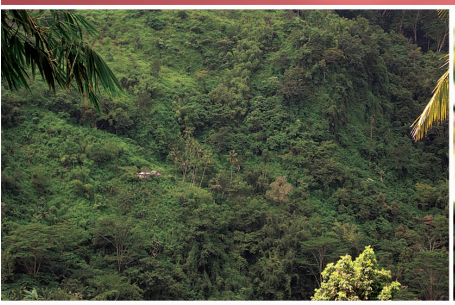
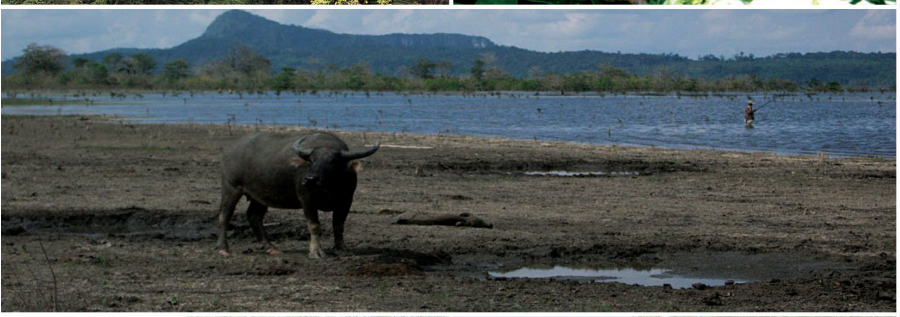
Timor-Leste's Fourth National Report to the UN Convention on Biological Diversity




DEMOCRATIC REPUBLIC OF TIMOR-LESTE

Timor-Leste's Fourth National Report to the UN Convention on Biological Diversity was prepared by the National Biodiversity Working Group coordinated by the Ministry of Economy and Development with support from the United Nations Development Programme and the Global Environment Facility.

October 2011.

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DEMOCRATIC REPUBLIC
OF TIMOR-LESTE

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Acronyms and Abbreviations

AMCAP	Ainaro and Manatuto Community Activation Project
ACB	ASEAN Centre for Biodiversity
ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
ASEAN	Association of Southeast Asian Nations
ATSEA	Arafura and Timor Sea Programme
AusAID	Australian Government Overseas Aid Program
CDCU	Capacity Development Coordination Unity
CHM	Clearing House Mechanism
CIDA	Canadian International Development Agency
COP	Conference of Parties
CPAP	Country Programme Action Plan
DFID	UK Department for International Development
DPANP	Department of Protected Areas and National Parks
EEZ	Exclusive Economic Zone
EGSP	Environment Governance Support Programs
EIA	Environmental Impact Assessment
EPU	Environment Protection Unit
FGD	Focus Group Discussion
GEF	Global Environment Facility
GoTL	Government of Timor-Leste
IBA	Important Bird Area
IUCN	International Union for Conservation of Nature
INGO	International Non-Governmental Organization
JICA	Japan International Cooperation Agency
LDP	Local Development Programme
MAF	Ministry of Agriculture and Fisheries
MEA	Multilateral Environmental Agreement
MED	Ministry of Economy and Development
MDG	Millennium Development Goal
MoEC	Ministry of Education and Culture
MPA	Marine Protected Area
NAP	National Action Programme to Combat Land Degradation
NAPA	National Adaptation Programme of Action on Climate Change
NBSAP	National Biodiversity Strategy and Action Plan

NBWG	National Biodiversity Working Group
NCSA	National Capacity Self-Assessment
NDCF	National Directorate of Coffee and Forestry
NDES	National Directorate of Environmental Service
NDFA	National Directorate of Fisheries and Aquaculture
NDP	National Development Plan
NEGA	National Ecological Gap Assessment
NFP	National Focal Point
NGO	Non-Governmental Organization
NKNSP	Nino Konis Santana National Park
OCAP	Oecusse Community Activation Project
PA	Protected Area
PEMSEA	Partnerships in Environmental Management for the Seas of East Asia
PNA	Protected Natural Area
PoWPA	Programme of Work on Protected Areas
PREDP	Participatory Rural Energy Development Program
PSM	Public Sector Management
RESPECT	Recovery, Employment & Stability Program for Ex-Combatants and Communities in East Timor
SAP	Strategic Action Plan
SDP	Strategic Development Plan
SECTOPD	Secretariat of State for Environment Coordination, Territorial Ordering and Physical Development
SIP	Sector Investment Plan
SoL	Seeds of Life Program
TA	Technical Assistance
TL	Timor-Leste
TWG	Thematic Working Group
UNCBD	United Nations Convention on Biological Diversity
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCC	United Nations Framework Convention on Climate Change
UNOPS	United Nations Office for Project Services
UNTAET	United Nations Transitional Administration in Timor-Leste
UNTL	University National of Timor-Leste
USAID	United States Agency for International Development
WB	World Bank
WWF	World Wildlife Fund

Executive Summary

This Fourth National Report (4NR) of Timor-Leste to the Convention on Biological Diversity (CBD) was prepared in parallel with the National Biodiversity Strategy and Action Plan (NBSAP) (October 2011). As a new Party to the CBD, Timor-Leste presents this Report as a first assessment of its progress towards achieving the 2010 Biodiversity Target, and considering the newly set global targets under the CBD Strategic Plan and the Aichi Targets 2011-2020. Timor-Leste, as a young nation that regained its independence in 2002, has undertaken some initiatives towards conserving and sustainably using its natural resources and biodiversity and protecting the environment. Timor-Leste, however, recognizes the challenges it faces, to address the causes and drivers of biodiversity loss and sustainably use its natural resources to improve the livelihoods and welfare of Timorese people.

Status and Trends of Biodiversity

Timor-Leste is a country positioned in a biodiversity hotspot, known as Wallacea, which harbors a number of globally significant ecosystems and endemic species. The hotspot is second in rank to the Tropical Andes in terms of bird endemism. The geographic position of Timor-Leste also places it in a strategic area for marine biodiversity being a part of the Coral Triangle, which sustains about 120 million people and where 76 percent of the world's coral species and 6 of the world's 7 marine turtle species can be found (NEGA, 2010 and IBA, 2007).

The composition of the flora of Timor island is influenced by Timor's location in Central Malesia (Wallacea), a transition zone between the main rainforest blocks of the Sunda (Peninsula Malaysia, Sumatra, Borneo, West Java) and Sahul (New Guinea) shelves (van Welzen, *et al*. 2005 in Cowie 2006). While Timor has a flora that is in many ways transitional between these areas, it lacks the diversity of many of the major rainforest elements found in those blocks such as Dipterocarpaceae, Rhododendron, and Myristicaceae) (van Steenis, 1979 in Cowie, 2006).

From the survey of birds in Timor-Leste, 3 were identified to be endangered [Timor green pigeon *(Treron psittacea),* local name (L.N.): Punai Timor; Timor imperial pigeon *(Ducula cineracea),* L.N: Pergam Timor]; and Wetar ground dove *(Gallicolumba hoetdii)* L.N.: Delimukan Wetar]; one (1) is critically endangered (Yellow-crested cockatoo *(Cacatua sulphurea),* L.N.: *Kakatua jambulkuning];* and one (1) is vulnerable [Timor sparrow *(Padda fuscata)* L.N.: Gelatik Timor].

The non-bird fauna of Timor-Leste and its associated islands is poorly known. However, the recent surveys discovering new species of bats, frogs, geckos and skinks,

could be an indication that there are high levels of endemism in all faunal groups. While roughly half of the bird fauna originates from Asia and half from Australasia, the mammal, amphibian and reptile faunas are dominated by Asian families and species (BirdLife, 2007).

Bats are the best represented group with at least 34 species, including 12 species of fruit-bats. There are at least seven species of rats and mice and five species of shrews. Only two shrew species are native to Timor Island: Thin shrew *(Crocidura tenuis)* and Timor rat *(Rattus timorensis)* (the only native mammals in Timor Island other than bats). Timor once had a rich native rat fauna including giant rats, but these may have become extinct after the introduction of many mammals associated with human settlement during the last 1,000–7,000 years. These species include the common spotted cuscus *(Phalanger orientalis)* (the only marsupial in Timor), long-tailed macaque *(Macaca fascicularis)* (the only primate), common palm civet *(Paradoxurus hermaphroditus,* Eurasian wild pig *(Sus scrofa),* Rusa deer *(Cervus timorensis),* house mouse *(Mus musculus),* house rat *(Rattus tanezumi),* brown rat *(R. norvegicus)* and field rat *(R. exulans)* (BirdLife International, 2007).

About 85 percent of Timor-Leste's population subsists on agriculture (Valdivioso, 2001 in NEGA, 2010). About 50 percent of the population lives in rural areas and likewise practice subsistence agriculture. Poverty levels are higher in the rural areas than in the urban centers (MAF 2003 in NEGA 2010). As a young country, Timor-Leste has yet to expand its export base especially in the agriculture sector. Trade is limited in agriculture and is mostly in green coffee beans or organic coffee (TL-EC Country Statistics 2008 – 2013).

Rice is commonly grown in the warmer lowland areas while maize is grown at the medium altitudes. Other crops such as rootcrops are grown at higher elevations. Only 30 percent of the 6,000 square kilometers of suitable land for agricultural production (crop and livestock) is being used, and mostly for crop production only. It is estimated that about 1,740 square kilometers can be used for crop production and an additional 1,240 square kilometers available for agricultural use; however, this additional land is still covered with brush, and thus, not yet suitable for agriculture purposes.

Over 100 rivers from the highlands flow into the coastal zone, but the discharges are short and fast flowing due to the steep topography. There are 12 main river systems in the north and 17 in the south, but very few of these rivers flow year round and often dry out and form pools of stagnant water in the dry season. Shrimp and eels congregate in these pools and are often caught by hand. Unidentified species of Derris ("ai-tuha") and Euphorbia ("ai-riti") and an unidentified Myristicaceae ("paunete") species were repeatedly mentioned as being effective fish poisons. River sedimentation can be found in many places as a result of soil erosion and quarrying done upstream.

Wetland areas throughout Timor-Leste provide habitats for a variety of unique water birds. None of these sites however are large enough to support the number of birds required for consideration as an Important Bird Area (IBA). Lake Iralalaru, in the eastern part of the country, is relatively large (22 square kilometers) and constitutes a very interesting wetland ecosystem, although almost nothing is known about it in scientific terms. There are reports however, of the wetland supporting crocodiles [probably saltwater crocodile *(Crocodylus porosus)*], catfish, and a rich bird life (BirdLife International 2007).

Timor-Leste has a coastline approximately 700 kilometers in length, and a potential Exclusive Economic Zone (EEZ) of approximately 75,000 square kilometers (although the precise boundaries of this zone have not yet been determined). The habitats along the coastline vary due to local influences such as seasonal rainfall, local geology and topography, river discharges and regional offshore oceanographic features as well as the impact of human activities.

The fringing coral reefs of Timor-Leste form an almost continuous strip along the coastal waters of west and north Irian Jaya, Sulawesi, Maluku, Timor, Bali, Mentawai, Belitung and the Lingga and Riau islands. The marine near-shore zone is characterized by a narrow reef flat (often <60 meters wide but up to almost one kilometer) and dominated by seagrass in shallower water. The north coast of Timor has very few coral reef, seagrass and mangrove habitats.

Total mangrove cover is small and confined mainly to the region between Tibar and Manatuto. There are 24 key wetland sites that have been identified as environmentally significant and in need of conservation and resource management. Almost all fishing in Timor-Leste is subsistence or semi-subsistence and is commonly supplemented by other livelihoods in the agriculture sector. The census results of the National Directorate of Fisheries and Aquaculture show that there were approximately 5,000 fishing households in 2004 and an estimated 10,000 people engaged in some level of marine resource capture. Only 4 percent were full-time, with 96 percent stating that they engaged in fishing and operated only when the opportunity arose (Uniquest in ADB, 2010).

Trends in Biodiversity

The dominant natural vegetation of the area appears to have originally consisted of closed forest, and probably with natural areas of sedge and grassland on the floodplain of Lake Iralalaru. The primary forests around Los Palos and in the Lake Iralalaru basin have been extensively converted by humans into grassland, cropland and secondary forest vegetation. The Tutuala and Com sub-districts in Los Palos, Lauterm and the mountain ranges and southern coastal areas continue to support primary closed forest and these are now probably the largest areas of natural primary vegetation that remain on the island of Timor (Cowie 2006).

Forest cover in East Timor has decreased by almost 30 percent over the period of 1972 to 1999, based on analysis of satellite images (Sandlund, *et al.* 2001). From 1990 to 2010, there was an average deforestation rate of -1.336 per cent. In terms of size, 11,000 hectares of forest were lost to deforestation and forest degradation annually since 1990 up to 2010. This translates to a remaining 50 percent forest cover for the whole country (UN GFRA 2010; WCMC 2009).

Approximately 35 percent (4,538.5 square kilometers or 453,850 hectares) of the land area (excluding approximately 22 square kilometers of water bodies) has some type of forest cover. Remaining primary forest vegetation is minimal. Estimates range from 1 to 6 percent of the territory.

Recent coastal mapping funded by the Ministry of Agriculture and Fisheries (MAF) has revealed significant and ongoing coastal habitat loss in Timor-Leste, particularly in coastal mangroves. In 1940, the mangrove area of Timor-Leste totalled 9,000 hectares. By 2008, the areas has decreased to only 1,802 hectares. This translates into an 80 percent loss.

Threats to Biodiversity

Over exploitation and unsustainable use of natural resources, as well as habitat degradation and fragmentation are the main drivers of biodiversity loss in Timor-Leste. These are mainly caused by deforestation, unabated collection of sand and stones in rivers, unsustainable agricultural practices, and land conversion to other uses. Pollution, invasive alien species, and climate change are also contributing factors to biodiversity loss.

Deforestation. Depletion of the country's forests continues to take place in varying degrees across the island, with only small pockets of dense primary forest remaining around the traditionally important sacred areas. Ebony, sandalwood, and teak trees have been almost completely eliminated (Westerberg, 2000), yet illegal logging of these species continues. The use of fuelwood as the main source of energy for cooking is also causing massive forest loss. In rural areas, forestry activities that the community members are mostly engaged in because of the income these activities provide, include fuelwood gathering, hunting, collection of palm wine, production of palm stem panel for house walling, collection of palm leaves for house roofing, harvesting of rattan, harvesting of bamboo, thinning, nursery and gathering of honey.

Habitat Degradation. The natural resource base in Timor-Leste is fragile, depleted and continues to be unsustainably exploited. Two identified disturbances affecting the health and vitality of forests include fire and disease. Soil depletion in upland areas is heavy and 'slash and-burn' is still widespread, further jeopardizing already low levels of agricultural production and productivity in the country.

Insufficient diversification makes agricultural productivity very low. As a result, underemployment in rural areas is high and incomes are very low, forcing people to migrate to cities or continue to live in poverty. Non-farm rural employment opportunities are practically non-existent except when there are public works (roads, bridges) projects that need local manpower. Lack of rural infrastructure (irrigation, markets, extension, roads, energy, and rural credit) further contributes to low agricultural productivity and high rural poverty.

Recurrent natural disasters and social unrest also take their toll in terms of loss of agricultural production and climate change is impacting on the country in terms of erratic rainfall, floods and drought (Timor-Leste CPAP 2009-2013).

Non-availability of adequate land for cultivation puts pressure on forests and forces people to cut down trees to meet their needs for arable land and fuelwood.

Collection of sand and stones in riverbeds contribute to the sedimentation of the rivers and streams that ultimately affects water quality and thereby death of river organisms such as fish, shrimps and eels. Other factors affecting the rivers are the discharging of sewage and disposal of solid wastes into the waterways, which threaten the aquatic species. Non-sustainable fishing methods have been cited also as threat to the aquatic ecosystem (NBSAP Report 2011).

In addition to the above, coordination among government institutions concerned in natural resources management is loose at best. Fire protection in protected areas also is the concern of the environment sector but the coordination in the two sectors to fight fire remains a challenge.

Conversion to other land uses. Coastal areas, in which the mangroves are found, are ideal for settlements because these areas are flat, well-drained, relatively open and have good access to the sea. The vegetation in these areas has been extensively modified

throughout the region. It is commonly used for houses, gardens and grazing of goats, buffalo and banteng (Cowie 2006). In Dili, Manatutu, Liquica, Baucau, Los Palos, Bobonaro, Suai, and Same, the mangroves are threatened with deforestation from illegal cutting for house construction and fishing boat building. Furthermore, in Manatutu, the mangroves are cut for fuelwood to support the salt-making livelihood of the locals (NBSAP 2011).

Pollution. Corals are being threatened with pollution and destructive means of fishing. Coastal resources in the localities of Behau, Tasi Tolu, Com, Baucau, Cristo Rei, Jaco Island and Metinaro are also threatened with the same factors. Solid wastes being thrown into river systems find their way into the coast and eventually pollute the coral ecosystems.

Overfishing. Although the fisheries sector is one of the top priorities for development, overfishing remains to be a major threat in marine ecosystems (Grantham *et al.* 2011).

Poaching or hunting of wildlife in terrestrial and marine environments is considered a threat to biodiversity. Removal of the wildlife in their respective habitats for food, medicine, and for the pet trade deprive the ecosystems of their role in species distribution and thus disrupt the natural processes and functions of the ecosystem to provide the necessary goods and services to the people (NEGA 2010).

Sea turtles are threatened with overharvesting of their eggs, skin and meat and their carapace for handicrafts in at least 11 districts in Timor-Leste. Other species being threatened by overharvesting are the mollusks, which are being collected for consumption and handicrafts.

Key Actions to Achieve the Objectives of the Convention on Biological Diversity

Timor-Leste became a Party to the CBD when the Government ratified the CBD on 8 January 2007. Since 2002, several initiatives were implemented to conserve biodiversity. These activities include establishing protected areas, developing environment policies and setting-up institutions that support conservation of biodiversity and natural resources. But these have been inadequate and the country faces a big challenge to improve its capacities both at the policy and institutional levels, including human capacity to protect its biodiversity and improve human welfare.

In fulfilment of its obligation to the CBD and to achieve the CBD objectives, the Government of Timor-Leste has undertaken a national process at the start of 2011 to develop the NBSAP, with the involvement of all sectors of the country. The NBSAP was completed in October 2011 in parallel to the preparation of Timor-Leste's Fourth National Report to the CBD.

Prior to the development of the NBSAP, biodiversity has been mainstreamed in the Strategic Development Plan (SDP) of Timor-Leste (2011-2030). Environmental legal frameworks to protect and conserve the environment, development of biodiversity decree, designating national authority on climate change, establishment of community-based nurseries to ensure enough planting materials to meet the goal of planting one million trees per year, eliminating fuelwood use for cooking, and establishing an extensive network of protected land and marine areas as representative of Timor-Leste biodiversity, are included as priority targets in the country's SDP.

This integration of environment and biodiversity conservation into the national development plan would strengthen the implementation of the NBSAP, Timor-Leste's

conservation strategy towards achieving sustainable development goals, key national sectoral plans, such as the fisheries sector plan, forestry plan, and the Strategic Action Plan (SAP) for Timor-Leste's Programme of Work on Protected Areas (PoWPA). Biodiversity concerns likewise have been incorporated in the development plans of the education, health, energy, tourism and environment sectors in various specific levels. However, these plans have yet to be effectively implemented on-the-ground with the aim of mainstreaming biodiversity into the development activities.

The NBSAP of Timor-Leste outlines the key legislations and policies on environment and biodiversity. These include, among others the following:

- The 2002 Constitution of the newly independent Democratic Republic of Timor-Leste includes, among the fundamental objectives of the State, the protection of the environment and preservation of natural resources. Under the Constitution, the State shall recognize the need to preserve and rationalize natural resources use and shall promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.
- Prior to the enactment of the Constitution, regulations passed under the United Nations Transitional Administration in East Timor (UNTAET) include *UNTAET Regulation 2000/17 On The Prohibition Of Logging Operations And The Export Of Wood From East Timor,* which prohibits the cutting, removal, logging and export (in any form) of wood, and the burning or any other destruction of forests.
- In February 2011, Timor-Leste enacted the Environmental Licensing Decree (Law No. 5) creating a system of environmental licensing for public and private projects likely to produce environmental and social impacts on the environment. This is basically the environmental impact assessment or EIA Law.
- The proposed Biodiversity Decree Law specifically targets biodiversity conservation concerns such as the protection of habitats and ecosystems, threat and management of invasive alien species, trade of species and the penalties, and other provisions. The National Adaptation Programme of Action on Climate Change (NAPA, 2010) envisions the Timorese people to be more resilient to climate change, recognizing their high vulnerability in an economy that is dominated by subsistence agriculture. Adaptation measures will focus on reducing the adverse effects of climate change and promote sustainable development. These measures will build on existing strategies and plans across all sectors, including the National Priorities process.
- The National Action Program to Combat Land Degradation (NAP, 2009) has identified project activities addressing deforestation and land degradation processes in Timor-Leste focusing on sustainable land management. These include restoring degraded areas, protecting and conserving unaffected areas of high agriculture and environment significance, and building capacity for the implementation of both the land rehabilitation and conservation activities.

