FAA 118 / 119 REPORT

CONSERVATION OF TROPICAL FORESTS

AND

BIOLOGICAL DIVERSITY

IN TIMOR-LESTE

JUNE 2012

PURPOSE

In 2012, USAID/Timor-Leste will prepare its five-year Country Development Cooperation Strategy. USAID/Timor-Leste recognizes that protection of the environment and sustainable management of natural resources are required for a successful development program. Climate change adaptation, environment and natural resources management will be crosscutting themes in the new strategy. This report is an update of an assessment conducted in 2009 and fulfills the planning requirements set out by two provisions of the Foreign Assistance Act:

1. Section 118(e) "Country Analysis Requirements – Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of – (1) the actions necessary in that country to achieve conservation and sustainable management of **tropical forests**, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

2. Section 119(d) "Country Analysis Requirements – Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of – (1) the actions necessary in that country to conserve **biological diversity**, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

METHODOLOGY

This report is intended as an update to the 2009 draft of the Timor-Leste Tropical Forests and Biodiversity Analyses. Additional information was gathered and incorporated into the previous report during a visit to Timor-Leste in April 2012 by Sarah Tully, USAID, ME/TS. Sarah Tully conducted interviews and meetings with representatives of local country ministries, non-governmental organizations, and USAID staff. Sarah Tully was based in Dili and conducted field visits around the capital.

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ACRONYMS AND ABBREVIATIONS

ACIAR	Australian Centre for International Agricultural Research
ADB	Asian Development Bank
AusAID	Australian Government Overseas Aid Program
CBD	Convention on Biological Diversity
cd	Conservation Dependent
CFET	Consolidated Fund for Timor-Leste
CI	Conservation International
CIA	Central Intelligence Agency
CITES	Convention on International Trade in Endangered Species
COCAR	Consolidating Cooperative and Agribusiness Recovery
CR	Critically Endangered
CRS	Catholic Relief Services
CSO	Civil Society Organization
CTI	Coral Triangle Initiative
CTSP	Coral Triangle Support Program
CWS	Church World Service
°C	Degrees Centigrade
DD	Data Deficient
DGEWS	Directorate General of Electricity, Water and Sanitation
DHS	Demographic and Health Survey
DNAAI	National Directorate for International Environmental Affairs
DNAS	National Directorate of Water Supply and Sanitation
DNSAS	National Directorate of Water and Sanitation Services
DNSB	National Directorate for Basic Sanitation
DNCQA	National Directorate for Water Quality
DOCIA	Development of Communities through Intensive Agriculture
DSHEP	Development Scholarships and Higher Education Program
DWASH	District Water Supply, Sanitation and Hygiene Program
EC	European Commission
Ed	Education
EN	Endangered
FAO	Food and Agriculture Organization
GEF	Global Environment Facility
GHG	Greenhouse Gas
GIZ	German Society for International Cooperation
GoTL	Government of Timor-Leste
ha	Hectares
HHI	Habitat for Humanity International
Hivos	Humanist Institute for Development Cooperation
ICRC	International Committee of the Red Cross
IDA	International Development Association
ILO	International Labor Organization
IMF	International Monetary Fund
INA	Indonesia
IrishAID	Irish Government Overseas Aid Program
IRL	Ireland
IUCN	International Union for Conservation of Nature

JICA	Japanese International Cooperation Agency
km	Kilometers
KOICA	Korea International Cooperation Agency
LR	Lower Risk
m	Meters
mm	Millimeters
MAF	Ministry of Agriculture and Fisheries
MCC	Millennium Challenge Corporation
MDG	Millennium Development Goals
MED	Ministry of Economy and Development
MICS	Multiple Indicator Cluster Survey
Min	Ministry
MoE	Ministry of Education
MoH	Ministry of Health
MoI	Ministry of Infrastructure
NAP	National Action Programme to Combat Land Degradation
NAPA	National Adaptation Programme of Action on Climate Change
NBSAP	National Biodiversity Strategy and Action Plan
NCBA	National Cooperative and Business Association
NDES	National Directorate for Environmental Services
NDF	National Directorate of Forests
NEGA	National Ecological Gap Assessment
NGO	Non-Governmental Organization
NKSNP	Nino Konis Santana National Park
No.	Number
NOAA	National Oceanic and Atmospheric Agency
NOR	Norway
nt	Near Threatened
NTF	Naroman Timor Foun
NZ	New Zealand
OXFI	Oxfam International
PoWPA	Programme of Works on Protected Areas
RR	Restricted-Range
SCUBA	Self-Contained Underwater Breathing Apparatus
SEARCA	Southeast Asian Regional Center for Graduate Study and Research in Agriculture
SEMA	State Secretariat for the Environment
SoL	Seeds of Life
SoS	Secretary of State
SPRTL	Strengthening Property Rights in Timor-Leste
TAF	The Asia Foundation
UN	United Nations
UNCBD	United Nations Convention on Biodiversity
UNCCD	United Nations Convention to Combat Desertification
UNCDF	United Nations Capital Development Fund
UNDP	United Nations Development Program
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFCC	United Nations Framework Convention on Climate Change
UNHRC	United Nations Human Rights Council
UNICEF	United Nations Children’s Fund

UNTAET	United Nations Transitional Administration in Timor-Leste
UNTL	National University of Timor-Leste
USA	United States of America
USAID	United States Agency for International Development
USG	United States Government
VU	Vulnerable
WB	World Bank
WFP	World Food Program
WLDV	World Vision
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

Timor-Leste is located in the Lesser Sunda Islands (part of the Australian continental plate), and includes the eastern end of the island of Timor, the Oecussi enclave in West Timor, and the islands of Atauro and Jaco. The flora and fauna of Timor-Leste appear to represent a mixture of Asian and Australian families and there are a large number of endemic species including 1500 plants, 262 birds, 127 mammals, 33 frogs, 99 reptiles and 50 freshwater fish. Unique areas of biodiversity include coastal and marine zones, Jaco Island, Nino Konis Santana National Park, semi-evergreen forests, moist deciduous forests, and non-deciduous forests. These natural systems contain rare species including the Christmas Island Frigatebird, Borneo teak, sandalwood, dugong, loggerhead turtles, and the Timor yellow tiger.

Timor-Leste has acceded to the following United Nations Conventions: to combat desertification (UNCCD) in 2003; on Biodiversity (UNCBD) in 2006 and Climate Change (UNFCCC) in 2007. National Action Plans have been written for Combating Land Degradation (2008), Climate Change Adaptation (2010), and Biodiversity (2012), and a National Ecological Gap Assessment was conducted (2010). Currently, work is underway on the Programme of Works on Protected Areas (PoWPA). Timor-Leste is a party to several regional agreements including the Arafura and Timor Seas Expert Forum to achieve sustainable development and poverty alleviation in coastal communities, Partnerships in Environmental Management for the Seas of East Asia, and the Coral Triangle Initiative to address the urgent threats facing the coastal and marine resources of one of the most biologically diverse and ecologically rich regions on Earth.

The Constitution of Timor-Leste provides clarity on the importance of the environment to livelihoods and national development; however, a complete legal framework has yet to be put into place. In the period between the 1999 referendum and official independence (May 20, 2002), The United Nations Transitional Administration in Timor-Leste (UNTAET) was given overall responsibility for the administration of Timor-Leste. Some Indonesian legislation related to the environment was used during this period and some specific UNTAET regulations were also drawn up. There was a Supreme Court decision against the use of Indonesian law in August 2003. While the Government of Timor-Leste is in the process of developing and approving its own set of environmental laws, the following two UNTAET regulations still seem to be in effect as of April 2012 (NBSAP, 2011). UNTAET Regulation No. 2000/17 prohibits logging and the export of wood products and UNTAET Regulation No. 2000/19 protects 15 of the remaining primary forest areas (primarily mountain summits), coral reefs, mangroves, and wetland habitats. These protected habitats allow traditional use by local communities.

The major threats to biodiversity and tropical forests may be categorized as the following in Timor-Leste: energy issues, lack of economic opportunity, lack of legal framework for the environment and natural resources, pollution, investments for economic growth, lack of human capacity and public awareness, climate change, and invasive species.

Energy Issues

The great irony of Timor Leste is that it is a country with ample petroleum resources and revenues coming online, but its citizens lack access to energy. Around 98 percent of people are dependent on fuelwood for cooking. A lack of economic alternatives drives deforestation, coral reef destruction and over-exploitation of wildlife in Timor-Leste. Deforestation is the single most pressing problem in Timor-Leste. The majority of Timor-Leste's endangered species, and much of its biodiversity are found in its remaining forests. Pressures on forests are driven primarily by the need for firewood, clearing for

agriculture and escaped fires during land clearing or hunting. Illegal logging is also a threat. From March 2002 to November 2003, the police confiscated over 572,000 tons of sandalwood (National Directorate of Forestry and Water Resources, 2003). Hunting for meat or sale for the pet trade appears to be common, but there are few concrete data. Destructive fishing practices are contributing to the degradation of coral reefs. During the UN transition period, corals were also used for construction material.

Lack of Economic Opportunity

More than two fifths of Timorese live in poverty. The poorest households are mostly farmers in rural areas with little land and no education. Given the low amount of appropriate agricultural land, and a rapidly growing human population engaged primarily in subsistence agriculture, the pressure on forest resources will continue unabated and habitat degradation will occur, unless steps are taken in the immediate future.

Given Timor-Leste's sloping terrain and the rainfall pattern of short, intense rains, soil erosion from farming and deforestation have negative impacts on both terrestrial and aquatic biodiversity. Conservation impacts of high erosion include loss of forest habitat through landslides and degradation of river and coastal habitats through sedimentation. Stream sedimentation is very high from upland soil erosion. Livestock grazing also contributes to erosion and the appearance of weeds that are difficult to eradicate.

Poaching and illegal logging are a major problem for endangered species. Endangered species are hunted for food, medicine, ornaments, and collected live for the pet trade. Conservation efforts in Timor-Leste are nascent. A start at protecting endangered species has been made by the formulation of UNTAET Regulation No. 2000/19, but enforcement has been lacking.

Lack of Legal Framework for the Environment and Natural Resources

As noted by Barreto (2007), Timor-Leste's legal framework is still not sufficient to protect forests and biodiversity. Rights to natural resources such as forests, land and water are not yet clarified. The lack of clear rights deters investments for conservation for the small-scale farmer, while facilitating the negotiation of the handover of large tracts of land to foreign investors. Decree Law No. 5/2011 legislated an Environmental Licensing System designed to prevent negative environmental impacts and control pollution from projects, but there is limited capacity to institute the law. Many laws and decrees regulate the fisheries sector, but they are rarely enforced. The Government of Timor-Leste is currently drafting and approving several laws and policies impacting the environment, forestry and biodiversity.

Pollution

Pollution from a variety of sources has potential for negative impacts particularly upon aquatic biodiversity. For example, upstream pollution of rivers from agricultural inputs and human wastes is not only contaminating rivers and streams, but also, makes its way out to the coasts and coral reefs. In 2009, the National Directorate of Water and Sanitation estimated that only 66 percent of the population has access to an improved water source and 49 percent use improved sanitation. Waste is a large issue and most waste is not collected nor disposed and remains on the streets and in dried up streams before being carried to the ocean by the rain. Air pollution is also a major concern, particularly for women and children who breathe in polluted air while cooking with firewood. In Dili, 91 percent of households use

firewood and in other parts of the country, 99 percent of households rely on firewood (2011 Human Development Report: Timor-Leste; Mercy Corps, 2011; CBD, 2011; NBSAP, 2011).

Investments for Economic Growth

Threats to biodiversity may arise due to outside investments such as, road construction, hydroelectric power plants, and oil palm and sugar cane plantations. Recently, the Government has increased spending on road improvements and construction in rural areas and the ADB country partnership emphasizes transportation infrastructure development. Road construction is a valuable way to connect rural communities to trade and communication networks, but it can lead to habitat fragmentation and wildlife mortality, increased threats from hunting, overharvesting of non-timber forest products and the introduction of invasive weed species.

While the Government of Timor-Leste has expressed interested in an integrated energy policy and investments in alternative energy, it is addressing energy needs by focusing on immediate solutions. Natural gas supplies from the Sunrise Petroleum field will not be online until 5 – 10 years from now, so the Government is currently funding the construction of three heavy oil-based power plants and the foundation stone for the first plant was laid in January 2010. Numerous NGOs have raised questions over the suitability of the plan and the potential environmental problems. There are concerns that the focus on the power plants will reduce interest in the development of alternative energy technologies. Heavy oil is polluting, can create acid rain, increase greenhouse gas emissions, pollute water resources and generate toxic waste.

Lack of Human Capacity and Public Awareness

In the environment sector, the government has limited budget and limited staff. Further development of capacity of staff is needed in scientific and management skills. In Timor-Leste, there is an overall lack of information on the environment and biodiversity such as extent of forest cover, hydrology, water catchment and wetland areas. The lack of knowledge hinders conservation. New legislation is being drafted and information to the public on these laws will need to be disseminated.

Climate Change

Timor-Leste faces considerable risk from the impact of climate change. The country will likely experience greater variability in rainfall from more intense rains for short periods, lengthened periods of drought, variations in monsoon winds and increased intensity of cyclone winds. The State of the Nation report attributes flooding in the west and east to climate change (MED, 2008). Such changes could affect the ability of species to survive in their current habitats. Sea level rise will change or eliminate coastal ecosystems and seawater acidification is anticipated. Coral reefs are most at threat from temperature rises and extreme temperature events are expected to increase. Climate variability will increase degradation of forested areas, soil erosion and landslides and flooding.

Invasive Species

Invasive species such as *Chromolaena odorata* (Siam weed) and *Mimosa diplotricha* hinder the rehabilitation of degraded lands. The cane toad (*Bufo marinus*) entered in 1999 with international troops, is poisonous to animals and may have already displaced native amphibians. Other potentially invasive species found in Timor-Leste by Charles Darwin University researchers include *Lantana gorse*, *Catharanthus roseus*, *Jatropha gossypifolia*, *Ziziphus mauritiana*, *Calotropis gigantean*, *Sida acuta*,

Lantana camara, *Tithonia diversifolia*, *Parkinsonia* sp. (*Palo Verde*), and *Prosopis pallida* (*Mesquite*) (NBSAP, 2011). According to the Global Invasive Database, the following invasive species are found in Timor-Leste: *C. odorata, Leucaena leucocephala, Thevetia peruviana, M. diplotricha, Cyprinus carpio, Lutjanus kasmira, Gallus gallus, Porphyrio porphyrio, Cervus timorensis russa,* and *Varanus indicus*. It is estimated that one-third of the mammal species on the island of Timor have been introduced and that they have accelerated the decline of endemic fauna.

Many bi- and multi-lateral donors and non-governmental organizations are actively working to address some of these threats to tropical forests and biodiversity. The United Nations Development Program (UNDP) has assisted the Government of Timor-Leste in the development of the National Biodiversity Strategy and Action Plan in 2011, reports to the UN CBD in 2011, a Programme of Works on Protected Areas in 2012, establishment of the Clearing House Mechanism for knowledge management on biodiversity in 2012, a National Action Programme to Combat Land Degradation in 2009, a National Ecological Gap Assessment in 2010 and the National Adaptation Plan of Action (NAPA) in 2010. Climate change adaptation is an active area of donor engagement in Timor-Leste. Global Environment Facility (GEF), AusAID and UNDP are conducting stocktaking and a stakeholders' consultation for development of project proposal for the Initial National Communication on Climate Change, and GEF and UNDP have NAPA follow up activities in support of strengthening the resilience of rural Timor-Leste to climate risks and disasters. The Coral Triangle Initiative supported by ADB, USAID, the National Oceanic and Atmospheric Administration (NOAA) and GEF funds payment for ecosystems management, fisheries management and mangrove protection. Several donors such are focusing on clean energy programs. JICA is working with the Secretary of State for Energy Policy on reducing greenhouse gas (GHG) emissions from power plants through use of solar photovoltaic cells. The European Commission is supporting Mercy Corps' Energy for All Program focusing on enhanced knowledge of renewable energy sources and improved access to energy in rural and peri-urban areas. The project includes work on cookstoves, solar energy, alternative energy loans, a fuelwood survey, fuelwood planting and agroforestry.

USAID's current program is focused on accelerating economic growth; strengthening key foundations of governance, increasing higher education opportunities and improving the health of the Timorese people, especially women and children. The ongoing economic growth programs support the diversification and sustainability of agricultural systems including improvements in coffee production in agroforestry systems. In this way, USAID has been reducing agricultural pressure on forests and their biodiversity.

USAID's new country strategy can meet conservation needs through the continuation of existing programs with the explicit integration of forest and biodiversity concerns within the economic growth and governance sector portfolios. Such integration is needed because the majority of Timor-Leste's population depends on natural resources for food and income. Furthermore, the sound management of these resources will be an indication and mechanism for good governance at national and local levels. Below are possible actions for the new USAID strategy in Timor-Leste that will meet Timor-Leste's needs to conserve forests and biodiversity. They are a range of options for consideration within the new strategy and it is not suggested that all recommendations be carried out. With additional funding, stand-alone activities could be carried out as well on the below topics. The recommended priority activities would include, in no specific order: clarification of tenure rights; sustainable land use policy; large-scale reforestation; increased capacity for natural resources management and governance; off-grid renewable energy; conservation of the Coral Triangle and conservation of the remaining forests. There are numerous linkages within this set of priorities because for example, deforestation will impact the sea and corals while clear land tenure is needed for reforestation. Off –grid renewable energy would reduce

deforestation for firewood and reduce pollution that currently affects all ecosystems and their biodiversity. Natural resource management activities, alternative energy development, sustainable agriculture, ecotourism and large-scale reforestation projects can provide much needed employment opportunities for the rapidly growing youth population.

Economic Growth through Watershed Management and Reforestation

The government of Timor-Leste and donors recognize the importance of watershed and water resources management. Reversing the declines in biodiversity, forest areas and agricultural productivity can be accomplished through sustainable natural resource management interventions in fragile land areas such as watersheds. Such interventions can include slope stabilization, reforestation and agricultural diversification. USAID's previous work on the identification of a critical watershed for rehabilitation and conservation in Oecussi could act as demonstration for the government of Timor-Leste. Working at a watershed level not only will conserve biodiversity and rehabilitate degraded lands, but also will improve water quality and quantity. Reforestation could utilize firewood species and others that have qualities for slope stabilization and water retention. Active protection of seedlings and trees from fires will be a critical component of any reforestation activity and would generate income.

Economic Growth and Conservation through Clean Energy

A stable energy supply at the local and national level is critical for the economic growth of Timor-Leste. USAID could explore opportunities between linkage of clean energy production and job creation. This effort would assist biodiversity conservation, as one threat to biodiversity is the lack of economic alternatives to the exploitation of forests and wildlife. On the one hand, oil and natural gas from the Timor-Leste Sea will be coming on line. How much of this will contribute to national energy generation versus foreign exchange earnings might be analyzed in the context of Timor-Leste's ability to generate other renewable energy resources, such as solar and biomass.

Economic Growth through Workforce Development

Given high unemployment in Timor-Leste, a possible objective is expanded employment and income generating opportunities in rural areas. The most practical opportunities for income generation are within the agricultural production and associated agribusinesses. It is encouraged that efforts in improving agricultural production include approaches that promote the conservation of natural resources such as soil and water. Diverse production systems that include a variety of products rather than monocultures would also be beneficial to minimize risk to market fluctuations and weather as well as have positive benefits to biodiversity. Mixes of different agricultural and tree species have benefits for the overall biodiversity of rural areas because they provide habitat for beneficial insects and birds. Even agricultural diversity mimics to some extent natural biodiversity. Natural resource management activities, alternative energy development, sustainable agriculture, ecotourism and large-scale reforestation projects can provide much needed employment opportunities for the rapidly growing youth population.

Payment for Environmental Services

A relatively new idea in international development and environmental conservation is the payment to communities for sound management of the environment. Such management in the case of watersheds provides benefits of a steady water supply to downstream users such as urban populations and farmers who irrigate their fields. The initiation of such a payment program would depend upon whether there

are any downstream users of water who would be able to provide some form of payment. In other countries, such downstream users of water are urban water authorities and irrigators. The payment is not necessarily a direct cash transfer to families, but can also take the form of communal funds managed for education or other community needs. It would be worth exploring whether there would be opportunities for payment to communities to manage the watershed that maintains water supplies to Dili residents.

Economic Growth through Fisheries Management and Coastal Tourism

The fisheries and coastal tourism could provide both food and income for Timor-Leste. The extent of Timor-Leste's fishery resources is not known. Some fishing occurs for local markets and vessels from other countries have been fishing offshore. An inventory of aquatic and marine species and their abundance has been completed and there is now a better idea of what species might be threatened and in need of protection. Marine protected areas should be established based on preferred locations of those species under threat and critical spawning grounds.

Coastal tourism that emphasizes biodiversity conservation has the potential to generate employment and income for the Timorese while protecting coastal resources. Examples include walking and shallow-water snorkeling tours that would educate tourists on local flora and fauna. SCUBA diving is another sub-sector that would, if properly managed, be highly successful given the diversity of coral that currently exists in the shallow waters off of Timor-Leste. Limitations on tour group size and frequencies would need to be exercised. Small, unobtrusive campsites could be designated and plots rented to tourists. In the development of tourism, opportunities for direct community involvement and benefit sharing should be explored.

Promoting Good Governance through Public Participation in Environmental Policy and Natural Resource Management

Uncertainty regarding land and property extends into forestlands and natural resources. The lack of clarity of rights and responsibilities has implications for sound environmental management. Security of tenure to agricultural and forestlands can be an incentive for community conservation of these resources. Rural poor would be more likely to invest in their land, including reforestation and sustainable agricultural practices that have downstream benefits in reducing soil erosion and rehabilitating degraded habitats. Such rights and enforcement of sound management can be strengthened through the official recognition of customary law for natural resource management and conservation, *tara bandu*. USAID should continue to work with the Ministry of Justice to clarify and enforce the Land Tenure Law.

Regarding environmental policy in general, advisors could be provided to improve capacity for policy formulation with public participation. Such a policy program could be developed to strengthen biodiversity conservation, watershed management, and sustainable agricultural practices. An overall participatory process in the development of policies related to resource tenure and environmental management such as protected area delineation is a concrete manner to demonstrate the implementation of good governance.

Environment and Health

Environment and health are closely linked with respect to foods and nutrition; sustainability of and access to natural resources; clean water supplies and firewood and respiratory illnesses. As the health special objective is defined, some of these links might be appropriate for integration. For example, the production of education materials on these links might be an opportunity to improve both the health and

environment of communities. The promotion of sustainable agriculture and reforestation with useful products such as fruits, vegetables and livestock will improve the food security and nutrition of families. Clean water supplies will depend upon reforestation, the stabilization of slopes as well as the implementation of some form of water sanitation. Finding alternatives to the use of firewood for cooking, or making cooking with firewood more efficient could reduce the incidence of respiratory illness among families.

Crosscutting – Adaptation to Climate Change

Climate variability already impacts economic sectors in developing countries and adaptation to this variability will be critical to sustaining improvements in development. To begin with, a "risk-based approach" to planning is needed with the objective of ensuring the economic resilience while working to conserve the environment to the greatest extent possible in a changing climate. In considering adaptation, numerous interventions need to be taken into account focusing on health, water, food, and income security. Adaptation of forest, marine and aquatic ecosystems as well as the wildlife they contain is paramount to maintaining current life on earth. Furthermore the most heavily populated areas are coastlines that will be directly impacted by sea-level rise.

Other goals in an adaptation strategy include: Counteracting water scarcity exacerbated by climate change; improving food security and food affordability; addressing hazard prone areas exacerbated by climate change (urban, rivers, coasts, hills & mountains); increasing the resilience of forests, wildlife and natural resources to climate change and increase adaptation benefits for human society; providing economic alternatives to those whose livelihoods will be affected by climate change; and assisting communities along coasts in adapting to climate change. Without these interventions there will be continued over-exploitation of the natural environment.

Crosscutting – Capacity Building

Crosscutting among all the recommendations is the need to build capacity among Timorese counterparts (including government and NGOs) in the design and implementation of conservation, sustainable production and development activities. USAID investments targeted towards biodiversity and forestry conservation of any type should consider integrating the building of government officials and civil society's capacity for safeguarding these resources.

