutu and Tumindao Islands

Annex 2. Livelihood Matrix on Agriculture.

Barangay Esperanza, Loreto, Dinagat Island, Surigao del Norte (Haribon RSA, 2001)

Variables	Kun- sumo sa Bahay	Igba- ligya	Mataas ang Kapital	Mababa ang Kapital	Dili Ma- trabaho	Presyo/Uri ng Bentahan
Gulay						
Ubasa	5	4	3	5	5	10.00/kg*11-12/kg**
Kangkong	5	4	5	5	5	10.00/ tangkong (bunch)
Petsay	5	3	4	4	5	5.00/puno 25.00/kg
Ampalaya	5	4	3	3	4	20.00/kg* 25.00/kg.**
Balatong	5	4	5	3	2	10.00/ tangkong* 10.00-15.00/ tangkong
Prutas						
Bayabas	4	3	3	5	5	
Calamansi	3	5	5	5	5	
Mangga	4	5	5	4	4	15-25/kg.* 40-45/ tangkong**
Nangka	3	5	5	5	5	S-30 @* 10 (uR)* M- 50 20 L-60-100 30
Tambis	3	5	5	4	5	1.0 (7 pcs.)* 15.00/ 15 pcs.**
Avocado	3	5	5	5	5	
Rootcrops						
Gabi	5	2	5	5	2	110.00/taro (can)* 15/ kg**
Haway	5	2	3	5	2	110.00/taro (can)* 15/ kg**
Payao	5	3	5	5	2	40.00/taro*
Singapor	5	5	5	4	2	
Camote	5	5	5	4	2	
Other Impt. Crops						
Saging	5	5	5	5	5	2.00/3 pcs. (sapelco) 1.00/pc. (latundan) .50c/cardava
Humay	5	4	5	2	2	40.00/ganta*
Lubi	5	5	5	5	2	4.50/6.00/kg* copra 6.50-10.00/kg**
Hayop						
Kanding	2	5	2	2	2	1,500 (M/adult) 1,200 (F/adult) 500.00 (6 mos.)
Manok	2	5	5	2	5	80/kg (li veweight) 4.00/egg
Baboy	1	5	5	1	2	45.00 kg/ liveweight 80.00/kg (pork)* 90.00/kg (pork)**
Kalabaw	5	1	2	2	2	10,000-12,000 (liveweight/6 yr s. Old) 15,000 Male (1 yr old) 120.00/kg (carabeef)
Pabo	1	3	1	2	2	120.00/kg (li veweight)

Source: Livelihood Matrix (Agriculture): Key Informant Interview: Bgy. Esperanza, Loreto, Surigao del Norte, Haribon PRA, April 2002. Ranking: 1-lowest; 5-highest.
Legend: on-farm*; off-farm**; R-r ipe; uR-unr ipe

Annex 2. Livelihood Matrix on Agriculture (continuation)

Participatory Rural Appraisal

Sitio Kambinliw, Barangay Santiago, Loreto, Dinagat Island, Surigao del Norte

(Haribon RSA, 2001)

Variables	House Consumption (Konsumo sa Bahay)	For Selling (Igbaligya)	High Production Cost (Mataasang Produksyon)	Low Capital (Mababang Kapital)	Not Labor Intensive (Dili Matrabaho)	Price Per Unit of Measure (Presyo [Peso]/Urining Bentahan)
Vegetables						
Ampalaya	5	4	5	2	1	25.00/kg* 30.00/kg**
Malunggay	5	1	5	5	5	
Petsay	5	4	5	5	5	5.00/puno 5.00/3 pcs.
Sitaw	5	4	3	2	1	10.00/bungkot 12.00/bungkot
Kalabasa	4	3	4	4	4	10.00/kg 12.00/kg
Rootcrops						
Camote	5	4	5	1	1	8.00/kg.* 10-12/kg**
Singapor	5	4	5	1	1	40.00/taro* 50.00/taro**
Ubi	5	4	2	1	1	80.00/kg 180.00/taro
Karlang	5	4	1	1	1	120.00/taro
Haway	5	3	1	1	1	120.00/taro
Payaw	4	2	1	5	5	100-200/sako
Cereals						
Humay	5	3	5	1	1	40.00/ganta*
Mais	5	3	5	1	1	
Other Important Crops						
Lubi	5	5	4	5	5	2.00-3.00/pc. 5-12/kg (copra)
Saging	5	5	3	5	5	2.00/3 pcs. (sapelco) 1.00/pc. (latundan) .50c/cardava
Fruit Trees						
Nangka	5	4	5	5	3	S-10.00 (uR) M-15-20 L-50.00 5.00/dangkal (pc.)
Avocado	3	5	5	5	5	S-1.50/pc M-3.00/pc. L-5.00/pc.
Tambis	5	4	5	5	3	1.00/5 pcs. 3.00/salmonan
Bayabas	5	2	5	5	5	

Mangga	5	2	5	2	2	0.50c/pc 25-30/kg
Animals						
Baboy	2	5	5	1	1	45.00/livewght 1,200-1,500 (piglet) 90.00kg/pork
Manok	2	5	5	1	1	85.00/livewght 3.00/egg (pcs)
Pato	2	4	4	1	3	350.00/pair (M,F) 175.00/head 3.00/egg (pcs.)
Itik	2	4	3	1	3	85.00/livewght 3.00/egg (pcs)
Kalabaw	5	1	4	1	1	7,500 -12,000 (adult/female) 15,000-toro (male) 10,000 (1-2 yr. Old)

Source: Livelihood Matrix on Agriculture; Key Informant Interview; Sitio Cambinliw, Bgy. Santiago, Loreto, Surigao del Norte, Haribon PRA, April 2002.. Ranking: 1-lowest; 5-highest
Legend: on-farm*; off-farm**; R-ripe; uR-unripe; S-small, M-Medium, L-Large

Annex 3a. List of Amphibians, Reptiles, Mammals and Birds in Mts. Kambinliw & Redondo, Loreto, Dinagat Island.

Species	Common Name	Global Status Endemicity	Conserv- ation
Amphibians			
<i>Ansonia muelleri</i>	Mueller's Toad	Mindanao	
<i>Bufo marinus</i>	Giant Marine Toad	introduced	
<i>Kalophrynus</i> sp.	Black-spotted	non-endemic	
<i>P. pleurostigma</i>	Narrow-mouth Frog		
<i>Limnonectes</i> sp.		Philippine	
<i>Megophrys montana</i>	Southeast Asian	non-endemic	
<i>Megophrys</i> sp.	Horned Toad		
<i>Occidozyga laevis</i>	Puddle Frog	non-endemic	
<i>Philautus</i> sp.			
<i>Philautus cf leitensis</i>	Leyte Tree Frog	Bohol and Leyte	LR
<i>Platymantis dorsalis</i>	Common Forest Ground Frog	Philippine	
<i>Platymantis corrugatus</i>	Rough-backed Forest Frog	Philippine	
<i>Platymantis guentheri</i>	Guenther's Forest Frog	Philippine	
<i>Platymantis ingeri</i> / now <i>P. guentheri</i>	Guenther's Forest Frog	non-endemic	
<i>Platymantis rabori</i>	Rabor's Forest Frog	Bohol, Leyte and Mindanao	Vu
<i>Platymantis cf mimulus</i>	Diminutive Forest Frog		
<i>Platymantis</i> sp.			
<i>Rana cancrivora</i>	Asian Brackish Water Frog	Non-endemic	
<i>Rana magna</i>	Giant Philippine Frog	Philippine	
<i>Rana signata grandocula</i>	Variable-backed Frog	non-endemic	
<i>Rana similis</i>	Variable-backed Frog		
<i>Staurois natator</i>	Rock Frog	non-endemic	
<i>Rhacophorus appendiculatus</i>	Rough-armed Tree Frog	non-endemic	
<i>Rhacophorus pardalis</i>	Gliding Tree Frog	non-endemic	
Reptiles			
<i>Chelonia mydas</i>	Green Sea Turtle		EN
<i>Cuora amboinensis</i>	Malayan Fresh-water Turtle	Philippine	
<i>Calotes cristatellus</i>	Indonesian Calotes	Philippine	
<i>Draco bimaculatus</i>		non-endemic	
<i>Draco everetti</i>	Everett's Flying Lizard	Bohol and Camiguin	Rare
<i>Draco mindanensis</i>		non-endemic	
<i>Draco ornatus</i>	White-spotted Flying Lizard	Luzon & Mindanao	Rare
<i>Gonyocephalus</i> sp	Anglehead	non-endemic	
<i>Hydrosaurus pustulatus</i>	Sailfin Water Lizard	Philippine	Vulnerable
<i>Cosymbotus platyurus</i>	Flat-bodied House Gecko	non-endemic	
<i>Cyrtodactylus agusanensis</i>	Agusan Bent-toed Gecko	Mindanao, Dinagat and Leyte	Rare
<i>Gehyra mutilata</i>	Tender-skinned House Gecko	Philippine Endemic	
<i>Gekko monarchus</i>	Variable-backed Narrow-disked Gecko	Philippine	

<i>Hemidactylus frenatus</i>	Common House Gecko	Philippine	
<i>Pseudogekko compressicorpus</i>	Cylindrical-bodied Smooth-scaled Gecko	Philippine	Rare
<i>Pychozoon intermedium</i>	Philippine Flying Gecko	Mindanao and Leyte	Rare
<i>Emoia atrocostata</i>	Gray Swamp Skink	Philippine	
<i>Lamprolepis smaragdina</i>	Spotted Green Tree Skink	Philippine	
<i>Lipinia pulchella</i>	Yellow-striped Slender Tree Skink	Philippine	
<i>Mabuya multicarinata</i>	Two-striped Mabouya	Philippine	
<i>Mabuya multifasciata</i>	Common Mabouya	Philippine	
<i>Sphenomorphus acutus</i>	Pointed-headed Sphenomorphus	Mindanao, Bohol and Leyte	
<i>Sphenomorphus abdictus</i>		non-endemic	
<i>Sphenomorphus coxi</i>	Cox's Sphenomorphus		
<i>Sphenomorphus cumingi</i>		non-endemic	
<i>Sphenomorphus fasciatus</i>	Banded Sphenomorphus	Mindanao, Leyte, Camiguin and Bohol	
<i>Sphenomorphus jagori</i>	Jagor's Sphenomorphus	Philippine	
<i>Sphenomorphus mindanensis</i>	Mindanao Sphenomorphus	Mindanao, Bohol, Camiguin and Leyte	Rare
<i>Sphenomorphus variegatus</i>	Black-spotted Sphenomorphus	Mindanao, Leyte, Camiguin and Bohol	Rare
<i>Tropidophorus partelloi</i>	Partello's Waterside Skink	Mindanao	Rare
<i>Varanus salvator</i>	Variable Monitor Lizard	Philippine	
<i>Ahaetulla prasina</i>	Elongate-headed Tree Snake	non-endemic	
<i>Boiga cynodon</i>	Large Blunt-headed Tree Snake	non-endemic	
<i>Boiga dendrophila</i>	Mangrove Blunt-headed Tree Snake	non-endemic	
<i>Calamaria lubricoidea</i>	Dark-bellied Worm Snake	non-endemic	
<i>Cerberus rynchops</i>		non-endemic	
<i>Chrysopelea paradisi</i>	Paradise Snake	non-endemic	
<i>Cyclocorus nuchalis</i>	Southern Triangle-spotted Snake	non-endemic	
<i>Dendrelaphis caudolineatus</i>	Lined Slender Arboreal Snake	non-endemic	
<i>Dendrelaphis pictus</i>	Common Bronze-backed Snake	Philippine	
<i>Elaphe erythrura</i>	Common Rat Snake	Philippine	
<i>Gonyosoma oxycephala</i>	Arboreal Rat Snake	Philippine	
<i>Oxyrhabdium modestum</i>	Non-banded Philippine Burrowing Snake	Philippine	
<i>Psammodynastes pulverulentus</i>	Dark-spotted Mock-viper	Philippine	
<i>Natrix dendrophiops</i>	Spotted Water Snake	Philippine	
<i>Natrix lineata</i>	Zigzag-lined Water Snake	Mindanao	
<i>Maticora intestinalis</i>	Striped Coral Snake	non-endemic	Rare
<i>Naja naja</i>	Philippine Common Cobra	Philippine	