Currently, there are 30 protected areas of which 15 are legislated and another 15 now identified and will be put under legislation and 16 Important Bird Areas (IBAs), counting up to 261 identified bird species in Timor-Leste.

Timor-Leste is also a Party to other multilateral environmental agreements, which it has ratified, such as the UN Framework Convention on Climate Change (UNFCC) and the Kyoto Protocol; the UN Convention to Combat Desertification (UNCCD); the Vienna Convention for the Protection of the Ozone Layer; and the Montreal Protocol on Substances that Deplete the Ozone Layer. Specific action plans such as NBSAP for UN CBD; NAPA for UNFCC and NAP for UNCCD have been formulated through multi-stakeholder process, and led by the MED through the State Secretariat for the Environment. These plans would need strong political support and leap-frogging commitments to build capacity to implement the priority strategies identified for these national plans.

Timor-Leste's progress in achieving the 2010 Biodiversity Target

Timor-Leste has put in place certain legal and policy frameworks for biodiversity conservation, including participation in global and regional programmes to help fulfill its commitments as Party to the CBD and at the same time achieve national sustainable development goals. It has set into motion the drafting of the biodiversity decree and has recently made progress in declaring at least 15 protected areas and another 15 identified for legislation for the protection of biodiversity and ecosystems. The key challenge however lies in building institutional and human capacities to implement policies, laws, and the priority strategic actions identified in key sectoral plans, particularly the NBSAP.

Based on a series of consultations attended by various stakeholders in Timor-Leste, an assessment of the 2010 CBD Goals and Targets has indicated efforts and initiatives

Timor-Leste and the 2010 Biodiversity Target: Areas where the country has undertaken efforts to achieve the Target

Target	2010 Biodiversity Target	Relevant Activities Undertaken
Target 1.1	Effectively conserve at least 10 percent of the world's ecological regions.	Established 15 legislated and 15 identified to be legislated protected areas in a network covering 2000 square kilometers, which is about 15 percent of the country's land area.
Target 1.2	Protect areas of particular importance to biodiversity.	Important rivers (5 percent), lakes (55 percent), estuaries (6 percent), nine IBAs, and coral reefs, sea grass habitats and 15 legislated and 15 identified to be legislated protected areas (55 percent), are all covered in the Protected Area network, hence are being protected.
Target 2. 1	Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	Enacted UNTAET 2000/19 to protect faunal groups including CITES-listed species in Appendices I & II such as sea turtles, marine mammals, crocodiles.
Target 2.2	Improve the status of threatened species.	Increased the population of the CITES-listed saltwater crocodile, according to locals.

Target	2010 Biodiversity Target	Relevant Activities Undertaken
Target 3.1	Maintain the genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge.	Established two Central Seed Centres for genetic conservation of rice, corn, soybean, peanuts and mung bean.
Target 4.1	Ensure that biodiversity-based products are derived from sustainably-managed sources, and production areas are managed consistent with the conservation of biodiversity.	Sandalwood, a native endangered species, is being produced in agroforestry systems by the MAF.
Target 4.2	Reduce unsustainable consumption of biological resources or that impact upon biodiversity.	Planted species for use as fuelwood and fodder in reforestation sites to ease pressure on natural forests from fuelwood gatherers.
Target 4.3	Ensure that no species of wild flora or fauna are endangered by international trade.	Threatened species are being protected from local and international trade under UNTAET regulation 2000/19.
Target 7.1	Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	Establishment of the Protected Area network is estimated to sequester 22 percent of Carbon.
Target 7.2	Reduce pollution and its impacts on biodiversity.	River clean-up activities are annual events.
Target 8.1	Maintain the capacity of ecosystems to deliver goods and services.	Reforested degraded forests and introduced agroforestry technologies.
Target 8.2	Maintain biological resources that support sustainable livelihoods, local food security and health care, especially of poor people.	Introduced agroforestry production systems that incorporate coffee, sandalwood and livestock.
Target 9.2	Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.	Promoted the use of the *Tara Bandu* traditional law to protect and conserve biological resources.
Target 11.1	Transfer new and additional financial resources to developing country Parties, to allow the effective implementation of their commitments under the CBD, in accordance with Article 20.	Donor agencies such as UNDP, USAID, ADB, WB are supporting the implementation of development projects in the country.
Target 11. 2	Transfer technology to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	Seeds of Life Program has transferred and promoted the planting of improved varieties of coffee and vanilla and other crops.

Priority Strategies and Targets on Biodiversity Conservation

The NBSAP Conservation Strategy has identified 5 Priority Strategies and Targets based on the needs of the Timorese people and the targets set in the Strategic Development Plan. These Priority Strategies and Targets are as follows:

NBSAP Priority Strategies

1. Mainstreaming Biodiversity into sectoral plans and programs to address the underlying causes of biodiversity loss
2. Protecting biodiversity and promoting sustainable use
3. Building climate-resilient ecosystems through effectively managing protected areas and reducing threats to biodiversity
4. Enhancing biodiversity and ecosystems services to ensure benefits to all
5. Enhancing implementation of the NBSAP through participatory planning, knowledge management and capacity building, including district and sub-district and community levels

Targets

Target 1

By 2015, public awareness on biodiversity has increased and participation in conservation activities through sustainable tourism and sustainable agriculture by private sector, media, and local communities, including women and youth has been enhanced.

Target 2

By 2015, rehabilitation activities in critical watersheds and degraded lands have been undertaken, with at least one million trees planted per year, and sustainable livelihoods have been provided to local communities through ecosystem restoration activities.

Target 3

By 2020, the status of biodiversity has improved by safeguarding ecosystems, species and genetic diversity in the 30 declared protected areas.

Target 4

By 2020, ecosystems services have been enhanced through promoting economic values of biodiversity and ecosystems and promoting benefits sharing.

Target 5

By 2015, a national biodiversity monitoring system has been established and the clearing house mechanism is used as an operational tool.

At the core of these priority strategies and targets is a Capacity Development Plan that would enhance the technical and managerial capacities of national government and district officials on the conservation and management of the country's rich but threatened biodiversity. A stand-alone Communication, Education and Public Awareness Strategy (CEPA) forms an integral approach in achieving Priority Target 1

of NBSAP: By 2015, public awareness on biodiversity has increased and participation in conservation activities through sustainable tourism and agriculture by private sector, media, local communities, including women and youth has been enhanced. CEPA likewise straddles through the other priority actions, as building a well-informed public service as the foundation for effective engagement and implementation of programmes and compliance to policies by the society in general.

The Capacity Development Plan was designed to propel Timor-Leste in building a cadre of conservation practitioners and experts in Timor-Leste. It builds and complements the CEPA. Foremost among the capacity gaps to be addressed cover the following training areas: (1) awareness, education and public relation; (2) biodiversity project planning, implementation and management; (3) management effectiveness assessment for protected areas and key biodiversity areas; (4) facilitation skills to moderate public consultations; (5) financial and physical resources management; (6) human resources management; (7) natural resources, socio-economic and cultural assessment; (8) protected area policy, planning and management; (9) recreation and tourism; (10) site management; (11) field craft or practical skills for working safely and effectively; (12) enforcement; (13) ecosystems assessment and management, including conservation of habitat and species; (14) reforestation, sustainable agriculture practices and community level rehabilitation activities; (15) sustainable livelihoods including vocational training and technical support for self-employment; (16) gender sensitization; and (16) sustainable land management.

This is supported by the establishment and operation of Timor-Leste's Clearing House Mechanism (CHM) on Biodiversity that would serve as a platform for managing information and knowledge sharing on biodiversity, including developing a network of national experts and stakeholders to support the implementation of the NBSAP.

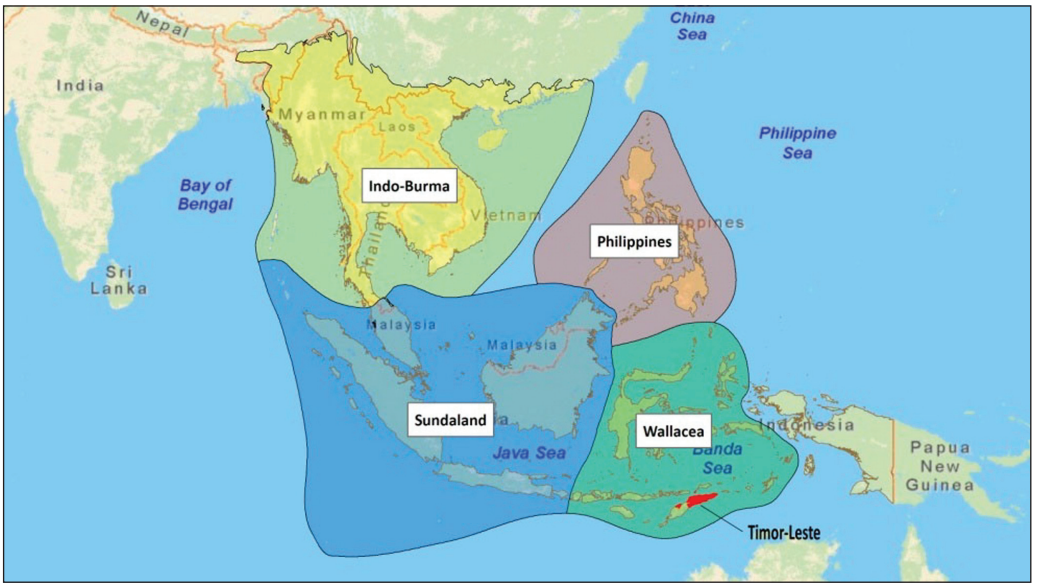
A key area of action is developing partnerships and increasing the level of funding and support both from the national government (possibly from Timor-Leste's Petroleum Fund) and donor community and other international and regional organizations. This was outlined in the NBSAP's Partnership Strategy that aims to support priority joint programmes demonstrating synergies among national agencies such as the environment and tourism directorates, to promote nature-based tourism, and the agriculture and environment directorates, to undertake joint initiatives on biodiversity and combating land degradation, through the implementation of a sustainable land management programme.

CHAPTER 1

CHAPTER 1
STATUS AND TRENDS OF BIODIVERSITY IN TIMOR-LESTE

1.A Timor-Leste's Rich Natural and Biological Resources

Timor-Leste is positioned in a biodiversity hotspot, known as Wallacea (Map 1), which harbors a number of globally significant ecosystems and endemic species. The hotspot is second only to the Tropical Andes in terms of bird endemism, which is particularly impressive given its relatively small land area. The geographic position of Timor-Leste also places it in a strategic area for marine biodiversity, being a part of the Coral Triangle, a nursery of the seas in which live 76 percent of the world's coral species, 6 of the world's 7 marine turtle species, and maybe most importantly, sustains about 120 million people (NEGA 2010, IBA 2007).



Map 1. Biogeographic regions of Southeast Asia where Timor-Leste is located.

The Malesian region, which includes Timor-Leste, is recognized as a region of high plant biodiversity with an estimated 41,000 plant species, including 70 percent of species endemic to that region (Roos, *et al.* 2004; van Welzen, *et al.* 2005). Although the most recent checklist for Timor lists 983 species (Forbes, *et al.* 1885), no modern census or complete flora for Timor or Timor-Leste exists from which to establish the size of the flora (Cowie, 2006).

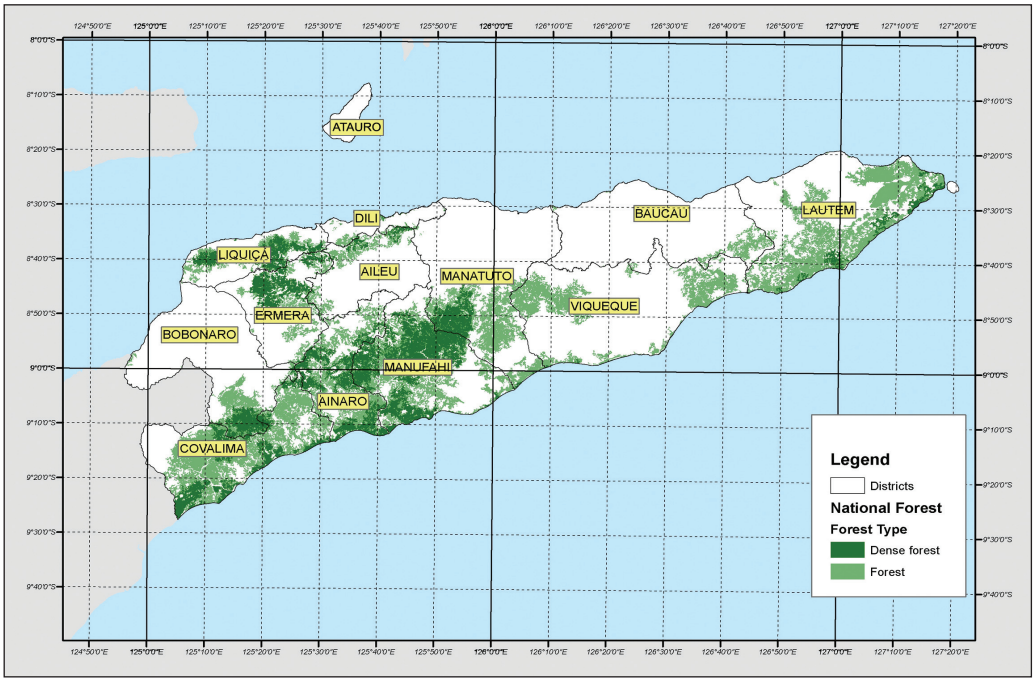
From the data of the Recapitulação Dos Dados De Flora E Fauna, the plant diversity index (Shannon-Weiner) surveyed from 11 localities reached H' = 3.86, which is considered quite high. This is computed from a species richness of 168 species in the 11 localities. The distribution of the flora is computed to be J'= 0.75 (Pielou Distribution Index), which makes the pattern a bit clustered. The survey was taken from the following localities: Jaco, Loro-Helapuna, Kussaro-Loro, Maatxutxu-Asirlafai, Aleira Lafai–Loi, Urunami-Lorimimiraka, Lapalapa-Hai Ilie, Arapmaco-Sisico, Arapmaco-Siiko, Mua Mimiraka-Moro, and Kasalak Lebutali Oan.

1.A.1 Terrestrial Ecosystems

1.A.1.a Forest and Mountain Ecosystems

Forests are defined as land spanning more than 0.5 hectares, with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds in situ. It does not include land that is predominantly under agricultural or urban land use (FAO).

As background in assessing the relative abundance of communities, Monk, *et al.* reported that 41 percent or 5,735 square kilometers of East Timor is covered with forest (based on 1972–86 satellite imagery) (Map 2), apportioned as follows: tidal (mangrove forest) – 0; coastal forest – 11; swamp forest – 57; heath-like cover – 161; moist primary lowland forest below 1000 meters above sea level (m asl) – 3,301; moist submontane forest at 1000–2000 m asl – 98; forest on limestone rock – 400; and mixed savanna – 1,707. These forest cover values are likely to have declined substantially in the past 20–30 years due to increasing population pressure. Also, these figures take no account of quality or degree of fragmentation and disturbance of remnant vegetation (Cowie, 2006).

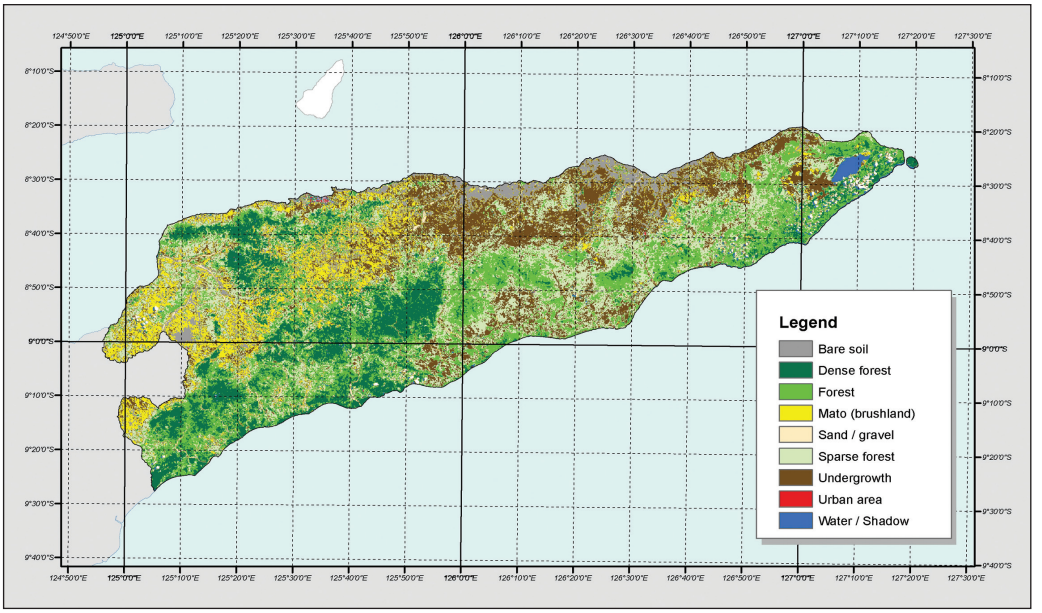


Map 2. Forest cover of Timor-Leste

Natural forests have been a major resource over the centuries, but exploitation of sandalwood, teak, and other hardwoods, and the expansion of agriculture, much of it swidden, a slash-and-burn type of sloping land farming, has left most of the island without forest cover. Records indicate that 41 percent of Timor-Leste is forested, of which 29 percent is "closed forest" (Map 3).

The composition of the flora of Timor is influenced by its location in Central Malesia (Wallacea), a transition zone between the main rainforest blocks of the Sunda

(Peninsula Malaysia, Sumatra, Borneo, West Java) and Sahul (New Guinea) shelves (van Welzen,et al. 2005 in Cowie, 2006). While Timor has a flora composition that is in many ways transitional between these areas, it is lacking in diversity of many of the major rainforest elements found in those blocks such as Dipterocarpaceae, Rhododendron and Myristicaceae. The geological history, climate, dispersal pathways, soils and topography appear to have had an additional influence on the flora (van Steenis 1979, in Cowie, 2006).



Map 3. Land cover map of Timor-Leste

The flora has been influenced more by its proximity to Australia than in West Malesia. During the ice ages, the northwest coast of Australia lay perhaps only 100-200 kilometers from Timor (Barlow 1981 and O'Brien & Glenn 2005 in Cowie 2006). This appears to have facilitated the exchange of plants and birds between the regions (Van Steenis 1979 & Mayr 1944 in Cowie 2006) in addition to the major exchange of flora between Australia and New Guinea. Van Steenis (1979), as cited by Cowie (2006), details a large widespread Australian component in the Malesian flora and also lists 14 Australian species in the Timor flora, which are not found elsewhere in Malesia. The latter includes species such as the *Ptilotus conicus* herb, which is a common component of coastal calcareous dunes and chenier plains in the Northern Territory; the *Thecanthes concreta* herb, which occurs on clay soils in north or northwest Australia as well as on Timor, and the parasitic shrub (*Exocarpos latifolius*), which is widespread in northern Australia but has a limited distribution in Malesia, including Timor (Cowie, 2006).

On the other hand, based on the data of the Recapitulação Dos Dados De Flora E Fauna, wherein flora surveys were done in 11 localities, the top 5 dominant plant species in their order of importance are "Paaraku", a plant of the Euphorbiaceae family, genus *Fluggea*; *Pterocarpus indicus* (Fabaceae), local name: "Mataria"; *Pterosporum acerifolium (Sterculiaceae)*, local name: "Pookuro"; *Schleichera oleosa (Sapindaceae)*, local

Arid woodlands dominated by *Eucalyptus alba* in the northern coast of Timor-Leste

name: "Kaitxava"; and *Mimusops elengi* (Sapotaceae), locally known as "Piaparuno".

At present, several forest types have been identified for Timor-Leste by various sources. The main forest types identified by the Ministry of Agriculture and Fisheries are dry lowland forest, moist forest, montane forest and swamp. Whitmore (1975) classified Timor's vegetation as "monsoon forests and savannah" due to the marked wet and dry season with low annual precipitation. The main monsoon forest species classified include *Aegle marmelos, Cassia fistula, Eucalyptus alba, Tamarindus indica* and *Melia azedarach.* On the other hand, Timor-Leste's NBSAP 2011 further defined the different types of forests as primary forest, modified natural forest, semi-natural forest, productive plantations and protective plantations.

The distribution of Timor's vegetation types varies considerably between the north and the south. The northern coast of Timor is predominantly dry and dominated by arid woodlands, except east of Lautem, where there is dense forest cover. Some areas such as around Dili are characterized by denuded hills with only grasses and bushes. There are very narrow or no coastal plains, except in some regions such as around Manatuto and Dili.

Patches of dense and sparse moist lowland forests dominate the southern coast of Timor. These moist lowland forests tend to be separated from the southern coastline by small patches of coastal forests and large patches of dry arable land used to grow food crops, with the exception of the southeast, where the moist lowland forest extends to the coastline.