Crosscutting – Gender

In Timor-Leste, women are traditionally responsible for household jobs such as cooking, cleaning, and child care. The country has a high fertility rate with 3.1 children per woman (World Fact Book, 2012, the 2010 DHS puts this number at 5.7) and women tend to have limited access to education and healthcare. Despite these constraints, women in Timor-Leste are fairly entrepreneurial and many own microenterprises involved in handicraft creation, salt-making and baked good production (2011 Human Development Report: Timor-Leste). As women are heavily engaged in agriculture as well as in firewood and non-timber forest product collection, their livelihoods are dependent on Timor-Leste's natural resource base. Women are potentially a good entry point for community-based approaches to conserving biodiversity and forests, as they have local knowledge of ecosystems, agricultural production and natural resource management. Their empowerment and equity are key factors for achieving economic growth, social development and environmental sustainability.

A. INTRODUCTION

Timor-Leste is located on Timor Island, the largest and easternmost island of the Lesser Sunda Islands chain (Figure 1), and is positioned in Wallacea, a biodiversity hotspot. Its residents voted for independence from Indonesia in a referendum held in 1999. Immediately following the referendum, large-scale violence by the Indonesian Army and militia erupted and included massacres and wide-scale destruction of property. Sixty to eighty percent of public and private property was destroyed including the electrical grid, water supply systems, schools and health clinics. There was a displacement of people into mountainous areas (UNHRC, 2000) and such violence destroyed the socio-economic base for the country's development. The United Nations helped to support the development of this new sovereign state and in May 2002, Timor-Leste became independent. In 2006, violence erupted in the face of the dismissal of soldiers, fighting between the military and the police and gang attacks. This also led to the displacement of as many as 150,000 people around Dili. People fled to the countryside and others found shelter in camps around Dili.

The area of Timor Leste is about 15,000 square kilometers (1.5 million ha) which is a little larger than the State of Connecticut. The total population of Timor-Leste is currently estimated at over 1.2 million people (World Fact Book, 2012). Timor-Leste has a high fertility rate with 3.1 children per woman (World Fact Book, 2012, the 2010 DHS puts this number at 5.7) and a population growth rate of 1.96 percent per year. The under-five mortality rate is 64 per 1,000 live births. Major killers of children under five are pneumonia, diarrhea, and malaria. There is a high prevalence of underweight children, reaching 45 percent (UN MDG Report 2011).

The population of youth aged 15 to 24 is growing quickly and it is estimated that 34 percent of inhabitants are under age 14 (World Fact Book, 2010). When combined with a lack of opportunities for employment, a large proportion of youth in a country's population can and have contributed to civil conflict. Currently unemployment is almost 20 percent in rural areas and up to 40 percent in urban areas, and youth unemployment is approximately 40 percent in Dili. Non-oil per capita income is estimated at $748 (UN MDG Report, 2011).

About 72 percent of the population is rural (World Fact Book, 2012), yet only 8.2 percent of the land is considered arable. A rural family holds on average about 1.2 ha of land and the rural population is poorer than urban populations (Ministry of Agriculture, *et al*., 2003). Farmers practice swidden cultivation and grow rice, corn, tubers and have some livestock. Coffee is the country's main export with the exception of petroleum and candlenut and coconut are grown commercially in lesser quantities. Agriculture provides 64 percent of the country's employment (World Fact Book, 2010).

Offshore petroleum production supports the government's revenue through a petroleum fund expected to be valued at $9.82 billion at the end of 2012. Amounts for government expenditure from this fund were to equal its "sustainable income"; however, in 2012, planned government expenditure totaling $764.5 million will leave an $8.5 million deficit. Despite the coming online of revenues for petroleum, statistics demonstrate a trend of increasing poverty from about 36 percent in 2001 to 41 percent in 2009 (UN MDG Report, 2011). Timor Leste's rank on the Human Development Index was 147 of 179 countries indicating that 18 percent of the world's countries were worse off than Timor-Leste. It ranked lower than Bangladesh, Laos, Cambodia and Indonesia (2011 Human Development Report). While food prices were increasing across the world in 2008, the government of Timor-Leste used petroleum revenue to import and subsidize rice to keep prices stable; however, this suppressed the rice price for the country's farmers. The poor rely on corn and cassava more than rice and still can experience food shortages for at least two months out of the year.

Figure 1: Location of Timor-Leste

Given that the majority of the population resides in rural areas, they are dependent upon forests and have an impact upon forest ecosystems and biodiversity. Deforestation and soil erosion are major problems in Timor-Leste (Westerberg, 2000). Forest cover in Timor-Leste has decreased by almost 30 percent over the period of 1972 to 1999, (Sandlund *et al*., 2001) and declined at a rate of 1.3 percent from 2000 to 2010 (CBD, 2011). It is believed that only 1 to 6 percent of the remaining cover is primary forest. Valuable timber species, such as sandalwood, teak and rosewood, have been nearly logged out due to cutting during the colonial and occupation periods. During the Indonesian occupation, troops frequently burned forests to flush out guerilla fighters and many people who fled from cities cleared forested land for agriculture. Fifty percent of the land is degraded (NAP, 2008) and this degradation is due, in part, to unsustainable agricultural practices. Subsistence farmers practice swidden agriculture by clearing forests for new fields in a cyclical manner. At low human population densities and long fallow periods, swidden systems can be sustainable. Population movements, sometimes forced, and lack of agricultural assistance under Indonesian rule affected the sustainability of agriculture. Despite relatively low population density in Timor-Leste, the amount of suitable agricultural land available per person is insufficient. Farmers regularly cultivate areas with slopes of more than 40 degrees. Almost half of the land of Timor-Leste is this steep or more (Democratic Republic of Timor-Leste, 2003). An additional pressure on forests and their biodiversity is the collection of fuelwood. Ninety to ninety-eight percent of the country uses fuelwood for cooking (World Bank, 2007; JICA 2002; Mercy Corps, 2011). Landslides

and flash floods are common. Despite such difficulties, agroforestry practices do exist, for example, shade coffee, and have the potential to rehabilitate degraded lands.

The Government of Timor-Leste's review of the natural resources and environment sector describes well the economic impacts of environmental degradation as follows:

"Natural resource degradation – for example, lack of water and productive land – is already limiting economic opportunities in many areas. It is also leading to significant direct economic costs, for example, by damaging infrastructure, increasing floods and contributing to health problems. Finally, there are localized threats to Timor-Leste air, coasts and remaining biodiversity" (Democratic Republic of Timor-Leste, 2003).

"The people of Timor-Leste have a strong relationship with the natural environment. For generations, our ancestors depended on the environment for food, clothing, building materials and everything else essential for life. We lived in harmony with the environment using it sustainably to support our families. But during the long period of colonialism and occupation, the exploitation and destruction of the environment was extreme. Forests were over-logged or burnt leading to landslides, chronic erosion, threats to wildlife and decreases in food sources. This has caused additional hardship for the many people living in rural areas who still rely on forests for food, fuel, medicines and building materials" (Timor-Leste Strategic Development Plan, 2011).

There is much work to be done to address Timor-Leste's challenges of deforestation and biodiversity loss. Opportunities to address these challenges will be considered in the light of the other pressing issues of Timor-Leste including youth unemployment, malnutrition, pervasive poverty and establishing a democratic government.

B. LEGISLATIVE AND INSTITUTIONAL STRUCTURES AFFECTING BIOLOGICAL RESOURCES

Legislation (Annex 1)

The Constitution of the Democratic Republic of Timor-Leste recognizes in Article 6 the importance of the protection of the environment. Furthermore, Section #61 states that:

1. 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.
2. The State shall recognize the need to preserve and rationalize natural resources.
3. The State should promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.

Section 139(3) addressing natural resources states "the exploitation of the natural resources shall preserve the ecological balance and prevent destruction of ecosystems" and Section 96(h) gives the Parliament the authority to define "the bases for a policy on environment protection and sustainable development."

The Constitution provides the greatest clarity on the importance of the environment to livelihoods and national development; however, a complete legal framework has yet to be put into place. In the period between the 1999 referendum and official independence (May 20, 2002), The United Nations Transitional Administration in Timor-Leste (UNTAET) was given overall responsibility for the

administration of Timor-Leste. Some Indonesian legislation related to the environment was used during this period and some specific UNTAET regulations were also drawn up. There was a Supreme Court decision against the use of Indonesian law in August 2003. While the Government of Timor-Leste is in the process of developing and approving its own set of environmental laws, the following two UNTAET regulations still seem to be in effect as of April 2012 (NBSAP, 2011). UNTAET Regulation No. 2000/17 prohibits logging and the export of wood products and UNTAET Regulation No. 2000/19 protects 15 of the remaining primary forest areas (primarily mountain summits), coral reefs, mangroves, and wetland habitats. These protected habitats allow traditional use by local communities.

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. Appendix I species are those threatened with extinction. Appendix II species are not threatened with extinction; however, their trade should be regulated in order to avoid exploitation that would affect their survival.

Government Resolution No. 8/2007 created Nino Konis Santana National Park, the largest among the protected areas. The Park covers an area of 123,600 ha (68,000 ha on land and 55,600 ha on sea). Government Resolution No. 9/2007 on the National Forestry Strategy and Policy provides for forest protection, water conservation and land restoration. This strategy will protect all forests from damage or loss through programs to involve communities in the management of forestlands, prevention and control of wild fires and reduced livestock grazing.

The Environmental Licensing - Decree Law No. 5/2011 institutes an Environmental Licensing System, designed as an incremental system to meet the need to prevent negative environmental impacts depending on the complexity of projects and given the economic and social situation of Timor-Leste. The system, moreover envisages the granting of environmental licenses and inspection responsibilities as a logical consequence of the procedure for environmental assessment of projects, thus creating an integrated procedure and a simplified process for prevention of negative environmental impacts and controlling pollution from projects.

To protect the environment and conserve the biodiversity of Timor-Leste, the Ministry of Agriculture and Fisheries (MAF) is responsible for quarantine control. Quarantine regulations are as follows:

- Quarantine Joint Instruction JI/2002
- Quarantine and Sanitary Control on Goods Imported and Exported - Decree Law No. 21/2003
- Quarantine General Regulations No. 1/2006

As mentioned in the 2011 Strategic Development Plan, many laws and decrees regulate the fisheries sector, but they are rarely enforced. These laws promote sustainable management of fisheries, ensure conservation of species, monitoring fishing activities, prohibit illegal fishing and ban the use of explosives and toxic substances for fishing:

- General Regulation on Fishing - Government Decree No. 5/2004
- On General Bases of the Legal Regime for Fisheries and Aquaculture Management and Regulation - Decree Law No. 6/2004
- Fishing Related Offences - Law No. 12/2004
- On General Bases of the Legal Regime for Fisheries and Aquaculture Management and Regulation - Decree Law No. 4/2005
- Ministerial Diploma No. 04/115/GM/IV/2005

- Ministerial Diploma No. 06/42/GM/I/2005
- Ministerial Diploma No. 02/04/GM/I/2005
- Ministerial Diploma No. 05/116/GM/I/2005
- Ministerial Diploma No. 03/05/GM/I/2005
- Implementing a Satellite System for the Monitoring Fishing Vessels - Decree Law No. 21/2008

Other laws that can impact incentives for forest and biodiversity conservation are Law No. 1/2003 and Law No. 12/2005 which provide the general conditions for land ownership and Decree Law No. 19/2004 which defines state property ownership (MED, 2008). With the support of USAID, in 2009 the Ministry of Justice drafted a new Land Tenure Law to define who does and does not own land and who deserves compensation but it was sent back to Parliament by the President and is now being revised. The passing of the law will be contingent upon approval of the new government.

The Government of Timor-Leste is currently drafting and approving several laws impacting the environment, forestry and biodiversity:

- Forest Management Decree Law (2007-in process) – sustainable management of forest resources and watersheds to provide environmental, social and economic benefits to the people of Timor-Leste
- Laws and Policies on Fertilizer and Pesticides (2009-draft) (NAP, 2008) and Seeds (2011-draft) (Fargher, J. *et al*., 2011)
- Environmental Base Law (2011-in process) – aims for the conservation and improvement of environmental quality, protection of human health, sustainable use of natural resources and pollution control. As of April 2012, this law has been approved by the Council of Ministers.

Several laws were proposed in the 2011 Strategic Development Plan that would greatly impact forests and biodiversity in Timor-Leste:

- Protected Area Decree Law (2011-proposed) – would update UNTAET Regulation 2000/19
- National Biodiversity Act or Biodiversity Decree Law (2011-proposed) – will assess the threats to marine and terrestrial biodiversity and identify strategies to conserve biodiversity
- Wildlife Conservation Law (2011-proposed) – will protect and conserve wildlife in Timor-Leste
- Air, noise, and soil pollution and vehicle emissions regulations (2011-proposed)

International Conventions (Annex 1)

Timor-Leste has acceded to the following United Nations Conventions: to combat desertification (UNCCD) in 2003; on Biodiversity (UNCBD) in 2006 and Climate Change (UNFCCC) in 2007. National Action Plans have been written for Combating Land Degradation (2008), Climate Change Adaptation (2010), and Biodiversity (2012), and a National Ecological Gap Assessment was conducted (2010). Currently, work is underway on the Programme of Works on Protected Areas (PoWPA). The National Parliament ratified the Kyoto Protocol on March 2008 and it came into effect on January 12, 2009. Timor-Leste plans to have a Designated National Authority for the Mechanisms of the Kyoto Protocol and a National Climate Change Centre by 2015. In 2009, Timor-Leste approved the Montreal Protocol, Vienna Convention and the London, Copenhagen, Montreal, and Beijing Amendments designed to protect the ozone layer by phasing out the production of numerous substances believed to be responsible for ozone depletion. The Nagoya Protocol on Access and Benefit Sharing of Genetic Resources is now under consideration. Timor-Leste is a party to several regional agreements including the Arafura and Timor Seas Expert Forum to achieve sustainable development and poverty alleviation in coastal communities, Partnerships in Environmental Management for the Seas of East Asia, and the

Coral Triangle Initiative to address the urgent threats facing the coastal and marine resources of one of the most biologically diverse and ecologically rich regions on Earth.

Government Institutions (Annexes 2 and 3)

Initially, the Democratic Republic of Timor-Leste had a Ministry of Development and Environment that was responsible for: environmental impact assessment; air and water pollution control; minerals management; biodiversity conservation; and environmental awareness and education (from Democratic Republic of Timor-Leste, 2003). Under Decree Law No. 7/2007, responsibility for the environment was included under the Ministry of Economy and Development (MED). As quoted from Article 26 of this Law, MED is:

- To draft an environmental policy and monitor and evaluate its implementation;
- To promote, follow-up and support strategies for integrating environmental issues in sectoral policies;
- To carry out strategic environmental assessments of plans and programmes, and coordinate the processes to assess the environmental impact of national-level projects, including public consultation procedures;
- To ensure the adoption of pollution prevention and control measures when issuing environmental licenses to production facilities;
- To manage National Parks and protected areas

There is a State Secretariat for the Environment (SEMA) included under the Ministry of Economy and Development (MED) (Ministry of Economy and Development, Decree Law No. 9/2008). Within the Secretariat there are two directorates: the National Directorate for International Environmental Affairs (DNAAI); and the National Directorate for Environmental Services (NDES). The latter is responsible for a national environmental education campaign. SEMA is responsible for the following:

- Improved management
- Regulation and environmental law
- Environmental education public awareness
- Evaluation, monitoring, investigation and permit environmental pollution license
- Reduce environmental impact
- Protecting and conserving the biodiversity and natural resources
- Enhanced participation in Multilateral Environmental Agreements Program
- Knowledge and quantification of Environmental Data
- Data Analysis and Sampling of Environmental Pollution in Timor-Leste, and
- Regional/Districts Focal Point for Environmental conservation and monitoring (MED, 2008)

Decree Law No. 7/2007 and Decree Law No. 18/2008 establish forestry and environment responsibilities under the MAF. The Ministry has associated with it the Secretary of State for Agriculture and Arboriculture, the Secretary of State for Fisheries, the National Directorate for Fisheries and Aquaculture, the National Directorate of Quarantine and Bio-security, the National Directorate for Irrigation and Water Use Management, the National Directorate of Agriculture and Horticulture and the Secretary of State for the Livestock Sector. The National Directorate of Forests and the Division of Reforestation and Forest Rehabilitation of MAF manage forests, and the Directorate for Protected Areas and National Parks is responsible for the Protected Area Network. The responsibilities related to forests and biodiversity include:

- To manage forest resources and catchment basins
- To control and oversee the fisheries and aquaculture sector
- To manage agricultural and forestry resources and watersheds
- To manage National Parks and Protected Areas
- To ensure the implementation and continuity of programs for rural development, in coordination with the MED
- To promote the agricultural and livestock breeding and fishing industries
- To manage quarantine services
- To carry out feasibility studies for the installation, rehabilitation, and improvement of irrigation systems
- To manage the water intended for agricultural purposes
- To control and inspect the fisheries and aquaculture sector

Several other Ministries and government bodies have mandates that can impact biodiversity and forests. Within the Ministry of Justice is the Directorate of Land, Property and Cadastre, which is responsible for the development and administration of an information system relating to use and ownership of immovable assets in Timor-Leste and for implementing an efficient system to manage State property. Under the Ministry of Trade, Tourism and Industry is the National Directorate of Tourism that regulates ecotourism and implements the national tourism policy. The National Directorate of Water Supply and Sanitation Services (DNSAS) within the Ministry of Infrastructure provides water and sanitation services to rural and urban areas of the country. The Decree Law No. 1 of 2011 flags upcoming changes to institutional arrangements for water supply and sanitation, with the creation of a National Directorate for Water Resources Management and a Directorate General of Electricity, Water and Sanitation (DGEWS) within the Ministry of Infrastructure. Under DGEWS, four directorates will be created including for water services (DNSA), basic sanitation (DNSB), water quality (DNCQA) and electricity. These changes are expected to come into effect in 2012. Lastly, the Secretary of State for Energy Policy is responsible for managing clean and alternative energy projects and the National Directorate for Environmental Health under the Ministry of Health is responsible for coordinating water and sanitation initiatives.

There are also traditional regulations and customs that in some areas have been successful in conserving natural resources such as forests and crops. This system of communal protection is known as *tara bandu*. Villagers designated as *cab-leha/tobe* are responsible for seeing that village laws are followed (Sandlund, *et al*., 2001). Also, there were designated village foresters. *Tara bandu* includes temporary prohibitions on resource extraction, such as tree cutting including mangroves and the designation of specific areas as sacred; for example, Jaco Island and its surrounding reef are considered sacred by the local community. *Tara bandu* prescribes fines for violations and also provides for mediation of land disputes. Timor-Leste's Constitution states in Section 2 line 4 "The State shall recognize and value the norms and customs of Timor-Leste that are not contrary to the Constitution and to any legislation dealing specifically with customary law."

In the State of the Nation Report (MED, 2008) and the 2011 Strategic Development Plan, the government states it is committed to developing environmental policies and aims to also have policies that integrate environmental sustainability across all development sectors. The government plans to update UNTAET regulations, comply with international conventions, including approval of a national strategy to conserve biodiversity, and establish a protected area system. Current and proposed policies impacting biodiversity are as follows (Summarized in Annex 1):

- National Fisheries Policy 2001 (currently being updated) – Forms the basis for future detailed fisheries management strategies that take account of ecologically sustainable development (ESD) that meets the needs of the present without compromising the ability of future generations to meet their own needs. Decisions will be based on the best scientific and economic advice available and take full account of traditional social structures and practices. Update will form Marine Protected Areas.
- Agriculture Policy and Strategic Framework 2004 – Working with rural communities to increase food production, and improve forest rehabilitation, watershed protection and biodiversity conservation.
- Forestry and Water Sub-Sector Policy 2004 – Community-based natural resource management strategy in the rehabilitation and conservation of remaining forest areas.
- National Forestry Policy 2005 – Sustainable management of forest resources and watersheds to provide environmental, social and economic benefits to the people of Timor-Leste.
- National Food Security Policy 2005 – A complementary instrument, not only for achieving the Millennium Development Goals, but also for materializing the Government's policy to eradicate hunger in all its forms, thus contributing to poverty reduction by 2020.
- National Policy of Waste Management (2007-proposed) – Proposed in the 4th Government programme 2007-2012.
- National Policy of Sustainable Natural Resource Use Regarding Extractives (2007-proposed) – Proposed in the 4th Government programme 2007-2012.
- Rural Energy Policy (2008-draft) – To respect that access to energy services in rural areas is an integral part of overall rural, agricultural and forest development and to take advantage of renewable, local energy resources, wherever this is possible from the aspects of availability (potential), energy demand, technical and social implications, economic feasibility, ecological harmony and sustainability.
- Water Resources Policy (2009-draft) – Under development by the Ministry of Agriculture and Fisheries and National Directorate for Water Resources Management (newly created).
- National Bamboo Policy (2011-proposed) – Proposed in the 2011 Strategic Development Plan. To increase the growth of bamboo both in forest and non-forest areas.
- Policy for Managing Watersheds and Coastal Zones (2011-proposed) – Proposed in the 2011 Strategic Development Plan. Will include strategies to rehabilitate and protect mangroves in coastal areas, regulate sand exploration in various rivers, especially the Comoro River, and will create buffer zones on riverbanks and around dams, lakes and coastlines to aid water resource conservation and floodplain control.
- National Environmental Policy (2012-proposed) – Allows the creation of necessary mechanisms for the management of the country's environment and natural resources in order to be able to achieve a sustainable economic development.

Donors and International Organizations (Annex 4)

During the transition period, there was not much support for the environment from donors or the UN, but following the transition period, the United Nations Development Program (UNDP) identified environmental governance and biodiversity management as priorities. Environmental governance consists of legislation, capacity and environmental information systems. UNDP developed a framework for biodiversity management that included an assessment of the country's biodiversity, legislation and community-based biodiversity management. This led to the development of the National Biodiversity Strategy and Action Plan in 2011, reports to the UN CBD in 2011, a Programme of Works on Protected Areas in 2012, establishment of the Clearing House Mechanism for knowledge management on

biodiversity in 2012, a National Action Programme to Combat Land Degradation in 2009, a National Ecological Gap Assessment in 2010 and the National Adaptation Plan of Action (NAPA) in 2010. UNDP has also assisted the GoTL in drafting or passing policies and laws related to fisheries, forestry, water management, agriculture, environment, pollution control, biodiversity, wildlife conservation and protected areas and is now designing pilot projects to implement these policies.

USAID's current program is focused on accelerating economic growth; strengthening key foundations of governance, increasing higher education opportunities and improving the health of the Timorese people, especially women and children. The ongoing economic growth programs support the diversification and sustainability of agricultural systems including improvements in coffee production in agroforestry systems. In this way, USAID has been reducing agricultural pressure on forests and their biodiversity.

Climate change adaptation is an active area of donor engagement in Timor-Leste. Global Environment Facility (GEF), AusAID and UNDP are conducting stocktaking and a stakeholders' consultation for development of project proposal for the Initial National Communication on Climate Change, and GEF and UNDP have NAPA follow up activities in support of strengthening the resilience of rural Timor-Leste to climate risks and disasters. A Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA) regional program assists Timor-Leste in climate change adaptation through best practices in agriculture and natural resources management, and WorldFish is working with Australia to assess climate change impacts on Timor-Leste's coastal economy. The Coral Triangle Initiative supported by ADB, USAID, the National Oceanic and Atmospheric Administration (NOAA) and GEF funds payment for ecosystems management, fisheries management and mangrove protection.

Several donors such are focusing on clean energy programs. JICA is working with the Secretary of State for Energy Policy on reducing greenhouse gas (GHG) emissions from power plants through use of solar photovoltaic cells. The European Commission is supporting Mercy Corps' Energy for All Program focusing on enhanced knowledge of renewable energy sources and improved access to energy in rural and peri-urban areas. The project includes work on cookstoves, solar energy, alternative energy loans, a fuelwood survey, fuelwood planting and agroforestry. ADB and the Canadian Cooperation Fund are working with the Ministry of Education on including GHG mitigation measures into infrastructure projects and government policies. The UNDP and GEF project "Promoting Sustainable Bio-energy Production for Biomass" supports the MED in removing barriers to sustainable production and utilization of biomass resources in Timor-Leste. It also promotes the application of biomass energy technologies to support local economic, environmental and social development leading to GHG mitigation. Korea is funding a program implemented by UNICEF and World Food Program (WFP) to install efficient cookstoves in schools and the WB is working with the Ministry of Infrastructure (MOI) to stabilize power services in Dili. The Global Alliance for Clean Cookstoves is preparing a market assessment and recommendations to develop a national cookstove industry in Timor-Leste.