<i>Oligodon</i> sp.			
<i>Ophiophagus hannah</i>	King Cobra	Philippine	Rare
<i>Trimeresurus flavomaculatus</i>	Philippine Pit Viper	Philippine	
<i>Trimeresurus wagleri</i>	Wagler's Pit Viper	non-endemic	
Mammals			
<i>Podogymnura aureospinula</i>	Dinagat Gymnure/ Dinagat Wood Shrew	Dinagat	IUCN: Endangered
<i>Urogale everetti</i>	Mindanao Tree Shrew	Mindanao faunal region	IUCN: Vulnerable
<i>Cynocephalus volans</i>	Philippine Flying Lemur/ Kagwang	Mindanao faunal region	IUCN: Vulnerable
<i>Acerodon jubatus</i>	Golden -crowned Flying Fox	Philippine	IUCN: Endangered
<i>Cynopterus brachyotis</i>	Common Short-nosed Fruit Bat	non-endemic	
<i>Haplonycteris fisheri</i>	Philippine Pygmy Fruit Bat	Philippine	IUCN: Vulnerable
<i>Macroglossus minimus</i>	Dagger-toothed Flower Bat/ Lesser Long-tongued Fruit Bat		
<i>Ptenochirus jagori</i>	Musky Fruit Bat	Philippine	
<i>Ptenochirus minor</i>	Lesser Musky Fruit Bat	Mindanao faunal region	
<i>Pteropus hypomelanus</i>	Common Island Flying Fox	non-endemic	
<i>Pteropus leucopterus</i>	Mottle-winged Flying Fox/ White-winged Flying Fox	Dinagat & Mindanao faunal region	
<i>Pteropus vampyrus</i>	Large Flying Fox	non-endemic	CITES: Appendix II
<i>Rousettus amplexicaudatus</i>	Common Rousette	non-endemic	
<i>Emballonura alecto</i>	Philippine Sheath-tailed Bat	non-endemic	
<i>Megaderma spasma</i>	Common Asian Ghost Bat/ Lesser False Vampire		
<i>Hipposideros diadema</i>	Diadem Roundleaf Bat	non-endemic	
<i>Hipposideros obscurus</i>	Philippine Forest Roundleaf Bat	Philippine	
<i>Rhinolophus virgo</i>	Yellow-faced Horseshoe Bat	Philippine	
<i>Tarsius syrichta</i>	Philippine Tarsier	Philippine	CITES: Appendix II
<i>Exilisciurus concinnus</i>	Philippine Pygmy Squirrel	Mindanao faunal region	
<i>Petinomys crinitus</i>	Mindanao Flying Squirrel	Mindanao faunal region	
<i>Sundasciurus philippinensis</i>	Philippine Tree Squirrel	Philippine	
<i>Apomys insignis</i>	Mindanao Montane Forest Mouse	Mindanao faunal region	
<i>Apomys littoralis</i>	Mindanao Lowland Forest Mouse	Mindanao faunal region	
<i>Batomys salomonseni</i>	Mindanao Hairy-tailed Rat	Mindanao faunal region	
<i>Batomys russatus</i>	Dinagat Hairy-tailed Rat	Dinagat	
<i>Bullimus bagobus</i>	Large Mindanao Forest Rat	Mindanao faunal region	
<i>Crateromys australis</i>	Dinagat Cloud Rat	Dinagat	IUCN: Endangered

<i>Rattus everetti</i>	Common Philippine Forest Rat	Philippine	
<i>Rattus exulans</i>	Polynesian Rat/ Small Spiny Rice-field Rat	non-endemic	
<i>Rattus tanezumi</i>	Oriental House Rat	non-endemic	
<i>Viverra zangalunga</i>	Malay Civet	non-endemic	
<i>Sus philippensis</i>	Philippine Warty Pig	Philippine	Vulnerable
<i>Cervus mariannus</i>	Philippine Brown Deer	Originally restricted to the Philippines but introduced into the Marianna Islands	Data Deficient
Birds			
<i>Butorides striatus</i>	Little Heron*	non-endemic	
<i>Bubulcus ibis</i>	Cattle Egret*	non-endemic	
<i>Egretta garzetta</i>	Little Egret	non-endemic	
<i>Egretta sacra</i>	Eastern Reef Egret*	non-endemic	
<i>Egretta alba</i>	Great Egret*	non-endemic	
<i>Nycticorax caledonicus</i>	Rufous Night-heron	non-endemic	
<i>Anas luzonica</i>	Philippine Duck	Philippine	Vulnerable
<i>Dendrocygna arcuata</i>	Wandering Whistling Duck*	non-endemic	
<i>Spilornis cheela</i>	Crested Serpent Eagle*	endemic subsp.	
<i>Butastor indicus</i>	Grey Faced Honeybuzzard*	non-endemic	
<i>Pernis celebensis</i>	Barred Honeybuzzard	non-endemic	
<i>Haliastur indus</i>	Brahminy Kite	non-endemic	
<i>Haliaeetus leucogaster</i>	White-bellied Sea Eagle	non-endemic	
<i>Accipiter trivirgatus</i>	Crested Goshawk	non-endemic	
<i>Spizaetus philippensis</i>	Philippine Hawk-eagle	Philippine	Vulnerable
<i>Megapodius cummingi</i>	Tabon Scrubfowl	endemic subsp.	
<i>Coturnix chinensis</i>	Blue-breasted Quail	non-endemic	
<i>Gallirallus striatus</i>	Slaty-breasted Rail	non-endemic	
<i>Motacilla flava</i>	Yellow wagtail*	non-endemic	
<i>Amaurornis phoenicurus</i>	White Breasted Waterhen*	non-endemic	
<i>Ptilinopus occipitalis</i>	Yellow Breasted Fruit Dove*	Philippine	
<i>Teron vernans</i>	Pink-necked Green-Pigeon	non-endemic	
<i>Phapitreron leucotis</i>	White-eared Brown-dove	Philippine	
<i>Phapitreron amethystina</i>	Amethyst Brown Dove*	Philippine	
<i>Streptopelia bitorquata</i>	Island Collared-Dove	non-endemic	
<i>Streptopelia chinensis</i>	Spotted Dove*	non-endemic	
<i>Chalcophaps indica</i>	Common Emerald-Dove	non-endemic	
<i>Gallicolumba criniger</i>	Mindanao Bleeding-heart	Mindanao, Leyte, Samar, Bohol, Dinagat	Endangered
<i>Geopelia striata</i>	Zebra Dove*	non-endemic	
<i>Tanygnathus sp.</i>			
<i>Cacatua haematuropygia</i>	Philippine Cockatoo	Philippine	Critically Endangered
<i>Eudynamis scolopacea</i>	Common Koel	non-endemic	
<i>Centropus viridis</i>	Philippine Coucal	Philippine	
<i>Centropus bengalensis</i>	Lesser Coucal*	non-endemic	
<i>Centropus melanops</i>	Black-faced Coucal*	endemic to Mindanao faunal	

		region	
<i>Mimizuku gurneyi</i>	Lesser Eagle-owl	Mindanao	Vulnerable
<i>Otus megalotis</i>	Philippine Scops Owl*	Philippine	
<i>Merops viridis</i>	Blue-throated Bee Eater*	non-endemic	
<i>Collocalia troglodytes</i>	Pygmy Swiftlet*	Philippine	
<i>Collocalia esculenta</i>	Glossy Swiftlet	non-endemic	
<i>Cacomantis variolusos</i>	Brush Cuckoo*	non-endemic	
<i>Eurystomus orientalis</i>	Dollarbird	non-endemic	
<i>Alcedo argentata</i>	Silvery Kingfisher	Philippine	Endangered
<i>Halcyon capensis</i>	Stork-billed Kingfisher	non-endemic	
<i>Halcyon chloris</i>	White-collared Kingfisher	non-endemic	
<i>Penelopides affinis</i>	Mindanao Hornbill	Mindanao (Kemp 1995)	
<i>Aceros leucocephalus</i>	Wriathed Hornbill	Mindanao, Dinagat, Camiguin	Near threatened
<i>Buceros hydrocorax</i>	Rufous Hornbill	Philippine	Near threatened
<i>Dryocopus javensis</i>	White-bellied Woodpecker	non-endemic	
<i>Eurylaimus steerii</i>	Wattled Broadbill	Mindanao faunal region	Vulnerable
<i>Hirundo rustica</i>	Barn Swallow*	non-endemic	
<i>Hirundo tahitica</i>	Pacific Swallow	non-endemic	
<i>Hypsipetes philippinus</i>	Philippine Bulbul	Philippine	
<i>Pycnonotus urostictus</i>	Yellow-wattled Bulbul*	Philippine	
<i>Pycnonotus goaivier</i>	Yellow-vented Bulbul*	non-endemic	
<i>Hypsipetes everetti</i>	Yellowish Bulbul	Mindanao faunal region	
<i>Dicrurus hottentottus</i>	Spangled Drongo	non-endemic	
<i>Oriolus chinensis</i>	Black-naped Oriole	non-endemic	
<i>Irena cyanogaster</i>	Philippine Fairy-Bluebird	Philippine	
<i>Harpactes ardens ardens</i>	Philippine Trogon*	Philippine (subsp. endemic to Basilan, Mindanao)	
<i>Lalage nigra</i>	Pied Triller*	non-endemic	
<i>Lanius cristatus</i>	Brown Shrike*	non-endemic	
<i>Corvus macrorhynchos</i>	Large-billed Crow	non-endemic	
<i>Rhabdornis mystacalis</i>	Striped-headed Rhabdornis	Philippine	
<i>Stachyris capitalis</i>	Rusty-crowned Babbler	Mindanao & Dinagat	
<i>Macronous striaticeps</i>	Brown Tit-Babbler	Mindanao faunal region	
<i>Copsychus saularis</i>	Oriental Magpie-Robin	non-endemic	
<i>Megalurus palustris</i>	Striated Grassbird	non-endemic	
<i>Pitta sordida</i>	Hooded Pitta*	non-endemic	
<i>Orthotomus nigriceps</i>	Black-headed Tailorbird	Mindanao, Dinagat & Siargao	
<i>Orthotomus castaneiceps</i>	Philippine Tailorbird*	Philippine	
<i>Zoothera andromedae(?)</i>	Sunda Ground Thrush*	non-endemic	
<i>Rhinomyias ruficauda</i>	Rufous-tailed Jungle Flycatcher	non-endemic	

<i>Phylloscopus olivaceus</i>	Philippine Leaf Warbler*	Mindanao and Negros	
<i>Cisticola exilis</i>	Bright-capped Cisticola	non-endemic	
<i>Ficedula basilanica</i>	Little Slaty Flycatcher	Mindanao faunal region	Vulnerable
<i>Hypothymis helenae</i>	Short-crested Monarch	Philippine	Near threatened
<i>Hypothymis coelestis</i>	Celestial Monarch	Philippine	Vulnerable
<i>Terpsiphone cinnamomea</i>	Rufous Paradise-Flycatcher	Philippine	
<i>Cullicicapa helianthea</i>	Citrine Canary Flycatcher*	non-endemic	
<i>Hypothymis azurea</i>	Black-naped Monarch	non-endemic	
<i>Hypothymis helenae</i>	Short-crested Monarch	Philippine	
<i>Pachycephala philippinensis</i>	Yellow-bellied Whistler	Philippine	
<i>Anthus novaeseelandiae</i>	Richard's Pipit	non-endemic	
<i>Artamus leucorhynchus</i>	White-breasted Wood-swallow	non-endemic	
<i>Aplonis panayensis</i>	Asian Glossy Starling	non-endemic	
<i>Sarcops calvus</i>	Coleto	Philippine (near-endemic)	
<i>Anthreptes malacensis</i>	Plain-throated Sunbird	non-endemic	
<i>Nectarinia jugularis</i>	Olive-backed Sunbird	non-endemic	
<i>Nectarinia sperata</i>	Purple-throated Sunbird	non-endemic	
<i>Aethopyga pulcherrima</i>	Metallic-winged Sunbird	Philippine	
<i>Aethopyga shelleyi</i>	Lovely Sunbird	Philippine	
<i>Prionochilus olivaceus</i>	Olive-backed Flowerpecker	Philippine	
<i>Dicaeum australe</i>	Red-keeled Flowerpecker	Philippine	
<i>Dicaeum hypoleucum</i>	Buzzing Flowerpecker	Philippine	
<i>Zosterops everetti</i>	Everett's White-eye	non-endemic	
<i>Parus elegans(?)</i>	Elegant Tit	Philippine	
<i>Passer montanus</i>	Eurasian Tree Sparrow	non-endemic	
<i>Lonchura leucogastra</i>	White-bellied Munia	non-endemic	
<i>Lonchura malacca</i>	Chestnut Munia	non-endemic	

*Observed bird species during the Haribon Field Survey, 2002.