The natural vegetation is tropical in character and consists of dry broadleaf forests with an undergrowth of shrubs and grasses supporting a rich wildlife. Many trees drop their leaves during the dry season but there are also evergreen and thorn trees in the woodland mix. Typical trees of the lowland slopes include a tropical chestnut, *Sterculia*

foetida, Callophyllum teysmannii and candlenut *(Aleurites moluccana).*

There are three dominant native species and these are *Eucalyptus alba, Eucalyptus urophylla* and *Pterocarpus indicus.* The most valuable among the native species include sandalwood (*Santalum album*) and *Pterocarpus indicus.* Nationally, *Santalum album* is considered a critically endangered species. Based on a preliminary survey of the flora and fauna in Timor-Leste conducted in collaboration with Birdlife International, more than 251 tree species have been identified as native.

Sandalwood (*Santalum album*) is an endangered species in Timor-Leste.

A large proportion of the dry adapted monsoon forest flora of the Northern Territory and Kimberley of Australia also occurs in Timor, but this flora is also frequently widespread in Central and Eastern Malesia and elsewhere in Northern Australia, with few biogeographic clues regarding dispersal pathways to Australia (Wheeler 1992 in Cowie 2006; Liddle, *et al.* 1994). As van Steenis (1979) noted, the exchange of flora has probably been influenced by climatic, edaphic and geological factors. North and northwestern Australia is generally drier and has large areas of sandstone lithology with sandy or lateritic soils (but also with significant areas of clay derived from limestone, basalt or other rocks). In comparison, Timor-Leste is dominated by shale and limestone lithology with clayey soils and generally has a less extreme dry season (Cowie 2006).

Distribution of Plants in the Lesser Sunda Island Region

The Lesser Sunda Island Region, which Timor-Leste is part of, has plants that also occur in the Kimberley or the Northern Territory of Australia. Such plants include *Lepisanthes rubiginosa*, *Melochia umbellata* and *Secamone timorensis*, all on Timor and known in Australia only from monsoon forest in the northwest Kimberley. Other plant species include vines (*Cyathostemma glabrum, Dichapetalum timorense),* shrubs (*Hibiscus vitifolius* and *Pentapetes phoenicea*) and trees (*Pittosporum moluccanum, Santalum album* and *Suregada glomerulata*), which are all known in Timor, but in Australia, are found only in the Northern Territory. *Eugenia reinwardtiana*, *Garuga floribunda, Lagerstroemia archeriana* and *Proiphys amboinensis* all occur on Timor, the Kimberley and Cape York but not on the Northern Territory. This raises the possibility that dispersal of these taxa to Australia has occurred independently across both the Quaternary Timor Sea and the New Guinea–Torres Strait land bridge (or that they have become extinct in Northern Territory).

The most recent estimate of the proportion of endemic plant species for the Lesser Sunda Islands (based on families treated in Flora Malesiana) is 5.2 percent,

a figure slightly below the average for Malesian phytographic areas (van Welzen, *et al.* 2005 in Cowie 2006). The flora of Timor is characterized by low levels of endemic genera (3) and, at the species level, endemism is estimated at 10.3 percent (Monk, *et al.* 1997; van Steenis 1979 in Cowie 2006). It is not clear, however, if the figures of Monk and van Steenis were revised downwards by the work of Van Welze,*et al.* (2005) or if Timor is unusually rich in endemic species compared to the rest of the Lesser Sunda Islands.

The Nino Konis Santana National Park contains a well-developed tropical closed forest flora as reflected by the large number of tree and vine species. The number of species by life form is 212 tree species, 84 shrub species, 194 herbaceous species, 104 vine species, 47 fern species and 11 epiphytes (non-ferns) with 67 that are unclassified. However, diversity is likely to be lower than on the wetter, older islands of the region (e.g. Seram, Sulawesi) or in larger areas such as North Queensland, Borneo or New Guinea. For example, 47 species of fern were recorded during the survey and most of these were from higher elevations in the Paitxau Range. Considering that only one site has been sampled in that area, it is likely that many more species will be found to occur in the Park. However, the fern flora of Seram is regarded as exceptionally rich with some 700 species known and it would appear highly unlikely that the Timor fern flora would approach this level (Kato 1992 in Monk, *et al.* 1997). At the same time, the Park is likely to support a number of dry adapted trees and shrubs, which are absent from wetter islands (Cowie 2006).

Much has improved since Cowie wrote the information coming from global datasets, inventory/surveys from scientists and international NGOs, field guides and local knowledge. Although available, they are quite limited.

Fauna of Timor-Leste

Approximately 6,000 years BC, Papuan people from the north invaded Timor and brought several animal species that are now considered part of the natural fauna, such as deer, civet, cuscus and shrews. Hence, the natural ecosystems of Timor-Leste have been heavily influenced, to some extent, by humans for a million years, although significant impacts on vegetation cover probably only come with agricultural practices commencing. Endemic species include the Timor shrew and Timor rat.

Birds of Timor-Leste

The total number of bird species is about 262
- 35 are with restricted range
- 23 are confined to Timor Leste and Wetar
- 5 residents are threatened with global extinction
- 15 species are near threatened
- 3 pigeons are endangered
- Yellow-crested cockatoo is critically endangered
- Kakuak *(Philemon Timorensis)* is a native bird now endangered

(Source: Trainor, *et al.* 2007, The Birds of Timor-Leste)

In a survey of fauna by a project, along a transmission line across Timor-Leste, mammals and reptiles were observed. For reptiles, the survey recorded 3 gecko species, two of which were introduced species, and two skink species. The endemic Timor gliding lizard (*Draco timorensis*) (Maguire and Haeng 2001), is generally a common species in woodlands, villages, and tall closed forests. Snakes, on the other hand, are recorded to have 15 species. None of Timor-Leste's snakes is presently globally

threatened with extinction, but two Python species are in the CITES list, under Appendix 2.

From the survey of birds in Timor-Leste (Fauna Di Timor-Leste, Stocktaking Document 1) that listed 32 species, 3 were identified to be endangered: Timor green pigeon (*Treron psittacea*), Local name (Ln) Punai Timor; Timor imperial pigeon (*Ducula cineracea*) Ln: Pergam Timor; and Wetar ground dove (*Gallicolumba hoetdii*) Ln: Delimukan Wetar; one (1) is critically endangered Yellow-crested cockatoo, (*Cacatua sulphurea)* Ln.: Kakatua jambulkuning; and one (1) is vulnerable – Timor sparrow (*Padda fuscata*) Ln: Gelatik Timor.

The non-bird fauna of Timor-Leste and its associated islands may be poorly known, but recent surveys have discovered new species of bats, frogs, geckos and skinks, indicating that there may be high levels of endemism in all faunal groups. While roughly half of the bird fauna originates from Asia and half from Australasia, the mammal, amphibian and reptile faunas are dominated by Asian families and species (BirdLife International 2007).

Bats are the best represented group with at least 34 species, including 12 fruit-bat species. There are at least seven species of rats and mice and five species of shrews; two of these shrew species are native to Timor: thin shrew (*Crocidura tenuis)* and Timor rat (*Rattus timorensis*). These are the only native mammals on Timor other than bats. Timor once had a rich native rat fauna including giant rats, but these may have become extinct after the introduction of many mammals associated with human settlement during the last 1,000–7,000 years. Such species include the common spotted cuscus (*Phalanger orientalis*) (the only marsupial on Timor), long-tailed macaque (*Macaca fascicularis*) (the only primate), common palm civet (*Paradoxurus hermaphrodites*),Eurasian wild pig (*Sus scrofa*), Rusa deer (*Cervus timorensis*), house mouse (*Mus musculus)*, house rat (*Rattus tanezumi*), brown rat (*R. norvegicus*) and field rat (*R. exulans*) (BirdLife International 2007).

There are about 15–20 amphibian species and 40 or more reptiles on Timor including six geckos, two monitor lizards, about 10 skinks, at least one blind snake, three pythons, one viper snake, about eight colubrid snakes, one file snake, at least four primitive sea snakes, one crocodile, one freshwater turtle and four sea turtles (BirdLife International 2007).

Rusa Deer *(Cervus timorensis)*, in the last 1,000-7,000 years, has eased out the native rat *(Rattus timorensis)*.
Source: Fact Sheet. 2009. The State of Queensland, Department of Employment, Economic Development and Innovation.

Levels of endemism are moderate to high for frogs (about 50 percent Timor-endemic), skinks (25 percent) and geckos (25 percent). Most species are native but amphibians such as the cane toad (*Bufo marinus*), geckos such as the Tokay gecko (*Gekko gecko)* and the flowerpot snake (*Ramphotyphlops braminus*) have entered Timor through transport of goods from Asia or Australia (BirdLife International 2007).

Changing Patterns in Forest and Mountain Ecosystems

The dominant natural vegetation of the area appears to have originally consisted of closed forest, and probably with natural areas of sedge and grassland on the floodplain of Lake Ira Lalaro. Primary forest around Lospalos and in the Lake Ira Lalaro basin has been extensively converted by humans into grassland, cropland and secondary forest vegetation. The Tutuala and Com sub-districts in Lospalos, Lautem and the mountain ranges and southern coastal areas continue to support primary closed forest and these are now probably the largest areas of natural primary vegetation left on the island of Timor (Cowie 2006).

Tropical Forest Status and Management

Forest cover in Timor-Leste has decreased by almost 30 percent over the period 1972 to 1999, based on analysis of satellite images (Sandlund, *et al*. 2001). From 1990 to 2010, there was an average deforestation rate of -1.336 percent. In terms of size, 11,000 hectares of forest were lost to deforestation and forest degradation annually since 1990 up to 2010. Figure 1 below shows this trend. This translates to a remaining 50 percent forest cover for the whole country (UN GFRA 2010; WCMC 2009).

In rural areas, however, forestry activities that provide cash income and that most community members are mostly engaged in include fuelwood gathering, hunting, collection of palm wine, production of palm stem panel for house walling, collection of palm leaves for house roofing, harvesting of rattan, harvesting of bamboo, thinning, nursery and gathering of honey.

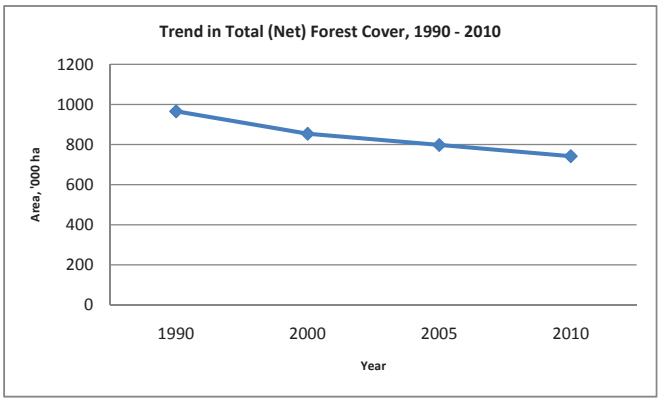


Figure 1. Trend in forest cover of Timor-Leste

Approximately 35 percent (4,538.5 square kilometers or 453,850 hectares) of the land area (excluding approximately 22 square kilometers of water bodies) has some type of forest cover (Maps 2 and 3). Remaining primary forest vegetation is minimal. Estimates range from one percent to 6 percent of the territory.

Timor-Leste does not have sufficient timber for rebuilding and firewood. Ebony, sandalwood, and teak trees have been almost completely eliminated (Westerberg, 2000); yet illegal logging of these species continues and is smuggled across the border into West Timor. During the Indonesian occupation of Timor-Leste, not only was timber harvested for sale, but the Indonesian military frequently burned the forest to remove any cover that would protect guerrillas. Furthermore, during the Indonesian occupation, many people fled to the hills and cleared forests for farming agricultural crops.

New land use plans and spatial zonation have not been completed. Land use designation prior to 1999 included five major categories: parks/reserves, watershed protection forest, production forest, convertible forest, and non-forest land. Most of

these lands were designated as convertible forest, meaning, the forest cover could be removed and replaced by crops or plantations (FAA 118/119 Report, June 2004).

Removal of wood for industrial purposes is currently banned. Cutting of big diameter trees is permitted only for domestic use. From 2000 to October 2011, the government has permitted a total of 3,750 cubic meters for cutting. Illegal cutting of big diameter trees for industrial purposes, especially of sandalwood, has become a problem. From March 2002 to November 2003, the Police Authority had reported a total of 572,290 tons of illegally cut sandalwood.

Wood is also removed for use as fuelwood. In 2002, the Japan International Cooperation Agency (JICA) study estimated that about 93 percent of household energy requirements for cooking are supplied through fuelwood. Thus, the average annual fuelwood consumption is estimated to be about 1.3 million cubic meters.

Timorese people are also dependent on non-wood forest products. These products include bamboo for house construction, furniture making and traditional ceremony; rattan for furniture; honey for food and medicine; palm for house construction, wine and starch; and medicinal plants and grasses for traditional house roofing.

The JICA study (2002) also indicated that annually, between 1992 and 1998, about 0.760 tons of sandalwood, and 6,867 tons of candle nut *(Aleurites moluccana)* were removed from forest areas.

1.A.1.b Agricultural Ecosystems

Main cereal crops include rice and maize and the major cash crop is coffee. Areas under irrigation are small and use of fertilizers is limited. There is very little agro-processing or agricultural diversification. As a result, underemployment in rural areas is high and incomes are very low, forcing people to migrate to cities or continue to live in poverty. In real terms, agricultural incomes have remained stagnant since 2002. Upland agriculture faces additional challenges in the form of 'slash and burn' methods and loss of soil during heavy rains. Non-availability of adequate land for cultivation puts pressure on forests and forces people to cut down trees to meet their needs of arable land and firewood. As a young country, Timor-Leste has yet to expand its export base, especially in the agriculture sector. Agricultural trade is mostly for green coffee beans. Eight million of the 9 million US dollars of non-oil export was coffee. The coffee export revenues are expected to rise in response to higher international prices and improved marketing (TL-EC Country Stat 2008 – 2013).

Degraded area resulting to soil erosion

Timor-Leste through the Ministry of Agriculture and Fisheries (MAF), with the Government of Australia through the Australian Agency for International Development (AusAID) and the Australian Centre for International Agricultural Research (ACIAR) implemented "The Seeds of Life" (SoL) Program in 2005, a bilateral assistance

programme aimed to address the food security issues in Timor-Leste. Key food crops of this programme are maize, sweet potato, cassava, peanuts and rice, wherein improved breeding materials of these crops were introduced into the country by expertise sourced from international organizations like CGIAR. The SoL Program has supported MAF with the production of 21.5 hectares of maize seeds, 3.2 hectares of peanuts, 12 hectares of rice, 0.33 hectares of sweet potato, and 0.44 hectares of cassava (Annual Research Report, SoL 2007).

The MAF staff have also attended a total of 138 training courses between 2006 and August 2007 (Annual Research Report, SoL 2007).

In 2009, research and seed production activities were concentrated in the districts of Manufahi, Alieu, Baucau, Viqueque, Liquica, Bobonaro and Ainaro. The best of the maize, rice, sweet potato, cassava and peanut varieties identified in these trials were examined on farmers' fields spread across a range of agro-ecosystems. Farmers receiving the test material were able to examine the crops under their own conditions and management practices and, if acceptable, keep the seeds for multiplication. In addition to these five core food crops, the number of species under examination was expanded to include potatoes, mung beans and climbing beans (Annual Research Report, SoL 2009).

In August 2009, the SoL Program officially released two new high-yielding, sweet cassava varieties, named Ai-luka 2 and Ai-luka 4. These varieties yield 51-65 percent higher than the local ones, based on replicated and on-farm trials. Planting materials are now being multiplied for distribution to farmers. These two varieties were identified after passing through the rigorous SoL evaluation process, which reported high yield and good flavor, and positive responses from farmers (Annual Research Report, SoL 2009).

The Sol Program established a total of 837 on-farm demonstrations and trials of maize, peanut, cassava, sweet potato and rice in 17 Sub-Districts during the 2008/09 wet season (November-April), broken down as follows: 286 maize, 151 sweet potato, 120 cassava, 194 peanut and 86 rice trials (Annual Report SoL 2009). Other accomplishments of the SoL Program can be found in their Annual Research Report.

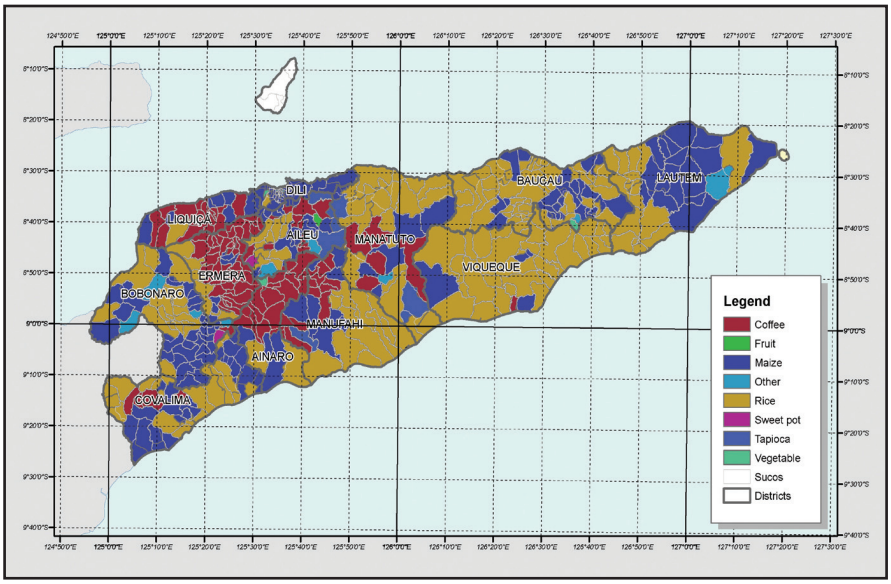
Agricultural Production

Rice is commonly grown in the warmer lowland areas while maize is grown at the medium altitudes. Other crops like root crops are grown at higher elevations.

Only 30 percent of the 6,000 square kilometers of suitable land for agricultural production (crop and livestock) is presently being used for crop production only. It is estimated that about 1,740 square kilometers can be used for crop production with an additional 1,240 square kilometers available for agricultural use.

Potential agricultural lands are still covered in brush.

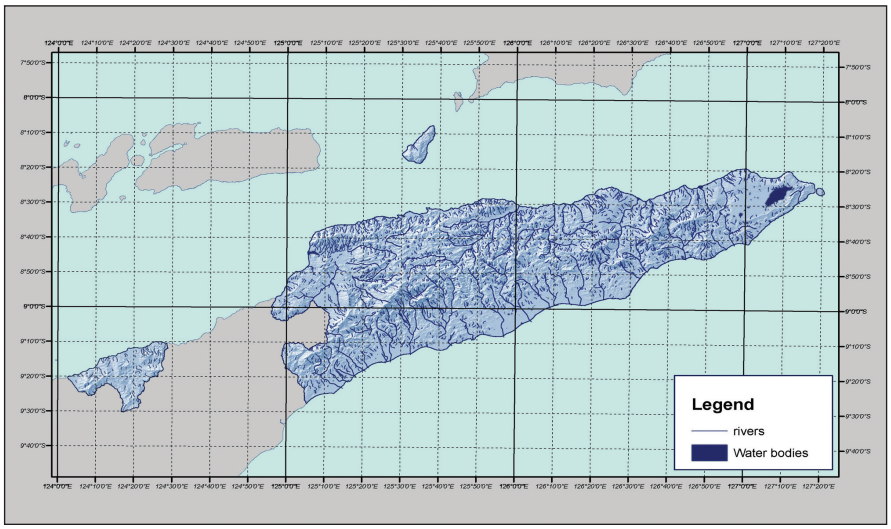
However, this additional land is still covered with brush, making the land unsuitable for farming.



Map 4. Agriculture Land Map of Main Crops in Timor-Leste.

I.A.1.c Wetland and Freshwater Ecosystems

Over 100 rivers from the highlands flow into the coastal zone, but the discharges are short and fast-flowing because of the steep topography. There are 29 main river systems, of which 12 are in the north and 17 in the south. Only a few of these rivers flow year round, and in the dry season, often dry out and form pools of stagnant water.



Map 5. Wetlands and inland waters of Timor-Leste.

Floodplain shore of Lake Iralalaru, a wetland ecosystem, is used by locals for grazing their livestock.

Several river systems also have certain catchment areas, which are potential watershed areas. There are 10 major river systems and watersheds and some river systems, which cover Indonesian areas, especially in the border area and Oecussi. The total length of the river system in Timor-Leste is about 4,286 kilometers, covering a total river surface area of around 1,834.2 square kilometers.

The largest river system is Loes, with a total area of 2,191.3 square kilometers and the smallest is Jaco, with 11.1 square kilometers.

Water balance availability of infrastructure and water resources services tend to be especially uneven and sensitive. Infrastructure development in water resources does not stand alone but is supportive to or could sustain the development of other sectors like agriculture, plantation, flood control, urban raw water supply and industrial and hydro-electric (hydropower).

The utilization of water resources in Timor-Leste is still suboptimal because many of the irrigation and reservoir structures are not functional. Water exploitation for electricity also has yet to be massively developed. There are only a few micro-hydro power plants, one of which is the micro-hydro power plant in Gariuai that has a capacity of 325 kilowatts.