Agriculture is a focus of IrishAid, European Commission (EC), AusAID, JICA, Portugal and WFP. AusAID's Seeds of Life program maintains a core focus on increasing yields by selecting and distributing improved varieties of superior genetic quality. It also has a secondary focus on analyzing and developing strategies to overcome climate variability and change; improving agronomic practices to reduce weed burdens and increase soil fertility; reducing postharvest storage losses and improving input supply arrangements for seed. JICA's work includes rice cultivation and coffee production and Portugal is assisting in improved land and water management. FAO and WWF US are designing an aquaculture development strategy for Timor-Leste as a means towards the diversification and improvement of rural people's livelihoods.

Many donors such as AusAID, UNICEF, EC, JICA, Korea International Cooperation Agency (KOICA) and ADB are active in water supply and sanitation projects in both rural and urban areas. Other donors with activities linked to environmental issues include JICA and EC projects focusing on sustainable use of natural resources through community-based management and the JICA Young Leaders Training Program (Urban Environment Management) providing 21 young leaders with knowledge of environment management.

There are indications that the lack of early attention to the environment by the UN and donors has resulted in some of today's environmental degradation. For example, without a subsidy for kerosene, there was widespread tree felling for firewood. Also, the high population concentration around Dili, in part due to the international presence, has resulted in significant deforestation for firewood. The rebuilding of infrastructure has led to increased pressures on the forest estate for raw materials and the construction of heavy fuel power plants may lead to further environmental degradation and release of GHGs.

	ADB	AusAID	EC	GEF	JICA	Korea	Portugal	UNDP	UNICEF	USAID	WB	WFP
Institution-building	X	X	X		X		X	X		X		
Capacity-building and education	X	X	X	X	X		X	X	X	X	X	
Agriculture		X	X		X		X			X		X
Forestry			X	X	X		X	X		X		
Water management	X	X	X		X	X	X		X			X
Solid waste				X				X				
Protected areas	X			X				X		X		
Biodiversity	X		X		X			X		X	X	
Information/monitoring	X			X		X			X	X		
Policy/legislation	X	X						X		X		
NGOs	X		X					X		X		
Clean energy			X	X	X	X		X	X		X	X

Table 1: Donor activities in Timor-Leste

Non-governmental Organizations Active in Timor-Leste

Timor-Leste currently has numerous NGOs providing assistance, but few are playing a direct role in the conservation of biological diversity and tropical forests. The Haburas Foundation is a prominent local environmental NGOs. Haburas works on environmental education, management and advocacy as well as networks for popular education and sustainable agriculture. Demetrio do Amaral de Carvalho, director of Haburas was a recipient in 2004 of a Goldman Environmental Prize for his leadership in sustainable development.

As economic opportunities are few and people greatly depend on natural resources, many types of assistance such as humanitarian aid, capacity-building, and technical assistance indirectly reduce subsistence pressures on tropical forest and biodiversity. Several international NGOs have conducted or are conducting environment-related activities, including CARE, Habitat for Humanity International (HHI), International Committee of the Red Cross (ICRC), OXFAM (OXFI), Church World Service (CWS), the Global Alliance for Clean Cookstoves, Mercy Corps, Save the Children, Conservation International (CI), the Nature Conservancy, the World Wildlife Fund (WWF), the Xanana Vocational Education Trust (Australia), PARCIC (Japan), Catholic Relief Services (CRS), the Humanist Institute for Development Cooperation (Hivos), the Asia Foundation (TAF), and World Vision (WLDV). Conservation International (CI) is currently establishing an office in Timor-Leste for work on the Coral Triangle Initiative. There are local NGOs working on urban environmental issues that have/can have an impact on biodiversity and tropical forest conservation. These include Santalum, Timor Verde, Forum

ONG Timor-Leste, La'o Hamutuk, Caritas and Achae in Oecussi. Some NGOs are working on improved cookstoves to reduce the demand for fuelwood. These are the Haburas Foundation, the ETADEP Foundation, the Alola Foundation, Naroman Timor Foun (NTF) and the Permatil Foundation.

C. BIOPHYSICAL AND ECOSYSTEM CHARACTERISTICS

Climate and Topography

Timor-Leste is located in the Lesser Sunda Islands (part of the Australian continental plate), and includes the eastern end of the island of Timor, the Oecussi enclave in West Timor, and the islands of Atauro and Jaco. The total area encompassed is approximately 1,460,937 ha (Sandlund *et al*., 2001). The total length is approximately 265 km, with a maximum width of 97 km.

The bedrock is primarily sedimentary calcareous rock, with fossil coral reefs found at high altitudes (up to 2000 m) (Monk *et al.*, 1997). Soils are generally thin, with poor water holding capacity (Carson, 1989). The topography is quite dramatic, with mountain peaks reaching as high as 2964 m. Steep slopes (incline over 40 percent) characterize as much as 44 percent of the total area (Monk *et al*., 1997). Over 78 percent of the land area is over 100 m (MED, 2008). Lakes are relatively few and small, apart from the Iralalaru Lake basin. Few of the approximately one hundred rivers flow regularly throughout the year and some dry up completely during the dry season. The largest river system (80 km in length) is the Loes River, on the north side of the mountains.

Climate varies greatly across Timor-Leste. The South coast is "permanently moist" with more than 2000 mm of rain for 9 to 12 months per year. The northern part is "permanently dry" with rainfall of 500 to 1000 mm or more occurring in a four to six month wet season from December to April or June. Hard torrential rain is common, with maximum daily rainfall recorded as high as 398 mm. This causes a high degree of surface runoff and increased soil erosion. The mean annual temperature at sea level is 27.5 °C and 19.8 °C at 1432 m above sea level (Keefer, 2000).

Natural Ecosystems

Timor-Leste contains six major ecosystem types (adapted from Sandlund *et al*., 2001; NBSAP, 2011; CDB, 2011). These are the:

- Marine and coastal zone
- Arid lowland areas
- Moist lowland areas
- Mountainous areas
- Highland plains
- Wetlands and lakes

Marine and coastal zone

Description – Includes the mangrove and other specialized coastal vegetation, the shallow seas adjacent to land, coral reefs, and seagrass beds.
Conservation status – Mangroves and coral reefs are protected by the UNTAET regulation 2000/19, and Government Resolution No. 8/2007 created Nino Konis Santana National Park. The Park covers an area of 123,600 ha (68,000 ha on land and 55,600 ha on sea). The National Fisheries Strategy outlines the

need to establish marine protected areas and the Strategic Development Plan calls for the protection and preservation of marine resources and habitats. Some mangroves, but not all, are also protected under traditional practices (*tara bandu*). Timor-Leste is part of the Coral Triangle Initiative (CTI), an effort to conserve and protect marine biodiversity, and the marine and coastal areas have maintained their environmental quality for the most part. Due to internally displaced person camps near mangroves after the 2006 violence, there was increased extraction and degradation of mangroves for fuelwood. Mangrove areas are also cleared for aquaculture.
Ecosystem functions – Mangrove and coastal vegetation protect the coastline from erosion, and the coral reefs from sedimentation. Productivity in mangroves and coral reefs is extremely high; these areas are the primary breeding grounds for many fish and shellfish species. Seagrass beds also protect coral reefs from erosion and provide feeding grounds for the endangered dugong.
Importance – Few people fish as their primary livelihood, although those located in coastal areas may fish for partial subsistence. The area is extremely important in the conservation of marine biodiversity and endangered marine species, such as turtles, dugong, and dolphins.

Arid lowland areas

Description – Located along the northern coast at altitudes of 0 to 600 m, with temperatures above 24 °C, and a five month dry season. Deciduous forest was the original vegetation; this has largely been converted to cultivated land, grasslands, or secondary forests.
Conservation status – Incomplete information on conservation status, but there may be some overlap with existing protected and conservation areas.
Ecosystem functions – Contributes to primary and secondary productivity.
Importance – Contributes to the agricultural sector of the economy. The area contributes to biodiversity, particularly insect, bird, and small mammal communities.

Moist lowland areas

Description – Located at altitudes between 0 and 600 m, with temperatures generally above 24 °C, along the southern coast. The original vegetation is moist deciduous forest, semi-evergreen forest, or lowland rainforest. Almost all of this area has been converted for agriculture, plantations, or degraded to secondary vegetation and grasslands.
Conservation status - Some sites are protected by UNTAET regulation 2000/19.
Ecosystem functions – Vegetation cover prevents erosion into rivers and the ocean, thus protecting coastal marine areas, and helps maintain water flow and quality. It also contributes to primary and secondary productivity.
Importance – Lowland areas typically have the highest degree of biodiversity in tropical areas. Most of the forest cover has been degraded or eliminated through human activities; the small remaining amount of forest probably harbors significant remaining biodiversity. The area contributes to the agriculture sector of the local economy.

Mountainous areas

Description – These areas are characterized by steep terrain, with altitudes 600 m and above. The original vegetation is semi-evergreen forest, moist deciduous forest, or non-deciduous forest. Landslides are frequent during the rainy season, partly due to the conversion of steep slopes for agriculture.
Conservation status – Several sites are protected by UNTAET regulation 2000/19.
Ecosystem functions (erosion, water flow, productivity) – The area plays an important role in water flow. Vegetation cover on steep slopes helps prevent landslides, flooding, erosion, and droughts. The area contributes to primary and secondary productivity.

Importance (economic, ecological, socio-cultural) – Mountain areas are noted for their high levels of endemism; several of Timor-Leste's endemic species are mountain forest species. The remaining primary forest in Timor-Leste is mostly located in this area. This area is also used for agricultural purposes.

Highland plains

Description – Located between 300 and 700 m, with clay soils and large fluctuations in water level. This area is currently dominated by agricultural land, particularly irrigated rice production. Basically all original forest cover has been converted for agriculture.
Conservation status – Incomplete information on conservation status, but there may be some overlap with existing protected and conservation areas.
Ecosystem functions (erosion, water flow, productivity) – Agricultural productivity is high in this area. Ground water levels are low, and the water retention attributes of the soil types contribute to flooding during the rainy season.
Importance – This area is the most important agricultural area.

Wetlands, freshwater rivers and lakes

Description - There is one large lake, Iralalaru Lake. Based on previous aerial photographs from 1972 (Sandlund *et al*., 2001), this area appears to have been a wetland previously. Several dead standing trees are visible in the lake. The Iralalaru lake basin is surrounded by well-preserved forest and harbors a number of species including crocodiles. Another significant lake is Lake Modo Mahut but there are few other lakes, and they are quite small in comparison. Rivers are ephemeral, often drying up completely during the dry season. There are over 100 rivers in the country, with 17 main river systems in the south and 12 main river systems in the north. The longest river system in the country is the Loes River.
Conservation status – Wetlands are protected by UNTAET regulation 2000/19. A 2007 survey identified 24 key wetland sites that are in need of conservation and resource management.
Ecosystem functions – Essential to water quality and abundance, contribute to nutrient cycling, and primary and secondary productivity.
Importance – The areas are essential to maintaining human quality of life, water for domestic use and agricultural irrigation. The areas are essential for migratory bird species, endangered bird species, and endemic fish species.

D. CURRENT STATUS OF TROPICAL FORESTS AND BIODIVERSITY

Tropical Forest Status and Management

Timor-Leste has had a long history of colonization and occupation. To understand today's state of the forests, some review of past history is needed. Forest cover in Timor-Leste decreased by almost 30 percent over the period of 1972 to 1999, based on analysis of satellite images (Sandlund *et al*., 2001) and declined at a rate of 1.3 percent from 2000 to 2010 (CBD, 2011)(Figure 2, green areas include both agriculture and forest cover). Approximately 35 percent (453,850 ha) of the land area (excluding approximately 22 km^2 of water bodies) has some type of forest cover (Figure 2). Remaining primary forest vegetation is minimal with estimates ranging from 1 to 6 percent of the territory. Ebony, sandalwood, and teak trees have been almost completely eliminated (Westerberg, 2000), and there are very few efforts to replant. Some teak forests do remain in Suai and Viqueque. During the Indonesian occupation of Timor-Leste, not only was timber harvested for sale, but the Indonesian military frequently burned the forest. One reason given was to remove any cover that could protect guerrillas.

Furthermore, during the Indonesian occupation, many people were displaced to the hills and cleared forests for agriculture.

Figure 2: Landsat 7 Satellite Image April 2012

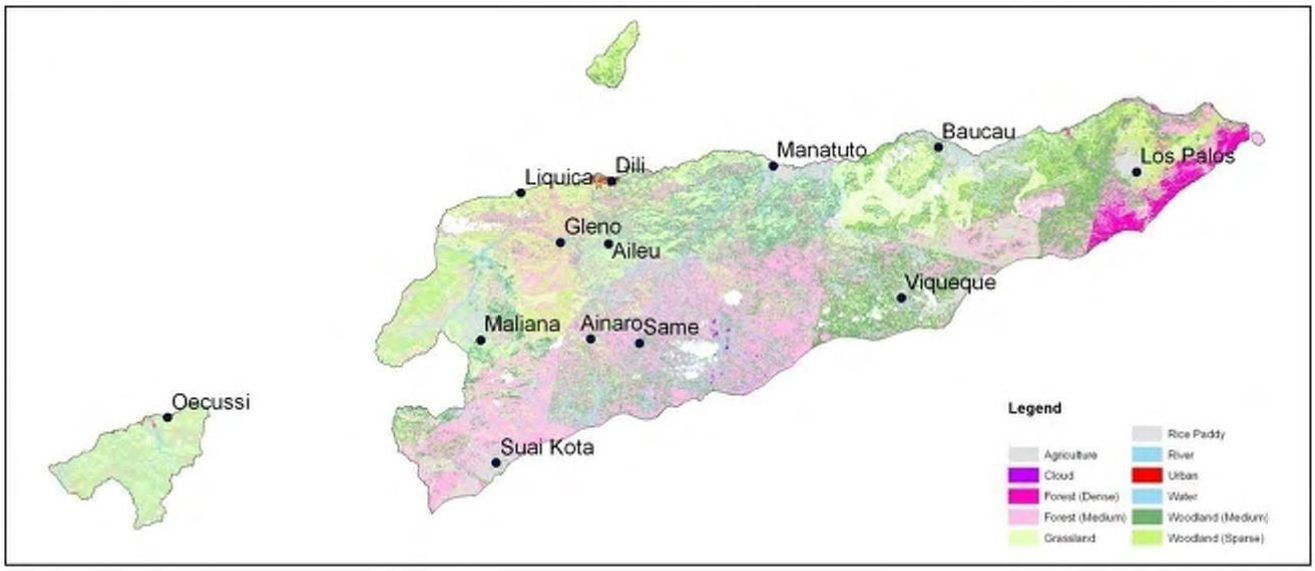

Figure 3: 2010 National Ecological Gap Assessment for Timor-Leste Land Cover Map

The collection of firewood is another major factor in deforestation. The demand for firewood for cooking grew fast when the subsidy for kerosene, the cooking fuel, was stopped. Based on a JICA estimation, the demand for firewood ranges between 377,000 – 1.5 million m^3 or 7.3 m^3 per household annually. The World Bank and Mercy Corps have indicated that around 94 – 100 percent of houses use firewood for cooking and approximately 80 percent of it is taken from the forest. A report by the Joint Agriculture Donors from 2002 stated that the demand for firewood supply, forest fires and the cut-and-burn agricultural method have reduced forest areas and worsened erosion in the highlands. Additionally, a gall rust shade affecting the coffee shade tree *Paraserianthes falcataria* is leading to further deforestation. Besides threatening the preservation of downstream irrigation systems and the main infrastructures like roads and bridges, forest degradation increases sedimentation in the river and coastal areas, particularly in coral zone, creating another environmental problem. It also creates social and

economic problems in the forms of decreasing forest cover, reducing farmer income, and environmental damages that may lead to natural disasters such as floods, erosion and a lack of water that is highly needed by the people. The Timorese people are dependent on forests for income and non-timber forest products. For example, communities are engaged in hunting, harvesting of bamboo, gathering of honey, production of palm stem panels for building construction, and collection of medicinal plants and palm wine.

There are gaps in information concerning actual forest status and a lack of regulations governing and protecting forests. Management of the forest estate is currently under the National Directorate of Forests (NDF) and the Division of Reforestation and Forest Rehabilitation of MAF manage forests. Under the NDF are the divisions of Reforestation and Rehabilitation, and Protection and Utilization of Forest Products and Services (for community forests and mangroves). The Forestry staff has few resources available. For example, the budget for the NDF is only $115,000 for 2012 and is not enough money for the guards needed for protected areas. MAF has done a limited inventory of trees from the Consolidated Fund for Timor-Leste (CFET) administered by UNTAET, and MAF and the NDF drafted a National Forestry Policy for the development of forest laws and regulations. Only four regulations impacting forests are currently in effect, UNTAET Regulation No. 2000/17 prohibiting logging and export of wood products, UNTAET Regulation No. 2000/19 defining the majority of the remaining forest cover as protected areas, Government Resolution No. 8/2007 creating Nino Konis Santana National Park, and Government Resolution No. 9/2007 on the National Forestry Strategy and Policy providing for forest protection, water conservation and land restoration. Removal of wood for industrial purposes is currently banned.

Reforestation projects are planned under the Reforestation Policy. This policy proposes the establishment of tree nurseries, creation of systems for the prevention of forest soil erosion and implementation of an orchestrated reforestation program. The Strategic Development Plan outlines policy directions for forestry including forest protection and management, watershed conservation, community management of forests and the goal of planting one million trees per year. Currently, the budget for the one million trees planted program is only $42,000. Community efforts to rehabilitate watersheds degraded by deforestation and forest fires are being carried out through the MAF and with donors. Public awareness and education are needed to instill values on forest protection and conservation to prevent further deforestation and promote reforestation.

Forest 1990 (ha)	966,000
Forest 2000 (ha)	854,000
Forest 2005 (ha)	798,000
Forest 2010 (ha)	742,000
Annual Change 1990 – 2000	-1.16%
Annual Change 2000 – 2005	-1.31%
Annual Change 2005 – 2010	-1.40%
Total Change 1990 – 2010	-23.2%

Table 2: Forest Cover, Change in Forest Cover: The Food and Agriculture Organization of the United Nations's Global Forest Resources Assessment (2010) and the State of the World's Forests (2010, 2005, 2003, 2001)

Biodiversity Status and Management

Protected Areas Status

In 2000, fifteen specific protected areas were designated under UNTAET Regulation No. 2000/19. These are:

1. The total land area of Jaco Island together with surrounding rocks, reefs, and other surface and sub-surface features;
2. Tutuala Beach together with forest adjacent to the beach;
3. Cristo Rei Beach and the hinterland;
4. The summit of Tata Mailau Mountain, all elevations on Tata Mailau Mountain above 2000 meters and the surrounding forest;
5. The summit of Sadoria Mountain, all elevations on Sadoria Mountain above 2000 meters and the surrounding forest;
6. The summit of Malobu Mountain, all elevations on Malobu Mountain above 2000 meters and the surrounding forest;
7. The summit of Mount Diatuto and the surrounding forests;
8. The summit of Mount Fantumasin and the surrounding forests;
9. The Riverlet Clere Sanctuary;
10. The Tilomar Reserve;
11. The Lore Reserve;
12. The Monte Mundo Perdido and the surrounding forest;
13. The summit of Monte Matebian and all elevations on Monte Matebian above 2000 meters and the surrounding forest;
14. The Monte Cablaque and the surrounding forest; and
15. The Manucoco Reserve.

In 2007, the Department of Protected Areas and National Parks identified 17 additional areas for protection. These areas were chosen through identification of forest ecosystems that are in good condition or likely to be deforested. They are also areas with threatened species and have high conservation value. These new protected areas are: Mangal Citrana, Mount Cutete, Mount Taroman, Mount Guguleur, Mount Loelako, Mount Tapo/Saburai, Lake Maurei, Mount Bibileo, Mount Burabo, Mount Kuri, Lake Modo Mahut, Mount Aitana, Mount Builo, Mount Laretame, Mount Legumau, Mount Manoleu and Lake Melenas (Annex 5).

Timor-Leste declared its first National Park in 2008. It is in Tutuala and known as Nino Konis Santana National Park. This national park covers both terrestrial and marine areas out to three nautical miles from the coast.

As a Party to the Convention on Biological Diversity, Timor-Leste began the process of developing its Programme of Work on Protected Areas in 2008. In the 2010 National Ecological Gap Assessment, the future protected area network for Timor-Leste was mapped for the first time (Figure 4). This network is not yet implemented and the boundaries are only estimates. Several protected areas are not yet legislated. The total area of the protected area network including marine areas is ~3200 km^2. The total area of terrestrial protected area network is ~2000 km^2, which is around 15 percent of the nation's land area.

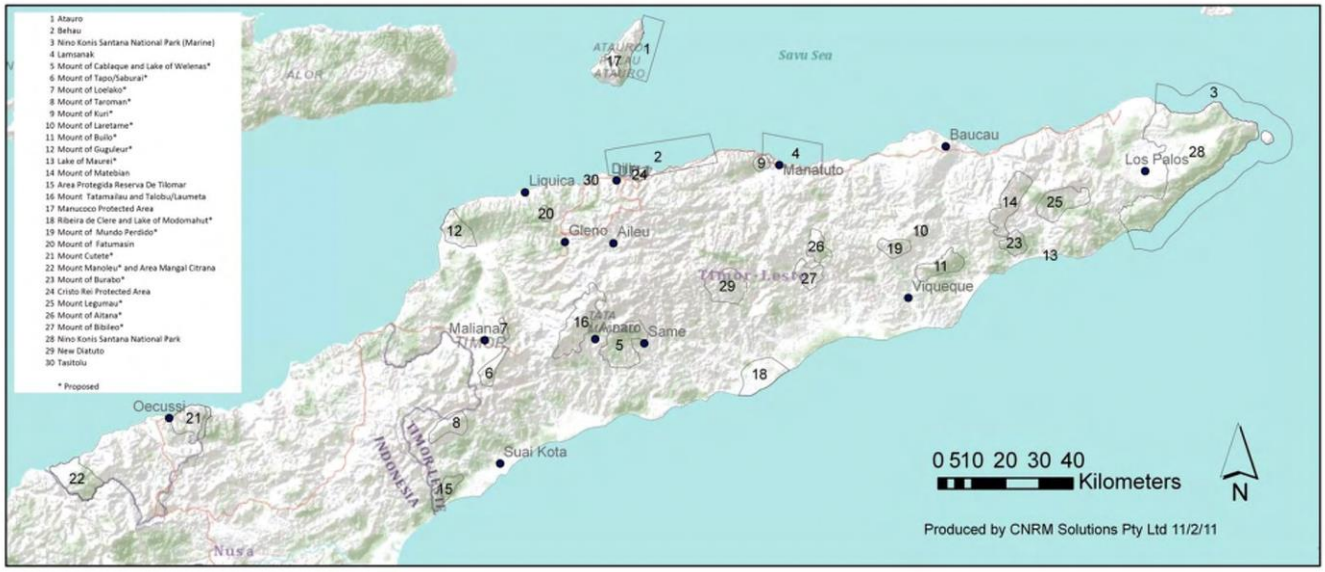

Figure 4: 2010 National Ecological Gap Assessment Protected Area Map

The protected areas designated contain the majority of the remaining primary forest cover in Timor-Leste and are found mainly in mountainous areas. These areas are likely to have high endemism. Lowland forest areas, typically higher in biodiversity and with greater numbers of threatened species, are not as well represented. The protected area system designated is provisional, and is not based on an analysis of Timor-Leste's biodiversity and forest conservation needs. It is likely that the critical habitat necessary for the survival of some endangered and endemic species is not included in the current design. Jaco Island and Lake Iralalaru area have had surveys performed by BirdLife International and the Directorate of Environment and are among the first to be proposed as protected areas. Management plans, including management of tourism, have not been developed yet for these protected areas.

There were fewer than 500 foreign visitors in 1998 to Timor-Leste. There has been a significant influx of foreign visitors since 1999, composed primarily of UN and other international aid staff on temporary assignment. The lack of tourist management practices has put pressure on some protected areas, and is contributing to increasing levels of degradation and conflict with local communities. Jaco Island is one such site. The island is considered sacred and local customs prohibit use; however, it has become a popular destination for foreign visitors. There is some disagreement among communities about this tourism.

Species information

The flora and fauna of Timor-Leste appear to represent a mixture of Asian and Australian families and there are a large number of endemic species including 1500 plants, 262 birds, 127 mammals, 33 frogs, 99 reptiles and 50 freshwater fish. Surveys and species information are available from scientists, NGOs, field guides and local knowledge but the data are quite limited. Collections of biological materials from Timor-Leste are located primarily in Indonesia, Australia, the Netherlands, Portugal, and the United States.