Annex 3b. Plant Species Recorded in Loreto, Dinagat Island. Based on Haribon RSA, 2001. Conservation status based on IUCN 2000.

Species	Local name	Common name	Global Status Endemicity	Status	Habitat Required	Use
TREES						
ACTINIDIACEAE						
<i>Saurauia clementis</i> Merr.	Kalimug-usa		Phil. Endemic		Damp primary forests, low to 900 masl	
<i>Saurauia glabrifolia</i> Merr.	Baring-linis		Phil. Endemic		Primary forests, low alt.	
<i>Saurauia gracilepes</i> Merr.	Tari-tari		Phil. Endemic		Primary forests, low to 900 masl	
ANACARDIACEAE						
<i>Dracontomelum sylvestre</i> Bl.	Ulandog		No info		Primary forests, low alt.	
<i>Mangifera altissima</i> Blco.	Malapaho	Pahunan	Phil. Endemic	Vulnerable	Primary forests, low & medium alt.	Edible
<i>Mangifera caesia</i> Jack	Baluno	Baluno	Widespread		Forests & thickets, low alt.	Wood, edible
<i>Mangifera monandra</i> Merr.	Malapaho		Phil. Endemic	Endangered	Primary forests, low alt.	
<i>Oncocarpus macrophylla</i> (Merr.) C.B. Rob.	Nugas		Phil. Endemic		Forests	
<i>Semecarpus surigaensis</i> Merr.	Surigao Ligas		Phil. Endemic		Forests along stream, low alt.	
ANNONACEAE						
<i>Mitrephora reflexa</i> Merr.	Pangananan		Widespread		Forests, low alt.	
<i>Polyalthia glauca</i> (Hassk.) Boerl.	Dogan	Dogan	Widespread		Forests, low alt.	Wood
<i>Popowia lanceolata</i> Merr.	Palang-palang		Phil. Endemic		Forests, low alt.	
APOCYNACEAE						
<i>Alstonia scholaris</i> (L.) R. Br.	Bitas	Ditas	No info		Primary & secondary forests, low & medium alt.	Medicinal

<i>Kibatalia stenopetala</i> Merr.	Pasnit-kitid		Phil. Endemic	Endangered	Forests, along stream, low alt.	
<i>Lepiniopsis ternatensis</i>	Valeton	Kolinos	Widespread		Forests, low & medium alt.	
<i>Paralstonia clusiacea</i> Baill.	Kuyaoyao	Malabatino	Widespread		Primary forests, low & medium alt.	Medicinal
ARALIACEAE						
<i>Polyscias nodosa</i> (Bl.) Seem.	Bingliu	Malapapaya	Widespread		Forests, low & medium alt.	Wood
BIGNONIACEAE						
<i>Radermachera</i> <i>pinnata</i> (Blco.) Seem.	Banai-banai	Banai-banai	Phil. Endemic		Primary & secondary forests, low & medium alt.	Poles
BORAGINACEAE						
<i>Cordia cumingiana</i> Vid.	Anonang lalake	Anonang-lalaki	Phil. Endemic		Secondary forests & thickets, low & medium alt.	Rope
BURSERACEAE						
<i>Canarium denticulatum</i> ssp. <i>denticulatum</i> Blume	Kalisau		Phil. Endemic		Forests, low & medium alt.	
<i>Canarium ovatum</i> Engl.	Liputi	Pili	Phil. Endemic	Vulnerable	Primary forests, low & medium alt.	Confection, Oil
<i>Canarium paucinervium</i> Merr.			Phil. Endemic		Primary forests, low & medium alt.	
<i>Canarium asperum</i> Benth ssp <i>asperum</i> var. <i>asperum</i>	Pagsahingin		Phil. Endemic		Forests along stream, low alt.	
<i>Dacryodes rostrata</i> H.J.Lam	Lunai		Widespread		Damp forests, low & medium alt.	
BUXACEAE						
<i>Buxus rolfei</i> Vid.	Malaapi	Malagaapi	Phil. Endemic		Primary forests, low & medium alt.	Medicinal

CASUARINACEAE						
<i>Casuarina equisetifolia</i> L.	Agoho	Agoho	Widespread		Along seashore, streams, open valleys to 800 masl	Wood, medicinal
<i>Gymnostoma</i> spp.	Maribuhok				Forests, low & medium alt.	Wood
CELASTRACEAE						
<i>Euonymus javanicus</i> Bl.	Malasangki		Widespread		Primary forests, low & medium alt.	
<i>Kurrimia paniculata</i> Wall.	Kuela		Widespread		Primary forests, low & medium alt.	
COMBRETACEAE						
<i>Terminalia copelandii</i> Elmer	Lanipao		Widespread		Primary forests, low alt.	
<i>Terminalia foetidissima</i> Griff.	Magtalisai	Talisai-gubat	Phil. Endemic		Primary & secondary forests, low alt.	Wood
<i>Terminalia microcarpa</i> Decne.	Kalumpit		Phil. Endemic		Primary forests, low alt.	
<i>Terminalia surigaensis</i> Merr.	Dalinsoi		Phil. Endemic		Forests along stream, low alt.	
CONNARACEAE						
<i>Elliphanthus tomentosus</i> Kurz ssp <i>tomentosus</i> var <i>luzoniensis</i> (Vidal) Leenh.	Luzon alomangoi		Widespread		Forests along stream, low alt.	
CRYPTERONIACEAE						
<i>Crypteronia cumingii</i> (Planch.) Endl.	Tigauon		No info		Forests, low & medium alt.	
DILLENIAEAE						
<i>Dillenia bolsteri</i> Merr.	Bolster katmon		Phil. Endemic		Forests, low alt.	Edible
<i>Dillenia philippinensis</i> Rolfe	Katmon		Phil. Endemic	Vulnerable	Forests, low alt.	Edible

DIPTEROCARPACEAE						
<i>Dipterocarpus validus</i> Blume	Balau	Hagakhak	Phil. Endemic	Critically Endangered	Primary forests, low alt.	Wood
<i>Dipterocarpus kerii</i> King	Malapanau	Malapanau	Phil. Endemic	Critically Endangered	Primary forests, low & medium alt.	Wood
<i>Parashorea malaanonan</i> (Blco.) Merr.	Bagtikan	Bagtikan	Phil. Endemic	Critically Endangered	Primary forests, low alt.	Wood
<i>Shorea astylosa</i> Foxw.	Almon	Yakal	Phil. Endemic	Critically Endangered	Primary forests, low alt.	Wood
<i>Shorea contorta</i> Vidal	Lauan	White lauan	Phil. Endemic	Critically Endangered	Primary forests, low alt.	Wood
<i>Shorea almon</i> Foxw.	Malasinoro	Almon	Phil. Endemic	Critically Endangered	Primary forests, low alt.	Wood
<i>Shorea negrosensis</i> Foxw.	Kila	Red lauan	Phil. Endemic	Critically Endangered	Primary forests, low alt.	Wood
<i>Vatica mangachapoi</i> Blanco ssp <i>mangachapoi</i>	Matulog	Narig	Phil. Endemic	Endangered	Primary forests, low alt., to 800 masl	Wood
EBENACEAE						
<i>Diospyros cauliflora</i> Blume	Tamil		Widespread		Primary forests, low & medium alt.	Wood
<i>Diospyros longiciliata</i> Merr.	Bantolinao	Itom-itom	Phil. Endemic		Primary forests, low alt.	Wood
<i>Diospyros pilosanthera</i> Blco.	Tauaylan	Bolong-eta	Widespread		Primary forests, low & medium alt.	Wood
<i>Diospyros poncei</i> Merr.	Ponce kamagong		Phil. Endemic		Primary forests, low alt.	
<i>Diospyros whitfordii</i> Merr.	Mahuyan		Phil. Endemic		Primary forests, low alt.	
ELAEOCARPACEAE						
<i>Elaeocarpus cumingii</i> Turcz.	Hunggo		No info		Forests, low alt.	
<i>Elaeocarpus dinagatensis</i> Merr.	Dinagat konakon		Phil. Endemic	Vulnerable	Forests	
<i>Elaeocarpus surigaensis</i> Merr.	Tigalot	Yagau-yagau	Phil. Endemic		Primary forests, low alt.	Wood

EUPHORBIACEAE						
<i>Actephila excelsa</i> (Dalz.) Muell.-Arg. var. <i>javanica</i> (Miq.) Pax & K Hoffm.			Widespread		Primary forests, low & medium alt.	
<i>Agrostistachys borneensis</i> Becc.	Haginis-agos		Widespread		Forests along stream, low & medium alt.	
<i>Alchornea rugosa</i> (Lour.) Muell.-Arg.	Aguioi		Widespread		Thickets & secondary forests	
<i>Antidesma agusanense</i> Elm.	Mataindo		Phil. Endemic		Forests & thickets, low & medium alt.	
<i>Antidesma samarensis</i> Merr.	Samar bignai		Phil. Endemic		Forests, low alt.	
<i>Baccaurea philippinensis</i> (Merr.) Merr.	Baloiboi		Phil. Endemic		Forests, low alt.	
<i>Baccaurea tetrandra</i> (Baill.) Muell.-Arg.	Dilak		Phil. Endemic		Forests, low & medium alt.	
<i>Cheilosa montana</i> Blume	Lalatan		Phil. Endemic		Primary forests, low alt.	
<i>Cleistanthus pedicellatus</i> (C.B. Rob.) Hook f.	Anupag		Phil. Endemic		Primary forests, low alt.	
<i>Drypetes longifolia</i> (Blume) Pax & K. Hoffm.	Malatamban	Balibkikan	Phil. Endemic		Primary forests, low alt.	Wood
<i>Glochidion album</i> (Blco.) Boerl.	Malabangang		Widespread		Primary forests, low alt., to 1200 masl	
<i>Glochidion lutescens</i> (C.B. Rob.) Blume	Salanisin		Widespread		Forests, to 1300 masl	
<i>Homalanthus macradenius</i> Pax & K. Hoffm.	Mindanao balanti		Phil. Endemic		Forests & thickets, to 1000 masl	
<i>Homalanthus megaphyllus</i> Merr.	Labulti		Phil. Endemic		Thickets along stream, to 1000 masl	

<i>Homalanthus rotundifolius</i> Merr.	Balanting-bilog		Phil. Endemic		Forests & thickets, low alt.	
<i>Macaranga ovatifolia</i> Merr.	Indang		Phil. Endemic		Forests along stream, low alt.	
<i>Mallotus hirsutus</i> (J.J. Sm.) Pax & K. Hoffm. Elm.	Masangauai		Phil. Endemic		Primary forests, to 1200 masl	
<i>Mallotus longistylus</i> Merr.	Tagusala		Phil. Endemic		Forests, low alt.	
<i>Securinega flexuosa</i> muell.-Arg.	Malangau	Anislag	Phil. Endemic	Vulnerable	Primary forests, low alt.	Implements
<i>Spathiostemon javensis</i> Blume	Mangagos-tahik		Widespread		Primary forests, low alt.	
<i>Trigonopleura dubia</i> (Elm.) Merr.	Badabongon		Phil. Endemic		Primary forests, to 1200 masl	
<i>Trigonostemon</i> <i>longipedunculatus</i> (Elm.) Elm.	Katap-tangaian		Phil. Endemic		Primary forests, low alt.	
FAGACEAE						
<i>Lithocarpus sultitii</i> Soep.	Pangnan		Phil. Endemic		Forests, medium alt.	
<i>Lithocarpus solerianus</i> (Vid.) Rehd.	Manaring		Phil. Endemic		Forests, low & medium alt.	
FLACOURTIACEAE						
<i>Casearia fuliginosa</i> Blco.	Talitan		Phil. Endemic		Secondary forests & thickets, low & medium alt.	
<i>Casearia loheri</i> Merr.	Loher Kaluag		Phil. Endemic		Primary forests, low & medium alt.	
<i>Flacourtia rukam</i> Zoll. & Merr.	Salabangin	Bitongol	Widespread		Forests, low & medium alt.	Wood, medicinal
<i>Homalium foetidum</i> (Roxb.) Benth.	Aranga		Widespread		Primary forests, low alt.	