There are several water resources with potential that can be utilized in a large scale such as the watersheds of Laclo and Sahen in the districts of Manatuto and Aileu, which have a fairly large catchment area, and the Loes watershed in the Bobonaro and Ermera Districts (Table 1).

The Daisoli Region is another location assessed to have this potential. It is possible for multi-purpose dams to be built in these regions to fulfill raw water and hydro-electric (hydropower) needs.

Saltwater crocodile *(Crocodylus porosus)*

Wetland areas throughout Timor-Leste contain a variety of unique water birds but none of these sites have proven to be large enough to support the number of birds required for consideration as an Important Bird Area (IBA). Lake Iralalaru in the eastern part of the country is relatively large (22 square kilometers) and constitutes a very interesting wetland ecosystem, which almost nothing is known about in scientific terms. There are reports of the wetland supporting crocodiles (probably Crocodylus porosus or saltwater crocodile), catfish, and a rich bird life (BirdLife International 2007).

Table 1. Area of watersheds in Timor-Leste

Watershed	Area (sq km)
Atauro	140.7
Jaco	11.1
Laclo	2,031.4
Loes	2,191.3
Clere & Belulic	1,923.16
Lifau & Tono Besi	814.4
Laleia	1,009.9
Vero	746.8
Tukan Sanen	1,379.8
Mola & Tafara	1,538.8
Seical	1,514.8
Irabere	1,619.6

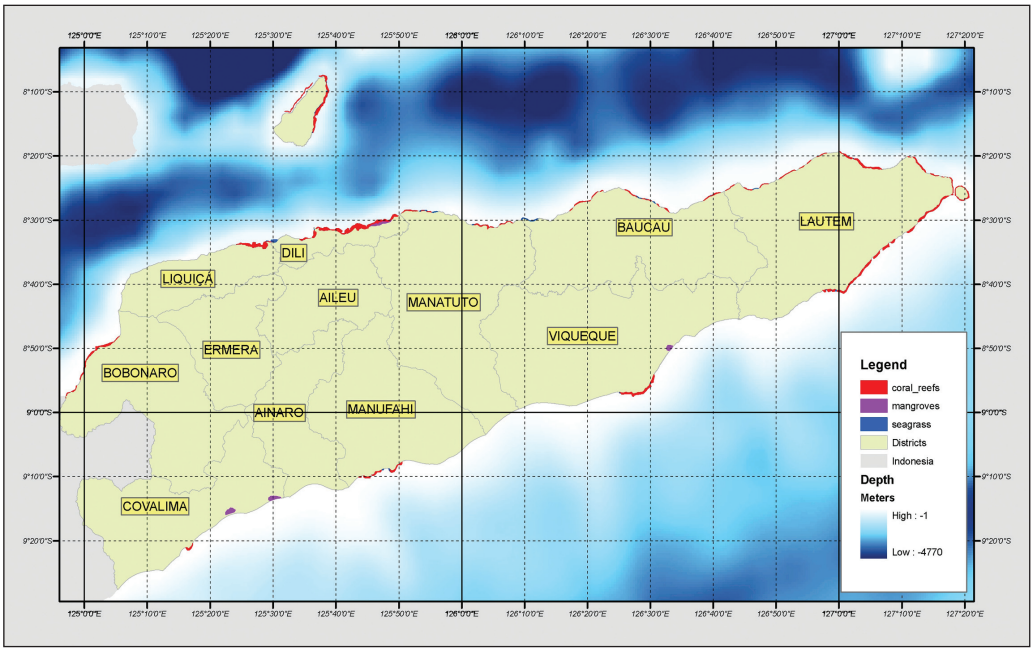
Source: MAF 2010

1.A.2 Coastal and Marine Ecosystems

Timor-Leste has a coastline approximately 747 kilometers in length, and a potential exclusive economic ocean zone (EEZ) of approximately 75,000 square kilometers (although the precise boundaries of this zone have not yet been determined).

The country has also been recognized as part of the Coral Triangle, a global center of marine biodiversity that is home to 76 percent of all known coral species, more than 3,000 species of reef fish, six of the seven turtle species, whale sharks, manta rays and a diversity of marine mammals such as 22 species of dolphin, and a variety of whale species.

There are also a number of endangered marine species, as shown in Table 2, which identifies these species found in Timor-Leste waters and their level of risk as determined under the Red List category for endangered species.



Map 6. Coastal outline and locations of mangroves, coral reefs and seagrasses in Timor-Leste.

Table 2: Endangered marine species and their level of risk in Timor-Leste

Taxonomic Name	Common Name	Category
Chelonia mydas	Green turtle	EN
Eretmochelys imbricata	Hawksbill turtle	**CR**
Demochelys coriacea	Leatherback turtle	**CR**
Carretta caretta	Loggerhead turtle	**CR**
Lepidochelys olivacea	Oliver turtle	**EN**
Dugong dugon	Dugong	**VU**
Physeter catodon	Sperm whale	**VU**
Turslops truncates	Bottlenose dolphin	**DD**
Rhincodon typus	Basking shark	**VU**
Tridacna derasa	Southern giant clam	**VU**

Source: Sandlund,et al. 2001
EN – Endangered, CR – Critically Endangered, VU – Vulnerable, DD – Data Deficient

1.A.2.a Coral Reefs

Fringing coral reefs form an almost continuous strip along the coastal waters of west and north Irian Jaya, Sulawesi, Maluku, Timor (Map 6), Bali, Mentawai, Belitung and the Lingga and Riau islands. The marine near-shore zone is characterized by a narrow reef flat (often <60 m wide but up to almost one kilometer) and is dominated by seagrass in shallower water. The north coast of Timor has very few coral reef, seagrass and mangrove habitats. This imposes strong limits on available marine resources and levels of harvest, particularly reef fisheries and mangroves. The small and few patches

of coral reef on the north coast of Timor-Leste impose strong limitations on available marine resources and levels of harvest, particularly in the case of reef fish.

The area of Nino Konis on the eastern tip of Timor-Leste has been promoted as a potential site of importance for coral reef conservation. Jaco Island is within the proposed area for conservation. The Island is covered with well-developed forest, and, according to traditional rules, all access is forbidden. Hence the island has not been exploited and there is no human population. The surrounding marine area has well established coral colonies that appear to be intact. Anecdotal evidence suggests that the passage of water, east and around Jaco Island, is a favored habitat for large pelagic fish caught by local fishers using spears.

1.A.2.b Mangroves

Total mangrove cover is small and confined mainly to the region between Tibar and Manatuto (Map 6). Recent coastal mapping funded by the MAF has revealed significant and ongoing coastal habitat loss, particularly in coastal mangroves. In addition, a survey of Timor-Leste has identified 24 key wetland sites that are environmentally significant and in need of conservation and resource management.

Mangrove forest along the road to Manatutu.

The loss of mangroves in Timor-Leste's coastal area is mainly due to trees harvested for timber and fuelwood. In some instances, hinterland mangroves have been removed for the establishment of brackish water shrimp and/or fish ponds. It is estimated that the total mangrove area has been reduced from 9,000 hectares in 1940 to 3,035 hectares in 2000 to just 1,802 hectares recorded in 2008. This equates to an 80 percent loss since 1940 (G. Boggs, *et al.* in ADB 2009).

Local stakeholders confirmed in the stakeholders' forum in May 2011 that mangroves and coastal habitats are "not in good condition".

I.A.2.c Fisheries

There may be a lack of reliable information on fisheries in Timor-Leste, but the Exclusive Economic Zone (EEZ) contains important commercial species especially to the south of the country. Timor-Leste does have an abundance of fish stocks, particularly inshore species, and this is directly related to the health of the supporting marine habitats. Offshore, there are demersal fish stocks and these too are in commercial quantities. Most of these stocks are shared with Australia and Indonesia.

There is a limited fishery on the north coast but the harvest was conducted from small boats or canoes with part-time labor. The level of subsistence fishing is determined in each area by available local fish abundance, local weather conditions and available equipment.

Local fishermen harvesting their day's catch.

Almost all fishing in Timor-Leste is subsistence or semi-subsistence and is commonly supplemented by other livelihoods in the agricultural sectors. Based on the NDFA census survey results, there were approximately 5,000 fisher households in 2004 with an estimated 10,000 people engaged in some level of marine resource capture. Of these, only 4 percent were full-time, with 96 percent stating that they were only part-time engaged in fishing and operated when the opportunity arose (Uniquest – ADB 2010).

It is estimated that the potential national average fish supply within Timor-Leste's EEZ is 4.4 kilograms per person per year. The actual average fish consumption is approximately 2.0 kilograms per person per year, which calculates a 45 percent utilization of current fish supply within the EEZ.

A wide range of tropical Indo-Pacific fishes can be found on sale in Dili, including a range of coral reef species such as groupers, snappers, emperors, parrot fishes, sweet lips, trevallies, wrasses, and mullets. Also landed are large pelagic species such as Spanish mackerel, yellow fin and skipjack tuna, small pelagics such as bullet tuna, Indian mackerel, flying fish and a range of scads. The supply of prawns is seasonal and only from localized areas due to the lack of estuaries and the extensive dry season. Small numbers of lobster are commonly seen and include mostly the painted crayfish *(Panulirus versicolor)* with smaller numbers of *P. pennicilatus* and *P. femoristriga* (Mission Report Fisheries 2005).

I.B Protected Areas System: Status and Trends

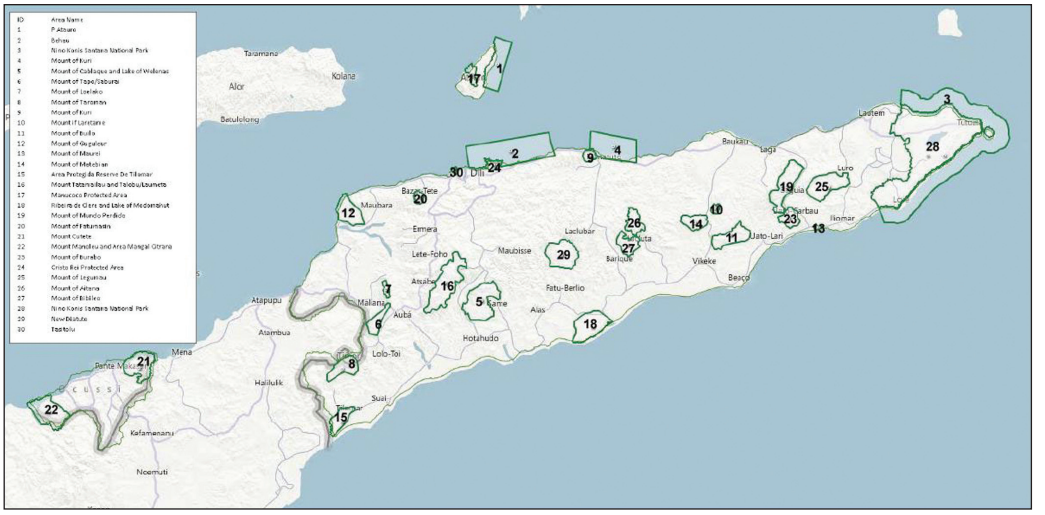
Protected Areas are sites identified because of their high national or international biological value and managed to protect natural and cultural values. In Timor-Leste, protected areas are seen as integral to the strategy to address fundamental priorities for sustainable management of the environment, natural resources and biological diversity, as guaranteed under the Constitution. The Government of Timor-Leste has declared 30 protected areas of which 15 are legislated and another 15 identified and will be put under legislation (DPANP, National Directorate of Forests, 2011). Its first national park is the Nino Konis Santana National Park that encompasses the easternmost tip of the country, including the Jaco Island Marine National Park, the Lake Iralalaru National Park, and the vicinity of Com.

Like other land management categories in Timor-Leste, the Protected Area Network will be under joint government and community-based management. Its new establishment provides an opportunity to apply best practices from the outset to deliver local and national benefits alongside conservation of biodiversity and natural heritage.

Nino Konis Santana National Park

The Park was declared in August 2008. Located in the Monte Paitchau-Iralalaru area, the Park covers 680 square kilometers and includes the best "undeveloped tropical evergreen forest in Timor Leste" (Grantham, et al. 2011). The forest is continuous, with primary and secondary drier tropical forests in the vicinity of Tutuala, Mehara, and Com (Trainor, etal. 2008). The Park also incorporates the Jaco Island, Lore Reserve, and the Tutuala Beach outlined in Regulation 2000/19. A marine section was added to the Park in 2007 (Grantham et al. 2011). Delineation of the boundaries is ongoing, as of this writing.

Regulation No. 2000/19 On Protected Places was passed by the UN Transitional Administration in East Timor (UNTAET) in 2000. It declared 15 'Protected Wild Areas' among other important conservation measures and was adopted by the new Government under the Constitution of Timor-Leste upon the transfer of administration from the UN when independence was restored in 2002. UNTAET (2000) provided generally defined boundaries for these areas via a series of low resolution maps. By 2007, much progress had been made in identifying candidate sites for protection, and in declaring the creation of the country's first national park, Nino Konis Santana National Park, at the country's eastern extremity. This includes a highly significant area of terrestrial and adjacent marine ecosystems.



Map 7. Location of the 15 legislated and 15 identified for legislation protected areas in Timor-Leste.

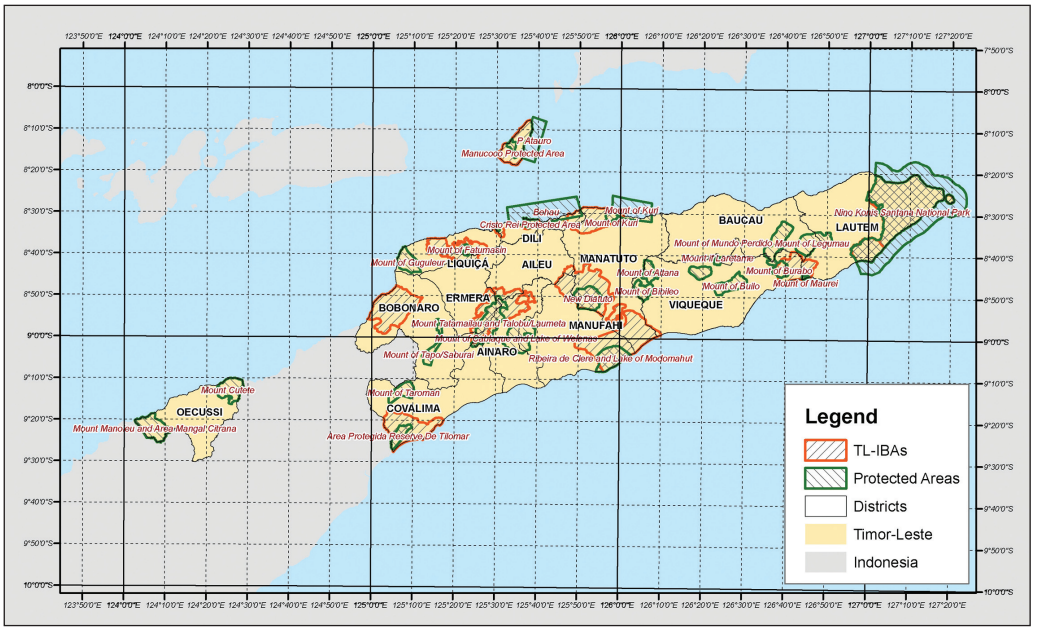
Currently, locations of the 15 legislated and 15 identified for legislation protected areas and 16 Important Bird Areas (IBAs), counting up to 261 identified bird species, have been implemented and legislated in Timor-Leste. These IBAs and protected areas are listed in Tables 3 and 4, respectively.

1. Atauro Island
2. Behau
3. Nino Konis Santana National Park (Marine)
4. Lamsanak
5. Mount Cablaque and Lake Welenas
6. Mount of Tapo / Saburai
7. Mount Loelako
8. Mount Taroman
9. Mount Kuri
10. Mount Laretami
11. Mount Builo
12. Mount Guguleur
13. Lake Maurei
14. Mount Matebian
15. Area Protegida Reserva De Tilomar
16. Mount Tatamailau and Talobu / Laumeta
17. Manucoco Protected Area
18. Ribeira De Clere and Lake Modomahut
19. Mount Mundo Perdido
20. Mount Fatumasin
21. Mount Cutete
22. Mount Manoleu and Area Mangal Citrana
23. Mount Burabo
24. Cristo Rei Protected Area
25. Mount Legumau
26. Mount Altana
27. Mount Bibileo
28. Nino Konis Santana National Park (Terrestrial)
29. Mount Diatuto
30. Tasitolu

The Important Bird Areas of Timor-Leste are:

Table 3. Important Bird Areas in Timor-Leste and Their Area Coverage

IBA No.	Site	Area (hectares)
1	Tilomar	22,708
2	Tata Mailau	30,372
3	Fatumasin	13,616
4	Atauro Island- Manucoco	14,118
5	Sungai Clere	42,266
6	Lore	10,906
7	Monte Paitchao and Lake Iralalaru	55,797
8	Jaco island	1,099
9	Mount Diatuto	34,462
10	Be Malae-Atabae	27,848
11	Maubara	5,292
12	Mount Mak Fahik and Mount Sarim	2,961
13	Tasitolu	1,540
14	Areia Branca Beach and Hinterland	2,994
15	Mount Curi	20,086
16	Irabere estuary and Tilomar forest	16,564



Map 8. Location of Important Bird Areas and Protected Areas (existing and proposed) in Timor-Leste.

The UNTAET had identified all these protected areas from 2000 to 2011 and now the Department of Protected Areas and National Parks (DPANP) put 15 legislated Protected Areas under the Regulation No.2000/19. Furthermore, all mangrove forests are specifically granted full protection from cutting, removal or other damage.

Table 4. Protected Areas in Timor-Leste and their Designation Status

Protected Area	Basic Designation	Observation	Stage
Area Protegida Reserva De Tilomar	Regulamento UNTAET 19/2000	Complete demarcation	Implemented
Diatuto and Lian Bau Protected Area	Regulamento UNTAET 19/2000	Preliminary survey was conducted; held consultation with the community	Implemented
Manucoco Protected Area	Regulamento UNTAET 19/2000	Preliminary survey was conducted; held consultation with the community	Implemented
Nino Konis Santana National Park	Resolusaun do Governo, no. 8/2008 Kria PNNKS, Regulamento UNTAET 19/2000	Declared August 1, 2008; includes Reserva de Lore, Jaco Island, and Tutuala	Implemented
Mount Matebian	Regulamento UNTAET 19/2000	Definitive	Implemented
Mount Mundo Perdido		Definitive	Implemented
Ribeira de Clere	Regulamento UNTAET 19/2000	Definitive	Implemented
Mount Fatumasin	Regulamento UNTAET 19/2000	Definitive	Implemented
Mount Cablaque	Regulamento UNTAET 19/2000	Definitive	Implemented
Mount Tatamailau	Regulamento UNTAET 19/2000	Definitive	Implemented
Cristo Rei PA	Regulamento UNTAET 19/2000	Definitive	Implemented
Talobu / Laumeta	Regulamento UNTAET 19/2000	Definitive	Implemented
Mount Cutete		Definitive	Implemented
Mount Manoleu		Definitive	Implemented
Area Mangal Citrana		Definitive	Implemented
Mount Tapo / Saburai		Definitive	Implemented

Protected Area	Basic Designation	Observation	Stage
Mount Taroman		Definitive	Implemented
Mount Kuri		Definitive	Implemented
Mount Lagumau		Definitive	Implemented
Mount Laretame		Definitive	Implemented
Mount Builo		Definitive	Implemented
Mount Guguleur		Definitive	Implemented
Mount Loelako		Definitive	Implemented
Mount Burabo		Definitive	Implemented
Lake Maurei		Definitive	Implemented
Mount Aitana		Definitive	Implemented
Mount Bibileo		Definitive	Implemented
Lake Modomahut		Definitive	Implemented
Lake Welenas		Definitive	Implemented

Source: Grantham, et al. 2011; DPANP, 2011

1.B.1 IUCN Red List Species for Timor-Leste

From the records of Cowie (2006), the following species are identified to be threatened species in Timor-Leste as categorized under the IUCN Red List of species:

- *Intsia bijuga* (IUCN Red List VU A1cd) – A scattered and reasonably common tree of primary semi-evergreen rain forest, moist deciduous forest and coastal forest; a major commercial timber species, which is the subject of illegal harvesting; occurred at low to moderate frequencies south of the main range from Tutuala to west of Lore (Santana 2005) but also at Malahara.
- *Pterocarpus indicus* (IUCN Red List VU A1d) – A major commercial timber species, which is subject to illegal harvesting. It occurred at low frequency on Jaco Island and near Lore and low to moderate frequencies south of the main range between Tutuala and Lore (Santana 2005).
- *Santalum album* (sandalwood) (IUCN Red List VU A1d) – A small evergreen, parasitic tree occasionally present in the dry deciduous forest near Iralalaru and in dry coastal forests near Lore. Illegal harvesting of this species is reported to be rife and the few individuals seen at Ira Lalaru had deep machete cuts in the trunk. This species is also listed as a threatened plant in Nusa Tenggara by Monk *et al.* (1997).
- *Dalbergia latifolia* (IUCN Red List VU A1cd) has been used in the Nino Komis Santana National Park. During the survey, this name was applied locally to a purple-flowered leguminous tree species found in the dry deciduous/thorn forest around limestone outcrops at Iralalaru and perhaps elsewhere. However, the specimen collected against this name appears to be *Millettia xylocarpa* (Fabaceae)

rather than a species of *Dalbergia.* From the limited available distributional information, it appears that *Dalbergia latifolia* may not occur in Timor at all.