BirdLife International, Charles Darwin University, the National Directorate for Environmental Services, MAF and the Department of Protected Areas and National Parks have done recent inventories of threatened birds and internationally significant sites (BirdLife International-Asia Programme, 2003 and Trainor, *et al*., 2007 and 2008). These inventories identified 16 Important Bird Areas and five candidate

Important Bird Areas: Tilomar, Tata Mailau, Fatumasin, Atauro Island – Manucoco, Sungai Clere, Lore, Mount Paitchau and Lake Iralalaro, Jaco Island, Mount Diatuto, Be Malae – Atabae, Maubara, Mount Mak Fahik and Mount Sarim, Tasitolu, Areia Branca beach and hinterland, Mount Curi, Irabere estuary and Iliomar forest, Saboria mountain (above 2000 m), Talobu/Laumeta mountain (above 2000 m), Mount Mundo Perdido, Mount Matebian (above 2000 m), and Mount Cablaque (Figure 5). Timor-Leste has numerous endemic and globally threatened bird species such as Timor Green Pigeon *Treron psittacea* (endangered), Timor Imperial Pigeon *Ducula cineracea* (endangered), Timor Black Pigeon *Turacoena modesta* (vulnerable), Wetar Ground-dove *Gallicolumba hoedti* (endangered), Yellow-crested Cockatoo *Cacatua sulphurea* (critically endangered) and Timor Sparrow *Padda fuscata* (Vulnerable) (Table 3).

Table 3: The Status of Timor-Leste's Birds and Their Dependence on Closed Canopy Tropical Forest.[1]

Taxonomic Name	English Name	Status	RR	Forest Fidelity
Fregata andrewsi	**Christmas Island Frigatebird**	**CR**		None
Treron psittacea	**Timor Green Pigeon**	**EN**	RR	**HIGH**
Ducula rosacea	Pink-headed Imperial Pigeon	LR/nt	RR	**MOD**
Ducula cineracea	**Timor Imperial Pigeon**	**EN**	RR	**MOD**
Turacoena modesta	Timor Black Pigeon	LR/nt	RR	MOD
Macropygia magna	Bar-necked Cuckoo-dove		RR	**MOD**
Gallicolumba hoedtii	**Wetar Ground Dove**	**EN**	RR	**HIGH**
Trichoglossus euteles	Olive-headed Lorikeet		RR	**MOD**
Psitteuteles iris	Iris Lorikeet	LR/nt	RR	**MOD**
Cacatua sulphurea	**Yellow-crested Cockatoo**	**CR**		**MOD**
Aprosmictus jonquillaceus	Olive-shouldered Parrot	LR/nt	RR	**MOD**
Todiramphus australasia	Cinnamon-banded Kingfisher	LR/nt	RR	**MOD**
Saxicola gutturalis	White-bellied Chat	LR/nt	RR	Low
Zoothera dohertyi	Chestnut-backed Thrush	LR/nt	RR	**HIGH**
Zoothera peronii	Orange-sided Thrush	LR/nt	RR	**MOD**
Urosphena subulata	Timor Stubtail		RR	Low
Buettikoferella bivittata	Buff-banded Bush-bird		RR	Low
Phylloscopus presbytes	Timor Leaf warbler		RR	Low
Ficedula timorensis	Black-banded Flycatcher	LR/nt	RR	**HIGH**
Cyornis hyacinthinus	Timor Blue Flycatcher		RR	**MOD**

[1] This table is adapted from Appendix 1 of BirdLife International-Asia Programme (2003), Trainor et al. 2008 and the NBSAP 2012. Status of globally threatened birds and internationally significant sites in Timor-Leste based on rapid participatory biodiversity assessments with particular reference to the 'Nino Konis Santana National Park (NKSNP)'. The legend of Appendix 1 explains states: "Approximate fidelity of globally threatened, near threatened and restricted-range birds to Closed Canopy Tropical Forest types in Timor-Leste, based on this study and previous reviews (Noske and Saleh 1996, BirdLife International 2001, Mauro 2003). Forest fidelity ranges from "none" (no dependence on closed canopy tropical forest) to "high" (highly dependent on closed canopy tropical forest)."

Gerygone inornata	Plain Fairy Warbler		RR	Low
Pachycephala orpheus	Fawn-breasted Whistler		RR	Low
Dicaeum maugei	Red-chested Flowerpecker		RR	Low
Nectarinia solaris	Flame-breasted Sunbird		RR	Low
Heleia muelleri	Spot-breasted White-eye	LR/nt	RR	**MOD**
Lichmera flavicans	Yellow-eared Honeyeater		RR	Low
Myzomela vulnerata	Black-chested Honeyeater		RR	Low
Meliphaga reticulata	Streak-breasted Honeyeater		RR	Low
Philemon inornatus	Timor Friarbird		RR	Low
Erythrura tricolor	Tricolored parrot-finch		RR	Low
Padda fuscata	Timor (Finch) Sparrow	LR/nt	RR	Low
Oriolus melanotis	Olive-brown Oriole		RR	**MOD**
Sphecotheres viridis	Timor Figbird		RR	**MOD**
Anhinga melanogaster	Oriental Darter	LR/nt		None
Ardea sumatrana	Great-billed Egret	LR/nt		None
Charadrius peronii	Malaysian Plover	LR/nt		None
Numenius madagascariensis	**Eastern Curlew**	**VU**		None
Esacus magnirostris	Beach Curlew	LR/nt		None
Calidris tenuirostris	**Great Knot**	**VU**		
Charadrius peronii	Malaysian Plover	LR/nt		
Esacus giganteus	Beach thick-knee	LR/nt		
Limnodromus semipalmatus	Asian Dowitcher	LR/nt		
Limosa limosa	Black-tailed Godwit	LR/nt		

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), **DD – data deficient**. Restricted-range – RR): natural global distribution is less than 50,000 km^2 (less than twice the area of Timor Island).

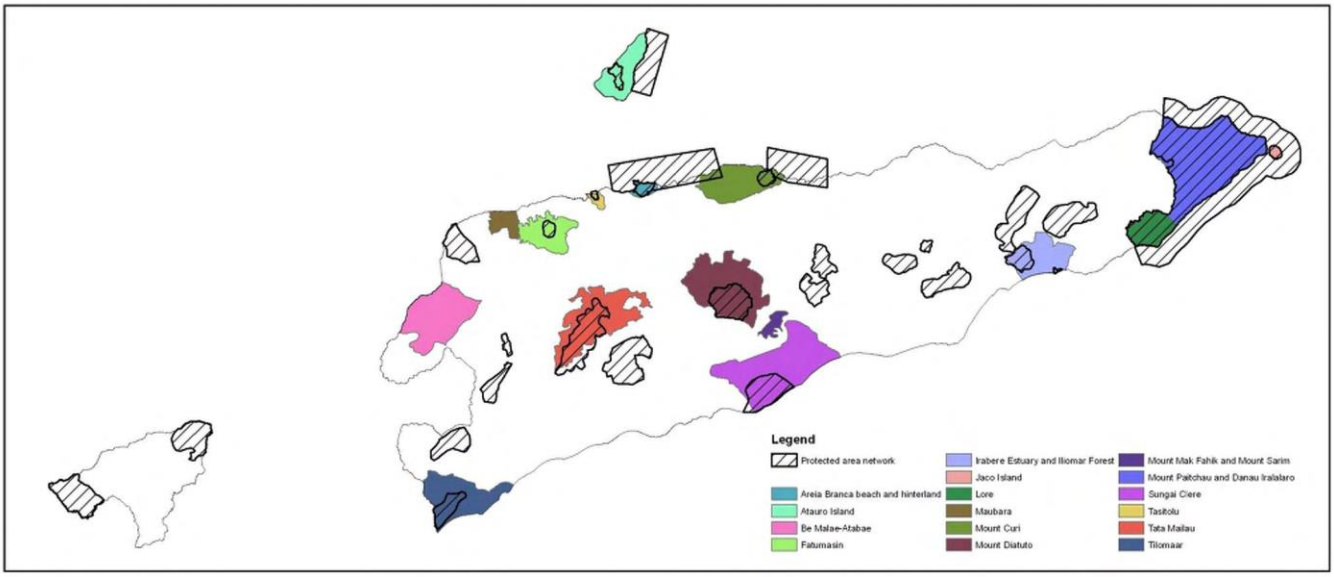

Figure 5: 2010 National Ecological Gap Assessment Important Bird Area Map

Terrestrial Species

Tropical forests are in poor condition, and continue to be degraded and converted, putting several species, particularly frugivorous birds and mammals, at risk. Coastal habitats are largely in good condition. This is probably due in part to traditional prohibitions against destruction of mangrove. Wetland areas are limited and ephemeral, generally drying up during the dry season. Asian families dominate most of the identified mammal, frog and reptile fauna. Thirteen endangered mammals, one endangered insect and three endangered reptiles are found in Timor-Leste (Table 4). The majority of the mammals and the python are all forest dwellers, and the remaining two lizards inhabit wetlands.

Table 4: Endangered Terrestrial Species

Taxonomic Name	English Name	IUCN/CITES
Macaca fascicularis	Long-tailed macaque	CITES
Paradoxurus hermaphrodites	Mentawai palm civet	Least concern
Phalanger orientalis	Northern common cuscus	CITES
Hipposideros crumeniferus	Timor leaf-nosed bat	DD
Nyctophilus timoriensis	Greater long-eared bat	DD
Rhinolophus simplex	Lombok horseshoe bat	EN
Miniopterus schreibersii	Schreibers' bent-winged bat	LR/nt
Crocidura tenuis	Timor shrew	DD
Varanus timorensis	Timor monitor lizard	CITES
Crocodylus porosus	Estuarine crocodile*	LR, CITES
Python timoriensis	Timor python	CITES
Nyctimene keasti	Keast's tube-nosed fruit bat	VU
Pteropus vampyrus	Large-flying fox	LR/nt
Parantia timorica	Timor yellow tiger	EN
Dobsonia peronei	Western naked-backed bat	VU
Rhinolophus philippinensis	Philippine horseshoe bat	LR/nt
Pipistrellus papuanus	Papuan pipistrelle bat	LR/nt

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD – data deficient, *Protected under Ministerial Diploma No. 04/115/GM/IV/2005

Marine Species

Threatened and endangered marine species include turtles, dugong, whales, dolphins, sharks, crabs, and clams (Table 5). Marine habitat degradation, from destructive fishing practices and pollutants, is beginning to occur, and could have serious implications for these species in the near future. Coral is also harvested as a building material and illegal fishing occurs which is depleting fish stocks. AusAID supported a survey of fish resources and a marine megafauna survey completed in 2008 revealed over 1000 species.

Table 5: Endangered Marine Species		
Taxonomic Name	**English Name**	**IUCN/ CITES**
Chelonia mydas	Green turtle*	EN, CITES
Eretmochelys imbricate	Hawksbill turtle*	CR, CITES
Dermochelys coriacea	Leatherback turtle*	CR, CITES
Caretta caretta	Loggerhead turtle*	EN, CITES
Lepidochelys olivacea	Olive turtle*	VU, CITES
Dugong dugon	Dugong*	VU
Physeter catodon	Sperm whale*	VU
Orcinus orca	Killer whale*	DD, CITES
Stenella longirostris	Spinner dolphin*	DD, CITES
Tursiops truncates	Bottlenose dolphin*	CITES
Rhincodon typus	Whale shark	VU, CITES
Tridacna derasa	Southern Giant Clam	VU
Tridacna gigas	Giant Clam*	VU
Tridacna maxima	Small Giant Clam*	LR/cd
Tridacna squamosa	Fluted Giant Clam*	LR/cd
Hippopus hippopus	Bear Paw Clam*	LR/cd
Hippopus porcellanus	China clam	LR/cd
Birgus latro	Giant coconut crab	DD
Aetobatus narinari	Spotted eagle ray	LR/nt
Aipysurus fuscus	Timor reef snake	EN
Balaenoptera musculus	Blue whale	EN, CITES
Cheilinus undulates	Undulate wrasse*	EN
Chelonia mydas	Green turtle	EN
Choerodon schoenleinii	Blackspot tuskfish	LR/nt
Galeocerdo cuvier	Tiger shark	LR/nt
Isurus oxyrinchus	Shortfin mako	VU
Plectropomus areolatus	Squaretail leopard grouper	VU
Plectropomus oligacanthus	Highfin coral grouper	LR/nt
Sousa chinensis	Indo-Pacific hump-backed dolphin	LR/nt
Taeniurops meyeni	Black-blotched stingray	VU
Thunnus alalunga	Albacore tuna	LR/nt
Thunnus obesus	Bigeye tuna	VU
Pinctada maxima	Pearl oyster*	Protected
Tridacna crocoa	Saffron colored giant clam*	Protected
All species	Sea lion*	Protected
All species	Seal*	Protected
All species	Coral*	Protected

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD – data deficient, *Protected under Ministerial Diploma No. 04/115/GM/IV/2005

Aquatic (both marine and freshwater) biodiversity are affected by environmental degradation from a number of causes. Sand extraction can affect the flow of the rivers. Informal settlements along river and stream banks dispose waste directly into the water. Sanitation services are being established, yet waste entering coastal areas is still a threat to biodiversity. Solid and hazardous wastes also contribute to the pollution of rivers and the seas. Villagers are also concerned about fertilizers and pesticides polluting the rivers.

Vegetation

The natural vegetation of Timor-Leste includes tropical dry broadleaf, deciduous and evergreen trees and an undergrowth of grasses and shrubs. Six plant species are endangered in Timor-Leste (Table 6). Sandalwood and teak were formerly abundant, but have been severely over-harvested.

Table 6: Endangered Plant Species

Taxonomic Name	English Name	IUCN/CITES
Santalum album	Sandalwood	VU
Mangifera timorensis		EN
Podocarpus rubens		LR
Sundacarpus amarus		LR
Intsia bijuga	Borneo teak	VU
Pterocarpus indicus	Burmese rosewood	VU

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD – data deficient

Timor-Leste, prior to the 1999 referendum, was in the process of developing a local system of seed multiplication for several crops. Two Central Seed Centers were set up in Balai Benih Induk , Maliana, Bobonaro district (rice) and in Loes, Liquica district (corn, soybean, peanuts and mung beans) (Timor-Leste Joint Assessment Mission, 1999). The MAF and the international donor community have undertaken efforts to conserve and support the sustained production of commercially important plant species through restoration and additional development of local seed resources and seed production stations. Through the AusAID and Australian Centre for International Agricultural Research (ACIAR) "Seeds of Life" (SoL) Program started in 2005, improved breeding materials for the key food crops of maize, sweet potato, cassava, peanuts and rice were introduced to farmers. USAID is supporting efforts to maintain locally adapted coffee plants.

E. ASSESSMENT OF THREATS TO TROPICAL FORESTS AND BIODIVERSITY

Energy Issues

The great irony of Timor Leste is that it is a country with ample petroleum resources and revenues coming online, but its citizens lack access to energy. Around 98 percent of people are dependent on fuelwood for cooking. A lack of economic alternatives drives deforestation, coral reef destruction and over-exploitation of wildlife in Timor-Leste. Deforestation is the single most pressing problem in

Timor-Leste. The majority of Timor-Leste's endangered species, and much of its biodiversity are found in its remaining forests. Pressures on forests are driven primarily by the need for firewood, clearing for agriculture and escaped fires during land clearing or hunting. Illegal logging is also a threat. From March 2002 to November 2003, the police confiscated over 572,000 tons of sandalwood (National Directorate of Forestry and Water Resources, 2003). Hunting for meat or sale for the pet trade appears to be common, but there are few concrete data. Destructive fishing practices are contributing to the degradation of coral reefs. During the UN transition period, corals were also used for construction material.

Demand for firewood around the Dili area has increased as the population of Dili has grown. In the urban area of Dili, 91 percent percent of households use firewood. In other parts of the country, 99 percent of households rely on firewood (Mercy Corps, 2011).

Lack of Economic Opportunity

More than two fifths of Timorese live in poverty. The poorest households are mostly farmers in rural areas with little land and no education. Given the low amount of appropriate agricultural land, and a rapidly growing human population engaged primarily in subsistence agriculture, the pressure on forest resources will continue unabated and habitat degradation will occur, unless steps are taken in the immediate future.

Given Timor-Leste's sloping terrain and the rainfall pattern of short, intense rains, soil erosion from farming and deforestation have negative impacts on both terrestrial and aquatic biodiversity. Conservation impacts of high erosion include loss of forest habitat through landslides and degradation of river and coastal habitats through sedimentation. Stream sedimentation is very high from upland soil erosion. Livestock grazing also contributes to erosion and the appearance of weeds that are difficult to eradicate.

Poaching and illegal logging are a major problem for endangered species. Endangered species are hunted for food, medicine, ornaments, and collected live for the pet trade. Conservation efforts in Timor-Leste are nascent. A start at protecting endangered species has been made by the formulation of UNTAET Regulation No. 2000/19, but enforcement has been lacking. A number of illegal wildlife products have been observed openly for sale in the capital, Dili. Sea turtles are threatened as they are harvested for their skin, meat, eggs and carapace. Mollusks are threatened with overharvesting for human consumption and handicraft creation (CBD, 2011). Unemployment and demand from foreigners fuels the trade in rare birds and turtles. There is a display in the airport of the wildlife products that are not permitted to be taken and some checking of bags is also occurring. The National Directorate for Environmental Services has joint patrols with the National Police force to improve enforcement and they have also created information cards on endangered species. Bio-prospecting for pharmaceutical and other industries is a potential threat.

Approximately 50 percent of the population of Timor-Leste is under the age of eighteen and youth unemployment is a critical problem. There are few job opportunities due to the weak state of the non-oil economy, youth lack appropriate skills when job opportunities are available, and there are limited resources to connect employers with available job seekers. The youth population is a potential human resource for the development of Timor-Leste but with limited educational and vocational opportunities, they can be a source of political instability. Uprisings can lead to the degradation of natural resources and a lack of education on environmental issues hinders conservation efforts.

Lack of Legal Framework for the Environment and Natural Resources

As noted by Barreto (2007), Timor-Leste's legal framework is still not sufficient to protect forests and biodiversity. Rights to natural resources such as forests, land and water are not yet clarified. The lack of clear rights deters investments for conservation for the small-scale farmer, while facilitating the negotiation of the handover of large tracts of land to foreign investors. Decree Law No. 5/2011 legislated an Environmental Licensing System designed to prevent negative environmental impacts and control pollution from projects, but there is limited capacity to institute the law. Many laws and decrees regulate the fisheries sector, but they are rarely enforced. The Government of Timor-Leste is currently drafting and approving several laws and policies impacting the environment, forestry and biodiversity. The Forestry Decree Law (2009-in process) will promote the sustainable management of forest resources and watersheds to provide environmental, social and economic benefits to the people of Timor-Leste. The Environmental Base Law (2011-in process) aims for the conservation and improvement of environmental quality, protection of human health, sustainable use of natural resources and pollution control. As of April 2012, this law has been approved by the Council of Ministers. Several laws were proposed in the 2011 Strategic Development Plan that would greatly impact forests and biodiversity in Timor-Leste. The Protected Area Decree Law would update UNTAET Regulation 2000/19, the National Biodiversity Act or Biodiversity Decree Law would assess the threats to marine and terrestrial biodiversity and identify strategies to conserve biodiversity, and the Wildlife Conservation Law would protect and conserve wildlife in Timor-Leste. Policies on waste management, rural energy, water resources, managing watersheds and coastal zones and the environment are being formulated.

In summary, the legal framework is still in development and still unclear with regards to the environment. The enforcement of even existing regulations is and any future enforcement will be a challenge due to an overall lack of financial and human resources.

Pollution

Pollution from a variety of sources has potential for negative impacts particularly upon aquatic biodiversity. For example, upstream pollution of rivers from agricultural inputs and human wastes is not only contaminating rivers and streams, but also, makes its way out to the coasts and coral reefs. In 2009, the National Directorate of Water and Sanitation estimated that only 66 percent of the population has access to an improved water source and 49 percent use improved sanitation. Waste is a large issue and most waste is not collected nor disposed and remains on the streets and in dried up streams before being carried to the ocean by the rain. Air pollution is also a major concern, particularly for women and children who breathe in polluted air while cooking with firewood. In Dili, 91 percent of households use firewood and in other parts of the country, 99 percent of households rely on firewood (2011 Human Development Report: Timor-Leste; Mercy Corps, 2011; CBD, 2011; NBSAP, 2011).

Investments for Economic Growth

Threats to biodiversity may arise due to outside investments such as, road construction, hydroelectric power plants, and oil palm and sugar cane plantations. Oil palm and sugar cane plantations are located around Los Palos. Recently, the Government has increased spending on road improvements and construction in rural areas and the ADB country partnership emphasizes transportation infrastructure

development. Road construction is a valuable way to connect rural communities to trade and communication networks, but it can lead to habitat fragmentation and wildlife mortality, increased threats from hunting, overharvesting of non-timber forest products and the introduction of invasive weed species.

While the Government of Timor-Leste has expressed interested in an integrated energy policy and investments in alternative energy, it is addressing energy needs by focusing on immediate solutions. Natural gas supplies from the Sunrise Petroleum field will not be online until 5 – 10 years from now, so the Government is currently funding the construction of three heavy oil-based power plants and the foundation stone for the first plant was laid in January 2010. Numerous NGOs have raised questions over the suitability of the plan and the potential environmental problems. There are concerns that the focus on the power plants will reduce interest in the development of alternative energy technologies. Heavy oil is polluting, can create acid rain, increase greenhouse gas emissions, pollute water resources and generate toxic waste. Difficulties in safely storing and disposing waste from heavy oil plants have caused many countries to discontinue use of this technology. Lake Iralalaro in the far east of the island has great potential for hydroelectric power and a capacity of 13 – 28 megawatts and 189 gigawatt hours per year. One small plant is already constructed and four additional plants are under consideration. The area around the hydroelectric site is the only pristine area of forests that remains in Timor-Leste and has been described as "best tropical closed forest on the island" (Birdlife International-Asia Programme, 2003). The lake is a stabilizer for the region including for wetlands and rivers to the south coast. The wetlands are important for crocodiles and large resident water bird populations. Livelihoods of people dependent on the environment could be greatly impacted through these projects.

Tasi Mane (Male Sea – the Tetum name for the Timor Sea between Timor-Leste's south coast and Australia) is the core of the Timor-Leste Government's development strategy – a corridor of petroleum infrastructure along the southwest coast of the country. This project is described in the 2011 Strategic Development Plan as "a multi-year development of three industrial clusters on the south coast which will form the backbone of the Timor-Leste petroleum industry." Communities have expressed concern over the environmental impacts of the project, but many in the Government believe the project must be pushed forward in order to develop the country.

Lack of Human Capacity and Public Awareness

In the environment sector, the government has limited budget and limited staff. Further development of capacity of staff is needed in scientific and management skills. In Timor-Leste, there is an overall lack of information on the environment and biodiversity such as extent of forest cover, hydrology, water catchment and wetland areas. The lack of knowledge hinders conservation. New legislation is being drafted and information to the public on these laws will need to be disseminated.

Climate Change

Timor-Leste faces considerable risk from the impact of climate change. The country will likely experience greater variability in rainfall from more intense rains for short periods, lengthened periods of drought, variations in monsoon winds and increased intensity of cyclone winds. The State of the Nation report attributes flooding in the west and east to climate change (MED, 2008). Such changes could affect the ability of species to survive in their current habitats. Sea level rise will change or eliminate coastal ecosystems and seawater acidification is anticipated. Coral reefs are most at threat from temperature rises and extreme temperature events are expected to increase. Climate variability will increase degradation of forested areas, soil erosion and landslides and flooding.

The Government of Timor-Leste does not yet have a climate change unit or a climate change secretariat and lacks the capacity to address climate change. The framework of regulation is missing and there are no specific climate change provision laws, regulations, policy or plans established. Coordination among relevant institutions is a challenge due to the absence of legal mechanisms for cooperation, though there appears to be an understanding that departments should be working in a more coordinated manner (World Bank, 2008).