<i>Hydnocarpus subfalcata</i> Merr.	Damol		Phil. Endemic	Forests & thickets, low alt.	Wood
<i>Osmelia philippina</i> (Turcz.) F-Vill.	Oonog			Forests, low alt.	
GUTTIFERAE/CLUSIACEAE					
<i>Callophyllum blancoi</i> Pl. & Tr.	Bitao	Bitanghol	Widespread	Primary forests, low & medium alt.	Wood & Medicinal
<i>Callophyllum</i> <i>brachyphyllum</i> Merr.	Tadak		Phil. Endemic	Forests along stream, medium alt.	
<i>Callophyllum cucullatum</i> Merr.	Palumut		Phil. Endemic	Thickets, low alt.	
<i>Callophyllum soulattri</i> Burm. f	Pamintaogon		Widespread	Forests, low & medium alt.	
<i>Callophyllum oliganthum</i> Merr.	Tambot		Phil. Endemic	Forests, low alt.	
<i>Callophyllum racemosum</i> Merr.	Gitaki		Phil. Endemic	Primary forests, low to 1000 masl	
<i>Garcinia lateriflora</i> Bl.	Kandis		Widespread	Primary forests, low alt.	
<i>Garcinia moseleyana</i> Pierre Moseley	bunog		Phil. Endemic	Primary forests, low alt.	
<i>Garcinia multibracteolata</i> Merr.	Kabangla		Phil. Endemic	Primary forests, low alt.	
ICACINACEAE					
<i>Gomphandra cumingiana</i> (Miers) F.-Vill.	Mangoi		Phil. Endemic	Primary forests, along stream, low alt.	
<i>Gonocaryum cognatum</i> Elmer	Angkak		Phil. Endemic	Primary forests, low alt.	
<i>Platea excelsa</i> var. <i>borneensis</i> (Heine) Sleum.	Pagpago		Phil. Endemic	Primary forests, medium alt.	
<i>Stemonurus hallieri</i> (Merr.) comb. Nov.	Malatado		Phil. Endemic	Primary forests, low alt.	

LAURACEAE						
<i>Actinodaphne bicolor</i> (Merr.) comb. Nov.	Hannag		Phil. Endemic		Forests, low to 900 masl	
<i>Actinodaphne conferta</i> (Merr.) Merr.	Mayabong		Phil. Endemic		Forests, medium alt.	
<i>Actinodaphne dolichophylla</i> (Merr.) Merr.	Pipi		Phil. Endemic		Primary forests, low alt.	
<i>Cinnamomum mindanaense</i> Elm.	Kalingag	Mindanao cinnamon	Phil. Endemic		Forests & thickets, low alt.	Condiment
<i>Cryptocarya affinis</i> Merr.	Nilagasi		Phil. Endemic		Primary forests, low alt.	
<i>Cryptocarya everettii</i> Merr.	Balit	Sayab	Phil. Endemic		Primary forests, low & medium alt.	Poles
<i>Cryptocarya oligocarpa</i> Merr.	Malaigot		Phil. Endemic		Forests, low alt.	
<i>Litsea urdanetensis</i> Elm.	Dilak manok	Dilak-manuk	Phil. Endemic		Primary forests, low alt.	Poles
<i>Neolitsea vidalii</i> Merr.	Puso-puso		Phil. Endemic	Vulnerable	Primary forests, low alt.	
<i>Neolitsea villosa</i> (Bl.) Merr.	Bohian				Mossy forests	
<i>Nothaphoebe leytensis</i> (Elm.) Merr.	Kubi-kubi		Phil. Endemic		Forests, low alt.	
LECYTHIDACEAE						
<i>Barringtonia pterita</i> Merr.	Hagpukan		Phil. Endemic		Primary forests, low alt.	
<i>Petersianthus quadrialatus</i> (Merr.) Merr.	Toog	Toog	Phil. Endemic		Primary forests, low alt.	Wood
LEGUMINOSAE						
<i>Afzelia rhomboidea</i> (Blco.) Vid.	Bayadgong	Tindalo	Phil. Endemic	Vulnerable	Primary forests, low & medium alt.	wood
<i>Albizzia lebbeck</i> (L.) Benth.	Aninapla	Langil	Widespread		Secondary forests	
<i>Cassia fistula</i> L.	Bitsula	Golden shower/ Caña-Fistula	Introduced		Thickets & forests	Ornamental

<i>Desmodium umbellatum</i> (L)DC.	Malapigas		Widespread		Thickets, along stream, low alt.	
<i>Intsia acuminata</i> Merr.	Malaipil		Widespread	Vulnerable	Forests, along seashore	
<i>Ormosia surigaensis</i> Merr.	Bahai	Surigao bahai	Phil. Endemic		Forests ridges, low alt.	wood
<i>Pithecolobium pauciflorum</i> Benth.			Phil. Endemic		Primary forests, low & medium alt.	
<i>Pithecolobium sessiliflorum</i> Merr.			Phil. Endemic		Forests, along stream, low alt.	
<i>Sindora inermis</i> Merr.	Parina	Kayugalu	Phil. Endemic	Vulnerable	Forests, along seashore	wood
<i>Sindora supa</i> Merr.	Manapo	Supa	Phil. Endemic	Vulnerable	Forests & thickets, low alt.	wood & Oil
LOGANIACEAE						
<i>Norrisia malaccensis</i> Gard.	Yangi		Phil. Endemic		Forests & thickets, along stream, low alt.	
<i>Fagraea racemosa</i> Jack.					Forests & thickets, along stream, low alt.	Wood, medicinal
<i>Strychnos ignatii</i> Berg.	Gasud				Damp primary forests, low and med. Alt	Medicinal
<i>Strychnos similis</i> A.W. Hill	Malaigasud				Forests at low alt.	Medicinal
LYTHRACEAE						
<i>Lagerstroemia pyriformis</i> Koehne	Pamalauagon	Batitinan	Phil. Endemic		Primary forests, low & medium alt.	Wood
MAGNOLIACEAE						
<i>Magnolia candollei</i> var. <i>candollei</i> (Blume)	Keng Batangis	Patangis	Phil. Endemic		Forests, low & medium alt.	Poles
MELASTOMATACEAE						
<i>Astronia cumingiana</i> Vid.	Badling	Badling			Forests, low & medium alt.	
<i>Astronia piperi</i> Merr.		Piper-dungao	Phil. Endemic		Primary forests, low & medium alt.	
<i>Astronia rolfei</i> Vid.		Dungao-pula	Phil. Endemic		Primary forests, low & medium alt.	

<i>Memecylon oligophlebium</i> Merr.		Timbaras	Phil. Endemic		Dry slopes, low alt.	
<i>Memecylon paniculatum</i> Jack	Pasagit		No info		Primary forests, low & medium alt.	
MELIACEAE						
<i>Aglaia ahermiana</i> Perk.	Alamag		Phil. Endemic	Vulnerable	Primary forests, low & medium alt.	
<i>Aglaia everettii</i> Merr.	Pagasantol	Bulog	Phil. Endemic		Primary forests, low & medium alt.	Edible
<i>Aphanamixis polystachya</i> (Wall.)R.N.Parker	Kangko		Widespread		Forests, low alt.	
<i>Dysoxylum alliaceum</i> Blume	Miau		No info		Forests, low & medium alt.	
<i>Dysoxylum parasiticum</i> (Osb.) Kosterm.	Bagolan		Widespread		Primary forests, low alt.	
<i>Dysoxylum mollissimum</i> Blume ssp. <i>Mollissimum</i>	Himamau		Widespread		Primary forests, low & medium alt.	
MORACEAE						
<i>Artocarpus blancoi</i> (Elm.) Merr.	Tipolo	Antipolo	Phil. Endemic	Vulnerable	Thickets & forests	Wood & Rope
<i>Artocarpus triculianus</i> Elmer	Pakak		Phil. Endemic		Forests, low alt.	
<i>Artocarpus subrotundifolius</i> Elm.	Malakubi		Phil. Endemic		Forests, medium alt.	
<i>Ficus ampelas</i> Burm.f.		Upling gubat	Widespread		Thickets & forests	
<i>Ficus chrysolepis</i> Bl.		Baleteng-habaan	Widespread		Forests, low & medium alt.	
<i>Ficus congesta</i> Roxb. F.		Malatibig	Phil. Endemic		Damp forests, low alt.	
<i>Ficus irisana</i> Elm. var <i>irisana</i>		Aplas	Phil. Endemic		Thickets & forests	
<i>Ficus microsphaera</i> Warb.		Magulipid	Phil. Endemic		Forests & thickets, along streams, to 900 masl	
<i>Ficus pseudopalma</i> Blco.	Lubi-lubi	Niog-niogon	Phil. Endemic		Thickets & forests	Edible

<i>Ficus septica</i> Burm.f.	Ladnog	Hauli	Widespread		Thickets, low & medium alt.	Medicinal
MYRICACEAE						
<i>Myrica javanica</i> Bl.		Hindang-pula	Widespread		Mossy forests	
MYRISTICACEAE						
<i>Gymnacranthera farquhariana</i> (Hook.f & Th.) Warb.		Anuping	Phil. Endemic		Forests, low & medium alt.	
<i>Myristica cinnamomea</i> King	Duguan-malabai		Widespread		Forests, low & medium alt.	Wood
<i>Myristica elliptica</i> Wall. Ex Hook. f & Thorns.	Tanghas		Phil. Endemic		Forests, low alt.	Wood
<i>Myristica fauta</i> Houtt var <i>wenzelii</i> (Merr.)Sincl.	Duguan	Wenzel duguan	Phil. Endemic		Forests, low & medium alt.	Wood
			No info			
MYRSINACEAE						
<i>Ardisia cuprea</i> Elm.		Sina-sina	Phil. Endemic		Primary forests, low & medium alt.	
<i>Ardisia squamulosa</i> Presl	Tagpo	Tagpo	Phil. Endemic	Vulnerable	Primary forests, low & medium alt.	Medicinal
<i>Discocalyx insignis</i> Merr.		Sitaas	Phil. Endemic		Primary forests, low alt.	
<i>Discocalyx longissima</i> Merr.		Sitaas-gitingan	Phil. Endemic		Forests, on rocky slopes, low alt.	
<i>Discocalyx micrantha</i> Merr.		Pangingan-liitan	Phil. Endemic		Forests, low alt.	
<i>Rapanea venosa</i> Elm.		Hanigad	Phil. Endemic		Mossy forests	
MYRTACEAE						
<i>Decaspermum microphyllum</i> Merr.	Gusokan	Halgus	Phil. Endemic		Thickets along stream, low alt.	Wood
<i>Eugenia aherniana</i> C.B. Rob.	Tulanan		Phil. Endemic		Primary forests, low & medium alt.	Edible