1.B.2 Species that may be threatened

Again from Cowie (2006), the following species are likely to be threatened in Timor-Leste:

- *Antiaris toxicaria* – A deciduous tree common in the dry deciduous forest at Ira Malaro between Com and Mehara. This species is listed as a threatened plant of Indonesia by Monk, *et al.* (1997). Also recorded at low frequencies south of the main range in the Tutuala to Lore area (cited from Santana 2005).
- *Neoalsomitra podagrica* (provisional identification) – This peculiar Cucurbitaceous vine with a spiny, swollen base was common in dry deciduous forest at Ira Malaro between Com and Mehara. It is a limestone specialist species and is reported to be otherwise known only from West Timor, Semau, Alor and southwestern Sulawesi (cited from de Wilde & Duyfjes 2003).
- *Carallia brachiata* (Oi) – An occasional component of semi-evergreen rainforest and swamp forest but widespread in the region. This tree species is listed as a threatened plant of Indonesia by Monk, *et al.* (1997) (cited in Cowie 2006).
- *Cycas rumphii* – This taxon is listed by IUCN as Near Threatened and in decline and thus the remaining wild stands in conservation areas are particularly important. Cycads worldwide are recognized as being in decline through habitat destruction and over harvesting for horticulture. It is an occasional component of semi-evergreen forest in Malahara and moist deciduous rainforest near Lore. Also recorded occasionally south of the main range between Tutuala to Lore (Cited from Santana 2005).
- *Eleocharis geniculata* – According to Cowie 2006 cf van Steenis (1979), this is a rare sedge on the Lesser Sunda Islands and only found in Timor. It has been recorded as an occasional component of vegetation on the floodplain of Lake Iralalaru.

I.B.3 New plant species records for Timor

There are 22 species currently thought to be new literature records for the Island of Timor. The number of new records for Timor-Leste is not known, although few data on distribution and abundance are available. The fact that they have not been recorded previously suggests that some are likely to be rare or of restricted distribution on the island. Species cited below are from Cowie 2006, as cited from their respective authors:

- *Aglaonema marantifolia* (Araceae) - A common understorey herb in Malahara and also present in Lore. The genus has not previously been recorded for Timor and the species is otherwise known to occur from the Moluccas to New Guinea (Hay, *et al.* 1995).
- *Aglaia lancilimba or affin.* (Meliaceae) – A tree recorded in the semi-evergreen rainforest of Malahara. The species is known to occur from Bali to the Philippines but was not recorded from Timor (Pannell 1992).
- *Alchornea rugosa* (Euphorbiaceae) – An occasional shrub recorded as an understorey in dry deciduous forest at Iralalaru. Occurs naturally from the Nicobar Islands to Northern Australia, but not previously recorded from Timor (Airy Shaw 1982).

- *Alstonia actinophylla* (Apocynaceae) – A corky barked tree with milky sap, which occurs in the dry deciduous forest and thorn forest in Iralalaru, otherwise known from the Moluccas, New Guinea and northern Australia (Forster, P. 2006 pers. comm.). Although the name A. microphylla has been used locally for this species, the name appears to be not validly published according to the International Code of Botanical Nomenclature.
- *Baumea rubiginosa* (Cyperaceae) – A robust perennial sedge common in the floodplain sedge/grassland around Lake Iralalaru. A polymorphic species otherwise known from Sri Lanka to New Zealand but previously thought to be absent from Timor (Kern 1974).
- *Colocasia gigantea* (Araceae) – An occasional understorey herb in the primary forest of Malahara and in the swamp forest of Bauro. The species has not previously been recorded for the Lesser Sunda Islands or Timor but is known from Java and the Malay Peninsula (Hay, *et al.* 1995).
- *Crateva religiosa* (Capparaceae) – This tree species was recorded from the swamp forest in Bauro. It also occurs from India to Northern Australia, typically in periodically inundated forest communities. In some countries, the species is of spiritual significance and is planted around temples. Not recorded from Timor by Jacobs (1960).
- *Dendrophthoe curvata* (Loranthaceae) (provisional identification) – A mistletoe species recorded from secondary forest on the upper lake margin. Widespread from Sumatra to Northern Australia but previously thought to be absent from the Lesser Sunda Islands (Barlow 1997).
- *Dimocarpus longan* ssp. *malesiana* (Sapindaceae) – The wild progenitor of the cultivated longan and widespread in the Malesian region (Adema, *et al.* 1994). Recorded from the semi-evergreen rainforest as an occasional component.
- *Euroschinus falcata* (Anacardiaceae) – This genus was previously thought to be restricted to Australia, New Caledonia and New Guinea and the species restricted to Australia (Ding Hou 1978). One tree was recorded in the dry deciduous forest in Ira Malaro and it appears to be a rare species in the area.
- *Ficus microcarpa* (Moraceae) – A fig species found from Sri Lanka to North Australia but not apparently recorded from Timor previously (Berg & Corner 2005). Occurs in swamp forest in Bauro and dry deciduous forest in Ira Malaro. Previously confused with *F. benjamina* in the field.
- *Ficus gul* (Moraceae) – A fig species known from Flores and Borneo to Solomon Islands but not apparently recorded from Timor previously (Berg & Corner 2005). Recorded from primary semi evergreen forest in Malahara and from the dry deciduous forest in Ira Malaro.
- *Haplolobus floribundus* (Burseraceae) (provisional id). – This genus has not been recorded in the literature from Timor (Leenhouts 1956, 1972). The species was provisionally recorded by Whistler (2001) but apparently without collecting a voucher specimen for checking. No fertile material was seen during the current survey so positive identification remains problematic but from Leehouts (1972), *H. floribundus* subsp. *moluccanus* appears most likely. Common in semi evergreen forest in Malahara and in moist deciduous forest in Lore.
- *Homalomena* sp. (Araceae) – A common understorey herb in Lore. The genus

has not previously been recorded for the Lesser Sunda Islands or Timor but is widespread in the Malesian region (Hay *et al.* 1995).

- *Horsfieldia* sp. (Myristicaceae) – A tree of the nutmeg family and an occasional component of the moist deciduous forest at Lore. The genus has not previously been recorded for Timor (de Wilde 2000).
- *Hypoxis aurea* (Liliaceae) – A small perennial herb with yellow flowers produced at ground level. This species was found on the edge of the teak plantation adjoining grasslands in Lore. The collection made represents the first record of the genus from Timor (Geerinck 1993). The population occurred over an area of c. 0.5 hectares, although non- flowering plants are difficult to distinguish from sterile grasses and it is thus difficult to survey.

The natural vegetation of the Jaco-Tutuala-Lore National Park is dominated by closed forest communities, with the exception of vegetation associated with Lake Iralalaru and its floodplain and some small areas of palm savanna, grassland and shrubland along the coast. The intact vegetation of the Park includes an entire altitudinal/edaphic/climatic continuum from sea level to the crest of the Paitxau range, an extended rainfall gradient receiving over 2000 millimeters (ever wet) at one end and probably less than 1000millimeters (strongly seasonal) at the other end, and a drainage gradient from well-drained to permanently flooded. As a consequence, a broad range of closed forest and other plant communities are represented with many of the links between different communities and organisms still intact (Cowie 2006).

1.C Current Conservation Status of Timor-Leste's Biodiversity

Recent terrestrial surveys identified new species of bats, frogs, geckos and skinks. However, most of the identified mammal, frog, and reptile fauna are dominated by Asian families and species.A large number of endemic species including 1,500 plants, 262 birds, 127 mammals, 33 frogs, 99 reptiles and 50 freshwater fish, mainly live in habitats such as tall evergreen forests, semi-deciduous and tropical dry forests, montane forests, beach forests and coastal strand areas, savannas and woodlands (e.g. acacia, eucalyptus).

In a validation of information for the 4NR (May 2011), the local stakeholders shared and validated the following biodiversity information for Timor-Leste:

- Dugongs are still present in the waters of Timor-Leste but they are already in low populations;
- Sea turtles are still plenty but are threatened;
- Whales are not threatened but they are also eaten when opportunities arise such as when they are also caught in fishing gears;
- Crabs are illegally harvested but not to extinction in localities such as Lore, Lospalos and Tutuala;
- Giant clams are threatened but they are still present in Timor-Leste; however, they are being used as decorations and pottery;
- Saltwater crocodiles are not threatened; in fact, their population is expanding.

A recent marine megafauna survey in Timor-Leste's waters, completed in November 2008 in collaboration with the Australian Institute of Marine Science (AIMS), the Government of Timor-Leste through the MAF and the Department of Natural Resources, Environment, The Arts and Sport (NRETAS), has revealed over 1,000 marine megafauna species existing in surrounding waters.

Table 5 shows 16 species (marine and terrestrial) that are classified as protected, and hence their capture is outlawed.

Table 5. Protected marine and terrestrial species of Timor-Leste.

Artigo 2.°
(Capturas proíbidas)

1. A captura ou a apanha das seguintes espécies está proíbida em qualquer altura do ano:

NOME			OBSERVAÇÃO
PORTUGUÊS/LOCAL	INGLÊS	CIENTÍFICO	
Niru baliun	Double-Headed Maori wrasse	*Cheilinus Undulatus Rippel*	
Toninho	Dolphin	*Aduncus spp.*	Todas as espécies
Baleia	Whale		Todas as espécies
Tartaruga	Turtie	*Eretmochelys spp.*	Todas as espécies
Dugong/Dujung	Engsel	*Dugong spp.*	Todas as espécies
Ostra de pérola/Sipu ostra (Mutiara)	Pearl oyster	*Pinctada maxima*	
Concha gigantez/Sipu kima	Giant Clam	*Tridacna gigas*	
Concha Grande/Sipu bot	Small Giant Clam	*Tridacna maxima*	
Concha/Sipu Kuda Ain	Horse hof	*Hippopus hippopus*	
Concha Espinhosa/Sipu Tarak	Scaly Clam	*Tridacna squamosa*	
Concha do sul/Sipu Sul	Southern Giant Clam	*Tridacna derasa*	
Concha açafrão	Saffron Colored Giant Clam	*Tridacna crocoa*	
Foca de juba/Leão marinho	Sea Lion		Todas as espécies
Foca	Seal		Todas as espécies
Crocodilo/Lafaek	Crocodile		Todas as espécies
Corais/Ahu Ruin	Coral		Todas as espécies

Diploma Ministerial No.04/115/GM/IV/2005 : Lista das espécies aquáticas protegidas.

1.D Major Threats, Risks and Challenges

1.D.1 Terrestrial Ecosystems

1.D.1.a Forest and Mountain Ecosystems

Deforestation. From 1989 to 1999, extensive deforestation in the forms of illegal logging, forest fires, grazing of livestock and conversion to agricultural uses, resulted in a significant reduction in forest cover in all Timor-Leste's districts. Depletion of the country's forests continues to take place in varying degrees across the island, with only small pockets of dense primary forest remaining around traditionally important sacred areas. According to Sandlund (cited in NEGA 2010), only 6 percent is believed to remain of Timor-Leste's primary forest. These forest patches offer the last few natural stands of *Eucalyptus urophylla* and *Santalum album* (sandalwood) (NEGA 2010). Ebony, sandalwood, and teak trees have been almost completely eliminated (Westerberg, 2000); yet illegal logging of these species continues and is smuggled across the border into West Timor. During the Indonesian occupation of East Timor, not only was timber harvested for sale, but the Indonesian military frequently burned the forest to remove any cover that could protect guerrillas.

Timor-Leste is suffering from massive forest loss due to use of fuelwood as the main source of energy for cooking. Most of the population use wood as solid fuel and less than 2 percent use gas/LPG and electricity. In urban areas, only 3 percent

use gas/LPG and 5 percent, other fuel (FRA 2005/218). Aside from cutting of big diameter trees, wood is gathered for fuelwood. JICA study (2002) estimated that about 93 percent of household energy requirements for cooking are supplied through fuelwood. The average annual fuelwood consumption is estimated to be about 1.3 million cubic meters or 7.3 cubic meters per household. In rural areas, however, forestry activities that provide cash income and that the community members are mostly engaged in include fuelwood gathering, hunting, collection of palm wine, production of palm stem panel for house walling, collection of palm leaves for house roofing, harvesting of rattan and bamboo, thinning, nursery operations and gathering of honey.

Degradation. The natural resource base in Timor-Leste is fragile, depleted and continues to be unsustainably exploited. Two identified disturbances affecting health and vitality of forest in Timor-Leste include fires and diseases. Forest fires occur mainly due to activities such as slash-and-burn farming, burning of pastureland for livestock grazing, fuelwood gathering and hunting. Forest fires normally happen in dry forest areas dominated by grasses, *Eucalyptus alba,* bamboo, *Casuarina equisitifolia* and *Tectona grandis.* A total of 60,301 hectares have been damaged by fire in 1994 alone. Soil depletion in upland areas is heavy and slash-and-burn farming is still widespread, further jeopardizing already low levels of agricultural production and productivity. Likewise, a disease identified as gall rust is affecting the *Paraserianthes falcataria* planted as shade for coffee (FRA 2005/218).

Climate change is impacting on the country in terms of erratic rainfall, floods and drought (Timor-Leste CPAP 2009-2013).

New land-use plans and spatial zonation have not been completed. Land-use designation prior to 1999 included five major categories: parks/reserves, watershed protection forest, production forest, convertible forest, and non-forest land. Most areas of these lands were designated as convertible forest, meaning the forest cover could be removed and replaced by crops or plantations (FAA 118/119 Report, June 2004).

1.D.1.b Agricultural Ecosystems

Subsistence agriculture is the main source of livelihood, with up to 90 percent of Timorese dependent on natural resources since the Indonesian occupation forced the people to the hills. The rural terrain and surfaces, which are prone to flooding, soil erosion, and droughts, further aggravates the situation. The intricate linkage between poverty and environment is therefore crucial to development in Timor-Leste. With a rapidly growing population, the challenge for sustainable development in Timor-Leste is becoming increasingly difficult.

Agricultural productivity is very low and suffers from insufficient diversification. As a result, underemployment in rural areas is high and incomes are very low, forcing people to migrate to cities or continue to live in poverty. Agricultural incomes remained stagnant since 2002. Non-farm rural employment opportunities are practically non-existent, except when there is demand for labor for the construction of roads and bridges, which is rare or none at all. Lack of rural infrastructure (irrigation, markets, extension, roads, energy, and rural credit) further contributes to low agricultural productivity and high rural poverty. Recurrent natural disasters and social unrest also take their toll in terms of loss of agricultural production (CPAP Timor-Leste, 2009-2013).

Upland agriculture faces additional challenges in the form of 'slash and burn' methods and loss of soil during heavy rains.

Lack of good crop varieties is one of the identified constraints to crop production in Timor-Leste. The major food crop yields are constrained by a number of other technological factors. Crops suffer from water shortages, high weed populations that reduce crop yield potential and low soil fertility. Storage of seed and grain is another problem identified (Annual Research Report, SoL 2009).

Non-availability of adequate land for cultivation puts pressure on forests as people cut down trees to meet their needs for arable land and fuelwood. As a young country, Timor-Leste has yet to expand its export base especially in the agriculture sector.

1.D.1.c Protected Areas

Threats to protected areas are almost the same as those experienced in the terrestrial and marine areas. In addition, coordination among government institutions concerned in natural resources management is loose at best. Fire protection in protected areas also is the concern of the environment sector but the coordination in the two sectors to fight fire remains a challenge.

The management system for protected areas is still inadequate despite the availability of the IUCN management guidelines. For instance, only a manager and six community forest guards are in charge of protecting and managing the recently opened Nino Konis Santana National Park. Lack of trained personnel to manage the protected areas is severe and the financial resources that accompany management is also lacking. Sharing of information among and between agencies, from local to international institutions and from international consultants is also inadequate.

One of the lakes of Timor-Leste.

Another challenge to protected area management is still the lack of laws and regulations. Current laws and regulations are inadequate to address the many problems and challenges in protected area management.

1.D.2. Wetland and Freshwater Ecosystems

Generally, the whole of Timor-Leste dries up during the dry months, causing a water crisis for irrigation and clean water. This happens especially in the southern coastal areas in the Betano Region and the northern coast of the Tutuala Region.

On the other hand, the impact of flooding is another challenge to be addressed. Flood control management strategies have to be thoroughly considered (SDP 2010).

River sedimentation is a problem in many areas of the country. The collection of sand and stones in riverbeds contribute to the sedimentation of the rivers and streams that ultimately affects water quality and kills river organisms such as fish, shrimps and eels. Other factors affecting the rivers and threatening the aquatic species include discharging of sewage and disposal of solid wastes into the waterways. Non-sustainable fishing methods have been cited also as threats to the aquatic ecosystem (NBSAP Report 2011).

Demand for clean water, irrigation water, and power will gradually increase in proportion to the increase in human population and economic growth of Timor-Leste. This demand necessitates the urgency to tap into the country's water potentials in an optimal way to fulfill society's needs and for ecosystem balance. The use of water resources is not being optimized as the irrigation system and the reservoirs are not functional. Water exploitation for power generation has yet to be fully developed. There are only a few micro-hydro power plants, one of which is the micro-hydro power plant in Gariuai that has a capacity of 325 kilowatts. However efforts are currently being undertaken in collaboration with IUCN to establish a Protected Areas Decree Law.

1.D.3 Marine Ecosystems

1.D.3.a Coastal and Marine Ecosystems

Overfishing. Overfishing remains to be a major threat. Currently, the maximum sustainable yields for fisheries are unknown, thus overfishing may occur if the sector is not regulated. Fishermen go beyond their capacity for catching fish and sometimes hand over their fishing concessions to outside fishers (Grantham, et al. 2011). This concern was identified during the perception mapping workshop held in May 2011, but was contested by the Department of Fisheries personnel during one of the consultations.

Conversion to other land uses. Coastal areas, in which the mangroves are found, are ideal for settlements because these areas are flat, well-drained, and relatively open and provide good access to the sea. These areas are commonly used for houses, gardens and grazing of goats, buffalo and banteng. Hence, the vegetation in these areas has been extensively modified throughout the region. Although many of the species in these areas are widespread strand species in the Indo-Pacific wet tropics, this vegetation type is subject to high human pressure and is widely converted (Cowie 2006).

In Dili, Manatutu, Liquica, Baucau, Los Palos, Bobonaro, Suai, and Same, the mangroves are threatened with deforestation from illegal cutting for house construction and for fishing boat building. Furthermore, in Manatutu, the mangroves are being

Coastal zone in Manatutu.

deforested for fuelwood to support the salt-making livelihood of the locals (NBSAP 2011).

1.D.3.b Marine Protected Areas

Pollution. Corals are being threatened with pollution and destructive means of fishing. Coastal resources in the localities of Behau, Tasitolu, Com, Baucau, Cristo Rei, Jaco Island and Metinaro are also threatened with the same factors. Solid wastes being thrown into river systems find their way into the coast and eventually pollute the coral ecosystems.

1.D.4 Cross-cutting threats and challenges in Terrestrial and Marine Ecosystems

1.D.4.a Poaching / Hunting

Poaching and/or hunting of wildlife in terrestrial and marine environments are a big threat to biodiversity. While there have been efforts to protect threatened species through Regulation 2000/19, enforcement of the regulation has been inadequate (NEGA 2010).

Sea turtles are threatened with overharvesting for their eggs, skin and meat and their carapace for handicrafts in at least 11 districts in Timor-Leste. Other species being threatened by overharvesting are the mollusks, which are being collected for making handicrafts and for human consumption.

1. D.4.b Invasive Alien Species

According to Trainor (2010), about 18 of the 52 mammals in Timor-Leste are introduced. However, the impact of these introduced mammals to the ecosystems and

biodiversity of the country is not clearly understood. These mammals are thought to have accelerated the decline of some of the endemic fauna, through predation, competition, introduction of new diseases and/or consequential habitat change that eventually deprive the ecosystem from providing the goods and services that are needed for human well-being. Among these mammals are the common spotted cuscus *(Phalanger orientalis)*, long-tailed macaque *(Macaca fascicularis)*, common palm civet *(Paradoxurus hermaphroditus)*, Eurasian wild pig *(Sus scrofa)*, Rusa deer *(Cervus timorensis)*, house mouse *(Mus musculus)*, house rat *(Rattus tanezumi)*, brown rat *(Rattus norvegicus)*, Polynesian rat *(Rattus exulans)* and house shrew *(Suncus murinus)*.

The giant cane toad, which was introduced in Timor-Leste by hitching a ride on vehicles of peace-keeping forces, has become established in the country as an invasive alien species.
Source: Alcala, A. C. (1957). "Philippine notes on the ecology of the giant marine toad". Silliman Journal 4 (2).