Invasive Species

Invasive species such as *Chromolaena odorata* (Siam weed) and *Mimosa diplotricha* hinder the rehabilitation of degraded lands. The cane toad (*Bufo marinus*) entered in 1999 with international troops, is poisonous to animals and may have already displaced native amphibians. Other potentially invasive species found in Timor-Leste by Charles Darwin University researchers include *Lantana gorse*, *Catharanthus roseus*, *Jatropha gossypifolia*, *Ziziphus mauritiana*, *Calotropis gigantean*, *Sida acuta*, *Lantana camara*, *Tithonia diversifolia*, *Parkinsonia* sp. (*Palo Verde*), and *Prosopis pallida* (*Mesquite*) (NBSAP, 2011). According to the Global Invasive Database, the following invasive species are found in Timor-Leste: *C. odorata*, *Leucaena leucocephala*, *Thevetia peruviana*, *M. diplotricha*, *Cyprinus carpio*, *Lutjanus kasmira*, *Gallus gallus*, *Porphyrio porphyrio*, *Cervus timorensis russa*, and *Varanus indicus*. It is estimated that one-third of the mammal species on the island of Timor have been introduced and that they have accelerated the decline of endemic fauna.

F. USAID'S CURRENT ACTIVITIES

USAID's current activities focus on four areas: accelerating economic growth; strengthening key foundations of governance, increasing higher education opportunities and improving the health of the Timorese people, especially women and children. Of these the economic growth and governance activities have the greatest potential linkages to the environment and biodiversity conservation as they address principles fundamental to sound resource management. Such linkages are further discussed under the recommendations to meet conservation needs in Section H below.

Given that unsustainable agricultural practices contribute to land degradation, deforestation and biodiversity loss, USAID's current economic growth activities work to improve livelihoods and incomes while conserving natural resources through sustainable agricultural practices. For example, the "Consolidating Cooperative and Agribusiness Recovery" (COCAR), is an four-year project which is implemented by National Cooperative and Business Association (NCBA) that targets the expansion and diversification of Timor-Leste's agricultural sector. COCAR supports the development of organically certified coffee grown in an environmentally sustainable manner. The coffee plantations involved in this project were planted during the time when Timor-Leste was a Portuguese colony. The coffee produced is a very strong tasting coffee 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. Given this coffee's local adaptation and pest resistance, inputs such as inorganic fertilizers or pesticides are not needed or used. The coffee project has taken advantage of these conditions and has achieved organic certification for smallholder-produced coffee. Through COCAR, the USG is raising agricultural productivity by promoting a more diversified agricultural system that includes cocoa, cassava, livestock, and agro-forestry products; improving small-holder access to markets for their surplus production; and taking advantage of economies of scale by better organizing farmers' surplus production for marketing, thereby contributing to increased food security of small holders and larger surpluses among commercial farmers. These activities strengthen market linkages within the country,

contribute significantly to the promotion of intra-regional exports, and ultimately result in greater income for the rural poor.

COCAR is also initiating the coffee rejuvenation activity to address a decline in coffee yields over the past few years by pruning existing coffee plants and the planting of new coffee seedlings and shade trees. Tree plantings occur not only within farmer agro-forestry systems but also along slopes to reforest the areas and reduce soil erosion. These trees can later be sold. Households at lower elevations cannot produce high-quality Arabica coffee, and since the option of Robusta coffee is precluded, COCAR offers these households the option of growing cocoa. At present, Timor-Leste has no commercial cocoa production although its climate and soils are capable of viably producing a crop. Therefore the COCAR project works with researchers, extension specialists and farmers to develop cocoa as an export crop. Additionally, COCAR expands agro-forestry activities (focusing primarily on timber wood production and marketing) to involve broader numbers of participants located in areas with high degrees of poverty and to further address important environmental issues. As a bold and innovative initiative it also introduced programs supporting intercropping food crops (primarily under the cassava program) to ensure farmer income in the early years of timber production. In forestry, NCBA works closely with communities, the MAF, and others to develop a comprehensive plan for the forestry industry based creatively on the foundation of existing tree nursery operations, including mechanisms that provide an income stream to poor households until trees are harvested on a regular basis yet protects the rights of affected communities and households. This USG investment not only diversifies farmers' income but also addresses serious land degradation issues faced by the country. Overall, COCAR contributes to increased international sales of selected agricultural commodities that are essential for sustainable increases in income, jobs and poverty reduction in rural areas while supporting the conservation of natural resources.

The Development of Communities through Intensive Agriculture (DOCIA) is a three-year project awarded in 2010 with a focus on a development model that improves the economic and social livelihoods of members of households in poor communities in a gender equitable manner. It achieves this by the introduction of technology, plants and equipment combined with focused technical and management training for communities of poor households. The community will increase its income and the value of its assets by serving a demanding market that will pay premium prices for selected products. Increased material wellbeing will enable the community to improve its social and environmental status. DOCIA efforts target continued improvement of horticultural operations; completion of environmental protection mechanisms such as the protection of springs, field boundaries, windbreaks, and slope protection; recording of claims to land belonging to individual members of the community; and formal registration with the local government (at the community's discretion) in order to be recognized as a significant rural enterprise. Registration of land and land rights are an important incentive for resource conservation.

The five-year Coral Triangle Support Program (CTSP) implemented by the World Wildlife Fund and Conservation International aims to accelerate the country's transition to climate resilient, sustainable development. Climate change impacts have the potential to harm livelihoods (including tourism and agriculture), food security, and coastal infrastructure, and may threaten the health and lives of poor communities. This project will promote the use of resources for sustained social and economic development, which is one of the USG's major objectives for assistance in Timor-Leste. Development of an integrated marine management strategy, encompassing use of fisheries to ensure food security and ecotourism to expand livelihoods, will enable sustainable natural resource use as well as economic growth. CTSP will also improve government and community co-management of selected coastal marine areas, including Timor-Leste's largest mangrove forest, and establish a Locally Managed Marine and

Coastal Areas network. In partnership with the National Oceanic and Atmospheric Agency (NOAA), CTSP will help the Government of Timor-Leste design a ridge-to-reef adaptation program demonstrating the interconnectedness of mountain and coastal ecosystems. This new mechanism will establish a network of protected areas ranging from ridge to reef that improve overall natural resource productivity and sustainability through communities that implement risk-reducing practices to improved resilience to climate change.

Activities under the democracy and governance program strengthen the rule of law and institute measures against corruption. The rule of law strengthens the business-enabling environment and, in so doing, provides citizens and the private sector with the confidence to engage in market activities. In order to assist Timor-Leste's blossoming civil society, the USG has been supporting a broad and diverse swath of civil society organizations (CSOs) including those in the independent media sector, suco (village) councils and community-based organizations focusing on agriculture, agribusiness and natural resources.

The Development Scholarships and Higher Education Program (DSHEP) provides higher education scholarships to Timorese students to strengthen the base of skilled, high performing professionals in Timor-Leste. This program equips participants with formal qualifications as managers, civic and government leaders or entrepreneurs. DSHEP provides Timor-Leste with a pool of individuals whose knowledge and skills can advance the country's social and economic development. The program aligns with the Government's strategic objectives. Training in environmental issues, biodiversity conservation, forestry and natural resources management could be included.

The Strengthening Property Rights in Timor-Leste (SPRTL) project facilitates the development of private land and property law, along with a process for registration and titling. The project has supported the near passage of a national land tenure law and the development of implementation regulations; raised public awareness regarding land issues; facilitated communication between the government and civil society, thereby fostering transparency and trust regarding the administration of land and property; developed dispute resolution mechanisms to resolve conflicting property claims in ways that foster reconciliation; and developed technological tools, procedures and systems for claims registration. The Government of Timor-Leste is still working on final passage of the Land Tenure Rights Law and the Ministry of Justice is responsible for implementation.

Under the support of water earmark funds, USAID implemented the District Water Supply, Sanitation and Hygiene (DWASH) Service Program. The objective of DWASH was to help district governments provide rural communities with access to clean and safe water and improved sanitation. To achieve this objective, a number of water systems were rehabilitated or constructed. Approximately 50,000 people from target districts received access to clean and safe water and 45,000 have access to improved sanitation. To maintain the sustainability of the results, the DWASH program involved community and local authorities in the process of decision making and implementing activities.

HADIAK, or the Timor-Leste Health Improvement Project (TL-HIP), is providing technical support to the Ministry of Health at the national level and targeted districts and communities to strengthen primary health care related to maternal & newborn and child health and family planning. At the national level, technical assistance is provided through four technical advisors seconded to Family Planning/Maternal and Child Health department, Health Promotion department, Health Management Information System cabinet and Quality Control cabinet. Support to five targeted districts focuses on the following three population segments: the primary health care providers at the district, sub-district and community levels; women of reproductive age; and children under five years of age. At the community level, TL-HIP

promotes community engagement in health, improves links between health facilities and communities, and improves quality of services provided at the village or community level.

Additionally, Timor-Leste has immunization and anticorruption programs funded by the Millennium Challenge Corporation (MCC). The immunization program seeks to strengthen service delivery and identification of unimmunized children by identifying underserved areas, developing long-term solutions to improve and maintain higher coverage rates, and immunize chronically low-coverage areas. The program also institutionalizes the Integrated Community Health Services Units (SISCa) as functional healthcare service units in all project supported districts, improves surveillance and reporting of vaccine-preventable diseases in order to monitor the effectiveness of immunization efforts and allow for timely detection and response to disease outbreaks, and increases capacity of district and community health center staff to effectively manage, plan, and supervise basic health care operations. The anticorruption program supports the Anti-Corruption Commission (ACC) to become the lead agency for anti-corruption education, prevention, and investigation, and builds the Office of Prosecutor General (OPG)'s investigative and prosecutorial skills, particularly for corruption cases and economic crimes. Additionally, the program increases the capacity and public advocacy skills of civil society organizations, media, academic, and private sector associations in order to improve their effectiveness in monitoring, advocating, and disseminating information on corruption-related issues.

G. ACTIONS NECESSARY TO CONSERVE BIOLOGICAL DIVERSITY AND TROPICAL FORESTS

The National Biodiversity Strategy and Action Plan: Priority Actions and Targets

The National Biodiversity Strategy and Action Plan (NBSAP) identified the following priorities and targets to achieve by 2020:

1. Priority Strategy 1: Mainstreaming biodiversity into sectoral plans and programs to address the underlying causes of biodiversity loss
    a. Target: 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.
        i. Raise awareness on the values of biodiversity and engage various sectors including media, business sector, youth and women groups and local communities in conservation activities and in implementing the Communication, Education and Public Awareness Strategy
        ii. Promote nature-based and community-based sustainable tourism and ecotourism
        iii. Integrate biodiversity into agriculture to ensure the development of diverse and sustainable crops and sustainable agriculture practices
2. Priority Strategy 2: Protecting biodiversity and promoting sustainable use
    a. Target: 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 provides to local communities through ecosystem restoration activities.
        i. Enhance and develop national biodiversity laws and relevant environmental policies on nature conservation, pollution and other related concerns, including traditional laws
        ii. Intensively rehabilitate critical and damaged habitats and ecosystems and degraded watersheds through massive tree planting, including mangroves reforestation

        iii. Implement sustainable livelihood activities for local communities and promote sustainable use of natural resources, including promoting traditional conservation knowledge and practices, and enhancing the role of women and youth
        iv. Establish waste management centers for composting, recycling and re-using of domestic, commercial and other wastes
3. Priority Strategy 3: Building climate-resilient ecosystems through effectively managing protected areas and reducing threats to biodiversity
    a. Target: By 2020, the status of biodiversity has improved through the safeguarding of ecosystems, species and genetic diversity in the 30 declared protected areas.
        i. Effectively manage representative samples of Timor-Leste's biodiversity in the 30 declared protected areas and create natural conservation zones to protect specific biodiversity and ecosystems
        ii. Develop and implement a comprehensive and integrated coastal and marine policy and fisheries management programme
4. Priority Strategy 4: Enhancing biodiversity and ecosystems services to ensure benefits to all
    a. Target: By 2020, ecosystem services have been enhanced through promoting economic values of biodiversity and ecosystems and promoting benefits sharing.
        i. Valuate and account direct and indirect goods and services of biodiversity and ecosystems
        ii. Safeguard and maintain ecosystems services through promoting Integrated Water Resource Management
        iii. Promote understanding and develop national policies, considering traditional knowledge, on access and benefit-sharing arising from utilization of genetic resources, including biosafety measures
5. Priority Strategy 5: Enhancing implementation of the NBSAP through participatory planning, knowledge management and capacity building, including district, sub-district and community levels
    a. Target: By 2015, a national biodiversity monitoring and reporting system on biodiversity has been established, using the Clearing House Mechanism as a platform for information, knowledge management and networking.
        i. Maintain and operationalize the Clearing House Mechanism as a platform for knowledge sharing and networking
        ii. Enhance technical and managerial capacity of officials and staff on biodiversity conservation and management as laid out in the Strategic Action Plan and the Capacity Building Plan on Protected Areas
        iii. Coordinate with donor partners, United Nations and regional organizations and explore ways to substantially increase levels of funding and develop joint programmes

Watershed Management through Sustainable Agriculture and Reforestation

Watershed management including sustainable agriculture and reforestation would address the two primary threats to Timor-Leste's forests and biodiversity. These threats are unsustainable, low-yielding agricultural practices and deforestation for firewood collection.

Improving agricultural production on existing cleared lands would reduce the need of farm families to clear forests for new fields. Support needs to be provided that will help Timor-Leste diversify the types of products grown and develop economic alternatives to subsistence agriculture, thus reducing pressure for forest conversion. Agriculture sector development should also focus on decreasing erosion and

maintaining soil quality. Practices such as bank stabilization and terracing can decrease the risk of landslides.

Agro-forestry systems such as coffee with shade trees are a valuable example of a practice beneficial to the environment. The benefits of planting of multi-purpose species in gardens, agro-forestry systems and large-scale reforestation would be an increase in tree cover, income generation, improved food security, erosion control, firewood supply and improvements in water quality and quantity.

Enabling conditions to ensure the success of such environmental rehabilitation would be the institutional capacity of Timor-Leste's MAF to provide assistance and continuation of such programs, along with clarification of the rights, roles and responsibilities of government, NGOs, communities and the private sector. Tenure rights to land and forests will be of primary importance for clarification (see also D'Andrea, *et al*., 2003).

Water Quality and Quantity

Humans along with terrestrial, aquatic, coastal and marine wildlife are dependent upon a steady water supply of good quality. Fresh water is needed for irrigation and high value crops. Water scarcity is a major challenge because of the relatively low levels and sporadic rainfall in some parts of Timor-Leste combined with deforestation and the sedimentation of rivers. Such water scarcity can become a flashpoint for conflict.

Overall, there is very little information of the hydrology of the country and the impacts that the wide-scale deforestation may have or had on groundwater supply. Existing water supplies are also threatened by wide-scale erosion and siltation of rivers. Run-off affects aquatic and marine ecosystems and their biodiversity. Additionally, many waterways are contaminated with human and livestock waste. There is no sewage treatment and the waste flow from Dili is released along the coast. Recommendations related to watershed management would also benefit the quality and quantity of Timor-Leste's water supply.

Firewood and Energy

Energy generation from diesel fuel supplies electricity mainly to people in the urban centers of Dili and Baucau where approximately 92 percent have some degree of service. In other urban areas about 47 percent of households are serviced. Many in rural areas use oil lamps for lighting (Mercy Corps, 2011). Furthermore, most people rely on firewood for their cooking needs. Timor-Leste's oil and natural gas reserves are coming on line, but more slowly than expected. In the meantime, there is not a reliable supply of energy in the country. Renewables may have potential for electricity generation in remote areas. Some pilots have been started to explore off-grid energy for the rural poor that may show promise for scaling up across the country.

The production of renewable energy resources may also have the potential to create jobs in rural areas while providing the necessary energy for the establishment of other industries. Renewable energy will be a sound foundation for the sustainable development of Timor-Leste to reduce greenhouse gas emissions and to plan for the eventual depletion of its gas and oil reserves. Investment in renewables may also provide an opportunity for developing public-private sector partnerships.

Efforts to explore renewable energy are also needed to mitigate climate change. Currently Timor-Leste has plans to install several models of generators to burn diesel fuel for electricity. This investment could

increase greenhouse gas emissions contributing to global climate change from which Timor-Leste will experience negative impacts.

Policies and Planning for Forest and Biodiversity Management

Timor-Leste as a new nation continues to develop its legal infrastructure, and the regulations and procedures necessary to conserve its resources. Assistance in developing transparent, equitable, and sustainable systems is paramount to conserving its biodiversity and remaining tropical forests. Capacity building of government staff to develop, implement and enforce environmental legislation is also necessary.

Furthermore, several laws from the UNTAET period are still on the books so there needs to be a way to update laws, as well as harmonize laws across the government in support of resource conservation. There are also gaps in legislation in support of biodiversity and forest conservation that need to be filled. National laws also need to be harmonized with customary laws on resource use and protection. Existing customary laws under *tara bandu* provide grassroots examples of the types of policies that could contribute to sound environmental management. NGOs could use assistance to enhance their skills in analysis and advocacy for specific environmental policies and their implementation.

Biodiversity Conservation

There is limited biodiversity data and inventories of Timor-Leste's species are needed. Although the Global Environment Facility funded a National Biodiversity Strategy Action Plan and protected areas have been designated, assistance to the government is needed to develop a functional protected areas system and to train protected area managers. Management plans should be developed for protected areas, including buffer zone development with community participation and active management. These activities that promote participatory planning of Timor-Leste's natural resources are important methods to build local governance and human capacity for biodiversity conservation and management.

Both government and non-governmental organizations require a building of capacity to sustainably manage Timor-Leste's forests and conserve their biodiversity. Training in basic principles of ecology and conservation, ecological restoration, sustainable management of fisheries and forests, habitat requirements of endangered species, and eco-tourism management are some of the most pressing training needs.

Environmental Education and Awareness

There is a lack of information in Timor-Leste on the state of the environment, including endangered species and sustainable agricultural and other environmental management practices. Existing legislation and policies are unclear to the Timorese public and international community. Environmental education and awareness can contribute to an informed citizenry and promote good governance of natural resources. Laws and information must be translated into the *Tetum* language.

Conservation of Marine Biodiversity within the Coral Triangle

Little is known of the marine ecosystem surrounding Timor Leste, yet the country sits within the Coral Triangle, the epicenter of the world's marine biodiversity and nursery for the world's fisheries. In Timor Leste, the marine environment is reasonably healthy; therefore, numerous opportunities and benefits exist for its explicit conservation prior to any negative impacts from large-scale development.

Among the conservation efforts needed which are also priorities for the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security at large are: 1) the identification and management of priority seascapes; 2) a vision and plan for an ecosystem-based approach to fisheries management including sustainable catch plans; 3) the establishment of marine protected areas; 4) adaptation measures to climate change; and 5) the conservation of threatened species. Ecotourism is another option to demonstrate financial benefits from Timor's natural wealth and beauty.

Adaptation to Global Climate Change

Timor-Leste's forests, biodiversity and its people will be impacted from climate change. These impacts possibly include erratic rainfall patterns, sea level rise, water scarcity, altered growing periods for crops and an increase in disease vectors. To maintain resiliency to climate change, natural systems must remain intact to the fullest extent possible. In other words, maintaining biodiversity and forests are critical to assisting communities to adapt to climate change in the future.

H. MEETING CONSERVATION NEEDS: RECOMMENDED ACTIONS

USAID's new country strategy can meet the above conservation needs through the continuation of existing programs with the explicit integration of forest and biodiversity concerns within the economic growth and governance sector portfolios. Such integration is needed because the majority of Timor-Leste's population depends on natural resources for food and income. Furthermore, the sound management of these resources will be an indication and mechanism for good governance at national and local levels. Below are possible actions for the new USAID strategy in Timor-Leste that will meet Timor-Leste's needs to conserve forests and biodiversity. They are a range of options for consideration within the new strategy and it is not suggested that all recommendations be carried out. With additional funding, stand-alone activities could be carried out as well on the below topics. The recommended priority activities would include, in no specific order: clarification of tenure rights; sustainable land use policy; large-scale reforestation; increased capacity for natural resources management and governance; off-grid renewable energy; conservation of the Coral Triangle and conservation of the remaining forests. There are numerous linkages within this set of priorities because for example, deforestation will impact the sea and corals while clear land tenure is needed for reforestation. Off –grid renewable energy would reduce deforestation for firewood and reduce pollution that currently affects all ecosystems and their biodiversity. Natural resource management activities, alternative energy development, sustainable agriculture, ecotourism and large-scale reforestation projects can provide much needed employment opportunities for the rapidly growing youth population.

Economic Growth through Watershed Management and Reforestation

The government of Timor-Leste and donors recognize the importance of watershed and water resources management. Reversing the declines in biodiversity, forest areas and agricultural productivity can be accomplished through sustainable natural resource management interventions in fragile land areas such as watersheds. Such interventions can include slope stabilization, reforestation and agricultural diversification. USAID's previous work on the identification of a critical watershed for rehabilitation and conservation in Oecussi could act as demonstration for the government of Timor-Leste. Working at a watershed level not only will conserve biodiversity and rehabilitate degraded lands, but also will improve water quality and quantity. Reforestation could utilize firewood species and others that have qualities for slope stabilization and water retention. Active protection of seedlings and trees from fires will be a critical component of any reforestation activity and would generate income.

Current USAID actions under the COCAR project are meeting needs for the maintenance of forest cover, reforestation and sustainable agriculture that will slow the degradation of the environment. By improving and diversifying existing agricultural and agro-forestry systems, these activities prevent the further cutting of forests and loss of their biodiversity. The project's reforestation activities if scaled up could significantly increase Timor-Leste's land rehabilitation with positive benefits in improving water supply and quality. COCAR provides an excellent example of how to reconcile the need to generate income for the rural poor while protecting the environment. The project's assistance to existing shade coffee production systems maintains critical forest cover. The project is adding aspects of diversification; for example, the cultivation of vanilla that requires shade and the maintenance of tree cover. Appropriate sustainable agricultural practices are being explored to reduce wide-scale erosion causing the degradation of terrestrial as well as river and coastal habitats. Timor-Leste, however, is facing the demise of the trees shading coffee by the fungal infection known as gall rust and due to age. The project has been investigating ways to protect the tree cover and is promoting the planting of seedlings to replace diseased and old trees. Given the tremendous need to generate income for farmers and to reduce environmental degradation, USAID's coffee project provides a key foundation to future activities that improve farmer incomes without cutting the remaining forests. Current work under the USAID DOCIA project is focusing on the completion of environmental protection mechanisms such as the protection of springs, field boundaries, windbreaks, and slope protection to prevent sedimentation in streams and waterways.

Economic Growth and Conservation through Clean Energy

A stable energy supply at the local and national level is critical for the economic growth of Timor-Leste. USAID could explore opportunities between linkage of clean energy production and job creation. This effort would assist biodiversity conservation, as one threat to biodiversity is the lack of economic alternatives to the exploitation of forests and wildlife. On the one hand, oil and natural gas from the Timor-Leste Sea will be coming on line. How much of this will contribute to national energy generation versus foreign exchange earnings might be analyzed in the context of Timor-Leste's ability to generate other renewable energy resources, such as solar.

Biomass energy generation is another option where, in some countries, rural communities earn income by growing trees as fuel. An advantage to this type of planting is that the trees themselves can remain standing and continue to grow while only branches are cut as a fuel source. A further advantage is that biomass gassifiers can be located on a small-scale in rural areas for localized energy generation without dependence on a grid and would not require the installation of transmission lines that might otherwise, cut through forests. If USAID economic growth activities promote the development of processing industries for agricultural products, sustainable energy supply in rural areas is particularly important. Efforts addressing sustainable and renewable energy supplies in rural areas while generating jobs and income will reduce the current pressure on forests for subsistence agriculture. They could also reduce some of the pressure from the hunting and poaching of wild animals by people who have no other alternative for earning cash. USAID could partner with the European Commission supported Mercy Corps' Energy for All Program focused on enhanced knowledge of renewable energy sources and improved access to energy in rural and peri-urban areas. The project includes work on cookstoves, solar energy, alternative energy loans, a fuelwood survey, fuelwood planting and agroforestry.

Economic Growth through Workforce Development

Given high unemployment in Timor-Leste, a possible objective is expanded employment and income generating opportunities in rural areas. The most practical opportunities for income generation are

within the agricultural production and associated agribusinesses. It is encouraged that efforts in improving agricultural production include approaches that promote the conservation of natural resources such as soil and water. Diverse production systems that include a variety of products rather than monocultures would also be beneficial to minimize risk to market fluctuations and weather as well as have positive benefits to biodiversity. Mixes of different agricultural and tree species have benefits for the overall biodiversity of rural areas because they provide habitat for beneficial insects and birds. Even agricultural diversity mimics to some extent natural biodiversity. Natural resource management activities, alternative energy development, sustainable agriculture, ecotourism and large-scale reforestation projects can provide much needed employment opportunities for the rapidly growing youth population.