<i>Eugenia aqueum</i> (Burm. F.) Alst.	Tambis	Tambis	No info	Forests & thickets, low & medium alt.	Edible
<i>Eugenia arcuatineruvia</i> Merr.			Phil. Endemic	Primary forests, low & medium alt.	
<i>Eugenia brevistylis</i> C.B. Rob.			Phil. Endemic	Forests, low alt.	
<i>Eugenia clementis</i> C.B. Rob.			Phil. Endemic	Primary forests, to 800 masl	
<i>Eugenia macgregorii</i> C.B. Rob.			Phil. Endemic	Forests, low & medium alt.	
<i>Eugenia mainitensis</i> Elm.			Phil. Endemic	Primary forests, to 1300 masl	
<i>Eugenia nitidissima</i> Merr.	Manogobinlod		Phil. Endemic	Forests, slopes & ridges, medium to 900 masl	Wood
<i>Eugenia siderocola</i> Merr.			Phil. Endemic	Forests along stream, low alt.	
<i>Eugenia surigaensis</i> Merr.			Phil. Endemic	Forests along stream, low alt.	
<i>Eugenia zamboangensis</i> C.B. Rob.			Phil. Endemic	Primary forests, low alt.	
<i>Leptospermum flavescens</i> Sm.	Malasulasi		No info	Exposed ridges, high alt.	
<i>Syzygium bordenii</i> Merr.	Malaruh-at-puti		Phil. Endemic	Primary forests, low alt.	
<i>Syzygium claviflorum</i> (Roxb.) Wall ex A.M.& J.M. Cowan	Patcharagon	Kurasam	No info	Primary forests, low & medium alt.	Wood
<i>Syzygium cumini</i> (L.) Skeels	Duhat	Duhat	No info	Thickets, secondary forests	Edible & medicinal
<i>Syzygium nitidum</i> Benth.		Makaasim	No info	Forests, low alt.	
<i>Syzygium simile</i> (Merr.) Merr.		Panglongboien	Phil. Endemic	Forests, low & medium alt.	

<i>Syzygium zanthophyllum</i> (C.B. Rob.) Merr.	Malatampoi	Malatampui	Phil. Endemic		Forests, low alt.	Edible
<i>Tristanopsis decorticata</i> (Merr.) Wils. & Waterh.	Malabayabas		Widespread	Vulnerable	Primary forests, low & medium alt.	Wood
<i>Xanthostemon</i> <i>verdugonianus</i>	Naves	Mangkono	Phil. Endemic	Vulnerable	Forests & open areas, low & medium alt.	Wood
OLACACEAE						
<i>Strombosia philippinensis</i> (Baill.) Rolfe	Tamayuan		Widespread		Forests, low alt.	
PITTOSPORACEAE						
<i>Pittosporum resiniferum</i> Hemsl.	Mamalis-pula		Phil. Endemic		Forests, medium alt.	
PODOCARPACEAE						
<i>Podocarpus</i> <i>nerifolius</i> D. Don		Malaadelfa	Widespread		Primary forests, low & medium alt.	Wood, Ornamental
PROTEACEAE						
<i>Helicia paucinervia</i> Merr.			Phil. Endemic		Along river banks, low alt.	
RHAMNACEAE						
<i>Alphitonia zizyphoides</i> (Spreng.) A. Gray					Forests, low & medium alt.	
<i>Zizyphus cumingiana</i> Merr.			Phil. Endemic		Forests & thickets, low & medium alt.	
<i>Zizyphus inermis</i> Merr.					Forests, low alt.	
RHIZOPHORACEAE						
<i>Gynotroches axillaris</i> Bl.			Widespread		Primary forests, low & medium alt.	
ROSACEAE						
<i>Parinarium bicolor</i> Merr.	Bakoyoyan		Phil. Endemic		Open slopes, low alt.	Poles
RUBIACEAE						
<i>Lucinaea monocephala</i> Merr.	Lingong		Phil. Endemic		Primary damp forests, low alt.	

<i>Morinda citrifolia</i> L.	Bangkuro	Bangkoro	No info	Thickets, along seashore	Medicinal
<i>Morinda bracteata</i> Roxb.	Nino		No info	Forests & thickets, low alt.	
<i>Nuclea subdita</i> (Miq.) Merr. (Korth.) Steud.	Bangkal	Kabak	Phil. Endemic	Primary & secondary forests, to 900 masl	wood , medicinal
<i>Neonuclea glabra</i> (Merr.) (Roxb.) Bakh.f.et Ridsd.	Hambabalod	Uisak-sikat	Widespread	Forests to 600 masl	Wood
<i>Psychotria pilosella</i> Elm.		Pasnoban	Phil. Endemic	Primary forests, medium to 1000 masl	
<i>Psychotria scaberula</i> Merr.		Katagpong-kanos	Phil. Endemic	Forests, low alt.	
<i>Psychotria malayana</i> Jack		Katagpong-ahas	No info	Forests & dry thickets, low alt.	
<i>Tarenna cumingiana</i> (Vid.) Elm.		Bigtungon	Phil. Endemic	Primary forests, low alt.	
<i>Tarenna elongata</i> Merr.		Bigtungon-haba	Phil. Endemic	Forests, low alt.	
<i>Tarenna eucrantha</i> (Elm.) Merr.			Phil. Endemic	Forests, low & medium alt.	
<i>Timonius arboreus</i> Elm.		Mabalod	Phil. Endemic	Primary forests, medium alt.	
<i>Timonius auriculatus</i> Merr.	Tinayinga		Phil. Endemic	Forests, low alt.	
<i>Timonius confertiflorus</i> Merr.		Payali	Phil. Endemic	Dry thickets, low alt.	
<i>Timonius lanceolatus</i> Merr.		Sibau	Phil. Endemic	Forests, low alt.	
<i>Timonius philippinensis</i> Merr.	Mayoro		Phil. Endemic	Forests, low alt.	
<i>Timonius rotundus</i> Merr.		Sibau-bilog	Phil. Endemic	Forests, low alt.	
RUTACEAE					
<i>Achronychia obovata</i> Merr.		Alibobo	Phil. Endemic	Open slopes, low alt.	

<i>Atalantia maritima</i> Merr.		Malarayap-dagat	No info		Beach forests	
<i>Euodia confusa</i> Merr.		Bugawak	No info		Forests, low alt.	
<i>Euodia crassifolia</i> Merr.		Balasbas	Phil. Endemic		Forests & thickets, low & medium alt.	
<i>Tetractomia tetrandrum</i> (Roxb.) Merr.		Yadagon	Phil. Endemic		Forests & thickets, low alt.	
SAPINDACEAE						
<i>Guioa bicolor</i> Merr.		Kaninging	Phil. Endemic	Vulnerable	On slopes, medium alt.	
<i>Guioa koelreuteria</i> (Blco.) Merr.	Kasai	Alahan	Widespread		Forests & thickets, low alt.	Oil
<i>Litchi chinensis</i> ssp. <i>philippinensis</i> (Radlk.) Sonn. Leenh.	Alupag-amo		Widespread		Primary & secondary forests, to 500 masl	
<i>Trigonachras spectabilis</i> Radlk.	Alilihau		Phil. Endemic		Primary forests, low alt.	
SAPOTACEAE						
<i>Madhuca lanceolata</i> (Merr.) Merr.	Lono-lono	Malalono	Phil. Endemic		Forests, low alt.	Wood
<i>Mimusops parvifolia</i> R. Br.	Bansalagon	Bansalagin	Phil. Endemic		Primary forests, low alt.	Edible, Medicinal
<i>Mimusops elengi</i> (R. Br.) L.		Kabiki	Introduced		Forests, low alt.	
<i>Palaquium calophyllum</i> (T.&B.) Pierre ex Burck	Natong-ganda		Widespread		Primary forests, low alt.	
<i>Palaquium polyandrum</i> C.B. Rob.	Tagkan	Tipurus	Phil. Endemic		Primary forests, low & medium alt.	Wood
<i>Palaquium tenuipetiolatum</i> Merr.	Manikmik		Phil. Endemic		Primary forests, low & medium alt.	
SAXIFRAGACEAE						
<i>Polyosma apoensis</i> Elm.		Taipo	Phil. Endemic		Forests, low to 1200 masl	
<i>Polyosma piperi</i> Merr.		Piper-magbut	Phil. Endemic		Forests, low & medium alt.	

SIMAROUBACEAE						
<i>Eurycoma longifolia</i> Jack. ssp. <i>eglandulosa</i> (Merr.) Noot.	Linatog		Phil. Endemic		Forests, low alt.	Medicinal
STERCULIACEAE						
<i>Commersonia bartramia</i> (L.) Merr.	Mayamgam	Kakaag	No info		Secondary forests & thickets, low & medium alt.	Rope
<i>Sterculia rubiginosa</i> R. Br var. <i>setistipula</i> (Merr.) Tantra	Anitap	Panakitin	Widespread		Thickets & forests	Wood, edible
<i>Sterculia ceramica</i> R. Br.		Malakalumpang	Widespread		Forests, low alt.	
SYMPLOCACEAE						
<i>Symplocos cochinchinensis</i> var. <i>philippinensis</i> (Bl.) Kurz. (Lour.) S. Moore		Balokbok	Widespread		Forests, medium to 1400 masl	
<i>Symplocos odoratissima</i> var. <i>odoratissima</i> (Blume) Choisy ex Zoll.		Agosip/Maksa	Widespread		Primary forests, low & medium alt.	
<i>Symplocos polyandra</i> (Blco.) Brand		Balakbakan	Widespread		Primary forests, low & medium alt.	
THEACEAE						
<i>Gordonia luzonica</i> Vid.		Kalambug	Widespread		Primary forests, ridges, medium to 1300 masl	
TILIACEAE						
<i>Diplodiscus paniculatus</i> Turcz.	Barobo	Balobo	Phil. Endemic	Vulnerable	Primary forests, low & medium alt.	Wood , edible & fiber
<i>Grewia multiflora</i> Juss.	Bagokon	Danglin	No info		Thickets & secondary forests	Fiber
<i>Microcos stylocarpa</i> (Warb.) Burret	Lapnisan	Kamuling	No info		Primary & secondary forests	Edible

ULMACEAE						
<i>Celtis luzonica</i> Warb.	Magabuyo	Magabuyo	Phil. Endemic	Vulnerable	Thickets & forests	Poles & Bowling pins.
<i>Gironniera celtidifolia</i> Gaudich.	Aragaasi	Magaubau	Widespread		Forest, low & medium alt.	Poles
<i>Trema orientalis</i> (L.) Bl.	Anabiong	Anabiong	Widespread		Thickets & secondary forests	Wood
URTICACEAE						
<i>Leucosyke capitellata</i> (Poir.) Wedd.	Alagasi	Alagasi	No info		Secondary forests, low alt.	Poles, fiber
VERBENACEAE						
<i>Callicarpa magnifolia</i> Merr.		Agnai	No info		Forests, low to 1000 masl	
<i>Callicarpa longifolia</i> Lam.		Papalsin	Phil. Endemic		Forests & thickets, low & medium alt.	
<i>Callicarpa surigaensis</i> Merr.		Buyakan	Phil. Endemic		Primary forests, low alt.	
<i>Premna membranifolia</i> Merr.		Agbau	Phil. Endemic		Primary & Secondary forests, Low & medium alt.	
<i>Teijsmanniodendron longifolium</i> (Merr.) Merr.	Mamanau	Atikoko	No info		Forests, low & medium alt.	Wood
<i>Vitex quinata</i> (Lour.) F.N. Will.					Forests, low alt.	
<i>Vitex turczaninowii</i> Merr.	Bongongon	Lingo-Lingo	No info		Forests	Poles
SHRUBS						
ARALIACEAE						
<i>Osmoxylon dinagatense</i> Merr.			Phil. Endemic		Forests, low alt.	
<i>Osmoxylon eminens</i> (Bull.) comb. Nov.			No info		Primary forests, low & medium alt.	