***Jatropha gossypifolia* is another invasive alien species able to thrive in almost soil-less conditions.**

The giant cane toad *(Bufo marinus)* was introduced into the country from Northern Australia, hitching a ride on vehicles and ships that transported the Australian Peace Keeping Force to Dili, Timor-Leste, in 2006. At present, this frog species is thought to have spread to several districts of the country (Sun Herald, 2006) and may have already displaced the native amphibians (The database of the Global Invasive Species Program, *accessed at http://www.issg.org on 7-July 2011,* lists several invasive species found in Timor-Leste.

Other invasive alien species not included in this database but are recognized as such by Charles Darwin University researchers in Timor-Leste are the following*: Jatropha gossypifolia, Sida acuta, Lantana camara, Tithonia diversifolia, Parkinsonia* sp. *(Palo Verde), Prosopis pallida (Mesquite), and Ziziphus mauritiana (fam: Rhamnaceae). J. gossypifolia* has invaded many open areas that are deemed "marginal" or unable to support any vegetation such as rockslides, gravel landscapes, road banks, and other inhospitable areas. This may be a positive thing since the Jatropha, as a pioneer species, is leading the way for ecological succession of the areas where they have become established.

The main concerns of the researchers, however, are those that impact on the livelihoods of the population especially the farming community. So far, the

researchers have introduced the stem gall fly *(Cecidochares connexa)* as a bio-control agent of *C. odorata.* This bio-control agent has stunted and reduced the height of the weed especially in the Baucau Airport area. The stem gall fly is now widespread in the country but it is affected by the dry season fires.

A psyllid (like a plant hopper) was introduced to control the leguminoidae *(Mimosa diplotricha).* The psyllids were established in a few sites but the efficacy of the insects has yet to be assessed.

In the localities of Maliana, Liquica, Baucau, Ainaro/Maubisse, Manatutu, Bobonaro and Viqueque where the main crops are rice, maize, cassava, coconut, potato, buffalo, and cabbage, the infestation of pests (like locusts) and diseases (like the *Fusarium* sp disease of potato) and other invasive species (like *Chromolaena odorata*) has caused low production. Other issues in the localities include low soil fertility, slash-and-burn farming, post-harvest rot / decay and the threat of extinction of local rice varieties.

A papaya mealy bug has newly arrived in the country especially around the Dili area. This has spread quickly around the City due to its multi-host characteristics that often infests ornamental plants and other crop plants. It is considered as "quite damaging".

CHAPTER 2

CHAPTER 2

CURRENT STATUS OF NATIONAL BIODIVERSITY STRATEGIES AND ACTION PLANS

As a Party to the Convention on Biological Diversity (CBD), Timor-Leste has undertaken a national process to develop the NBSAP by involving all sectors of the country to achieve the objectives of the Convention. With funding support from the Global Environment Facility (GEF) through the United Nations Development Programme (UNDP)-Timor-Leste, the Ministry of Economy and Development (MED) has embarked on a year-long NBSAP process commencing in November 2010 until October 2011.

The NBSAP was developed in parallel with the Fourth National Report (4NR) to the CBD. Thus, the consultation process in developing the two documents was jointly undertaken. A three-stage process was followed leading up to the Final Draft of the two reports as of end of October 2011: Stage 1 - Stocktaking and Review of Available Information and Documents; Stage 2 – Stakeholders Consultations and Focus Group Discussions; and (3) Stage 3 - Writing and Revalidation.

Stage 1 - Stocktaking and Review of Available Information and Documents

Available information on the biodiversity of Timor-Leste was compiled from various sources such as reports from national agencies, globally available datasets, academic institutions, and research results. The NBSAP and 4NR teams have collected and reviewed all available information. The UNDP and the concerned agencies in Timor-Leste also made available relevant documents for the NBSAP and the 4NR. As these are housed in various formats and repositories, there was a need to acquire, consolidate and prioritize the information. Based on relevant information synthesized from various reports, the first draft of the NBSAP and the 4NR were prepared for the next stage, the stakeholders consultation process. Appendix 2 of the 4NR provides a list of Sources of Information. A list of References was also provided in the NBSAP document.

Stage 2 - Stakeholders Consultations and Focus Group Discussions

The consultation process for the NBSAP and the 4NR comprised a National Stakeholders Consultation Workshop (31 March–01 April 2011); Community Interviews (April 2011); Focus Group Discussions (May 2011); Meetings of the National Biodiversity Working Group (April, May and July 2011); and a High-Level Biodiversity Policy Dialogue (21 July 2011).

(1) Stakeholders Consultation Workshop, 31 March - 01 April 2011, Dili, Timor-Leste
This workshop was one of the key activities that engaged stakeholders in the NBSAP development process and was attended by over 100 representatives from various sectors and institutions (government, academe, media, NGOs and community groups). A Perception Mapping Methodology was used in the Consultation Workshop to augment secondary data collected and generate additional information on the biodiversity resources of Timor-Leste. The Perception Mapping exercise covered six workshop sessions: (Workshop I) – Resources, Resource Uses, Threats Assessment and Threatened Species; (Workshop II) – Stakeholder Analysis and Issues Identification; (Workshop III) – Potential Livelihoods; (Workshop IV) – NBSAP Strategy; (Workshop V)

– Capacity Assessment and (Workshop VI) – NBSAP Working Group. Each Workshop Group was further subdivided into 5 Ecosystems Groups, following the CBD ecosystems areas: (Group 1) Inland Waters Ecosystems; (Group 2) Marine and Coastal Ecosystems; (Group 3) Mountain and Forests Ecosystems; (Group 4) Agricultural Ecosystems; and (Group 5) Grasslands Ecosystems. The participatory process generated a wealth of useful information in the 5 workshop areas and the 5 ecosystem subgroups.

The "Report of NBSAP Consultation Workshop: Integrated Workshop Output using a Perception Mapping Methodology" was prepared as a separate stand-alone document. This Report provides detailed matrices and maps following the five ecosystems groups for the perception mapping exercise, depicting the biodiversity resources, threats, stakeholders analysis, potential livelihoods and detailed description of problems and issues on biodiversity. This was used as basis for the NBSAP priority actions and targets and maybe useful for future identification of specific activities in various localities identified in the Report.

In addition, a National Biodiversity Working Group (NBWG) was organized at this workshop to ensure stakeholder participation and national ownership of the development process leading to the preparation of the NBSAP.

(2) Biodiversity Policy Dialogue, 21 July 2011, Dili, Timor-Leste

The Biodiversity Policy Dialogue was conducted on 21 July 2011 with the joint leadership of the MED, Senor Joao Mendes Goncalves and UNDP Country Director, Ms. Mikiko Tanaka. The presence of the Minister and his interventions and statement provided a good signal for the NBSAP ownership of the Government of Timor-Leste. Mr. Augusto Pinto, CBD Focal Point presented the NBSAP Priorities. Mr. Manuel Mendes made a presentation of the importance of CHM, which served as soft launch of the draft Timor-Leste-CHM (http://bim.aseanbiodiversity.org/tlchm/). Mr. Mendez used the offline version of the draft CHM web in his presentation (mainly in Portuguese and Tetun).

About 30 participants from various ministries attended the Biodiversity Policy Dialogue where substantive discussions on biodiversity issues ensued. The recognition by the Minister of the NBSAP process and the key elements of the strategy signals a new sense of support and ownership on the emerging national policy strategy on biodiversity. The Minister was very appreciative of the consultation process being undertaken with support from UNDP and the Timor-Leste Biodiversity Working Group for updating him on the NBSAP and the CHM. He further shared that some new legislations such as the Basic Environmental Law and the Biodiversity Conservation Law will be approved in the near future by the Council of Ministers.

(3) Focus Group Discussions, 21-22 May 2011, Liquica and Manatuto Districts, Timor-Leste

Two community consultations using a Focus Group Discussion or FGD approach were conducted in May 2011 to verify information from secondary sources such as the global datasets and other documents obtained from various institutions and sources in Timor-Leste. One of the FGDs was conducted in the upland village of Lirahe Protected Area in Aldeia Metir, Fatumasi, Liquica and the

other one was in the village adjacent to the Lamsanak Marine Protected Area in Manatuto. This process has generated and validated information on resource management in a representative terrestrial and a marine protected area. Field validation of data was further undertaken (23-24 July 2011) in and around the Nino Konis Santana National Park at the easternmost part of the country. Different ecosystems were located using a portable GPS and photo-documented. Of particular interest was the Lake Iralalaru, the largest lake in the country. Mangroves and a saltwater lake were also visited and photo-documented.

Stage 3 - Writing and Validation

Data Validation

The NBWG was engaged to participate in the review and further iterations of the NBSAP and the 4NR to provide comments and suggestions and improve its substance. From the Stakeholders' Consultation, the document was again revised to include the results. One-on-one meetings were also held with the Ministry of Agriculture and Fisheries (both the Forestry and Fisheries Directorates) and the MED (Environment and International Affairs Directorates) for more in-depth discussions and data analysis.

Individual consultations were also made with other government agencies (e.g., Tourism Directorate) and focal points (e.g., GEF Focal Point), business groups, NGOs and the media to ensure the accuracy of the NBSAP especially in prioritizing activities for the period 2011-2020. This process has ensured that the activities identified by the stakeholders are also in line with the government plans and targets and the concerns of other major groups.

The drafts of the NBSAP and the 4NR were prepared and circulated among NBWG members, UNDP and other stakeholders. Comments and additional information were received (August-September 2011) and were incorporated in the revised Final Drafts of the NBSAP and the 4NR documents that were completed by the end of October 2011. The Council of Ministers of Timor-Leste will review and finally approve or endorse the NBSAP and the 4NR to the CBD.

The Final Draft NBSAP, October 2011

The NBSAP (2010-2020) provides a vision and a strategy for Timor-Leste to conserve and wisely use its biodiversity to provide for food security, contribute to poverty eradication and improve the quality of life of Timorese people. It identified 5 priority strategies, 5 priority targets and 21 strategic actions to be undertaken for the period 2010-2020. Fifteen (15) out of the 21 strategic actions are considered high priority (as outlined in Chapter 2 of the NBSAP) and must be initiated in the short-term period (2011-2015). A more detailed set of activities is provided in Annex 3 of the NBSAP, and serves as a menu or checklist of other activities identified by stakeholders. These activities correspond to the global set of targets under the CBD Strategic Action Plan and the Aichi Targets approved at the Tenth Conference of Parties (COP-10) to the CBD held in Nagoya, Japan in October 2010.

The NBSAP covers four chapters: (1) the context describing the wealth and threats to biodiversity; (2) the strategy defining the vision and priority strategies, priority targets and actions; (3) the action plan, specifying the broader set of actions

with timelines, both immediate and long-term, and includes Timor-Leste's Plan for Capacity Development on Biodiversity; and (4) the implementation plan, including the coordinating mechanism and monitoring system. The Implementation Plan features also the Communication, Education and Public Awareness (CEPA) Strategy to systematically promote the values of biodiversity and the Clearing House Mechanism (CHM). The CHM serves as a web-based platform for biodiversity information, knowledge sharing and networking of stakeholders on biodiversity.

The Final Draft 4NR, October 2011

The 4NR to the CBD presents Timor-Leste's progress and capacity needs to achieve the CBD Targets. The assessment was made in relation to the 2010 Biodiversity target as required by the CBD Secretariat. The 4NR provides baseline information on past and ongoing efforts on biodiversity that may serve as basis for future reporting to the CBD and to the Council of Ministers of Timor-Leste as well as to concerned national agencies (MED, MAF, and others) for their internal planning and monitoring (Please refer to Appendix IV). The 4NR is divided into four chapters: (1) Overview of Biodiversity Status, Trends and Threats; (2) Current Status of NBSAP; (3) Mainstreaming of Biodiversity Considerations and Sectoral and Cross-Sectoral Integration; and (4) Conclusions: Progress Towards the 2010 Biodiversity Target.

Relevant Activities Prior to the NBSAP

Since 2007, upon Timor-Leste's ratification of the CBD, the concerned ministries have been implementing activities related to the 2010 Targets. There have been some grounds gained in the implementation of the 2010 Biodiversity Targets. These are discussed in detail in Chapter IV. These activities include the establishment of protected areas, legislation that relate to biodiversity conservation, assessment of biological resources, and development of national targets.

Biodiversity Targets and Indicators and Biodiversity Assessment Reports

Biodiversity targets and indicators were, to some extent, developed under the following initiatives/national assessment report and plan: Coral Triangle Initiative on Coral Reefs and Fisheries, particularly in the Regional and National Plan of Actions (RPOA and NPOA); the National Ecological Gap Analysis (NEGA), and the Strategic Development Plan (SDP). These are discussed in other chapters within this report.

Biodiversity assessment activities have been ongoing even prior to the ratification of the CBD in 2007. The Important Biodiversity Areas (IBA) survey was done by BirdLife International. The bird and faunal assessment expeditions were done by Colin Trainor and other scientists who contributed to the assessment of biodiversity of Timor-Leste. The IBA Report has identified areas of high biodiversity.

Protected Area Establishment

There are 30 protected areas already identified as of July 2011. The biggest declared protected area in Timor-Leste is the Nino Konis Santana Protected Area, which emcompasses 3 contiguous protected areas. (See Chapter 1 of this Report).

Enacting legislations, policies, institutional and cooperation agreements

Prior to the independence of Timor-Leste, there were already laws governing the management of biodiversity. Indonesian laws were adopted by the government and still apply at present. New laws have been enacted during the UNMIT and these are all discussed in Chapter III.

Timor-Leste has been involved with many of the multi-lateral and bilateral agreements and organizations related to biodiversity being implemented in the region. Such agreements/organizations include the Coral Triangle Initiative, PEMSEA and ATSEA Regional Programmes, the ASEAN (as observer country), apart from the other conventions such as the UNCCD, UNFCCC and other MEA.

Programme of Work on Protected Areas (PoWPA)

Parallel to the development of the NBSAP and the 4NR, Timor-Leste is also developing the PoWPA. Under the PoWPA Project, the NEGA Report was prepared including the Strategic Action Plan (SAP) and the Capacity Building Plan on PoWPA (work in progress as of July 2011). The NEGA contains much of the information included in this 4NR. (See Chapter 1). It describes the status of biodiversity, the bio-physical state of the country, and the recommendations and targets for the conservation and management of the country's biodiversity.

CHAPTER 3

CHAPTER 3

MAINSTREAMING OF BIODIVERSITY CONSIDERATIONS AND SECTORAL AND CROSS-SECTORAL INTEGRATION

Mainstreaming biodiversity involves integrating biodiversity into national and local decision-making. Since 2002, Timor-Leste has implemented several initiatives to conserve biodiversity. These activities include the establishment of protected areas, developing environment policies and setting-up institutions that support conservation of biodiversity and natural resources. But these have been inadequate and Timor-Leste continues to face challenges to improve its capacities both at the policy and institutional levels, including human capacity to protect its biodiversity and improve human welfare.

In fulfilling its obligation to the CBD, the Government of Timor-Leste has undertaken a national process to develop the NBSAP by involving all sectors of the country to achieve the objectives of the Convention. The NBSAP was completed in October 2011 in parallel to the preparation of Timor-Leste's 4NR to the CBD.

Prior to the development of the NBSAP, biodiversity has been mainstreamed in the Strategic Development Plan (SDP) of Timor-Leste (2010-2030). Environmental legal frameworks to protect and conserve the environment, development of biodiversity decree, designating national authority on climate change, establishment of community-based nurseries to plant one million trees per year, eliminating fuelwood use for cooking, and establishing an extensive network of protected land and marine areas as representative of Timor-Leste biodiversity, are included as priority targets in the country's SDP 2010-2030.

This integration of environment and biodiversity conservation into national development plan would strengthen the implementation of the NBSAP, Timor-Leste's conservation strategy, towards achieving sustainable development goals. Key national sectoral plans, such as the fisheries sector plan, forestry plan, and the Strategic Action Plan (SAP) for Timor-Leste's Programme of Work on Protected Areas (PoWPA). Biodiversity concerns are likewise incorporated in the development plans of the education, health, energy, tourism and environment sectors in various levels of specificity. However, these plans have yet to be effectively implemented on the ground to ensure the mainstreaming of biodiversity into development activities. The NBSAP outlines the key legislations and policies on environment and biodiversity.

3.A Mainstreaming Biodiversity in National Policies and Legal Frameworks

Constitutional Framework

The 2002 Constitution of Timor-Leste includes, among the fundamental objectives of the State, the protection of the environment and preservation of natural resources. Under the Constitution, the State shall recognize the need to preserve and rationalize natural resources use and shall promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy. The first National Development Plan and Road Map and subsequent development documents and plans include as key goals the conservation of biodiversity, the enhancement of livelihoods and the active participation of communities. These commitments to conserve the natural and cultural assets of the country are integral to the Government's strategies to ensure sustainable development. Article 61 of the Constitution of Timor-Leste states that:

- Everyone has the right to a humane, healthy and ecologically balanced environment and the duty to protect it and improve it for the benefit of the future generations.
- The State shall recognize the need to preserve and rationalize natural resources.
- The State should promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.

UNTAET Regulations

Prior to the enactment of the Constitution, regulations passed under the United Nations Transitional Administration in East Timor (UNTAET) include *UNTAET Regulation 2000/17 On The Prohibition Of Logging Operations And The Export Of Wood From East Timor,* which prohibits the cutting, removal, logging and export (in any form) of wood, and the burning or any other destruction of forests. Given the high proportion of forest-dependent species of flora and fauna and the secondary impacts of forest disturbance and destruction on other ecosystems (e.g. riparian, marine), this national policy is a very important contribution to biodiversity conservation.

UNTAET Regulation No. 2000/19 On Protected Places was passed in 2000, and declared 15 'Protected Wild Areas' in addition to selected "endangered" species, coral reefs, wetlands and mangroves, and historic, cultural and artistic sites. These two regulations passed automatically into national law when independence was restored in 2002 (IBA 2007).

Environmental Licensing Decree Law and Biodiversity

The Environmental Licensing Decree (Law No. 5/2011) enacted in February 2011 creates a system of environmental licensing for public and private projects likely to produce environmental and social impacts on the environment, basically, the Environmental Impact Assessment (EIA) Law. This Law aims to create conditions to minimize or eliminate negative environmental and social impacts of project implementation and determines measures for environmental and social protection.

Proposed Biodiversity Decree Law

Timor-Leste is also in the process of developing a Biodiversity Decree Law. The proposed Biodiversity Decree Law would define the national policy on: biodiversity planning, monitoring, and inventory; protection and conservation of ecosystems, habitats and species; addressing threats to biological diversity and resources including genetic resource, traditional knowledge and benefit-sharing; and addressing biodiversity information and public awareness, including training, research, valuation and incentives.

3.B Mainstreaming Biodiversity in National and Sectoral Plans

The Strategic Development Plan (SDP) (2011-2030) envisions that by 2030 a strong bond between Timorese people and the environment will be restored and the natural resources and the environment managed sustainably for the benefit of all. The protection of biodiversity, key habitats and ecosystems are part of the Plan. Specifically, the SDP has the following targets related to biodiversity for the period 2011-2030:

Short Term (2011-2015)
▪ An environmental basic law will be the legal framework to protect and conserve the environment.
▪ A designated national authority for the mechanisms of the Kyoto Protocol and a national climate change center will be made operational.
▪ A national biodiversity law and a wildlife conservation law will protect and conserve biodiversity.
▪ Air, noise, soil pollution and vehicle emissions regulations will be in place.
▪ Community-based nurseries will be established to ensure planting of one million trees nationwide every year.
▪ Public awareness of environmental protection will be enhanced.
Medium Term (2015-2020)
▪ Seventy percent of the National Adaptation Programme of Actions under the United Nations Framework Convention on Climate Change will be implemented.
▪ No families in Dili will have to cook with fuelwood.
▪ Timor-Leste will have an extensive network of land and marine national parks that protect representative samples of our biodiversity.

Climate Change Adaptation Plan

The National Adaptation Programme of Action on Climate Change (NAPA, 2010) envisions the "Timorese people to be more resilient to climate change, recognizing their high vulnerability in an economy that is dominated by subsistence agriculture. Adaptation measures will focus on reducing the adverse effects of climate change and promote sustainable development. These measures will build on existing strategies and plans across all sectors within Timor-Leste including the National Priorities process." Specifically, the SDP targets that by 2030, "no families in Dili will have to cook with firewood". This would lessen pressure on forests and mangrove ecosystems, which are the main sources of firewood by the local people.

The Government of Timor-Leste highlights the issue of global climate change and its effects on the country particularly due to its geographic position situated just north of Northern Australia and south of the equator, which influences the monsoon climate and has a differentiated effect on the North and South of the country that makes it vulnerable to disasters. This greatly affects its social and economic infrastructure and, most importantly, greatly impacts the lives of the Timorese people. As a result, the National Disaster Management Directorate adopted the National Disaster Risk Management Policy which covers a shift from traditional crisis response management to disaster, conflict and climate change risk reduction. It provides a general framework and details of activities related to disaster risk management. In addition, it integrates activities across all sectors addressing economic, social and environmental development, strengthening community capacity and reducing vulnerabilities.