Further environmental degradation in Timor-Leste will exacerbate poverty as the land becomes less productive for food, water becomes scarce and contaminated and landslides destroy homes. The severity of the challenge in Timor-Leste warrants immediate action that mobilizes people for planting and erosion control through an employment generation program. Such an approach could be developed as a part of an environmental rehabilitation work program for sustainable development. In the short-term, this will create employment. In the long-term if environmental stewardship is institutionalized and continues with incentives for conservation, there will be available a variety of tree and agricultural products for domestic and export markets. With careful market analysis, these products could also provide raw materials for the development of local industries. An additional consideration is that there are different types of lands that need to be rehabilitated, for example, those under government, private or communal control. The approach to their rehabilitation will be dependent upon the type.

Although USAID might begin an employment program, a long-term investment will be needed for watershed rehabilitation including a large-scale tree-planting (i.e. reforestation) project. One option is working to raise the rehabilitation of Timor-Leste's environment as a priority for government funding and support government reforestation and nursery development activities. Another option is to consider private sector investment in valuable tree species and their products for development. Care must be taken with proposals for crops such as jatropha as usually these investors search for existing forests to clear rather than the higher-cost option of rehabilitating degraded lands. In any case, these types of plantations require large areas of land that are already occupied by people.

Payment for Environmental Services

A relatively new idea in international development and environmental conservation is the payment to communities for sound management of the environment. Such management in the case of watersheds provides benefits of a steady water supply to downstream users such as urban populations and farmers who irrigate their fields. The initiation of such a payment program would depend upon whether there are any downstream users of water who would be able to provide some form of payment. In other countries, such downstream users of water are urban water authorities and irrigators. The payment is not necessarily a direct cash transfer to families, but can also take the form of communal funds managed for education or other community needs. It would be worth exploring whether there would be opportunities for payment to communities to manage the watershed that maintains water supplies to Dili residents.

Additional considerations in promoting watershed management are capacity building of government staff and NGOs to provide extension services to farmers. If it is decided to work at a watershed level, then there is the potential for conflicts regarding land uses between neighboring *sucos*. Provisions to resolve such conflicts would need to be made.

Economic Growth through Fisheries Management and Coastal Tourism

The fisheries and coastal tourism could provide both food and income for Timor Leste. The extent of Timor-Leste's fishery resources is not known. Some fishing occurs for local markets and vessels from other countries have been fishing offshore. An inventory of aquatic and marine species and their abundance has been completed and there is now a better idea of what species might be threatened and in need of protection. Marine protected areas should be established based on preferred locations of those species under threat and critical spawning grounds.

Coastal tourism that emphasizes biodiversity conservation has the potential to generate employment and income for the Timorese while protecting coastal resources. Examples include walking and shallow-water snorkeling tours that would educate tourists on local flora and fauna. SCUBA diving is another sub-sector that would, if properly managed, be highly successful given the diversity of coral that currently exists in the shallow waters off of Timor-Leste. Limitations on tour group size and frequencies would need to be exercised. Small, unobtrusive campsites could be designated and plots rented to tourists. In the development of tourism, opportunities for direct community involvement and benefit sharing should be explored.

USAID could invest in this area in a number a ways. It could continue to dedicate funding to the Coral Triangle Initiative effort to provide advisors and assistance to Timor-Leste's government and civil society as the Government of Timor-Leste needs continued assistance to implement its Coral Triangle National Plan for Action. USAID could also continue to fund the Coral Triangle Support Program to establish a Locally Managed Marine and Coastal Areas network and to develop a model for government and local community sustainable management of fisheries. Additionally, USAID could incorporate ideas of fishing and/or coastal ecotourism for plans to work with medium and small-scale enterprise activities under the Economic Growth program. Establishment of a network of protected areas ranging from ridge to reef could improve overall natural resource productivity and sustainability as well as promote ecotourism.

Promoting Good Governance through Public Participation in Environmental Policy and Natural Resource Management

Uncertainty regarding land and property extends into forestlands and natural resources. The lack of clarity of rights and responsibilities has implications for sound environmental management. Security of tenure to agricultural and forestlands can be an incentive for community conservation of these resources. Rural poor would be more likely to invest in their land, including reforestation and sustainable agricultural practices that have downstream benefits in reducing soil erosion and rehabilitating degraded habitats. Such rights and enforcement of sound management can be strengthened through the official recognition of customary law for natural resource management and conservation, *tara bandu*. USAID should continue to work with the Ministry of Justice to clarify and enforce the Land Tenure Law.

Regarding environmental policy in general, advisors could be provided to improve capacity for policy formulation with public participation. Such a policy program could be developed to strengthen biodiversity conservation, watershed management, and sustainable agricultural practices. An overall participatory process in the development of policies related to resource tenure and environmental management such as protected area delineation is a concrete manner to demonstrate the implementation of good governance.

Activities under the democracy and governance program strengthen the rule of law and institute measures against corruption. The rule of law strengthens the business-enabling environment and, in so doing, provides citizens and the private sector with the confidence to engage in market activities. In order to assist Timor-Leste's blossoming civil society, the USG has been supporting a broad and diverse swath of civil society organizations (CSOs) including those in the independent media sector, suco (village) councils and community-based organizations focusing on agriculture, agribusiness and natural resources. Work on good governance, participatory process and transparency in decision-making provides the enabling environment for the conservation of biodiversity and forests. It can contribute to the protection of endangered species, biodiversity conservation, and the retention of forest cover, as these issues slowly gain greater attention. Assistance can also contribute to the environment by strengthening anti-corruption measures and improving land titling. Its efforts to share information on laws and legal services could also be of value if information is disseminated and legal services are provided in rural areas on/ in relation to natural resources and biodiversity.

There is also a need for mediation in the case of land and resource disputes and for information on natural resource and biodiversity laws in local languages. USAID assistance on decentralization could be a benefit to the sound management of local resources because those that are closest to the resource have the most to win by sound management or the most to lose by degradation and loss of the resource base.

Environment and Health

Environment and health are closely linked with respect to foods and nutrition; sustainability of and access to natural resources; clean water supplies and firewood and respiratory illnesses. As the health special objective is defined, some of these links might be appropriate for integration. For example, the production of education materials on these links might be an opportunity to improve both the health and environment of communities. The promotion of sustainable agriculture and reforestation with useful products such as fruits, vegetables and livestock will improve the food security and nutrition of families. Clean water supplies will depend upon reforestation, the stabilization of slopes as well as the implementation of some form of water sanitation. Finding alternatives to the use of firewood for cooking, or making cooking with firewood more efficient could reduce the incidence of respiratory illness among families.

Crosscutting – Adaptation to Climate Change

Climate variability already impacts economic sectors in developing countries and adaptation to this variability will be critical to sustaining improvements in development. To begin with, a "risk-based approach" to planning is needed with the objective of ensuring the economic resilience while working to conserve the environment to the greatest extent possible in a changing climate. In considering adaptation, numerous interventions need to be taken into account focusing on health, water, food, and income security. Adaptation of forest, marine and aquatic ecosystems as well as the wildlife they contain is paramount to maintaining current life on earth. Furthermore the most heavily populated areas are coastlines that will be directly impacted by sea-level rise.

Other goals in an adaptation strategy include: Counteracting water scarcity exacerbated by climate change; improving food security and food affordability; addressing hazard prone areas exacerbated by climate change (urban, rivers, coasts, hills & mountains); increasing the resilience of forests, wildlife and natural resources to climate change and increase adaptation benefits for human society; providing economic alternatives to those whose livelihoods will be affected by climate change; and assisting

communities along coasts in adapting to climate change. Without these interventions there will be continued over-exploitation of the natural environment.

These interventions can be achieved by: incorporating climate change information into planning and implementation of programs in climate-sensitive sectors: agriculture, water, forests, urban, rivers and coasts; supporting applied agricultural research for crop adaptations to climate change; identifying economic alternatives to provide resilience to the poor harmed by climate change; protecting wildlife and endangered species to the extent possible to ensure genetic diversity and population numbers to adapt to climate change; and instituting biodiversity corridors and marine protected areas to provide resilience and adaptation to protected areas at fixed sites.

Crosscutting – Capacity Building

Crosscutting among all the recommendations is the need to build capacity among Timorese counterparts (including government and NGOs) in the design and implementation of conservation, sustainable production and development activities. USAID investments targeted towards biodiversity and forestry conservation of any type should consider integrating the building of government officials and civil society's capacity for safeguarding these resources.

Coastal environmental education programs would serve to inform industry and local citizens of the impact of their actions on the coastal and marine environment. Such programs include the identification and execution of proper sewage treatment. Proper maintenance of sea-going vessels, waste disposal, and responsible fishing practices are also important focal points and could be a part of a comprehensive education program. Parallel to education, activities such as beach cleanups conducted by citizens would reveal trends in marine debris and solid waste as well as identify sources. Participation also promotes community awareness, increased morale and community involvement.

The USAID higher education program should be open to including practical skills in natural resources management and biodiversity conservation as part of the curriculum.

Crosscutting – Gender

In Timor-Leste, women are traditionally responsible for household jobs such as cooking, cleaning, and child care. The country has a high fertility rate with 3.1 children per woman (World Fact Book, 2012, the 2010 DHS puts this number at 5.7) and women tend to have limited access to education and healthcare. Despite these constraints, women in Timor-Leste are fairly entrepreneurial and many own microenterprises involved in handicraft creation, salt-making and baked good production (2011 Human Development Report: Timor-Leste). As women are heavily engaged in agriculture as well as in firewood and non-timber forest product collection, their livelihoods are dependent on Timor-Leste's natural resource base. Women are potentially a good entry point for community-based approaches to conserving biodiversity and forests, as they have local knowledge of ecosystems, agricultural production and natural resource management. Their empowerment and equity are key factors for achieving economic growth, social development and environmental sustainability.

Potential Negative Impacts to Forests and Biodiversity in the New Strategy

There is a slight risk that improved agricultural yields from the COCAR and DOCIA projects could encourage the clearing of forests to expand agriculture. USAID work must focus on promoting sustainable intensification of agriculture solely on existing agricultural lands. Another area of potential

concern is small-scale infrastructure construction. Appropriate and thorough initial environmental impact assessments must be conducted before any infrastructure projects are initiated.

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Annex 1: Summary of Laws and International Conventions Related to the Environment

Law or Regulation	Category	Content
Convention to Combat Desertification (2003)	International agreement	To combat desertification and mitigate the effects of drought through national action programs that incorporate long-term strategies supported by international cooperation and partnership arrangements.
Convention on Biological Diversity (2006)	International agreement	The Convention has three main goals: 1) conservation of biological diversity (or biodiversity); 2) sustainable use of its components; and 3) fair and equitable sharing of benefits arising from genetic resources.
UN Framework Convention on Climate Change (2007)	International agreement	Stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system.
Kyoto Protocol (2008)	International agreement	International environmental treaty with the goal of achieving the "stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system." Timor-Leste plans to have a Designated National Authority for the Mechanisms of the Kyoto Protocol and a National Climate Change Centre by 2015.
Montreal Protocol; Vienna Convention; London, Copenhagen, Montreal, and Beijing Amendments (2009)	International agreement	International treaties designed to protect the ozone layer by phasing out the production of numerous substances believed to be responsible for ozone depletion.
Nagoya Protocol (currently under consideration in 2012)	International agreement	Access and Benefit Sharing on Genetic Resources
Arafura and Timor Seas Expert Forum	Regional agreement	Assist in achieving the goals of sustainable development and poverty alleviation in the Arafura and Timor Seas region, particularly for the coastal communities, who depend upon marine and fisheries resources for their livelihood.
Partnerships in Environmental Management for the Seas of East Asia	Regional agreement	To build interagency, intersectoral, and intergovernmental partnerships for achieving the sustainable development of the Seas of East Asia.
Coral Triangle Initiative	Regional agreement	A multilateral partnership of six countries formed in 2009 to address the urgent threats facing the coastal and marine resources of one of the most biologically diverse and ecologically rich regions on earth.

Constitution of the Democratic Republic of Timor-Leste (2002)	Constitution of Timor-Leste	Fundamental Principles, Objectives of the State; Sections 61, 96, 139 relating to environmental and natural resource protection, preservation, and sustainable use.
Indonesian Law No. 23 1997	National Law	Environmental Protection
On the prohibition of logging operations and the export of wood from East Timor - UNTAET Regulation No. 2000/17	National Regulation	Prohibits logging and the export of wood products.
On protected places - UNTAET Regulation 2000/19	National Regulation	Protects 15 of the remaining primary forest areas (primarily mountain summits), coral reefs, mangroves and wetland habitats. Species listed in the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) are protected.
National Fisheries Policy 2001 (currently being updated)	National Policy	Forms the basis for future detailed fisheries management strategies that take account of ecologically sustainable development (ESD), which meets the needs of the present without compromising the ability of future generations to meet their own needs. Decisions will be based on the best scientific and economic advice available and take full account of traditional social structures and practices. Update will form Marine Protected Areas.
UNTAET Directive No. 2002/3	National Directive	Certain exemptions to Regulation 2000/17 - sandalwood logged before 8 June 2000.
Quarantine Joint Instruction JI/2002	Ministerial Instruction	The Quarantine Service of the Ministry of Agriculture, Forestry and Fisheries shall be the responsible entity for inspection and quarantine, namely in the border posts of the country, and for the implementation of law no. 16, of 1992, relating to quarantine of animals, fish and plants.
Maritime Boundaries of the Territory of the Democratic Republic of Timor-Leste - Law No. 7/2002	Parliamentary Law	Defines territorial waters of Timor-Leste.
Juridical Regime of Real Estate (Part I - Ownership over Real Estate) - Law No. 1/2003	Parliamentary Law	Provides general conditions for land ownership.
Quarantine and Sanitary Control on Goods Imported and Exported - Decree Law No. 21/2003	Decree Law	Establishes effective sanitary control and quarantine mechanisms for the import and export of goods.
Agriculture Policy and Strategic Framework 2004	National Policy	Working with rural communities to increase food production, and improve forest rehabilitation, watershed protection and biodiversity conservation.

Forestry and Water Sub-Sector Policy 2004	National Policy	Community – based natural resource management strategy in the rehabilitation and conservation of remaining forest areas.
Juridical Regime of Property: Official Allocation and Leasing of Private Property of the State - Decree Law No. 19/2004	Decree Law	Defines state property ownership.
Water Supply for Public Consumption - Decree Law No. 4/2004	Decree Law	Regime of water distribution for public consumption.
General Regulation on Fishing - Government Decree No. 5/2004	Government Decree	Creates the conditions for the development of a national fisheries sector and industry and gives the Government power to grant fishing licenses within the framework of the sustainable exploitation of resources.
On General Bases of the Legal Regime for Fisheries and Aquaculture Management and Regulation - Decree Law No. 6/2004	Decree Law	Responds to the need of regulating fishing activities so as to contribute to the attainment of objectives on the economic and social development policies of the country while simultaneously ensuring the protection and conservation of species, as well as their continuous and sustainable exploitation.
Fishing Related Offences - Law No. 12/2004	Parliamentary Law	Bans the use of explosives and toxic substances in the exploitation of such resources and other ecologically reprehensible uses of the aquatic ecosystems, illegal fishing, as well as the fishing of corals and protected species or fishing in prohibited or protected areas to better protect and preserve aquatic species and ecosystems.
Cooperatives - Decree Law No. 16/2004	Decree Law	Aims to help rekindle cooperative values in order to release energy to rebuild the country and the mentalities and values that have been deformed during the somber period of military occupation. Cooperatives for fisheries and agriculture are noted.
Schedule of Fees and Charges for Water - No.1/2004	Ministerial Orders	Schedule of fees for domestic water supply.
On General Bases of the Legal Regime for Fisheries and Aquaculture Management and Regulation - Decree Law No. 4/2005	Decree Law	Regulation on fishing - Amended. Fees for fishing licenses set.
Ministerial Diploma No. 04/115/GM/VI/2005	National Law	List of Protected Aquatic Species
Ministerial Diploma No. 06/42/GM/I/2005	National Law	Fisheries crimes
Ministerial Diploma No. 02/04/GM/I/2005	National Law	Main fisheries catch
Ministerial Diploma No. 05/116/GM/I/2005	National Law	Minimum catch size (fisheries)
Ministerial Diploma No. 03/05/GM/I/2005	National Law	Fish allowable by catch

Juridical Regime of Real Estate (Part II) - Leasing between Individuals) - Law No. 12/2005	Parliamentary Law	General conditions for land leasing.
National Forestry Policy 2005	National Policy	Sustainable management of forest resources and watersheds to provide environmental, social and economic benefits to the people of Timor-Leste.
National Food Security Policy 2005	National Policy	A complementary instrument, not only for achieving the Millennium Development Goals, but also for materializing the Government's policy to eradicate hunger in all its forms, thus contributing to poverty reduction by 2020.
Quarantine General Regulations No. 1/2006	National Regulation	Quarantine regulations
Organic Of The Fourth Constitutional Government - Decree Law No. 7/2007	Decree Law	Determines which ministries are responsible for the environment.
Government Resolution No. 8/2007	Resolution	Establishment of the Nino Konis Santa National Park. The park covers an area of 123,600 ha (68,000 ha on land and 55,600 ha on sea).
Government Resolution No. 9/2007	Resolution	National Forestry Policy and Strategic framework. Objectives are for forest protection, water conservation and land restoration. The strategy will protect forests from damage or loss through programs that will empower, encourage and involve communities to manage forests through public awareness and education activities, the prevention and physical control of wild fires and reduced livestock grazing.
National Policy of Waste Management (2007-proposed)	National Policy	Proposed in the 4th Government programme 2007-2012.
Forest Management Decree Law (2007-in process)	Decree Law	Under development by the Ministry of Agriculture and Fisheries.
National Policy of Sustainable Natural Resource Use Regarding Extractives (2007-proposed)	National Policy	Proposed in the 4th Government programme 2007-2012.
Structure of Ministry of Economy and Development - Decree Law No. 9/2008	Decree Law	Defines the National Directorates for International Environmental Affairs and Environment.
Structure of Ministry of Agriculture and Fisheries - Decree Law No. 18/2008	Decree Law	Defines the National Directorates under the Ministry of Agriculture and Fisheries that manage forests, National Parks and Protected Areas, quarantine services and watersheds.

Implementing a Satellite System for the Monitoring Fishing Vessels - Decree Law No. 21/2008	Decree Law	Continuous monitoring via satellite of certain types of fishing vessels is considered a key instrument to secure a better monitoring and control of fishing activities, as it allows for substantially improved fishing ground surveillance and illegal landing control.
Rural Energy Policy (2008-draft)	National Policy	To respect that access to energy services in rural areas is an integral part of overall rural, agricultural and forest development and to take advantage of renewable, local energy resources, wherever this is possible from the aspects of availability (potential), energy demand, technical and social implications, economic feasibility, ecological harmony and sustainability.
Land Tenure Law (2009-in process)	National Law	Decides who does and does not own land, and who has the right to compensation.
Water Resources Policy (2009-draft)	National Policy	Under development by the Ministry of Agriculture and Fisheries and National Directorate for Water Resources Management (newly created).
Laws and Policies on Fertilizer and Pesticides (2009-draft) and Seeds (2011-draft)	National Policies and Laws	Under development by the Ministry of Agriculture and Fisheries.
Guidelines for Watershed Management (2009-draft)	National Guidelines	Under development by the Ministry of Agriculture and Fisheries.
Protected Area Decree Law (2011-proposed)	Decree Law	Would update UNTAET Regulation 2000/19.
Environmental Base Law (2011-in process)	National Law	Aims at the conservation and improvement of environmental quality, protection of human health, sustainable use of natural resources and pollution control, as one of the most serious problems resulting from human action.
Organic Structure of the Ministry of Infrastructure - Decree Law No. 1/2011	Decree Law	Upcoming changes to institutional arrangements for WASH, with the creation of a Directorate-General of Electricity, Water and Sanitation (DGEWS) within the Ministry of Infrastructure. Under DGEWS, four directorates will be created including for water services (DNSA), basic sanitation (DNSB), water quality (DNCQA) and electricity. These changes are expected to come into effect in 2012.

Environmental Licensing - Decree Law No. 5/2011	Decree Law	Institutes an Environmental Licensing System, designed as an incremental system to meet the need to prevent negative environmental impacts depending on the complexity of projects and given the economic and social situation of Timor-Leste. The system, moreover envisages the granting of environmental licenses and inspection responsibilities as a logical consequence of the procedure for environmental assessment of projects, thus creating an integrated procedure and a simplified process for prevention of negative environmental impacts and controlling pollution from projects.
National Biodiversity Act or Biodiversity Decree Law (2011-proposed)	National Law	Proposed in the 2011 Strategic Development Plan. Will assess the threats to marine and terrestrial biodiversity and identify strategies to conserve biodiversity.
Wildlife Conservation Law (2011-proposed)	National Law	Proposed in the 2011 Strategic Development Plan. Will protect and conserve wildlife in Timor-Leste.
National Bamboo Policy (2011-proposed)	National Policy	Proposed in the 2011 Strategic Development Plan. To increase the growth of bamboo both in forest and non-forest areas.
Air, noise, and soil pollution and vehicle emissions regulations (2011-proposed)	National Regulations	Proposed in the 2011 Strategic Development Plan
Policy for Managing Watersheds and Coastal Zones (2011-proposed)	National Policy	Proposed in the 2011 Strategic Development Plan. Will include strategies to rehabilitate and protect mangroves in coastal areas, regulate sand exploration in various rivers, especially the Comoro River, and will create buffer zones on riverbanks and around dams, lakes and coastlines to aid water resource conservation and floodplain control.
National Directorate for Environment Guidelines	National Guidelines	Guidelines 1-8 protect biodiversity.
National Environmental Policy (2012-proposed)	National Policy	Allows the creation of necessary mechanisms for the management of the country's environment and natural resources in order to be able to achieve a sustainable economic development.

Annex 2: Ministries Responsible for the Environment

Ministry or Department	Mandates
1. Ministry of Economy and Development	Responsible for the design, implementation and assessment of the policies for the areas of development of micro-finances and cooperatives, as well as environment.
a. State Secretariat for the Environment	Development and execution of policies concerning the environment.
i. National Directorate for International Environmental Affairs	In charge of stimulating and coordinating the active participation of the Government in international fora, preparing and formulating positions to be adopted in connection with environmental issues, as well as fostering cooperation and collaboration to promote sustainable and environmental development.
ii. National Directorate for the Environment	In charge of undertaking studies, executing and monitoring environmental development, protection and conservation policies, as well as preparing and overseeing the application of environmental regulations and standards.
b. State Secretariat for Rural and Cooperative Development	Development and execution of policies concerning rural and cooperative development.
i. National Directorate of Research for National Development	In charge of defining economic policies and the national development strategy.
ii. National Directorate for Rural Development	In charge of studying and executing rural development policies, as well as preparing, implementing and monitoring development regulations and rules in rural areas.
iii. National Directorate for Cooperatives	In charge of designing, executing and assessing the national policy on the cooperative sector.
2. Ministry of Agriculture and Fisheries	Responsible for the design, implementation and assessment of the policies for the areas of agriculture, forestry and fisheries.
a. State Secretariat for Agriculture and Arborculture	Development and execution of policies concerning agriculture and arborculture.

i. National Directorate of Forests	To draw up, follow up, implement and enforce forestry policy, specifically in the fields of sustainable development of forest resources and their associated spaces and, additionally, hunting, beekeeping, and aquatic resources in inland waters, guaranteeing their protection, conservation and management; the service is empowered to function as the national forestry authority.
a. Directorate for Protected Areas and National Parks	Responsible for the National Protected Area Network
ii. Division of Reforestation and Forest Rehabilitation	
b. State Secretariat for Fisheries	Development and execution of policies concerning fisheries.
i. National Directorate for Fisheries and Aquaculture	To draw up, coordinate, schedule, execute and enforce policies, plans, programs and projects for fishing, aquaculture, the transformation industry and others allied with it, as the service invested with authority over fisheries on the national level.
ii. Agriculture Land Use Geographic Information System Department (ALGIS)	
c. State Secretariat for Animal Husbandry/Livestock	Development and execution of policies concerning livestock.
d. National Directorate of Quarantine and Bio-Security	To coordinate and implement measures, laws, and regulations on quarantines and sanitary controls on the import and export of animals and plants, animal and plant products, merchandise, assets, or objects, as well as sanitary control of vehicles, ships, and aircraft.
e. National Directorate of Agricultural Education and Training	To coordinate schools offering technical and professional education, integrated with the national educational system.
f. National Directorate of Support to Agricultural Community Development	To implement extension programs and the agricultural community development fund.
g. National Directorate of Policy and Planning	To support the setting of the strategic directions, priorities and objectives for MAF policies, as well as coordinating, following up and assessing their application and ensuring the Ministry's relationships for national and international cooperation.
h. National Directorate of Irrigation and Water Use Management	To carry out policies in the fields of irrigation and management of water use for farming, proposing policy measures and instruments, promoting their application and participating in monitoring and assessment; the service is empowered to function as the national irrigation authority.

i. National Directorate of Agriculture and Horticulture	To carry out policies within the fields of agriculture and horticulture, genetic plant resources, materials for multiplying plant and vegetable varieties, training rural agents, and providing for the enhancement and economic diversification of rural areas.
j. National Directorate of Research and Specialist Services	To coordinate and implement research and laboratory activities, specifically in the fields of agricultural and agro-forestry crops, soils, veterinary medicine and food production, in order to equip the Ministry services with the information and data required for the better and more efficient management of resources.