<i>Osmoxylon heterophyllum</i> Merr.		Phil. Endemic	Primary forests, low & medium alt.	
<i>Schefflera insularum</i> (Seem.) Harms	Kalangkang	Phil. Endemic	Primary & secondary forests	Ornamental
APOCYNACEAE				
<i>Tabernaemontana mucronata</i> Merr.		No info	Damp primary forests, low and med., alt.	
<i>Voacanga globosa</i> (Blco.) Merr.	Talanisog	Phil. Endemic	Primary & secondary forests, low alt.	Medicinal
ASCLEPIADACEAE				
<i>Centrostemma multiflora</i> (Bl.) Decne			Primary forests, low & medium alt.	
<i>Dischidia platyphylla</i> Schltr.		Phil. Endemic	Along seashore	
<i>Dischidia purpurea</i> Merr.		Phil. Endemic	Forests, low to 1200 masl	
<i>Dischidiopsis carinata</i> Schltr.		Phil. Endemic	Forests & thickets, low alt.	
<i>Hoya cardiophylla</i> Merr.		Phil. Endemic	Forests, low alt.	
<i>Hoya fischeriana</i> Warb.		Phil. Endemic	Forests, low & medium alt.	
<i>Hoya incrassata</i> Warb.		Phil. Endemic	Forests & thickets, low alt.	
<i>Hoya penthaphlebia</i> Merr.		Phil. Endemic	Forests, low alt.	
<i>Hoya reticulata</i> Merr.		Phil. Endemic	Swampy thickets, low alt.	
CAPPARACEAE				
<i>Capparis cerasifolia</i> A. Gray		Phil. Endemic	Thickets, low alt.	
ERICACEAE				
<i>Rhododendron quadrasianum</i> Vid.		No info	Exposed ridges, mossy forest	
<i>Rhododendron spectabile</i> Merr.		No info	Mossy forests, medium to 2200 masl	
<i>Vaccinium gitingense</i> Elm.		No info	Along stream & ridges, low & medium alt.	

EUPHORBIACEAE					
<i>Ricinus communis</i> L.	Tangan-tangan	No info		Thickets & secondary forests, low alt.	Medicinal
GONYSTYLACEAE					
<i>Gonystylus philippinensis</i> Elm.		Phil. Endemic		Primary forests, low to 1500 masl	Wood, edible
GOODENIACEAE					
<i>Scaevola micrantha</i> Presl		No info		Dry open places, along stream, low alt.	
MALVACEAE					
<i>Hibiscus cannabinus</i> L.	A las Dose	No info		thickets, open areas at low alt.	Ornamental
MELASTOMACEAE					
<i>Medinilla albiflora</i> Merr.		Phil. Endemic		Primary forests, medium alt.	
<i>Medinilla capitata</i> Merr.		Phil. Endemic		Primary forests, low alt.	
<i>Medinilla cephalophora</i> Merr.		Phil. Endemic		Damp primary forests, low alt.	
<i>Medinilla ferruginea</i> Merr.		Phil. Endemic		Primary forests, low alt.	
<i>Medinilla magnifica</i> Lind.	Lagikau	Phil. Endemic	Vulnerable	Primary & secondary forests, low & medium alt.	Ornamental
<i>Medinilla teysmanni</i> Miq.		No info		Primary forests, low & medium alt.	
<i>Medinilla umbellata</i> Merr.		Phil. Endemic		Forests along stream, low alt.	
MYRSINACEAE					
<i>Maesa cumingii</i> Mez	Sulinao	Phil. Endemic		Forests & thickets, low & medium alt.	Rope
<i>Maesa megaphylla</i> Merr.		Phil. Endemic		Primary forests, low alt.	
OCHNACEAE					
<i>Ochna fascicularis</i> Blco.		Phil. Endemic		Primary forests, low & medium alt.	

<i>Ouratea mindanaensis</i> Merr.		Phil. Endemic	Forests & thickets, low alt.	
OXALIDACEAE				
<i>Ctenolophon philippinense</i> Hallier f.		Phil. Endemic	Forests, low alt.	
<i>Ixonanthes longipedunculata</i> Merr.		Phil. Endemic	Forest ridges, low alt.	
ROSACEAE				
<i>Rubus fraxinifolius</i> Poir.	Sampinit	No info	Forests, low alt., to 1800 masl	Edible
<i>Angelesia splendens</i> Korth.		No info	Forests & dry thickets, low alt.	
RUBIACEAE				
<i>Bikkia philippinensis</i> Val.		No info	Thickets, along seashore	Poles
<i>Gynochthodes mindanaensis</i> Merr.		No info	Forests, medium alt.	
<i>Hydnophytum membranaceum</i> Merr.		No info	Forests, low alt.	
<i>Hydnophytum philippinense</i> Becc.		No info	Forests, low alt.	
<i>Ixora angustilimba</i> Merr.		No info	Dry forests, slopes & ridges, low alt.	
<i>Ixora confertiflora</i> Merr.		No info	Primary forests, low alt.	
<i>Ixora salicifolia</i> (Bl.) DC.		No info	Primary forests, low alt.	
<i>Psychotria camarinensis</i> (Merr.) comb. Nov.		No info	Mossy forests	
<i>Psychotria lagunensis</i> (Merr.) comb. nov.		No info	Primary forests, low alt.	
<i>Psychotria membranifolia</i> Bartl.	Aliuankai	Phil. Endemic	Primary forests, low & medium alt.	Poles
<i>Psychotria piperi</i> Merr.		No info	Forests, low alt.	
<i>Psychotria subsessiliflora</i> Elm.		No info	Forests, low & medium alt.	

<i>Tabernaemontana mucronata</i> Merr.		No info	Damp primary forests, low & medium alt.	
<i>Tricalysia tinagaoensis</i> Elm.		No info	Primary forests, low to 900 masl	
<i>Villaria odorata</i> (Blco.) Merr.		No info	Thickets, along seashore	
<i>Villaria philippinensis</i> Rolfe		No info	Secondary forests, low alt.	
<i>Williamsia mindanaensis</i> Elm.		No info	Primary forests, low to 900 masl	
<i>Xanthophytum fruticosum</i> Reinw. Ex Bl.		No info	Primary damp forests, low & medium alt.	
RUTACEAE				
<i>Wenzelia brevipes</i> Merr.		No info	Damp forests, to 500 masl	
SAPINDACEAE				
<i>Cubilia blancoi</i> Bl.	Baksian	No info	Primary forests, medium alt.	Edible
<i>Meliosma sumatrana</i> (Jack) Walp.		No info	Forests, to 1200 masl	
SAPOTACEAE				
<i>Sideroxylon pittosporifolium</i> Elm.		Phil. Endemic	Forests, low & medium alt.	
SCROPHULARIACEAE				
<i>Adenosma javanicum</i> (Bl.) Koord.		No info	Forests, along stream, low & medium alt.	
SIMARUBACEAE				
<i>Brucea amarissima</i> (Lour.) Merr.	Bogo-bogo	No info	Thickets, low alt.	Medicinal
<i>Quassia indica</i> (Gaertn.) Nooteboom		No info	Forests, low alt.	Medicinal

SOLANACEAE				
<i>Solanum lagunense</i> Elm.		No info	Primary forests, low & medium alt.	
THYMELAEACEAE				
<i>Gyrinopsis acuminata</i> Merr.		Phil. Endemic	Dry forests, @ 1100 masl	
URTICACEAE				
<i>Pipturus arborescens</i> (Link.) C.B. Rob.		No info	Thickets & secondary forests	
<i>Pipturus argenteus</i> (Forst. F.) Wedd.		No info	Forests near sea	
VERBENACEAE				
<i>Clerodendron macrocalyx</i> H. Lam		Phil. Endemic	Secondary forests & thickets, low & medium alt.	
GRAMINAE/POACEAE				
<i>Dinochloa pubiramea</i> Gamble	Bukad	No info	Forests, low & medium alt.	General purposes
<i>Imperata exaltata</i> Brogn.	Kogon	Phil. Endemic	Exposed ridges & thickets	Thatch
<i>Ischaemum intermedium</i> Brongn.		No info	Open wet places, low alt.	
<i>Miscanthus japonicus</i> (Thunb.) Anders.		No info	Thickets to 1200 masl	
<i>Paspalum longifolium</i> Roxb. var. <i>trichocoleum</i> Hack.		Phil. Endemic	Open places, low alt.	
<i>Schizostachyum diffusum</i> (Blco.) Merr var. <i>negrosensis</i> Becc.	Loob	Phil. Endemic	Primary & secondary forests	General purposes

HERBS			
ACANTHACEAE			
<i>Hemigraphis sublobata</i> Elm.	Phil. Endemic	Primary forests, along stream, low alt.	
BEGONIACEAE			
<i>Begonia bolsteri</i> Merr.	Phil. Endemic	Primary forests, along stream, low alt.	Ornamental
<i>Begonia longiscapa</i> Warb.	Phil. Endemic	Primary forests, boulders, low alt.	Ornamental
<i>Begonia longistipula</i> Merr.	Phil. Endemic	Primary forests, low alt.	Ornamental
<i>Begonia mindanaensis</i> Warb.	Phil. Endemic	Primary forests, low & medium alt.	Ornamental
<i>Begonia mindorensis</i> Merr.	Phil. Endemic	Forests along stream, low alt.	Ornamental
CAMPANULACEAE			
<i>Pentaphragma platyphyllum</i> Merr.	No info	Primary forests, along stream, low alt.	
CONVOLVULACEAE			
<i>Merremia distillatoria</i> (Blco.) Merr.	No info	Secondary forests & thickets, low & medium alt.	
GESNERIACEAE			
<i>Cyrtandra agusanensis</i> Elm.	Phil. Endemic	Forests, along stream, low alt.	
<i>Cyrtandra humilis</i> Elm.	Phil. Endemic	Primary forests, along stream, low & medium alt.	
<i>Cyrtandra maesifolia</i> Elm.	Phil. Endemic	Primary forests, medium to 1200 masl	
<i>Monophyllaea merrilliana</i> Kranzl.	Phil. Endemic	Damp cliffs & ravines, low to 800 masl	

<i>Trichosporum cardinale</i> Copel. Ex Merr.	Phil. Endemic	Primary forests, medium to 1400 masl	
LABIATAE / LAMIACEAE			
<i>Leucas lavandulifolia</i> Sm. Pansi-pansi	No info	Open, waste places, low & medium alt.	Medicinal
LILIACEAE			
<i>Dianella caerulea</i> Sims.	No info	Forests, medium alt., to 2200 masl	
MARANTACEAE			
<i>Monophrynium fasciculatum</i> (Presl.) K. Schum.	No info	Primary forests, low & medium alt.	
<i>Phrynium philippinense</i> Ridl.	No info	Thickets & forests	
<i>Hedyotis auricularia</i> L.	No info	Thickets & open places, low & medium alt.	
<i>Hedyotis costata</i> (Roxb.) Kurz	No info	Thickets & open places, low alt.	
<i>Hedyotis pilosissima</i> Merr.	No info	Forests & damp ravines, low alt.	
<i>Hedyotis radicans</i> (DC.) Miq.	No info	Forests, low alt.	
<i>Hedyotis ramosii</i> Merr.	No info	Forests, low alt.	
VERBENACEAE			
<i>Stachytarpheta jamaicensis</i> (L.) Vahl.	No info	Open places, low & medium alt.	
ZINGIBERACEAE			
<i>Alpinia haenkei</i> Presl	No info	Forests, low & medium alt.	
<i>Alpinia zerumbet</i> (Pers.) B.L. Burtt. & R.M.	No info	Thickets & forests	
ORCHIDACEAE			
<i>Bulbophyllum bolsteri</i> Ames	No info	Forests	

<i>Bulbophyllum profusum</i> Ames	No info	Forests, low alt.	
<i>Ceratostylis senilis</i> Reichb. F.	Phil. Endemic	Forests, to 900 masl	
<i>Coelogyne asperata</i> Lindl.	No info	Forests, low & medium alt.	
<i>Coelogyne bilamellata</i> Lindl.	No info	Forests, to 1000 masl	
<i>Coelogyne quinquelamellata</i> Ames	Phil. Endemic	Forests, low alt.	
<i>Cordula ciliolaris</i> (Reichb. F.) Rolfe	No info	Forests slopes, low to medium alt.	Ornamental
<i>Cymbidium finlaysonianum</i> Lindl.	No info	Forests, sea level to medium alt.	
<i>Dendrobium aporoides</i> (Lindl.) Merr.	No info	Forests, 0 to 1000 masl	
<i>Dendrobium crumenatum</i> Sw.	No info	Forests, low & medium alt.	
<i>Dendrobium cultratum</i> Schltr.	No info	Forests, low & medium alt.	
<i>Dendrobium dearei</i> Reichb. F.	Phil. Endemic	Forests	Ornamental
<i>Dendrobium escritorii</i> Ames	No info	Forests, low alt.	
<i>Dendrobium schuetzei</i> Rolfe	Phil. Endemic	Forests	
<i>Dendrobium uniflorum</i> Griff.	No info	Forests, low & medium alt.	Ornamental
<i>Dendrobium ventricosum</i> Kranzl.	Phil. Endemic	Forests, low alt.	
<i>Dipodium paludosum</i> (Griff.) Reichb. F.	No info	Forests, low & medium alt.	