In the area of climate change adaptation, policies and institutional arrangements are being established. The MED, through the National Directorate for Environmental Services and the National Directorate for International Environment Affairs, submitted

the National Adaptation Program of Action (NAPA) in 2008 and established several thematic working groups to oversee the commencement of climate change planning.

Acknowledging that biodiversity and climate change are inextricably linked, the government of Timor-Leste has recognized that the country is vulnerable to climate change physically and biologically. Thus, the NAPA is aimed to address the concerns on biodiversity and climate change issues through the following priority actions:

- *Food Security:* Reduce vulnerability of farmers and pastoralists to increased drought and flood events.
- *Water Resources:* Promote the Integrated Water Resource Management (IWRM) to guarantee water access in a climate change context.
- *Human Health:* Enhance the capacities of the health sector and the communities to anticipate and respond to changes in distribution of endemic and epidemic climate-sensitive diseases, and reduce vulnerability of population to infection in areas at risk from expansion of climate related diseases.
- *Natural Disasters:* Improve institutional and community (including vulnerable groups such as women and children) capacity to prepare for and respond to climate change induced natural disasters.
- *Forests, Biodiversity and Coastal Ecosystems:* Maintain and restore mangrove and forests and promote awareness-raising activities to protect coastal ecosystems and forests from climate change impacts.
- *Livestock Production:* Improve planning and legal framework for promoting sustainable and balanced food for livestock production.
- *Physical Infrastructure:* Improve regulations, standards and compliance for climate-resilient infrastructure.
- *Poverty Reduction:* Support the ambitious national poverty reduction target in relation to the expected increased storm intensity at sea by improving capacity to forecast and adapt offshore oil and gas infrastructure to withstand strong storms and waves.
- A ninth priority area, underpinning all others, focuses on National Institutional Capacity Development for Climate Change through which overarching programme level coherence will be ensured.

Land Management Plan

The National Action Program to Combat Land Degradation (NAP, 2009) has identified project activities addressing deforestation and land degradation processes in Timor-Leste focusing on sustainable land management. These include restoring degraded areas, protection and conservation of unaffected areas of high agriculture and environment significance, and capacity building for the enabling of the implementation of both land rehabilitation and conservation activities.

Timor-Leste and the Global Multilateral Environmental Agreements

Timor-Leste acceded to the Convention on Biological Diversity (CBD) on 10 October 2006, and became a Party to the CBD on 8 January 2007. The three main goals of the CBD are the conservation of biodiversity, the sustainable use of its components and the equitable sharing of the benefits arising out of the utilization of genetic resources.

Degraded land being colonized by *Jatropha gossypifolia* in the foreground.

Timor-Leste is also a Party to other multilateral environmental agreements, which it has ratified, such as the UN Framework Convention on Climate Change (UNFCC) and the Kyoto Protocol; the UN Convention to Combat Desertification (UNCCD); the Vienna Convention for the Protection of the Ozone Layer; and the Montreal Protocol on Substances that Deplete the Ozone Layer. Specific action plans such as NBSAP for UN CBD; NAPA for UNFCC and NAP for UNCCD have been formulated through multi-stakeholder process, led by the MED through the Secretariat for the Environment. These plans would need a strong political support and leap-frogging commitments to build capacity to implement the priority strategies identified for these national plans.

The UN agencies, particularly UNDP is committed to providing continued support to the Government of Timor-Leste in complying with multilateral environmental agreements. UNDP is actively engaged in implementing the enabling activities for the Rio Conventions and supports the development and implementation of follow-on projects in biodiversity conservation, climate change, and combating desertification as indicated in the UNDP Country Programme and Action Plan for 2009-2013. UNEP likewise supports the Government of Timor-Leste in developing the environment decree and the Biodiversity Decree Law.

Biodiversity Considerations in Sectoral Plans

The SDP of Timor-Leste provides a framework and a mandate for integration of biodiversity concerns into the sectoral plans, which in turn define necessary actions for the sustainable development of the country. The SDP aims to transition the country

from a low-income society to an upper middle income one, with a healthy, well-educated, and safe population by 2030.

Forestry and Protected Areas

The Ministry of Agriculture and Fisheries carry prime responsibility for cross-sector coordination in water management. The Protected Area Network program is integral to this as it will contribute to national watershed management, in a seasonally dry country with significant desertification problems. A Forestry Management Plan will be developed in the short term to promote reforestation and sustainable land management practices. Many of the plans and targets are stipulated in the SDP. Biodiversity is specifically mentioned in the SDP 2011-2030 and the NBSAP will be at the forefront in defining conservation action for natural resources.

Fishery

Policies on coastal and marine resources management are yet to be established. However, the National Fisheries Strategy deals with some issues relating to coastal and marine resources.

The Strategy outlines the need to establish Marine Protected Areas (MPAs) over areas of critical habitats to protect such areas from unsustainable fishing practices and impacts and those of terrestrial origin, including river-borne pollutants, and coastal building developments. The policy recognized that at the village level, the fisheries sector offers a significant opportunity to contribute to sustainable livelihoods and cash income. It also recognized the need to use the precautionary approach to setting

The day's catch being sold along the highway in Manatutu.

allowable catch limits and the access to foreign fishing vessel to be under a licensed agreement with set conditions. The Fisheries Policy has been a work in progress for more than six years with inputs from various authors. Updates are in order to rectify the aggregate information collected over the years, to incorporate results of recently conducted consultations and to generate the necessary approvals. The fisheries sector is governed by several policies as covered in the Strategic Policy for the Fisheries Sector and the Fisheries Strategic Plan for 2007/2012.

In addition, the fisheries sector has been included in the SDP 2011-2030. In the short-term (2011 to 2015), strategies and actions to improve the management of coastal and inland fisheries and create a vibrant commercial fisheries sector will focus on increasing the catch from traditional fishing activities and exploiting fishing grounds in the Exclusive Economic Zone. In the medium term (2016 to 2020), actions will focus on ocean-based fishing and be oriented towards exports and the development of fishery centers along the southern coastline, especially in Lore (Lautem District).

The implementation of the National Fisheries Strategy is challenged with limited staff skills, lack of institutional arrangements around the strategy outcomes and challenges in political direction at the national level.

Tourism

Tourism is high on the priority of Timor-Leste and this will be pursued through a range of tourism experiences that take advantage of the country's natural beauty, culture and heritage. Timor-Leste will also develop niche market offerings for visitors seeking adventure tourism, scuba diving and marine tourism, trekking or cultural and historical tourist experiences.

Tourist on a view deck at the Cristo Rei Protected Area

Since the main attractions for this sector are nature-based, the link to biodiversity conservation presents a good opportunity to pursue joint programmes that will promote ecotourism and other nature-based tourism activities in biodiversity-rich areas and around protected areas.

Energy

The Government of Timor-Leste has been working with UNDP since 2005 in piloting Rural EnergyTechnologies. Under the CPAP 2009-2013, UNDP continues to support and provide alternative energies through improved use of biomass for energy, which in turn reduce pressures on biodiversity and land resources. Alternative sources of energy have to be developed such that the dependence on biomass like fuelwood, has to be reduced to conserve the biodiversity of Timor-Leste. The SDP 2011-2030 specifically mentions the expansion of "renewable energy", which includes bioenergy or energy from biomass.

Agriculture

The economy of Timor-Leste is heavily dependent on the export of petroleum. Given the fluctuations of the international pricing of oil, Timor-Leste has become more vulnerable to economic fluctuations. Hence, the diversification of its agricultural products has been strongly pursued (UNDP CPAP 2009-2013).

Agricultural land dominated by ricefileds in Manatutu.

The economic development of Timor-Leste will be built around three critical industries: agriculture, oil and gas, and tourism. The agriculture industry will focus on the development of its food crops, cash crops and the livestock industry. The SDP 2011-2030 mentions that by 2020, the rural communities would have adequate food supply. It further plans to create sustainable agriculture production zones. Farming practices will be improved and actions will be taken to boost the production of specific crops such as rice, maize, and coffee.

The SDP 2011-2030 targets to "improve national food security, reduce rural poverty, support the transition from subsistence farming to commercial farming of crops, livestock and fisheries, and promote environmental sustainability and the conservation of Timor-Leste's natural resources".

Engaging other sectors

The trade and industry sectors have yet to understand the concept of biodiversity conservation. This was raised by private sector groups during both the NBSAP and the 4NR consultation processes. Biodiversity conservation is a new concept to these sectors and continued sensitization of these sectors must be vigorously pursued. Likewise, health and education sectors have yet to be sensitized and engaged to ensure awareness, understanding and eventual integration of biodiversity concerns.

Tara bandu

Culture and Heritage

Biodiversity also includes traditional knowledge, culture and practices of the native people of the country. There are traditional regulations and customs in Timor-Leste that contribute to conserving the natural resources such as forests and crops. This system of communal protection is known as *Tara bandu.*

In agriculture, *Tara bandu* involves an object, which is hung near a fruiting tree or garden to indicate custodianship of the resource. It may be a piece of rattan tied around the trunk of the mango tree; or the banned items are hung from

a t-shaped bamboo. It is widely believed that people who steal the goods that are the subject of *Tara bandu* will suffer from an accident, penalty, misfortune or illness. Villagers designated as cab-leha/tobe are responsible for ensuring that village laws are followed (Sandlund, *et al.* 2001). *Tara bandu* also includes temporary prohibitions on resource extraction such as cutting of trees, including mangroves, and the designation of specific areas as sacred like Jaco Island and its surrounding reef, which are considered sacred by the local community. *Tara bandu* prescribes fines for violations and also provides for mediation of land disputes (SoL Program, 2009).

Tara bandu

Tara bandu is a Timor-Leste customary law that is principled on "traditional ecological wisdom". It involves an agreement with a community to protect a special area for a period of time. It also applies to the harvest of agricultural produce, cutting of trees or collecting forest products, and hunting or fishing. It is also being used as a means to regulate social behaviour. Tara Bandu also means "putting of prohibition", and requires a large public ceremony following a public meeting that determines particular penalties or sanctions for particular activities.

This traditional law is already a recognized management strategy and is being observed in several communities of Timor-Leste.

A ceremonial activity is a feature of contemporary agriculture across Timor-Leste and highlights the continuing vitality and significance of customary beliefs and obligations for households as members of ritual practices. Ritual beliefs and practices may also affect farmer interest and adoption of new technology, such as new seed or cultivation techniques, although most rituals are tied to the stages of development that a plant passes through.

The common practice of presenting food as gift throughout Timor-Leste strengthens social networks between an extended family and neighbours who are non-kin and helps to secure access to food. Successes in restoring ecological systems have been documented by some non-government organizations such as Haburas Foundation in relation to community support for livelihood activities.

The SDP 2011-2030 encourage preserving Timor-Leste's cultural diversity and build respect for the country's cultural heritage and history. It recognizes that without this respect, the country would be vulnerable to globalization and would lose the unique features of its society and people inherent to its national identity. It further taps into the cultural practices and traditions to contribute to the economic development of the country by targeting the small- to medium- sized businesses.

CHAPTER 4

CHAPTER 4

CONCLUSIONS: PROGRESS TOWARDS THE 2010 BIODIVERSITY TARGET

Timor-Leste has put in place certain legal and policy frameworks for biodiversity conservation, including participation in global and regional programmes to help fulfil its commitments as Party to the CBD and at the same time achieve national sustainable development goals. Timor-Leste has set into motion the drafting of the Biodiversity Decree Law and has recently approved the Environmental Licensing Decree Law. Timor-Leste has made progress in declaring at least 30 protected areas for the protection of biodiversity and ecosystems (Please see Chapter 1). The key challenge however remains: building institutional and human capacities to implement policies, laws, and the priority strategic actions identified in key sectoral plans, particularly the NBSAP.

Appendix 4 of this Report presents the Matrix of Indicators and Accomplishments of Timor-Leste in relation to the 2010 Biodiversity target. The assessment was based on a series of consultations attended by various stakeholders in Timor-Leste and using available reports and documents referred to in Appendix 2.

An assessment of the 2010 CBD Goals and Targets has indicated efforts and initiatives undertaken in the following CBD biodiversity targets:

Target	2010 Biodiversity Target	Relevant Activities Undertaken
Target1.1	Conserve at least 10 percent of the world's ecological regions effectively.	Established 30 protected areas (15 legislated and 15 identified for legislation) in a network covering 2000 square kilometers, which is about 15 percent of the country's land area.
Target 1.2	Protect areas of particular importance to biodiversity.	5 percent of rivers, 55 percent of lakes, 6 percent of estuaries, 9 IBA's, 55 percent of coral reefs, sea grass habitats and 30 protected areas (15 legislated and 15 identified for legislation), are under the Protected Area Network, and hence are covered by protected area regulation.
Target 2. 1	Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	Enactment of UNTAET 2000/19 protects faunal groups including CITES-listed species in Appendices I & II such as sea turtles, marine mammals, crocodiles.
Target 2.2	Improve the status of threatened species.	CITES-listed Salt water crocodile in increasing in population, according to locals.
Target 3.1	Conserve genetic diversity of crops, livestock, and harvested species of trees, fish and wildlife and other valuable species, and maintain associated indigenous and local knowledge.	Established two Central Seed Centers for genetic conservation of rice, corn, soybean, peanuts and mungbean.
Target 4.1	Ensure that biodiversity-based products are derived from sources that are sustainably managed, and production areas are managed consistent with the conservation of biodiversity.	Sandalwood, a native endangered species, is being produced in agroforestry systems by the MAF.

Target	2010 Biodiversity Target	Relevant Activities Undertaken
Target 4.2	Reduce unsustainable consumption of biological resources or other resources that impact biodiversity.	Species with utility as fuelwood and fodder are being planted in reforestation sites to ease pressure on natural forests from fuelwood gatherers.
Target 4.3	Ensure that no species of wild flora or fauna are endangered by international trade.	UNTAET regulation 2000/19 protects threatened species from local and international trade.
Target 7.1	Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	Established the Protected Area network, which is estimated to sequester 22 percent of Carbon.
Target 7.2	Reduce pollution and its impacts on biodiversity.	River clean-up activities are annual events.
Target 8.1	Maintain capacity of ecosystems to deliver goods and services.	Reforested degraded forest ecosystems and introduced agroforestry technologies.
Target 8.2	Protect and conserve biological resources that support sustainable livelihoods, local food security and health care, especially of poor people.	Introduced agroforestry production systems that incorporate coffee, sandalwood, and livestock.
Target 9.2	Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.	Promoted and encouraged the use of the *Tara bandu* traditional law to protect and conserve biological resources.
Target 11.1	Transfer new and additional financial resources to developing country Parties, to allow the effective implementation of their commitments under the CBD, in accordance with its Article 20.	Donor agencies such as UNDP, USAID, ADB, WB are supporting the implementation of development projects in the country.
Target 11. 2	Transfer technology to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.	Seeds of Life Program has transferred improved varieties of coffee and vanilla and other crops.

Timor-Leste has established 30 protected areas (15 legislated and 15 identified for legislation) to address the global target of reducing the rate of biodiversity loss by 10 percent. The largest protected area – the Nino Konis Santana National Park - already covers 4.57 percent of Timor-Leste's land area as the Park encompasses or covers three protected areas. Notably, the biodiversity of Timor-Leste is characterized as an overlap of Asian and Australasian biodiversity. By effectively managing these protected areas, biodiversity resources will be protected in their habitats and the rate of biodiversity loss will be contained.

Timor-Leste would need a systematic public awareness and capacity-building strategy to achieve the second and third objectives of the CBD, protect its sovereign resources and provide benefits to all Timorese people.

While there have been accomplishments or activities undertaken in the above Targets, there remains a huge gap in terms of achieving the goals of the CBD on conservation, sustainable use and benefit sharing. The Strategic Action Plan under the PoWPA Project (in progress) has outlined key actions to effectively manage the 15 declared protected areas in Timor-Leste. Among these key actions are the need to establish and strengthen the national system of protected areas; build capacity for the planning, establishment and management of protected areas; and enhance involvement of local communities and relevant stakeholders through the improved CEPA. These are likewise reiterated in the NBSAP under Priority Strategy 3: Improving the status of biodiversity by safeguarding ecosystems, species and genetic diversity (Also see NBSAP Strategic Action 10).

A massive capacity-building effort must be jump-started in the immediate short-term for Timor-Leste to build a cadre of experts and biodiversity-sensitized stakeholders.

Timor-Leste's NBSAP – Implementing the Strategic Plan for Biodiversity (2011-2020) and the Aichi Targets

The NBSAP (2011-2020) will be Timor-Leste's guiding framework to conserve its biodiversity and will serve as safeguard in achieving the country's development agenda in the next two decades. The NBSAP provides a vision and a strategy for Timor-Leste to conserve and wisely use its biodiversity to provide food security, contribute to poverty eradication and improve the quality of life of Timorese people. As identified in the NBSAP, 5 priority strategies and 5 priority targets and 21 strategic actions will be undertaken for the period 2011-2020. Fifteen (15) out of the 21 strategic actions are considered high priority (as outlined in Chapter 2) and must be initiated in the short-term period (2011-2015).

Priority Strategies and Targets on Biodiversity

The NBSAP has identified 5 Priority Strategies and 5 Targets based on the needs of the Timorese people and the targets set in the SDP. These are as follows:

NBSAP Priority Strategies

1. Mainstreaming biodiversity into sectoral plans and programmes to address the underlying causes of biodiversity loss

2. Protecting biodiversity and promoting sustainable use
3. Building climate-resilient ecosystems through effectively managing protected areas and reducing threats to biodiversity
4. Enhancing ecosystems functioning and providing benefits to all
5. Enhancing implementation of the NBSAP through participatory planning, knowledge management and capacity building, including district and sub-district and community levels

Targets:

Target 1: By 2015, public awareness on biodiversity has increased and participation in conservation activities through sustainable tourism and sustainable agriculture by private sector, media, and local communities, including women and youth has been enhanced.

Target 2: By 2015, rehabilitation activities in critical watersheds and degraded lands have been undertaken, and at least one million trees have been planted per year, and sustainable livelihoods have been provided to local communities through ecosystem restoration activities.

Target 3: By 2020, the status of biodiversity has improved by safeguarding ecosystems, species and genetic diversity in the 30 declared protected areas.

Target 4: By 2020, ecosystems services have been enhanced through promoting economic values of biodiversity and ecosystems and promoting benefits sharing.

Target 5: By 2015, a national biodiversity monitoring has established, and the clearing house mechanism is being used as an operational tool

At the core of these priority strategies and targets is a Capacity Development Plan that would enhance the technical and managerial capacities of national government and district officials on the conservation and management of the country's rich but threatened biodiversity. A stand-alone Communication, Education and Public Awareness Strategy (CEPA) forms an integral approach of achieving Priority Target 1 of NBSAP: By 2015, public awareness on biodiversity increased and participation in conservation activities through sustainable tourism and agriculture by private sector, media, local communities, including women and youth enhanced. CEPA likewise straddles through the other priority actions as building a well-informed public serves as the foundation for effective engagement and implementation of programmes and compliance to policies by the society in general.

The Capacity Development Plan was designed to propel Timor-Leste in building a cadre of conservation practitioners and experts in the country. It builds and complements the CEPA (in progress as of 4NR writing). Foremost among the capacity gaps to be addressed cover the following training areas: (1) awareness, education and public relation; (2) biodiversity project planning, implementation and management; (3) management effectiveness assessment for protected areas and key biodiversity areas; (4) facilitation skills to moderate public consultations; (5) financial and physical resources management; (6) human resources management; (7) natural resources, socio-economic and cultural assessment; (8) protected area policy, planning and management; (9) recreation and tourism; (10) site management; (11) field craft or practical skills for working safely and effectively; (12) enforcement; (13) ecosystems assessment

and management, including conservation of habitat and species; (14) reforestation, sustainable agriculture practices and community level rehabilitation activities; (15) sustainable livelihoods including vocational training and technical support for self-employment; (16) gender sensitization; and (16) sustainable land management.

This is supported by the establishment and operation of Timor-Leste's Clearing House Mechanism on Biodiversity (CHM), which would serve as a platform for managing information and knowledge sharing on biodiversity, including developing a network of national experts and stakeholders to support the implementation of the NBSAP.

A key area of action is developing partnerships and increasing the level of funding both from national government support (possibly from Timor-Leste's Petroleum Fund) and in partnership with development partners and other international and regional organizations. This was outlined in the NBSAP's Partnership Strategy, and underscores the need to support programmatic synergies among national agencies such as environment and tourism directorates to promote nature-based tourism. The agriculture and environment directorates need to be engaged to undertake joint initiatives on biodiversity and combating land degradation, through the implementation of a sustainable land management programme.

Providing sustainable livelihood opportunities still remain a big challenge to Timor-Leste to ease the pressures on biodiversity and natural resources. One specific example is the provision of alternative methods in salt production. Prior to this training, salt production was being produced through boiling and evaporation using fuelwood. A training programme was conducted using solar drying as an alternative to fire, boiling and evaporation to ease pressure on the forest. This was successful initially but due to lack of materials and sustained technical advice, the salt-makers reverted to using fuelwood.

Thus, a collective effort among key government agencies in partnership with various stakeholders must be pursued to effectively implement the NBSAP, considering capacity development at all levels and increasing the level of funding on biodiversity, not only from various donor partners but from internal priorities and budget setting accorded to environment and natural resources.