Annex 3: Ministries Indirectly Responsible for the Environment

Ministry or Department	Mandates
1. Ministry of Finance	Responsible for the design, implementation and assessment of the policies for the areas of budget and finance annual planning and monitoring.
a. National Directorate of Statistics	Coordinates the system of official statistics of Timor-Leste to ensure that the system is coherent and rational and compiles, analyses, systematizes, produces and publishes statistical data on the population, companies and other entities, with a view to producing and publishing information on the economic, social and demographic situation of Timor-Leste.
2. Ministry of Justice	Responsible for the design, implementation and assessment of the policies for the areas of justice and human rights.
a. Directorate of Land, Property and Cadastre	Responsible for the development and administration of an information system relating to use and ownership of immovable assets in Timor-Leste and for implementing an efficient system to manage State property.
3. Ministry of Education	Responsible for the design, implementation and assessment of the policies for the areas of education and culture, as well as science and technology.
4. Ministry of State Administration and Territorial Planning	Responsible for the design, implementation and assessment of the policies for the areas of public administration, local and regional power, and administrative arrangement of the territory.
a. National Directorate of Public Service	Responsible for studying, proposing and executing the policies and regulations relating to civil service, social security of functionaries and agents of the Public Administration and other related administrative procedures.
b. National Directorate of Local Development and Territorial Management	Responsible for ensuring the works in the field of local development.
5. Ministry of Infrastructure	Responsible for the design, implementation and assessment of the policies for the areas of civil works, urbanization, water and power distribution, civil land, sea and air transportation, auxiliary communications services, including postal, telegraphic and telephonic services, use of the radio electric space, meteorological services and management of related State equipment.

a. National Directorate for Water Supply and Sanitation	The Decree Law No. 1 of 2011 flags upcoming changes to institutional arrangements for WASH, with the creation of a Directorate-General of Electricity, Water and Sanitation (DGEWS) within the Ministry of Infrastructure. Under DGEWS, four directorates will be created including for water services (DNSA), basic sanitation (DNSB), water quality (DNCQA) and electricity. These changes are expected to come into effect in 2012.
b. National Directorate for Water Resources Management	A Water Resources Policy for Timor-Leste has been drafted. Information about the availability and status of freshwater sources in Timor-Leste is currently being collated, and the National Directorate for Water Resources Management is being established. In collaboration with Geoscience Australia, the first Hydrogeology Map (draft) has been produced and a simplified version indicates aquifers of high water potential, low water potential and non-aquifers.
c. State Secretariat of Public Works	Responsible for the orientation, pursuance and integrated implementation of the national policy for public works, all strands of civil construction, roads, bridges and flood control, buildings and structures, housing and urban planning.
d. State Secretariat of Electricity, Water and Urbanization	Responsible for the orientation, pursuance and integrated implementation of the national policy for the distribution of water and electric energy and basic sanitation.
6. Ministry of Tourism, Commerce and Industry	Responsible for the design, execution, coordination and assessment of the policies for the areas of tourism and economic, commercial and industrial activities.
a. National Directorate for Tourism	Designs, implements and evaluates national tourism policy, including the aspects of leisure, fun and ecotourism. Also implements and enforces legislation considering the installation, licensing, sorting and checking of the status of operation of tourist facilities.
7. Secretary of State for Youth and Sports	Responsible for designing, executing, coordinating and assessing the policy for the areas of promotion of the youth's wellbeing and development. It is responsible for proposing the policy and preparing the draft regulatory procedures for the areas of Youth and Sports, ensuring the implementation and execution of the legal and regulatory framework for Youth and Sports, and promoting youth-oriented activities, especially in the fields of sports, arts and culture.

8. Secretary of State of Natural Resources	Responsible for the areas of mineral and natural resources, including oil and gas, as well as the activities of the mining, petroleum and chemical industries. The Secretary of State ensures a transparent management of the resources, in conformity with international practices and in accordance with national legislation; establishes contacts with international investors so as to attract investment in national territory, in the areas under its responsibility; supervises production sharing contracts, authorizations and approvals; and promotes new explorations of oil resources and develops those already in existence.
9. Secretary of State for Energy Policy	Responsible for designing, executing, coordinating and assessing the policy for the areas of energy resources. It also defines and proposes guidelines on energy policy to the Government. It takes the responsibility for developing the legal and regulatory framework for the activities related to energy resources; for regulating, in coordination with other ministries, operators in the area of power generation; for developing studies on the capacity of energy resources and alternative energies; for coordinating and promoting the management and the updating of the infrastructures in the areas of power generation; and for ensuring the coordination of the energy sector and stimulating complementarily between its various modes, as well as their competitiveness.
10. Secretary of State for the Promotion of Equality	Responsible for designing, executing, coordinating and assessing the policy for the areas of promotion and defense of gender equality. It is responsible for supporting the design of global and sector-based policies regarding the promotion of gender equality and the strengthening of the role of Timorese women in society.
11. Ministry of Health	Responsible for the design, implementation and assessment of the policies for the areas of health and pharmaceutical activities. The Ministry is responsible for the Central Health Services, the National Laboratory, the Institute of Health Sciences, National Hospitals and District Health Services. It is the lead agency for health and hygiene and plays a key role in rural sanitation.
a. National Directorate for Environmental Health	Coordinates relevant WASH sector initiatives.

Annex 4: Donors and International Organizations with Environment-Related Activities

Donor	Implementer	Project	Funding (millions of USD)	Purpose
EC	Office of the Prime Minister	Support to non-State Actors	4.653	Capacities of local NGOs strengthened
Portugal	INA	Public Administration Training Project	0.644	Capacity building for the Secretary of State for Council of Ministers
UNICEF	MoE, SoS for Youth and Sports	Adolescent and Youth Development and Participation Project	2.613	Youth development
Korea	KOICA, SoS for Natural Resources	Geologic Mapping of Suai District	1.7	Mapping of the Suai District
Japan	JICA, SoS for Energy Policy	Project for Clean Energy Promotion Using Solar Photovoltaic System	6.078	Reduce GHGs from power plants
EC	Mercy Corps (NGO), SoS for Energy Policy, Naroman Timor Foun (NTF, local NGO), Alola Foundation (local NGO)	Energy for All -- Alternative Energy Solutions for Rural and Peri-Urban Areas	1.476	Enhanced knowledge of renewable energy sources and improved access to energy. Work on cookstoves, solar and alternative energy loans. Fuelwood planting and jobs in agroforestry.
ADB	MOI, SoS for Vocational Training and Employment	Mid-level Skills Project	8.7	Technical and vocational education
EC, NOR, IRL, AusAID, ILO	ILO, SoS for Vocational Training and Employment	TIM-Works	7.759	Livelihoods improved and social stability promoted in rural communities through development and employment generation
GoAustralia, AusAID, ILO	ILO, SoS for Vocational Training and Employment	YEP (Youth Employment Promotion) Programme	8.024	Youth employability enhanced and employment opportunities increased
USA	TBD, Ministry of	Assistance	23.789	Citizen access to justice and improved good governance

	Finance	Agreement in Governing Justly and Democratically		
USA	TBD, Ministry of Finance	Assistance Agreement in Investing in People	29.187	Improved health, MCH, family planning, WASH and higher education
USA	TBD, Ministry of Finance	Assistance Agreement in Economic Growth	50.052	Agriculture, private sector capacity and environmental management
UNICEF	Ministry of Finance	Planning, Monitoring and Evaluation Programme	4.335	Strategic and gender sensitive information on the situation of children and women
Japan	JICA, Ministry of Justice	Technical Advisor for Mapping	0.309	Establish a system to promote use of geographic information
USA	Associates in Rural Development, Ministry of Justice	Strengthening Property Rights in Timor-Leste (completed)	9.876	Supported the establishment of a comprehensive and functioning land titling, registration and dispute resolution system
Australia	Australian Bilateral Initiative, Ministry of Health, Min of Infrastructure	Rural Water Supply and Sanitation	42.73	Rural access to clean water and adequate sanitation; improved hygiene behavior
USA	CDM International Inc, MoH	District Water Supply, Sanitation and Hygiene Program (DWASH) (completed)	16.184	Strengthened district government delivery of community DWASH and environmental services
USA	Macro International Inc, MoH	DHS (completed)	1.146	DHS supported
Australia	AusAID, Ministry of Education	Australian Development Scholarship	24.804	Provide educational opportunities
Australia	World Bank, Min of Ed	Education Sector Support Program	7.428	Provide educational opportunities
Japan	JICA, Min of Ed	Project for Capacity Development of the Faculty of Engineering, UNTL	3.185	Capacity development of the Faculty of Engineering, UNTL

NZ	NZ Aid Programme, Min of Ed	NZ Development Scholarships	6.477	Tertiary education to Timorese nationals for human resource capacity
Portugal	Min of Ed	Support to UNTL	9.741	Capacity building of UNTL and technical and scientific preparation of future public administration and private sector employees
USA	East West Center, Min of Ed	US -- Timor-Leste Scholarship Program	0.5	5 Timorese students sent to university
Canadian Cooperation Fund and Climate Change Fund, ADB	ADB, Min of Ed	Strengthening the Capacity of Pacific Developing Member Countries to Respond to Climate Change	3.465	Climate risk management, adoption practices and GHG mitigation measures incorporated into infrastructure and key sector management plans
Australia	Australian Bilateral Initiative, Ministry of State Administration and Territorial Management	Public Sector Capacity Development Program	29.019	Sustainable and effective system of governance and public administration for the delivery of high quality public services
Australia	various Aussie Government, Ministry of State Administration and Territorial Management, Min of Infrastructure, Min of Tourism, Commerce and Industry, MAF	Public Sector Linkages Program	6.024	Sustainable and effective system of governance and public administration for the delivery of high quality public services
ADB	ADB, Ministry of State Administration and Territorial Management	Capacity Building to Strengthen Public Sector Management and Governance Skills III	0.6	Civil servants successfully trained in professional competencies in public administration and governance
IDA, WB	Ministry of State Administration and Territorial Management	Timor-Leste Youth Development Project (IDA)	2.118	Youth empowered and their inclusion developed to participate in community and local development initiatives
IRL, NOR, UNCDF, UNDP	UNCDF, UNDP, and Min. of Economy	Local Governance Support Programme	3.976	Full-fledged and effective local government system in Timor-Leste established

	and Development	(LGSP)		
EC	Min of Economy and Development	Technical Assistance to ICRD	2.737	ICRD capacity to coordinate interventions in rural development in strengthened
Germany	GIZ, Min of Economy and Development	Youth and Employment	5.306	
Japan	JICA, Min of Economy and Development	Young Leaders Training Program (Urban Environment Management)		21 young leaders will have knowledge of environment management
IRL, Irish Aid, ILO	ILO, Min of Economy and Development	BOSS -- Business Opportunities and Support Services Project	7.433	Pro-poor economic development and quality employment for women and men generated by spurring growth of micro and small enterprises
GEF, AusAID, UNDP	UNDP, Min of Economy and Development	Climate Change Enabling Activity Self-Assessment	0.818	Stocktaking and stakeholders' consultation for development of project proposal for the Initial National Communication on Climate Change
GEF, UNDP	UNDP, Min of Economy and Development	Climate Change Adaptation (after NAPA)	5	NAPA follow up activities in support of Strengthening the Resilience of Rural Timor-Leste to Climate Risks and Disasters implemented
UNDP	UNDP, Min of Economy and Development	National Biodiversity Strategy and Action Plan (NBSAP)	0.277	National Biodiversity Strategy and Action Plan for Conservation and Sustainable Use of Biodiversity aligned to meet CBD obligations prepared
Australia, Government of South Australia, UNDP	UNDP, Min of Economy and Development	Environment Mainstream in TL	0.36	Environmental policy development in GoTL and build synergy between poverty reduction initiatives with environment mainstreamed
UNDP. GEF	UNDP, Min of Economy and Development	Promoting Sustainable Bio-energy Production for Biomass	2.4	Barriers to sustainable production and utilization of biomass resources in Timor-Leste and application of biomass energy technologies to support local economic, environmental and social development that leads to GHG mitigation removed
UNDP	UNDP, Min of Social Solidarity	National Risk Assessment	0.965	National Risk Assessment conducted

AusAID, IOM	Trocaire, CRS, CVTL, HIVOS, Save the Children	Disaster Risk Reduction Phase III	2.514	Institutional strengthening of national and district Government bodies to enable them to develop systems that can prepare them to map, identify, and respond to nationwide and localized disasters achieved.
Australia	Australian Bilateral Initiative, Ministry of Infrastructure, MAF	Climate Change Adapation	1.308	Timor-Leste's preparedness for climate change assisted
EC	Austrian Red Cross, Min of Infrastructure	Integrated Rural Community Water and Sanitation Development Project in the Districts Ermera, Liquica and Bobonaro	1.499	Improved water and sanitation facilities in 38 villages (19,000 beneficiaries)
EC	TRIANGLE, Min of Infrastructure	Towards improved water and sanitation services in rural areas	1.841	Improved access to safe water, and improved sanitation facilities
EC	UNICEF, Min of Infrastructure	Improving Acess to Water, Sanitation and Hygiene in Rural School and Communities	2.053	Improved water and sanitation facilities in rural schools and communities
EC	PLAN INTERNATIONAL, Min of Infrastructure	Creating a Healthy Environment for Children in Rural Communities	2.542	Improved access to water and sanitation in rural communities
Japan	JICA, Min of Infrastructure	Project for Capacity Development for Water Supply System	1.621	Improved operation and maintenance of water treatment plants & water quality control performance
Japan	JICA, Min of Infrastructure	Project for Urgent Improvement of Water Supply System in Bemos-Dili	8.436	Improved Dili urban raw water main and water reservoir and valve chamber in Bemos WTP
Korea	KOICA, Min of Infrastructure	Drinking Water Supply by	6	Safe and clean drinking water secured and provided to people in targeted area

		Desalination Using Photovoltaic Power Plant (solar panel power)		
ADB	MOI	District Capital Water Supply Project	15	Upgraded and maintained the water supply systems of district capitals
ADB	MOI	Dili Urban Water Supply Project	7.15	Improved Hydraulic Management of the Dili Water Supply System and more Efficient Tertiary Distribution
ADB	ADB, MOI	Oecussi and Ermera Water Rehabilitation Project	0.77	Population of Oecussi and Ermera and one additional district provided efficient use of water resources
WB	Directorate of Corporate Services Unit, MOI	Energy Services Delivery Project	2.5	Power services in Dili stabilized, and long-term sustainability of the power sector promoted
UNICEF	MOI	Water, Sanitation and Hygiene Programme	10.285	80% of rural population in 150 villages including schools in 6 districts have access to sustainable safe water sources and improved sanitation
EC	CIDAC, Min of Tourism, Commerce and Industry	Ahimatan ba futuru -- Reducao da pobreza em Timor-Leste atraves do turismo de base comunitaria	0.649	Poverty in Timor-Leste reduced through promotion of local capacity to set up activities which generate revenue and are based in sustainable management of natural resources
USA	DAI, Min of Tourism, Commerce and Industry	The Development of Community through Intensive Agriculture (DOCIA) (complete)	5.679	
USA	National Cooperative Business Association, Min of Tourism, Commerce and Industry	Consolidating Cooperative Agribusiness Recovery (COCAR)	7.2	

Australia	Australian Bilateral Initiative, MAF	Seeds of Life	32.892	SoL maintains a core focus on increasing yields by selecting and distributing improved varieties of superior genetic quality. It also has a secondary focus on analyzing and developing strategies to overcome climate variability and change; improving agronomic practices to reduce weed burdens and increase soil fertility; reducing postharvest storage losses and improving input supply arrangements for seed.
EC	GIZ/IPAD, MAF	Upgrading skills of AG Extension Services	10.949	Upgraded skills of AG extensionists
EC	HIVOS, MAF	Building Food Security and Resilience Among Rural Households in TL	1.765	Food security of most vulnerable households in 31 sucos in the Lautem and Baucau and Viqueque district substantial achieved
EC	Mercy Corps (NGO), MAF	SECURE Sustainable Crop Production, Utilization, and Resource Management through Capacity Enhancement in Two Districts	1.423	Food security and incomes are increased for vulnerable communities in Ainaro and Manufahi Districts
EC	MAF	Technical Assistance to Food Security Unit	3.011	Improved overall capacity in addressing food security shortcomings
Japan	JICA, MAF	Irrigation and Rice Cultivation Project in Manatuto (IRCP)	3.807	
Japan	JICA, MAF	Community-based Sustainable Natural Resource Management	4.857	Implementation of sustainable community-based natural resource management activities supported
Portugal	MNE, IPAD, MAF	Rural Development Programme	5.55	Management of the water and soil improved
EC	World Vision (NGO), MAF	Baucau Food Security and Nutrition Project	1.494	Food security improved through the appropriate use of natural resources and improved technology
EC	CARE International (NGO), MAF	Hadia Agrikultura no Nutrisaun	1.642	Food security in favor of the poorest and the most vulnerable improved

Japan	PARCIC (NGO), MAF	The Project for Extension of Coffee Producer's Cooperative Model	0.606	Network formed to promote cooperation of coffee producers' cooperative
Japan	PARCIC (NGO), MAF	Livelihood Improvement with Participation of Women in Coffee Producing Area	0.182	Income of women in coffee producers' households by food processing increased
USA	Xanana Vocational Education Trust (NGO), MAF	TL Domestic Dairy Industry	0.5	Household dairy industry in Timor-Leste initiated
USA	Church World Service (CWS) (NGO), MAF	Strengthen Livelihood Security for Poor Micro-entrepreneurs in TL	0.45	Small and microenterprise at the remote areas of Timor-Leste supported
Korea	WFP	School Meals Programme	??	Improvement of school cooking facilities such as kitchen improvement and the construction and installation of energy-efficient stoves.
WFP	WFP	Food for Assets	??	Focusing on enhancing agricultural production in rural areas through land clearance and reclamation, the rehabilitation of small-scale irrigation canals, construction or rehabilitation of feeder roads, improvement of community water ponds, and construction of schools using locally available material.
NGO	Haburas Foundation	Cookstove Project	??	Cookstove distribution
NGO	BirdLife International, Darwin University	Completed	??	Bird inventory
NGO	ETADEP Foundation	Cookstove Project	??	Cookstove distribution
NGO	Permatil Foundation	Cookstove Project	??	Cookstove distribution
ADB, USAID, GEF	MAF, NGOs, Conservation International, WWF, The Nature Conservancy	Coral Triangle Initiative	??	Payment for ecosystems management, fisheries management, mangrove protection

Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA)	SEARCA's University Consortium in Southeast Asia, University of the Philippine Los Banos, World Fish Centre and the Adaptation Learning Mechanism	Regional Program: Knowledge Center on Climate Change: Adaptation and Best Practices in Agriculture and Natural Resources Sectors	1	The objectives of this project are: • Increasing understanding, knowledge and skills of those in the agriculture and natural resources sectors; • Making clients quickly access and learn about what is going on about climate change; • Responding to every client with quickness, courtesy, competency and accuracy; • Providing products that give clients easy access to cutting-edge research and development results, learning events and policy advocacy.
Global Alliance for Clean Cookstoves	Global Alliance for Clean Cookstoves, Accenture Development Partners	Clean Cookstoves for Timor-Leste	??	Preparing a market assessment and recommendations to develop a national cookstove industry in Timor-Leste.
Finland	Local organizations	Local Cooperation Fund for 2012	??	A call for proposals for funding from the Local Cooperation Fund for TImor-Leste will be advertised in local media in TImor-Leste. Priority areas in 2012 are the following: 1) Human rights and democracy, 2) Poverty reduction and economic development, 3) Gender equality and rights of easily marginalized groups, 4) Strengthening of the civil society.
UNESCO	Government ministries and local organizations and communities	Environment Framework	1	The framework will be designed to: address climate change adaptation and mitigation issues; ensure stronger scientific input into environmental policy formulation; address issues under the Man and Biosphere Programme and protected areas management; develop stronger networks between regional and international scientific and environmental organizations and Timor-Leste agencies and organizations; and provide a basis for formulating environmental monitoring plans.

Australia	MAF, WorldFIsh, ALGIS, NDFA	Developing Timor-Leste's Coastal Economy - Assessing Potential Climate Change Impacts and Adaptation Options	??	The team will produce a vulnerability map that identifies the people and places vulnerable to climate change in the coastal zone. For the two communities under special study the team will have determined climate change adaptation options designed to build up community adaptive capacity to make people there less vulnerable. This analysis will scrutinize economic sub-sectors (e.g. reef-dependent fisheries, marine cage aquaculture) and infrastructure (e.g. 'climate-proofing' new harbor facilities). The project will also lead to an increased awareness of the capabilities of staff working on economic development and coastal environmental management, and this will result in a better understanding of the help needed in planning to meet needs for climate-change adaptation.
Food and Agriculture Organization of the United Nations (FAO), World Wildlife Fund - US	Regional Fisheries Livelihood Program (RFLP) of FAO Department of Aquaculture of the National Fisheries Development Agency, Timor Leste, WorldFish	Aquaculture development strategy and action plan for Timor-Leste	??	Design an aquaculture development strategy for Timor-Leste as a means towards the diversification and improvement of rural people's livelihoods. It had three components: an analysis of the current situation and the potential for future aquaculture development, the preparation of a strategy document, and a follow up implementation plan for aquaculture in the country.