<i>Eria jarensis</i> Ames	No info	Forests, medium alt.
<i>Eria merrillii</i> Ames	No info	Forests, low & medium alt.
<i>Eria polyura</i> Lindl.	Phil. Endemic	Forests, low to 2000 masl
<i>Eulophia merrillii</i> Ames	No info	Open slopes at 100 masl
<i>Grammatophyllum speciosum</i> Bl.	No info	Forests, low alt.
<i>Liparis nutans</i> Ames	No info	Forests, low to medium alt.
<i>Luisia cordatilabia</i> Ames and Quisumbing	Phil. Endemic	Forests, low & medium alt.
<i>Malaxis latifolia</i> Sm.	No info	Forests, to 1300 masl
<i>Oberonia luzonensis</i> Ames	No info	Forests, medium alt.
<i>Oberonia minutissima</i> Ames	No info	Forests, low alt.
<i>Oberonia surigaensis</i> Ames	No info	Forests, low alt.
<i>Oberonia thisbe</i> Reichb. F.	No info	Forests, sea level to medium alt.
<i>Plocoglottis mindorensis</i> Ames	No info	Forests, low alt.
<i>Renanthera storiei</i> Reichb. F.	Phil. Endemic	Forests, low alt.
<i>Saccolabium tenellum</i> Ames	No info	Forests, low alt.
<i>Sarcochilus merrillii</i> Ames	No info	Forests, low alt.
<i>Spathoglottis plicata</i> Bl.	No info	Forests, low to 1500 masl Ornamental
<i>Spathoglottis tomentosa</i> Lindl.	No info	Forests, low & medium alt.
<i>Thelasis triptera</i> Reichb. F.	No info	Forests, low to 1500 masl
<i>Thrixspermum elongatum</i> Ames	No info	Forests, sea level to medium alt.
<i>Trichoglottis mindanaensis</i> Ames	No info	Forests, low alt.
<i>Trichoglottis philippinensis</i> Lindl.	No info	Forests, low alt.
<i>Trichoglottis rosea</i> (Lindl.) Ames	No info	Forests, sea level to 1300 masl
PALMAE / ARECACEAE		
<i>Areca costulata</i> Becc.	Phil. Endemic	Primary forests, low & medium alt.

<i>Korthalsia scaphigeroides</i> Becc.		Phil. Endemic	Primary forests, low alt.	
<i>Calamus discolor</i> Mart. var. <i>negrosensis</i> Becc.		Phil. Endemic	Primary forests, low & medium alt.	Rattan, furniture
<i>Calamus elmerianus</i> Becc.	Sababai	Phil. Endemic	Primary forests, low to 1800 masl	Rattan, furniture
<i>Calamus manillensis</i> (Mart.) Wendl.	Tumarom	Phil. Endemic	Forests, 600 to 1000 masl	Rattan, furniture
<i>Calamus ornatus</i> Bl. Ex Schultes var. <i>philippinensis</i> Becc.		Phil. Endemic	Primary forests, low & medium alt.	Rattan, furniture
<i>Calamus usitatus</i> Blco.	Tagokan	Phil. Endemic	Forests & thickets, low & medium alt.	Rattan, furniture
<i>Heterospathe elata</i> Scheff.	Sagisi		Forests, low alt.	Ornamental
<i>Pinanga insignis</i> Becc.	Saruag	Phil. Endemic	Primary forests, low & medium alt.	Ornamental
<i>Pinanga negrosensis</i> Becc.	Sakolon	Phil. Endemic	Forests, damp ravines, to 900 masl	Ornamental
<i>Metroxylon sagu</i> Rottb.	Langdang	No info	Fresh water swamp, low alt.	Edible
PANDANACEAE				
<i>Freycinetia oblongifolia</i> Merr.		Phil. Endemic	Primary forests, low alt.	
<i>Pandanus apiculatus</i> Merr.		Phil. Endemic	On ridges to 650 masl	
<i>Pandanus botroides</i> Merr.		Phil. Endemic	Forests along tidal streams to 650 masl	
<i>Pandanus copelandii</i> Merr.	Pangtud	Phil. Endemic	Forests, low & medium alt.	Hats & Mats
<i>Pandanus dinagatensis</i> Merr.		Phil. Endemic	Forests along streams, low alt.	
<i>Pandanus multibracteatus</i> Merr.		Phil. Endemic	Forests along streams to 650 masl	
<i>Pandanus ramosii</i> Merr.		Phil. Endemic	Dry forests, low alt.	
<i>Pandanus tenuipedunculatus</i> Merr.		Phil. Endemic	Open forests, low alt.	

<i>Sararanga philippinensis</i> Merr.	Baleo	Phil. Endemic	Endangered	Secondary forests, 0 to 750 masl	Hats & Mats
VINES/CLIMBERS					
ANACARDIACEAE					
<i>Alyxia obovalifolia</i> Merr.		Phil. Endemic		Forests & thickets, along stream, low alt.	Medicinal
ANNONACEAE					
<i>Uvaria zschokkei</i> Elm.		Phil. Endemic		Forests, low & medium alt.	
APOCYNACEAE					
<i>Parsonia cumingiana</i> A. DC.		No info		Forests & thickets, along seashore	
<i>Parsonia philippinensis</i> Merr.		Phil. Endemic		Forests & thickets, low & medium alt.	
<i>Urceola philippinensis</i> Merr.		Phil. Endemic		Forests, low & medium alt.	
BIGNONIACEAE					
<i>Nyctocalos cuspidatum</i> (Bl.) Miq.		Phil. Endemic		Primary forests, low & medium alt.	
CONNARACEAE					
<i>Connarus mindanaensis</i> Merr.		Phil. Endemic		Forests, low alt.	
<i>Rourea volubilis</i> (Blco.) Merr.	Hambabau	Phil. Endemic		Thickets & forests	Rope
DIOSCOREACEAE					
<i>Stenomeris dioscoreaeifolia</i> Planch.		Phil. Endemic		Thickets, low & medium alt.	
FLAGELLARIACEAE					
<i>Flagellaria indica</i> L.	Baling-uai/huag	No info		Secondary forests & thickets, low & medium alt.	Rope
<i>Hanguana malayana</i> (Jack) Merr.		No info		Secondary forests & thickets, to 900 masl	
<i>Cyrtandra agusanensis</i> Elm.		No info		Forests, along stream, low alt.	

HIPPOCRATEACEAE				
<i>Hippocratea ellipticarpa</i> Merr.	Phil. Endemic		Forests, low alt.	
<i>Salacia euphlebica</i> Merr.	Phil. Endemic		Forests & thickets, low alt.	
<i>Salacia integrifolia</i> Merr.	Phil. Endemic		Forests & thickets, low alt.	
<i>Salacia philippinensis</i> Merr.	Phil. Endemic		Forests & thickets, low alt.	
ICACINACEAE				
<i>Iodes philippinensis</i> Merr.	No info		Thickets, low alt.	
LEGUMINOSAE				
<i>Mucuna longipedunculata</i> Merr.	Phil. Endemic		Forests & ravines, medium to 1400 masl	
<i>Pueraria pulcherrima</i> (Koord.) Merr. Ex K. - Schum.	No info		Forests & thickets, low alt.	
LOGANIACEAE				
<i>Couthovia celebica</i> Koord.	No info		Swamp, low alt.	
LORANTHACEAE				
<i>Loranthus geminatus</i> Merr.	Phil. Endemic		Along tidal streams	
<i>Loranthus maritimus</i> Merr.	Phil. Endemic		Forests near sea	
MELASTOMATAACEAE				
<i>Dissochaeta acmura</i> Stapf. & M.L. Green	Phil. Endemic		Damp primary forests, low alt.	
<i>Pogonanthera reflexa</i> Bl.	No info		Forests, low & medium alt.	
<i>Otanthera crinita</i> Naud.	Phil. Endemic		Primary forests, low & medium alt.	
MENISPERMACEAE				
<i>Fibraurea chloroleuca</i> Miers	No info		Forests along stream, low alt.	
NEPENTHACEAE				
<i>Nepenthes merrilliana</i> Macfarl.	Phil. Endemic	Vulnerable	Forests, low to 1500 masl	Ornamental
<i>Nepenthes truncata</i> Macfarl.	Phil. Endemic	Endangered	Forests, medium to 1200 masl	Ornamental

OLACACEAE					
<i>Erythralium scandens</i> Bl.			No info	Forests, low & medium alt.	
PIPERACEAE					
<i>Piper allenii</i> C. DC.			Phil. Endemic	Primary forests, low & medium alt.	
<i>Piper nigrum</i> L. var. <i>glabrispicum</i> C. DC.	Paminta		No info	Thickets & secondary forests	Condiment
POLYGALACEAE					
<i>Polygala venenosa</i> Juss. Ex Poir.			No info	Damp primary forests, low & medium alt.	
RUBIACEAE					
<i>Uncaria philippinensis</i> Elm.			No info	Forests, low & medium alt.	
SMILACACEAE					
<i>Smilax bracteata</i> Presl	Banag		Phil. Endemic	Thickets & secondary forests, low & medium alt.	Medicinal
VITACEAE					
<i>Ampelocissus ochracea</i> (Teysm. & Binn.) Merr. var. <i>trilobata</i> Merr.			Phil. Endemic	Forests along stream, medium alt.	
<i>Columella corniculata</i> (Benth.) Merr.			No info	Primary forests, low & medium alt.	
<i>Leea platyphylla</i> Merr.			Phil. Endemic	Primary forests, low alt.	
<i>Leea ramosii</i> Merr.			Phil. Endemic	Forests, low alt.	
<i>Tetrastigma mindanaense</i> Merr.			Phil. Endemic	Forests, low alt.	
HEDGES					
CYPERACEAE					
<i>Cladium juncooides</i> Elm.			No info	Forests & thickets, low & medium alt, along streams	

<i>Cladium philippinense</i> Merr.	No info	Along streams on ledges & boulders, low & medium alt.
<i>Fimbristylis annua</i> (All.) R. & S.	No info	Open places, low & medium alt.