Appendices

APPENDIX 1
Information Concerning Reporting Party and Preparation of the National Report of Timor-Leste

A. Reporting Party
Contracting Party: Democratic Republic of Timor-Leste

NATIONAL FOCAL POINT AND CONTACT OFFICER FOR NATIONAL REPORT
Full name of the institution:

National Directorate for Environmental Services
Secretariat of State for the Environment
Ministry of Economy and Development
Democratic Republic de Timor-Leste

Name and title of contact officer: Mr. Augusto Pinto, CBD National Focal Point
Mailing address:

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Secretariat of State for the Environment
Ministry of Economy and Development
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Real, Mandarin, Dili
Timor-Leste

Telephone: +670 3907305826
E-mail: Augusto Pinto (anopinto@yahoo.com)

SUBMISSION
Signature of officer responsible for submitting national report:

_____

Date of submission: _____

B. Process of preparation of national report

(Please provide information on the process used to prepare this report, including information from the different stakeholders involved and material used as a basis for the report).

The Fourth National Report to the Convention on Biodiversity (4NR) of Timor-Leste is the first national report that the country has submitted to the CBD. As a new sovereign state, established in 2002, Timor-Leste ratified the CBD on 8 January 2007 and as such, was not required to submit the first three national reports to the CBD. The Fourth National Report of Timor-Leste provides an assessment of the biodiversity in Timor-Leste and describes the progress made in achieving the 2010 Biodiversity target, i.e., the efforts and initiatives made by Timor-Leste in achieving the goals of the CBD to conserve and sustainably use its biodiversity.

The process started with stocktaking of available information on biodiversity in Timor-Leste. There have been notable studies and data set available from projects supported by UN agencies and international NGOs. These sets of data and information were products of surveys, inventories, and reports of scientists who conducted biodiversity-related projects in Timor-Leste. Notable among the species surveys are the studies conducted by BirdLife International on the birds of Timor-Leste, particularly the survey done by Dr. Colin Trainor. Personal communication by the NBSAP team to Dr. Trainor provided more updated information on his recent works in Timor-Leste.

Academic institutions such as the Charles Darwin University of Northern Australia also conducted some studies on biodiversity, particularly on invasive species in Timor-Leste. UN agencies such as UNDP, UNEP, UNOPS and FAO, have supported capacity assessments on biodiversity (e.g., NCSA Report, 2006 supported by UNDP), drafting of environment decree and biodiversity decree supported by UNEP, and the PoWPA Project supported by GEF through UNOPS, parallel to the NBSAP process and the 4NR preparation process, supported by GEF through UNDP.

There were also several action plans formulated related to biodiversity (e.g., NAPA on Climate Change and NAP on Land Degradation), which provided a wealth of information particularly on the assessment of environment, economy and overall development in Timor-Leste, and relevant to fulfilling Timor-Leste's commitments under the UNFCCC and UNCCD, as a Party to these Conventions.

Based on documents reviewed from the stock-taking process, a draft biodiversity assessment, including threats assessment, was prepared following the outline of the reference manual for 4NR by the CBD. The draft 4NR report was also based on the Report of the Stakeholders Consultation Meeting held on 31 March–01 April 2011 using a Perception Mapping Exercise Methodology. A separate stand-alone report was prepared by the NBSAP team as basis for future implementation of the NBSAP and 4NR follow-on actions.

The draft report on status and trends of biodiversity in Timor-Leste was presented to the National Biodiversity Working Group (NBWG) composed of different stakeholders from government (MAF, Tourism Ministry, and MARD), academe (National University of Timor-Leste), and civil society (NGOs, WWF, other local CS groups), and media group. A series of NBWG meetings were convened for the consultation process for the NBSAP and 4NR documents.

Many of the activities implemented in the drafting of the NBSAP, complemented the process for the drafting of the 4NR, since most of the information needed for the NBSAP were also needed in the 4NR. Two community consultations (Focus Group Discussions or FGD approach) were conducted in May 2011 to verify information from secondary sources such as the global datasets and other documents obtained from various institutions and sources in Timor-Leste. One FGD was conducted in the upland village of Lirahe Protected Area in Aldeia Metir, Fatumasi, Liquica and the other one was in the village adjacent to the Lamsanak Marine Protected Area in Manatuto.

The full draft of the 4NR was subjected to review by the NBWG, again in a series of consultation meetings for the NBSAP and the 4NR in July 2011. These series of meetings were also highlighted by a Policy Dialogue among key government officials and other stakeholders' representatives and convened by the Minister of Economy and Development, Senor Joao Mendes Goncalves. This was also participated by the UNDP Country Director, Ms. Mikiko Tanaka and other UNDP Programme Officers. Comments and suggestions were noted and incorporated in the subsequent revision and finalization of the 4NR and the NBSAP documents of Timor-Leste. A key outcome of the Policy Dialogue is the high-level support accorded by Timor-Leste officials on the importance of biodiversity in Timor-Leste's development process.

Consultations were also done with government officials as part of the 4NR and NBSAP process. Meetings were held with officials of the Ministry of Agriculture, Forestry and Fisheries; Ministry of Economy and Development; Ministry of Trade, Industry and Tourism; and Chamber of Commerce of Timor-Leste.

Certain portions of the Draft 4NR and the Draft NBSAP documents were also translated into the local language, Tetun, and to some extent to Portuguese (the official language of Timor-Leste), to provide a wider involvement and understanding of stakeholders.

The sources of information came from many documents, foremost of these are the National Strategy and Development Plan 2011-2030 (SDP, July 2011), the National Ecological Gap Analysis (NEGA, 2011), National Adaptation Programme of Action (NAPA) on Climate Change, National Action Plan to Combat Land Degradation (NAP, 2009) and a number of scientific reports on assessments, inventories and surveys of the biological resources of Timor-Leste.

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APPENDIX 3

Progress towards Targets of the Programme of Work on Protected Areas

Timor-Leste became a Party to the CBD when it ratified the Convention on 8 January 2007. Since then, Timor-Leste has made progress in contributing to the achievements of the objectives of the CBD. As a Party to the CBD, a Programme of Work on Protected Areas has to be fulfilled in accordance with COP-7 Decision in 2004 – to address the barriers in the effective establishment and management of protected areas.

In 2008, Timor-Leste started undertaking a national process to develop its Programme of Work on Protected Areas (PoWPA) through the National Directorate for Forestry under the Ministry of Agriculture and Fisheries, with support from the Global Environment Facility (GEF) and the UN Office for Project Services (UNOPS).

The process of developing the PoWPA entails 5 stages – situation analysis, problem analysis, objective analysis, stakeholder analysis and involvement, and moving towards the development of the strategic action plan (SAP).

The formulation of the SAP requires a 10-step process from inception planning to the final presentation. The main inputs to the process are the National Ecological Gap Assessment (NEGA) Report prepared in 2011 and the Capacity Needs Assessment. The SAP process was clustered into three sets of activities:

I: Stakeholders involvement, needs assessment, issues/gaps identification and a situation analysis.

II: Baseline evaluation and assessment with consultations from the stakeholders in identifying objectives, activities and priorities, and incorporating the NEGA Report and the Capacity Needs Assessment Report.

III: Criteria and targets identification and priority setting: objectives and activities.

As of this writing, the PoWPA is undergoing validation and finalization of the document. Priority areas for action in different sectors have been identified in the formulation process:

1. Agriculture
   a. Maintain soil quality for quantity and quality production
   b. Train local farmers in innovative crop farming, e.g. agroforestry, drought-resilient and new crops.
   c. Support and encourage agricultural extension officers in rural areas
   d. Work with land owners to encourage continuation of traditional sense of stewardship
   e. Establish and strengthen strong partnership among stakeholders (landowners, government, NGO, CBO, and the private sector)
   f. Maintain realistic and accessible data or information system
2. Forestry
   a. Strengthen forest law enforcement, e.g. training and awareness at the local level in national and provincial forest laws and sustainable forest management
   b. Reforest and afforest cleared grasslands – plant local tree species of economic and cultural value
   c. Encourage renewable energy or its efficient use in place of fuelwood

3. Water resources
    a. Harvest rainwater, and conserve or sustainably use water catchments
    b. Improve both the water supply and sanitation systems to reduce cases of water borne diseases
    c. Establish buffer zones for the protection of land and ecosystems in riverbanks
4. Natural Disasters
    a. Maintain and improve early warning systems for natural disasters
    b. Educate public and raise awareness to preserve essential warning systems
    c. Improve data management

A Capacity Building Plan (Cap-B Plan) is also being formulated in parallel with the SAP. Both the SAP and the Cap-B Plan were considered in the NBSAP Capacity Development Plan and serve as supplementary documents to the NBSAP.

As part of the PoWPA, a National Ecological Gap Assessment was also finalized in May 2011, a first ever document that mapped the network of existing and future protected areas in Timor-Leste. The NEGA Report provides the total estimate of terrestrial and marine areas, without actual boundary delineation. It also captures a variety of ecological GIS data; provides information on the loss of forest cover using data from the UNDP-supported Sustainable Land Management Project; classification of terrestrial protected areas and data on coral reef cover, including identification and location of key habitats and ecosystems.

The NEGA Report also has set out national targets for protected area coverage by 2020. These are summarized in Appendix 4 Matrix of Indicators and Accomplishments *vis-a-vis* the CBD 2010 Targets and the NEGA Targets.

APPENDIX 4

Matrix of Indicators and Accomplishments of Timor-Leste

Goals and targets	Related national targets (2011-2020) From NEGA 2011	Relevant national indicators (Accomplishments)	Remarks
Protect the components of biodiversity			
Goal 1. Promote the conservation of the biological diversity of ecosystems, habitats and biomes			
Target 1.1: At least 10% of each of the world's ecological regions effectively conserved.	*A minimum of 30% of the original extent for each major vegetation type to be placed in protected areas.* *Maintain / restore 100% habitat connectivity within and around terrestrial protected areas and 50% MPAs.*	• The total area of the terrestrial protected network is approximately 2,000 square kilometers, which is about 14% of the country's land area. • Maintenance of forest cover includes reforestation and sustainable agricultural practices. • Mapped out the remaining primary forests that shows minimal coverage and estimates range from 1 - 6% of the territory. • Mapping also shows that approximately 35% (453,850 hectares) of the land area (excluding approximately 22 square kilometers of water bodies) has some type of forest cover.	• Forest cover in East Timor has decreased by almost 30% over the period of 1972 to 1999, (Sandlund*et al*. 2001) and only 1 to 6% of the remaining cover is believed to be primary forest. • Tropical forests are in poor condition, and continue to be degraded and converted, putting several species, particularly frugivorous birds and mammals, at risk.
Target 1.2: Areas of particular importance to biodiversity protected.	• *A minimum of 50% of the current extent of estuaries.* • *30% of the distribution of rivers and lakes are in protected areas.* • *100% of the critical habitats for terrestrial threatened species to be captured in a protected area.*	• Presently, 5% of braiding rivers and 55% of lakes are in the Protected Area Network. • 6% of estuaries are within the Protected Area Network. • Since 2002, Timor-Leste has designated 15 protected areas and 9 Important Bird Areas: Tilomar, Tata Mailau, Fatumasin, Atauro Island, Sungai Clere, Lore, Monte Paitchau, Jaco Island and Mount Diatuto.	• Some mangroves are also protected under traditional practices (*Tara bandu*). • The police have a community service division in charge of crime prevention at the community level. Their aim is to deter the cutting of logs, hunting and the burning of vegetation in the summer.

Goals and targets	Related national targets (2011-2020) From NEGA 2011	Relevant national indicators (Accomplishments)	Remarks
	• *50% of critical habitats for marine threatened species to be captured in a protected area.* • *Protect 100% fish spawning areas.* • *80% mangroves.* • *30% of each coral reef type in MPAs.* • *30% for seagrasses in MPAs.*	• There are mangroves and coral reefs protected by the UNTAET regulation 2000/19. Overall, 55% of coral reefs are in MPAs (there are 7 coral reef types in Timor-Leste) with nearly 50% found within the Protected Area network. • Wetlands are protected by UNTAET regulation 2000/19 • Currently, 70% of seagrass habitats are located within MPAs.	• Coastal habitats are not in good conditionand Mangrove targets are not met.
Goal 2. Promote the conservation of species diversity			
Target 2.1: Restore, maintain, or reduce the decline of populations of species of selected taxonomic groups.	• *A minimum of 30% of the distribution of each known taxa to be within a protected area.* • *100% of the known range of terrestrial endemic species to be captured in protected areas.* • *50% of the known range of marine endemic species to be captured in MPAs.* • *100% of the known range of terrestrial migratory species to be captured in a protected area.* • *50% of the known range of marine migratory species to be captured in protected areas.*	• Some fauna groups are also protected under UNTAET Regulation No. 2000/19. These include all species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) Appendices I and II, including sea turtles, marine mammals, wallabies, and crocodiles. • There are reports that the population of saltwater crocodile is increasing. • Ten endangered mammals and three endangered reptiles are found in East Timor. • Identified two tree species that are endangered in East Timor – Sandalwood (*Sandalum album*) and Timorese mango (*Mangiferatimorensis*). • BirdLife International and the Directorate of the Environment have done recent inventories of threatened birds and	Collections of biological materials from East Timor are located primarily in Indonesia, Australia, the Netherlands, Portugal, and the United States. Populations of selected taxonomic groups have not been ascertained, only the identification of species has been done.

Goals and targets	Related national targets (2011-2020) From NEGA 2011	Relevant national indicators (Accomplishments)	Remarks
		internationally significant sites (BirdLife International-Asia Programme, 2003) in Maubara, Los Palos and the three lakes of Tacitolu where the government is planning a peace park. • Threatened and endangered marine species include turtles, dugong, whales, dolphins, sharks, crabs, and clams.	
Target 2.2: Status of threatened species improved.		• Population of the CITES-listed saltwater crocodile is increasing as noted by the locals. • Some fauna groups are protected under UNTAET Regulation No. 2000/19. These include all species listed in the CITES, Appendices I and II, including sea turtles, marine mammals, wallabies, and crocodiles.	Some species are not considered threatened in the country such as the crocodile and crabs. Populations of threatened species have not been ascertained.
Goal 3. Promote the conservation of genetic diversity			
Target 3.1: Genetic diversity of crops, livestock, and of harvested species of trees, fish and wildlife and other valuable species conserved, and associated indigenous and local knowledge maintained.		• Varieties of locally-adapted coffee plants are maintained in agroforestry systems. • Coffee and vanilla varieties have been improved through the USAID program and maintained in the agroforestry systems. • Two Central Seed Centers were set up in BalaiBenihInduk , Maliana, Bobonaro district (rice) and in Loes, Liquica district (corn, soybean, peanuts and mung beans). • The transitional government and the international donor community have undertaken efforts to conserve and support the sustained production of commercially	The varieties of coffee produced are very strong tasting and is a genetic mix of Robusta and Arabic strains developed over the years. The coffee is hardy, resistant to disease (leaf rust), and is able to grow at practically all elevations.

Goals and targets	Related national targets (2011-2020) From NEGA 2011	Relevant national indicators (Accomplishments)	Remarks
		important plant species through restoration and additional development of local seed resources and seed production stations.	
Promote sustainable use			
Goal 4. Promote sustainable use and consumption.			
Target 4.1: Biodiversity-based products derived from sources that are sustainably managed, and production areas managed consistent with the conservation of biodiversity.		• Coffee and vanilla are products derived from the agroforestry production systems that are presently sustainably managed. • Meat products from livestock are sourced from animals that have been introduced in the agroforestry systems under the coffee project. The animals also provide manure as fertilizer in the production system. • Sandalwood, a prime commodity, is also being produced in agroforestry systems by the MAFF.	
Target 4.2: Unsustainable consumption of biological resources or that impacts upon biodiversity, reduced.		• Species for use as fuelwood and fodder are being planted. These could be pruned later for fuelwood and fodder instead of cutting the whole tree. In turn, this would ease the pressure on natural forests from firewood gatherers.	
Target 4.3: No species of wild flora or fauna endangered by international trade.		• Poaching for the pet trade exist in Timor-Leste. While the UNTAET Regulation 2000/19 aims to protect threatened species, actual or effective enforcement of the regulation is lacking.	

Address threats to biodiversity			
Goal 5. Pressures from habitat loss, land-use change and degradation, and unsustainable water use, reduced.			
Target 5.1. Rate of loss and degradation of natural habitats decreased.		Rate of loss has not been established, however, the following regulations are in place to protect these natural habitats: • UNTAET Regulation No. 2000/17 prohibits logging and the export of wood products. • UNTAET Regulation No. 2000/19 protects 15 of the remaining primary forest areas, primarily mountain summits. Coral reefs, mangroves, and wetland habitats are also protected under this regulation. • There are also traditional regulations and customs like *Tara bandu*, which, in some areas, have been successful in conserving natural resources such as forests and crops.	
Goal 6. Control threats from invasive alien species			
Target 6.1: Pathways for major potential alien invasive species controlled.		Major pathways of invasive alien species have not been identified much less controlled although there are reports that when ships release their wastes along the coasts, invasive species may have spread; future outside investments for palm oil and sugarcane plantations may have also brought in invasive species.	

Target 6. 2: Management plans in place for major alien species that threaten ecosystems, habitats or species.		No management plans for any alien species.	
Goal 7. Address challenges to biodiversity from climate change, and pollution			
Target 7.1. Maintain and enhance resilience of the components of biodiversity to adapt to climate change.	*The goal here is to design protected areas so that they are resilient and able to withstand stresses and changes such as human-induced climate change.* • *30% of the nation's sequestered carbon found in living terrestrial vegetation is captured inside protected areas.* • *80% of the current distribution of mangroves to be protected in protected areas based on securing the carbon of these mangroves.* • *Ensure that protected area are as large as they can possibly be.* • *Ensure that protected areas are connected to one another especially along elevation gradients for terrestrial protected areas.*	NAPA programmes or goal 7 mention the biological components of biodiversity in addressing climate change. Around 22% of carbon sequestered / secured is within the Protected Area Network. Only 50% of the mangroves are found in the Protected Area Network, therefore, only 50% of the carbon is secured in mangroves.	

	• *Ensure climate refugia are protected especially in areas representative of major geological features in the Protected Area system.*		
Target 7.2. Reduce pollution and its impacts on biodiversity.		Programmes / activities on coastal and river clean-up are being done annually. Agricultural activities that contribute to pollution of rivers and coral reefs have not yet been addressed.	
Maintain goods and services from biodiversity to support human well-being			
Goal 8. Maintain capacity of ecosystems to deliver goods and services and support livelihoods			
Target 8.1. Capacity of ecosystems to deliver goods and services maintained.		Reforestation and afforestation activities are ongoing along with the use of agroforestry techniques.	
Target 8.2. Biological resources that support sustainable livelihoods, local food security and health care, especially of poor people maintained.		Agroforestry production systems that incorporate coffee, vanilla, sandalwood and livestock have been promoted. Corn, soybean, peanut, and mungbean cultivation are also being done.	
Protect traditional knowledge, innovations and practices			
Goal 9. Maintain socio-cultural diversity of indigenous and local communities			
Target 9.1. Protect traditional knowledge, innovations and practices.		The *Tara bandu* traditional law is being promoted and has been also included in the policies of biodiversity conservation.	

Target 9.2. Protect the rights of indigenous and local communities over their traditional knowledge, innovations and practices, including their rights to benefit-sharing.		The *Tara Bandu* traditional law is used to protect and conserve the biological resources; however, efforts toward benefit-sharing.	
Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources			
Goal 10. Ensure the fair and equitable sharing of benefits arising out of the use of genetic resources			
Target 10.1. All access to genetic resources is in line with the Convention on Biological Diversity and its relevant provisions.			No system in place yet.
Target 10.2. Benefits arising from the commercial and other utilization of genetic resources shared in a fair and equitable way with the countries providing such resources in line with the Convention on Biological Diversity and its relevant provisions.			No system in place yet.

Ensure provision of adequate resources			
Goal 11: Parties have improved financial, human, scientific, technical and technological capacity to implement the Convention			
Target 11.1. New and additional financial resources are transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with Article 20.		Several donor agencies have brought in development projects aimed at addressing biodiversity conservation concerns and the Millennium Development Goals. These are the following: USAID, UNDP, ADB, WB, DfID, GIZ, CIDA, INGOs such as Bird Life International, WWF, and Local NGOs, the European Union (EU), JICA, UNESCO, AusAID. Timor-Leste is also involved in regional initiatives such as the Coral Triangle Initiative, PEMSEA, Arafura and Timor Seas Experts Forum (ATSEA).	
Target 11.2. Technology is transferred to developing country Parties, to allow for the effective implementation of their commitments under the Convention, in accordance with its Article 20, paragraph 4.		The technologies on improved varieties of coffee and vanilla as introduced by the USAID project and the University of Hawaii's CRSP for other crops have been transferred, or at least introduced in Timor-Leste. Livestock is being incorporated into the agroforestry production systems along with the use of varieties of coffee, vanilla, and legumes. These technologies contribute to the maintenance of ecosystems services and the reduction of impacts on habitats and species.	

Notes

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