Annex 4. Livelihood Matrix on Forestry and Mines and Seasonal Calendar.
Sitio Cambinliw, Bgy. Santiago, Loreto, Surigao del Norte

Variables	January	February	March	April	May	June	July	August	Sept	Oct	Nov	Dec
Timber												
White Lauan	Harvest and Fruiting (Visayan trans)						Harvest			Harvest/Fruiting		
Red Lauan												
Sudyang	Harvest			Harvest/Fruiting			Harvest					
Yakal	Harvest						Harvest/Fruiting					
Magkono	Harvest all year round (Visayan trans)											
Pagsiyagon												
Kulipapa												
Lapnisan												
Non-Timber												
Uway	Harvest all year round (Visayan trans)											
Huwag												
Bilot												
Romblon/Baliw/Pantod												
Nito												
Dugos (honey)												
Orchids												
Hayop sa Lasang												
Wild Pig	Harvest all year round (Visayan trans)											
Kalaw												
Antulihaw												
Sawa												
Halo												
Wild Duck												
Alimukon												
Míneral												
Chromite	Harvest all year round (Visayan trans)											
Gold												

Source: Livelihood Matrix (Forestry); Key Informant (KI) Interview; Sitio Cambinliw, Bgy. Santiago, Loreto, Surigao del Norte, Haribon PRA, April 2002.

Annex 5a. Detailed List of Municipal Resolutions.

Resolution/ Ordinance No.	Subject	Status of Implementation	Catalyst
14-2002	Resolution Requesting Regional Director of BFAR for Technical and Materials' Assistance to the Municipality of Loreto in line with the Marine Lives Protection and Preservations and the Supply of 2 Units Deep-Sea Marine Sanctuary and 2,000 Kilos of Seaweed Propagules.	No info	LGU
11-2002	Resolution Requesting the Regional Director of BFAR for Technical and Materials' Assistance Re: Relocation of Municipal Fish Sanctuary in Barangay Magsaysay (Gibusong Island), Loreto, such as Anchors, Ropes and Buoys.	No info	LGU
10-2002	Resolution Adopting the Philippine Eagle Foundation Program.	No info	LGU
18-2001	Resolution referring the MFARMC to the Resolution No. 46-98 "Resolution Establishing Official Fish Sanctuary in the Municipal Waters, Loreto."	Not yet enforced- Fish Sanctuary	LGU
59-99	Resolution Declaring A Tourist Zone on the Tourist Spots Established in the Municipality of Loreto.	Not yet enforced	LGU
49-99	Resolution Preventing Rice Chaff from Rice Mills to be Dumped in the Brook Water to Prevent the Stoppage of the low of the Water thereby changes its course.	No info	LGU
01-98	Resolution Ordinance Prohibiting the Illegal Occupation, destruction of Forest such as Kaingin, Especially along the Watershed Area, Catching Fish Using Illegal Materials Mesh Net, Liba-Liba etc., Cutting of Mangrove, Collecting Corals Within the Territorial Jurisdiction of Barangay Esperanza, Loreto.	Enforced; List of apprehended violators with the Bantay Gubat and Coastal Area Managers of Esperanza (CAME)	Barangay LGU
36-98	Resolution Enjoining the Local Government Unit to Organize Clean and Green Committee Down to the Barangay Level.	Enforced; An annual contest of the cleanest and greenest barangay in Loreto is held	LGU
29-97	Resolution Endorsing resolution No. 04-97 of Barangay Esperanza Granting Permission and/or Authority of Loreto Mining Corporation.	No info	LGU

	for the Application of Environmental Clearance Certificate (ECC) for Mining Purposes.		
12-97	Resolution Recommending A Five (5) Hectare Nursery Farm for a Seaweed Nursery in Barangay Magsaysay, Loreto.	No info	Community of Brgy. Magsaysay
06-96	Resolution Approving the Municipal Disaster Coordinating Council Preparedness Plan.	No info	LGU
05-96	Resolution Regulating the Extraction of Sand and Gravel, and Other Similar Commodities Within the Jurisdiction of the Municipality of Loreto.	No info	LGU
21-95	Resolution Preventing Abuse of the Ecological System Through Preservation and Conservation.	No info	LGU
06-95	Resolution on Proper Disposal of Garbage as a Matter of Concern for Environment Protection and Cleanliness in the Community for the Preservation of Public Health.	Enforced; Solid Waste Management Program	LGU
11-94	Prohibiting the Construction of Rice/Corn Mills Within the 200-Meters Distance form the Built-Up Areas (Resident Areas).	No info	LGU
17-93	Resolution Prohibiting Minors from Smoking in Public Places, Gathering and or any other Places.	No info	LGU
32-93	Resolution Requesting Delineation of the Watershed Area Within the Territorial Jurisdiction of the Municipality of Loreto.	Enforced; Delineated watershed area	LGU
88-93	Resolution Absolutely Banning Fishermen/Operators Using Scuba Divers Outfit (Buso) Within the Municipal Waters of the Municipality of Loreto.	No info	Small fishermen & Members of Fishermen's Asso.
23-93	Resolution Re-aligning Spring Development Project from Liberty to Panamaon CY 1993.	No info	Residents of Panamaon and Liberty
16-92	Resolution Requesting the DENR through the Community Development Officer (CDO) of Loreto, to Help Implement Presidential Decree No. 1153 - Requiring the Planting of One Tree Every Month for Five Consecutive Years by Every Citizen of the Philippines.	No info	LGU and Citizens of Loreto

80-92	Requesting the National Government the Assignment of Municipal Environment and Natural Resources Office for Each Municipality, Paid Out From the DENR Funds.	Not enforced; No existence of MENRO	LGU
Barangay Special Ordinance No. 04 S.2001	An Ordinance Creating “Barangay Ecological Solid Waste Management Committee (BESWMC)” of Santiago, Loreto.	Not enforced	DILG
Barangay Special Ordinance No. 09 S.2001	An Ordinance Creating “Barangay Ecological Solid Waste Management Committee (BESWMC)” of Esperanza, Loreto.	Not enforced	DILG

Source: Haribon RSA, Sangguniang Bayan Secretary, Municipality of Loreto, 2001.

Annex 5b. Detailed List of Barangay Resolutions and Environment-related Initiatives.

Project/ Legislation	Strategies/ Activities	Status of Implementation	Implemented By
Barangay Santiago			
A. Ecological Sector			
1. “Samuyaw” plant & Ipil tree planting 2. Organic Farming (1999-2004)	<ul style="list-style-type: none"> • Adoption of appropriate farming technology • Construction of compost pit • Coordination w/ the line agencies like DA, DENR, DAR & LGU • Stop burning of rice straw & weeds from coconut lands 	<ul style="list-style-type: none"> • Tree planting activities to be done • Not all residents have compost pits. • Garbage is collected by the municipal garbage truck • Coordination every Clean & Green Evaluation month of July • There are still some of the residents who burn their garbage • Not all the residents are practicing organic farming 	<ul style="list-style-type: none"> • BMFI • KAKA • Brgy. Council
3. Reforestation of 26 has. rattan Rattan Industry	<ul style="list-style-type: none"> • Coordination w/ GAs that could provide skills trng. For rattan industry 	<ul style="list-style-type: none"> • No training and coordination yet. 	<ul style="list-style-type: none"> • TESDA
4. Barangay Road Side Tree Planting 1999-2004	<ul style="list-style-type: none"> • Stop forest fires 	<ul style="list-style-type: none"> • Brgy. Council & High School students conducted tree planting activities • Planted gemelina, fruit trees, talisay, mahogany 	<ul style="list-style-type: none"> • Dep. Ed., MLGU & Brgy. Council
5. Mangrove Sanctuary Development 6. Seaweed Production 1999-2004	<ul style="list-style-type: none"> • Prohibit the use of fine mesh nets • Implement laws to protect & preserve the mangrove trees • Prohibit cutting of mangrove trees • Mangrove swamp reforestation 	<ul style="list-style-type: none"> • There is a Brgy. Ordinance already • Mangrove cutting is prohibited but there are still violators • Only mangrove swamp reforestation plan has been done 	<ul style="list-style-type: none"> • BP, Fish Warden, Warden, PNP, Brgy. Capt REACH Foundation
B. Organizational Development			
1. BDC Organization	<ul style="list-style-type: none"> • Provide incentives to those who actively 	<ul style="list-style-type: none"> • Trng. Attended on PM&E, 	<ul style="list-style-type: none"> • Brgy. Council

2. Skills Training 3. Regular Meetings 1999-2004	participate in Brgy. activities • Send brgy. officials to diff. Trng. In other brgys. • Regular evaluation & planning session w/ members of BDC	Paralegal, RA8550, Sustainable Agriculture & Agroforestry • Mtgs. Every 1 st Friday of the month	
C. Legislations			
1. Res. Prohibiting the “Tapsay” Fishermen from the pt. Of Polo Island to Kayasa		• 2 Fish Wardens • Gives warnings • Seasonal enforcement	• PNP & LGU
2. Brgy. Sp. Ord. BESWMC 2001		• Committee already organized • No meeting yet	• DILG
3. Prohibiting use of fine mesh net and buso (RA 8550)		• Seasonal enforcement	• PNP & LGU
4. Mangrove Sanctuary		• Seasonal enforcement	• Brgy. Council • Fish Wardens
Barangay Esperanza			
A. Land Use Sector			
1. Identification of brgy. watershed & devising of brgy. land use & mngt. Plan 1999-2000	• Resolution-making	• Still being planned	• Brgy. Council
2. Monitoring & evaluation of mining activities 1999-2004	• Information-dissemination re: rationale of ECC • Public transparency re: accepting potential mining partners	• Still being planned	• Brgy. Council
3. Forest & watershed protection; rehabilitation of Layungan Bay 1999-2004	• Joint meeting & planning w/ other concerned line agencies	• Still being planned	• Brgy. Council
B. Agri-aqua Development Sector			
1. Prevention & elimination of illegal fishing 1999-2004	• develop financial assistance program in both fishing & farming concerns	• Still being planned	• Brgy. Council
C. Economic Development Sector			
1. Spring resort improvement	• Regular maintenance & beautification	• To be turned over to Municipal	• Brgy. Council

2001-2002		LGU • MOA between LGU & Brgy. still being drafted	
D. Human Resource Development Sector			
1. Clean and Green Program 1999-2000	• Coordinate w/ BLGU	• On-going	
2. Backyard gardening 1999-2004	• coordinate w/ BLGU	• on-going	• WOFEL
E. Development Administrative Sector			
1. Seminar & orientation for brgy. officials 1999-2004	• pooling of resources	• Coming soon	• DILG
2. Organizing of BDC 1999-2004	• coordination	• organized; 13 members of BDC Brgy. Capt., SK, Brgy. Kagawad, PTCA, KAKA, WOFEL, Brgy. Sec.	• DILG
F. Legislations			
1. Res. Ord. Prohibiting Illegal Occupation, destruction of Forest ... 1998		• Illegal fishing, mangrove cutting • Existing resolution will be segregated to more specific concerns	• Brgy. Council
2. Sp. Ord. BESWMC 2001		• Organized committee • Projects coming soon	• Brgy. Council, MLGU & NGOs
3. Establishment of mangrove sanctuary 1998		• 4 fish wardens (volunteers) • regular monitoring	• Brgy. constituents & council
Barangay Panamaon			
1. Establishment of Mangrove Sanctuary resolution 1998; 4 has.	• w/ markers (1999) • Increased productivity • Regular monitoring (PO coordinators once a wk) • 14 fish warden (volunteers)		• PAID • PAMUCO • Brgy. Council • Brgy. Constituents
2. Prohibition of logging within the watershed area resolution 1982	• 2 water maintenance personnel (w/ honorarium) • w/out boundary markers • surveyed 500 sq.m.		• Brgy. Council
3. Reforestation Project 2001; 2 has.	• tree planting activity • magkono, fruit trees, lauan		• BMFI & Brgy. Council

JLB Stockpile	• 500 seedlings planted	
4. Prohibition of Scuba Diving	• monitored by Fish Wardens & Brgy. Police • 15 km. From shoreline • buoys to be installed • 2 violators apprehended (PhP10,000 fine)	• Brgy. Council



Haribon Foundation



BirdLife International



European Commission



Royal Netherlands Embassy