Annex 5: List of Protected Areas

Protected Area Name	Basic Designation	Stage	Legislated
Area Protegida Reserva De Tilomar	UNTAET 2000/19	Complete demarcation	Implemented
Diaturo and Lian Bau Protected Area	UNTAET 2000/19	Preliminary survey was conducted and a consultation with community	Implemented
Manucoco Protected Area	UNTAET 2000/19	Preliminary survey was conducted and a consultation with community	Implemented
Nino Konis Santana National Park	Resolusaun do Governo, no. 2008/8 Kria	Declaration on 1 August 2008 including protected areas Reserva de Lore, Jaco Island and Tutuala	Implemented
Mount of Matebian	UNTAET 2000/19	Definitive	Implemented
Mount of Mundo Perdido		Definitive	Implemented
Ribeira de Clere	UNTAET 2000/19	Definitive	Implemented
Mount of Fatumasin	UNTAET 2000/19	Definitive	Implemented
Mount of Cablaque	UNTAET 2000/19	Definitive	Implemented
Mount Tatamailau	UNTAET 2000/19	Definitive	Implemented
Cristo Rei Protected Area	UNTAET 2000/19	Definitive	Implemented
Talobu / Laumeta	UNTAET 2000/19	Definitive	Implemented
Mount Cutete		Definitive	Implemented
Mount Manoleu		Definitive	Implemented
Area Mangal Citrana		Definitive	Implemented
Mount of Tapo / Saburai		Definitive	Implemented
Mount of Taroman		Definitive	Implemented
Mount of Kuri		Definitive	Implemented
Mount Lequmau		Definitive	Implemented
Mount of Laretame		Definitive	Implemented
Mount of Builo		Definitive	Implemented
Mount of Guguleur		Definitive	Implemented
Mount of Loelako		Definitive	Implemented
Mount of Burabo		Definitive	Implemented
Lake of Maurei		Definitive	Implemented
Mount of Aitana		Definitive	Implemented
Mount of Bibileo		Definitive	Implemented
Lake of Welenas		Definitive	Implemented
Lake of Modomahut		Definitive	Implemented

Annex 6: Persons Contacted

Contact	Institutional Affiliation	Contact Information
William Baron	Mercy Corps	wbaron@tl.mercycorps.org
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Annex 7: Recommended USAID Actions

USAID Activity	Sector	Recommendation
Consolidating Cooperative and Agribusiness Recovery (COCAR)	Economic Growth	1. Expand agro-forestry activities to involve broader numbers of participants located in areas with high degrees of poverty. 2. Works closely with communities, the MAF, and others to develop a comprehensive plan for the forestry industry based of existing tree nursery operations. 3. Work with MAF to expand tree nursery and tree planting activities. 4. Ensure enterprises and farmers supported by the activity develop or adopt best practices for pest control (integrated pest management), fertilizer inputs, and sustainable agriculture. 5. Incorporate climate change information into planning and implementation. 6. Utilize women as an entry point for community-based approaches to conserving biodiversity and forests, as they have local knowledge of ecosystems, agricultural production and natural resource management.
Development of Communities through Intensive Agriculture (DOCIA)	Economic Growth	1. Target continued improvement of horticultural operations; completion of environmental protection mechanisms such as the protection of springs, field boundaries, windbreaks, and slope protection; recording of claims to land belonging to individual members of the community; and formal registration with the local government (at the community's discretion) in order to be recognized as a significant rural enterprise. 2. Ensure enterprises and farmers supported by the activity develop or adopt best practices for pest control (integrated pest management), fertilizer inputs, and sustainable agriculture. 3. Incorporate climate change information into planning and implementation. 4. Utilize women as an entry point for community-based approaches to conserving biodiversity and forests, as they have local knowledge of ecosystems, agricultural production and natural resource management.
Coral Triangle Support Program (CTSP)	Economic Growth	1. Promote the use of resources for sustained social and economic development. 2. Develop an integrated marine

		management strategy, encompassing use of fisheries to ensure food security and ecotourism to expand livelihoods, and enable sustainable natural resource use. 3. Improve government and community co-management of selected coastal marine areas, including Timor-Leste's largest mangrove forest, and establish a Locally Managed Marine and Coastal Areas network. 4. Help the Government of Timor-Leste design a ridge-to-reef adaptation program demonstrating the interconnectedness of mountain and coastal ecosystems. 5. Provide advisors and assistance to Timor-Leste's government and civil society 6. Incorporate ideas of fishing and/or coastal ecotourism for plans to work with medium and small-scale enterprise activities under the Economic Growth program. 7. Incorporate climate change information into planning and implementation. 8. Coastal environmental education programs would serve to inform industry and local citizens of the impact of their actions on the coastal and marine environment. 9. Utilize women as an entry point for community-based approaches to conserving biodiversity and forests, as they have local knowledge of ecosystems, agricultural production and natural resource management.
Rule of Law	Democracy and Governance	1. Support a broad and diverse swath of civil society organizations (CSOs) including those in the independent media sector, suco (village) councils and community-based organizations focusing on agriculture, agribusiness and natural resources. 2. Ensure land tenure rights. 3. Advisors could be provided to improve capacity for biodiversity and natural resource policy formulation with public participation. 4. Work on good governance, participatory process and transparency in decision-making provides the enabling environment for the conservation of biodiversity and forests.
Development Scholarships and	Education	1. Training in environmental issues,

Higher Education Program (DSHEP)		biodiversity conservation, forestry and natural resources management should be included.
Timor-Leste Health Improvement Project (TL-HIP)	Health	1. Strengthen primary health care related to maternal & newborn and child health and family planning. 2. Promote sustainable agriculture and reforestation with useful products such as fruits, vegetables and livestock to improve the food security and nutrition of families. 3. Find alternatives to the use of firewood for cooking or make cooking with firewood more efficient to reduce the incidence of respiratory illness among families.

Annex 8: Biographic Sketch of Assessment Team Member

Sarah Tully is an American Association for the Advancement of Science (AAAS) Policy Fellow in the Asia and Middle East Bureaus, Office of Technical Support (ME/TS). She is involved with several agriculture and water initiatives, works to use science and technology to advance development and searches for opportunities to integrate food security programming with gender, nutrition, global climate change and natural resources management. Prior to joining ME/TS, Sarah was a Damon Runyon Postdoctoral Scholar at The Scripps Research Institute. Her research involved developing chemical tools to understand neurobiological processes, discover new drug targets and elucidate key biological interactions. Previously she was a NSF Postdoctoral Scholar at Oxford University working in immunology and HIV vaccine development and a NSF Predoctoral Fellow at the California Institute of Technology, where her Ph.D. research focused on using chemical biology techniques to understand the importance of a class of carbohydrates in the brain. Sarah graduated from Barnard College, Columbia University with an A.B. in Biochemistry and was raised on a farm in the foothills of the Appalachian Mountains in southern Ohio.

Annex 9: Statement of Work for the 118/119

Timor-Leste Country Analysis for Biodiversity and Tropical Forests

STATEMENT OF WORK:

I. OBJECTIVES AND RATIONALE

The purpose of this Statement of Work (SOW) is to update country biodiversity and tropical forests analyses for Timor-Leste. The previous analyses were done in March 2009. Sarah Tully, ME/TS, will travel to Timor-Leste 12 April – 24 April 2012 to update these analyses.

The proposed analyses will address the requirements of Section 118 (**Tropical Forests**)**;** and 119 (**Biodiversity Analysis**) of the Foreign Assistance Act of 1961 (as amended) and ADS 201.3.4.1b, Tropical Forests and Biodiversity Analysis for country strategic plans. The analyses are mandatory for the strategic planning process of new USAID Country Development Cooperation Strategies and may not be waived, modified, or eliminated. The legislation states:

"FAA Sec 118 (e) Country Analysis Requirements. Each country development strategy statement or other
country plan prepared by the Agency for International Development shall include an analysis of

> (1) the actions necessary in that country to achieve conservation and sustainable management of tropical forests, and
>
> (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

and:

"FAA Sec 119 (d) Country Analysis Requirements. Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-

> (1) the actions necessary in that country to conserve biological diversity, and
>
> (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

By mandating these analyses, the United States Congress is recognizing the fundamental role that tropical forests and the conservation of biodiversity play in sustainable development. Based on these analyses, USAID/Timor-Leste will define how its programs in the new Country Development Cooperation Strategy (CDCS) contribute to conservation needs in Timor-Leste. The analyses will also serve as a planning tool to assist USAID/Timor-Leste in integrating environmental concerns into its overall program.

These analyses have a number of benefits to USAID Missions. Information from reviews carried out to satisfy Sections 118 and 119 may be useful background for the design and implementation of forest and biodiversity conservation activities. They can also help to identify threats, stakeholders, and potential partners. The usefulness of Section 118 and 119 analyses in strategic planning for the CDCS is

improved when they are conducted at an early stage in the strategic planning process for USAID programs. They inform not only forest and biodiversity programs, but also activities related to poverty alleviation, agriculture, democracy and governance, and natural resource based conflict.

For additional information, contact the Asia Bureau's Environment Team Leader and the EGAT Bureau's Forest and Biodiversity Team. For further guidance and information on best practices see the reports: "Tropical Forestry and Biodiversity (FAA 118 and 119) Analyses: Lessons Learned and Best Practices from Recent USAID Experience" and "Best Practices for Biodiversity and Tropical Forest Assessments" (http://pdf.usaid.gov/pdf_docs/PNADE195.pdf and https://pdf.usaid.gov/pdf_docs/PNADE673.pdf).

Upon completion of the analyses, the Mission will submit the report to the Asia Bureau's Environment Team Leader for final approval.

II. STATEMENT OF WORK

Sarah Tully will work with USAID/Timor-Leste to evaluate tropical forest and biodiversity concerns in Timor-Leste and undertake the appropriate synthesis of the information addressing 1) actions necessary to conserve biodiversity, and 2) the extent actions proposed in the country strategic plans meet, or could meet, the tropical forest and biodiversity needs thus identified.

The analysis will include the following activities:

A) Data Collection:

1. Prior to departure, get acquainted with already existing background information about Timor-Leste including the Mission's 2009 Tropical Forest and Biodiversity Analyses and relevant host country and/or donor environmental reviews specific to the country's natural resources, ecological and biological specificities, current status of tropical forests and biodiversity, climate change and sustainable landscapes, and institutional organizations. Sarah will work with the Mission to become knowledgeable about key stakeholders and donors in tropical forests and biodiversity, legislation related to tropical forests and biodiversity, and other relevant information required for the country analysis. Principal donors include the World Bank, UKAID, UNDP, GTZ, the European Commission, JICA, CIDA and AusAID.

2. Prior to departure, work with the Asia Bureau's Environment Team Leader and Country Desk Officer to gather relevant information on regional programs and other United States Government Agencies active in Timor-Leste.

3. Consult with Mission personnel to identify stakeholders, non-governmental organizations (NGOs) and local officials with whom she wishes to conduct the interviews and identify priority site visits. This should include input from environment staff at RDMA.

4. Hold meetings with the relevant local government institutions, agencies and Ministries to gather information, recommendations and experiences about past and planned activities from the officials and persons directly involved in tropical forest and biodiversity issues. Sarah will gather detailed information about changes in the country's specificities, such as protected areas and endangered species since the 2009 report.

5. Hold meetings with other international donors, agencies and NGOs involved in tropical forest and biodiversity programs in Timor-Leste and become well informed about ongoing and planned activities by other donors and agencies.

B) Analysis:

Based upon the review of documents, interviews, and site visits, analyze the following:

1. The status of tropical forests and biodiversity in Timor-Leste,

2. The social, economic, institutional, legal, and policy context for their use and conservation, including actions currently being taken by government, other donors, NGOs, and the private sector.

3. The key direct and indirect threats to tropical forests and biodiversity.

4. The actions necessary to conserve and sustainably manage tropical forests and biodiversity in Timor-Leste in the current context based on analysis of Government, Donor, and NGO responses to meet these needs.

5. The implications for USAID or other donor programming and environmental monitoring on tropical forests and biodiversity; and

6. Potential recommendations, which shall define the actions for USAID/Timor-Leste to consider ensuring tropical forest and biodiversity conservation.

7. The implications of climate change for forest and biodiversity conservation based on climate projections for Timor-Leste and potential for integration of climate change responses within any USAID activities following the USAID Climate Change and Development Strategy (http://www.usaid.gov/our_work/policy_planning_and_learning/documents/GCCS.pdf).

8. The role of gender in conservation in keeping with USAID's new gender policy (http://www.usaid.gov/our_work/policyplanning_and_learning/documents/GenderEqualityPolicy.pdf).

9. The capacity and associated enabling environment needed to implement conservation. Capacity should be analyzed at the macro, meso and micro levels.

C) Report:

Update the 2009 report describing the analysis and conclusions. This report shall meet the legal requirement of FAA Sections 118 and 119 by: (1) clearly articulating the actions necessary to conserve tropical forests and biodiversity in Timor-Leste, and (2) clearly describing the extent to which USAID actions proposed in the new USAID CDCS meets the needs identified. Analysis of gender, climate change and capacity should be incorporated as appropriate throughout the report and listed as separate recommendations as appropriate.

The report, of approximately 50 – 70 pages in length (including annexes), shall include sections covering the following topics:

Title Page, including the date of completion of the analysis report

Table of Contents

A. Introduction, describing the purpose of the analysis and methods used in conducting it, including the timing of the analysis in relation to the timing of USAID CDCS.

B. An overview of the status of tropical forests and biodiversity in Timor-Leste, including ecosystem diversity, species diversity, threatened & endangered species, genetic diversity, agricultural biodiversity, ecological processes and ecosystem services, and values and economics of biodiversity and forests.

C. An overview of changes in the social, economic, and political context for sustainable natural resources management and the conservation of biodiversity and forests in Timor-Leste, including the social and economic environment; institutions, policies, and laws affecting conservation; the national protected area system (including IUCN areas); laws affecting the protection of endangered species; and participation in international treaties. An updated map of the protected areas system should be provided if available. Describe the institutional framework for environmental, tropical forest and biodiversity management, including organizational set-up at the national and local levels including community forests, relevant legislation and obligations under ratified international environmental agreements and conventions.

D. An update and review of government, NGO, and donor programs and activities that contribute to conservation and sustainable natural resources management (including the Coral Triangle Initiative), and an assessment of their effectiveness, strengths, and weaknesses. Data may be consolidated in a summary table of Donor and NGO projects (w/ $ amounts) since the last report in 2009 (include implemented, ongoing and planned) related to/or impacting biodiversity conservation (direct and indirect). Identify gaps where USAID could best leverage funds.

E. An update to the threats to biodiversity and forests, including direct threats and indirect threats or root causes of the direct threats.

F. An updated list or description of the actions necessary to conserve biodiversity and forests in Timor-Leste, logically flowing from the review of the threats, and what is currently being done by government, NGO, and donor programs that address those threats.

G. An updated review of the proposed USAID/Timor-Leste strategy and program, including all Objectives, followed by an analysis of the extent to which actions proposed for support by the USAID/Timor-Leste's upcoming CDCS correspond to the needs identified in (F) above. This section should also point out any threats to biodiversity and forests from activities proposed for USAID support, and suggest mitigating actions. It should also identify opportunities for cross-cutting, cross-sectoral linkages with proposed activities (for all proposed Objectives and Program Areas); especially those that would be low cost and/or would enhance the effectiveness of the proposed activities.

I. Possible annexes to the report:

a. A consolidated matrix comparing the current THREATS identified, to ACTIONS needed, with EXTENT TO WHICH USAID addresses threats, & RECOMMENDATIONS for USAID to address threats

b. Current IUCN Red List data
c. Environment-Related Legislation & Concepts, Plans, Programs, & Strategies (highlight changes since 2009)
d. International Conventions and Treaties (highlight changes since 2009)
e. The SOW for the analysis
f. Biographical sketches of analysis Team members
g. A list of persons contacted and their institutional affiliation
h. Other background or supporting material as needed such as maps.
i. All references used and cited in the report along with URLs used for information resources.

Annex 10: Draft FAA 118/119 for Timor-Leste from March 2009

FAA 118 / 119 REPORT*

CONSERVATION OF TROPICAL FORESTS

AND

BIOLOGICAL DIVERSITY

IN TIMOR-LESTE

MARCH 2009

*This report fulfills the planning requirements as set out by two provisions of the Foreign Assistance Act.

Section 118(e) "Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-- (1) the actions necessary in that country to achieve conservation and sustainable management of **tropical forests**, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."
Section 119(d) "Country Analysis Requirements.--Each country development strategy statement or other country plan prepared by the Agency for International Development shall include an analysis of-- (1) the actions necessary in that country to conserve **biological diversity**, and (2) the extent to which the actions proposed for support by the Agency meet the needs thus identified."

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A. INTRODUCTION

Timor-Leste is located on Timor Island in the Lesser Sunda Islands chain (Figure 1). Its residents voted for independence from Indonesia in a referendum held in 1999. Immediately following the referendum, large-scale violence by the Indonesian Army and militia erupted that included massacres and wide-scale destruction of property. Sixty to eighty percent of public and private property was destroyed including the electrical grid, water supply systems, schools and health clinics. There was a displacement of people into mountainous areas (UNHRC, 2000). Such violence destroyed the socio-economic base for the country's development. The United Nations has helped to support the development of this new sovereign state and in May 2002, Timor-Leste became independent. In 2006, violence erupted in the face of the dismissal of soldiers, fighting between the military and the police and gang attacks. This also led to the displacement of as many as 150,000 people around Dili. People fled to the countryside and others found shelter in about 30 camps around Dili. To date, resettlement has occurred for some, but not all.

The area of Timor Leste is about 15,000 square kilometers (1.5 million ha) which is a little larger than the State of Connecticut. The total population of Timor-Leste is currently estimated at over 1.1 million people (World Fact Book, 2009). Timor-Leste has one of the highest fertility rates in the world with 7.8 children per woman and a population growth rate of 3.2 percent per year. The under-five mortality rate is 83 per 1,000 live births. Major killers of children under five are pneumonia, diarrhea, and malaria. There are extremely high rates of malnutrition reaching nearly 50 percent among children.

The population of youth aged 15 to 24 is growing fast at 3.7 percent per year. When combined with a lack of opportunities for employment, a large proportion of youth in a country's population can and have contributed to civil conflict. Currently unemployment is 20% in rural areas and up to 40% in urban areas.

About 73% of the population is rural (World Fact Book, 2009), yet only 8.2 % of the land is considered arable. A rural family holds on average about 1.2 ha of land. The rural population is poorer than urban populations (Ministry of Agriculture, *et al*, 2003). Farmers practice swidden cultivation and grow rice, corn, tubers and have some livestock. Coffee is the country's main export with the exception of petroleum. Agriculture provides 85% of the country's employment (ADB, 2009).

Offshore petroleum production supports the government's revenue through a petroleum fund valued at $4.2 billion at the end of 2008. Amounts for government expenditure from this fund were to equal its "sustainable income"; however, in 2008, more was drawn down with government expenditure totaling $450 million. While food prices were increasing across the world in 2008, the government of Timor-Leste used petroleum revenue to import and subsidize rice to keep prices stable; however, this suppressed the rice price for the country's farmers. The poor rely on corn and cassava more than rice and still can experience food shortages for at least two months out of the year. Despite, the coming online of revenues for petroleum, statistics demonstrate a trend of increasing poverty from about 36% in 2001 to 50% in 2007 (ADB, 2009). Timor Leste's rank on the Human Development Index was 150 of 177 countries indicating that 15% of the world's countries were worse off than Timor-Leste. It ranked lower than Bangladesh, Laos, Cambodia and Burma (2007/2008 Human Development Report http://hdrstats.undp.org/en/indicators/1.html).

Given that the majority of the population resides in rural areas, they are dependent upon forests and have an impact upon forest ecosystems and biodiversity. Deforestation and soil erosion are major problems in Timor-Leste (Westerberg, 2000). Forest cover in Timor-Leste has decreased by almost 30% over the

period of 1972 to 1999, (Sandlund *et al*., 2001) and declined another 1.3% from 2000 to 2005 (FAO, 2009). It is believed that only 1 to 6% of the remaining cover is believed to be primary forest. Valuable timber species have been nearly logged out due to cutting during the colonial and occupation periods. Fifty percent of the land is degraded. This degradation is due, in part, to unsustainable agricultural practices. Subsistence farmers practice swidden agriculture by clearing forests for new fields in a cyclical manner. At low human population densities and long fallow periods, swidden systems can be sustainable. Population movements, sometimes forced, and lack of agricultural assistance under Indonesian rule affected the sustainability of agriculture. Despite relatively low population density in Timor-Leste, the amount of suitable agricultural land available per person is insufficient. Farmers regularly cultivate areas with slopes of more than 40 degrees. Almost half of the land of Timor-Leste is this steep or more (Democratic Republic of Timor-Leste, 2003). An additional pressure on forests and their biodiversity is the collection of fuelwood. Ninety-eight percent of the country uses fuelwood for cooking (World Bank, 2007). Landslides and flash floods are common. Despite such difficulties, agroforestry practices do exist, for example, shade coffee and have the potential to rehabilitate degraded lands.

The Government of Timor-Leste's review of the natural resources and environment sector describes well the economic impacts of environmental degradation as follows:

"Natural resource degradation-for example, lack of water and productive land- is already limiting economic opportunities in many areas. It is also leading to significant direct economic costs, for example, by damaging infrastructure, increasing floods and contributing to health problems. Finally, there are localized threats to Timor-Leste air, coasts and remaining biodiversity." (Democratic Republic of Timor-Leste, 2003, p. v.).

There is much work to be done to address Timor-Leste's challenges of deforestation and biodiversity loss. Opportunities to address these challenges will be considered in the light of the other pressing issues of Timor-Leste including youth unemployment, malnutrition, pervasive poverty and establishing a democratic government.

and seeks to maintain Timor-Leste's eligibility for MCA assistance." NB anything to say about loss of MCC status.

If there is an education program, practical skills and natural resources and biodiversity should be a part of that to have a practical curriculum.

B. LEGISLATIVE AND INSTITUTIONAL STRUCTURES AFFECTING BIOLOGICAL RESOURCES

Legislation

The Constitution of the Democratic Republic of Timor-Leste recognizes in Article 6 the importance of the protection of the environment. Furthermore, Section #61 states that:

4. 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.
5. The State shall recognize the need to preserve and rationalize natural resources.
6. The State should promote actions aimed at protecting the environment and safeguarding the sustainable development of the economy.

The Constitution provides the greatest clarity on the importance of the environment to livelihoods and national development; however, a legal framework has yet to be put into place. . In the period between the 1999 referendum and official independence (May 20, 2002), The United Nations Transitional Administration in Timor-Leste (UNTAET) was given overall responsibility for the administration of Timor-Leste. Some Indonesian legislation related to the environment was used during this period and some specific UNTAET regulations were also drawn up. There was a Supreme Court decision against the use of Indonesian law in August 2003; however, some regulations following this Supreme Court decision advocate that these former laws are still intact until they are revoked. It is not clear what laws still apply and what should be enforced. While the Government of Timor-Leste is in the process of developing and approving its own environmental laws, the following two UNTAET regulations still seem to be in effect as of September 2008 (Ministry of Economy and Development, 2008). 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. These protected habitats allow traditional use by local communities.

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. Appendix I species are those threatened with extinction. Appendix II species are not threatened with extinction; however, their trade should be regulated in order to avoid exploitation that would affect their survival.

Other laws that can impact incentives for forest and biodiversity conservation are Law No. 1/2003 and Law No. 12/2005 which provide the general conditions for land ownership and Decree-Law No. 19/2004 which defines state property ownership (MoED, 2008).

Decree law for pollution control and discharge licenses and the environmental impact assessment has been approved on November 2010. .

MAF drafted the National Forest Policy, but the legislation and regulations to support this policy is still pending. MAF and NDCF, supported by FAO and the Netherland Partnership Programme (FNPP), drafted the National Forest Policy. The Policy was approved following public hearings involving a broad range of stakeholders. The aim of the National Forest Policy is to provide a framework for the development of an appropriate Forest Law and Regulations. Supporting forest legislation is being formulated. A concept for implementing participatory forestry practices has also been drafted and is under decentralized review (FAO, 2006).

International Conventions

Timor-Leste has acceded to the following United Nations Conventions: to combat desertification (UNCCD) in 2003; on Climate Change (UNFCCC) in 2006 and on Biodiversity (UNCBD) in 2006. National Action Plans have been written for (check with Adao Barbosa)…… The National Parliament ratified the Kyoto Protocol on March 2008 and came into force on January 12, 2009.

Government Institutions

Initially, the Democratic Republic of Timor-Leste had a Ministry of Development and Environment which was responsible for: environmental impact assessment; air and water pollution control; minerals management; biodiversity conservation; and environmental awareness and education (from Democratic Republic of Timor-Leste, 2003). Under Decree Law No. 7/2007, responsibility for the environment was included under the Ministry of Economy and Development (MoED). As quoted from Article 26 of this Law, MoED is:

- To draft an environmental policy and monitor and evaluate its implementation;
- To promote, follow-up and support strategies for integrating environmental issues in sectoral policies;
- To carry out strategic environmental assessments of plans and programmes, and coordinate the processes to assess the environmental impact of national-level projects, including public consultation procedures;
- To ensure the adoption of pollution prevention and control measures when issuing environmental licences to production facilities;
- To manage National Parks and protected areas

There is a State Secretariat for the Environment (SEMA) included under the Ministry of Economy and Development (MoED) (Ministry of Economy and Development, 2008). Within the Secretariat there are two directorates: the National Directorate for International Environmental Affairs (DNAAI); and the National Directorate for Environmental Services (NDES). The latter is responsible for a national environmental education campaign. In 2008, SEMA received a budget of approximately $2.2 million to do the following:

- Improved management
- Regulation and environmental law
- Environmental education public awareness
- Evaluation, monitoring, investigation and permit environmental pollution license
- Reduce environmental impact
- Protecting and conserving the biodiversity and natural resources
- Enhanced participation in Multilateral Environmental Agreements Program
- Knowledge and quantification of Environmental Data

- Data Analysis and Sampling of Environmental Pollution in Timor-Leste, and
- Regional/Districts Focal Point for Environmental conservation and monitoring (MoED, 2008)

Decree Law No. 7/2007 also establishes forestry and environment responsibilities under the Ministry of Agriculture and Fisheries (MAF). The Ministry has associated with it the Secretary of State for Agriculture and Arboriculture, the Secretary of State for Fisheries, and the Secretary of State for the Livestock Sector. The National Directorate of Agriculture and Forestry of MAF manages forests. The responsibilities related to forests and biodiversity include:

- To manage forest resources and catchment basins;
- To control and oversee the fisheries and aquaculture sector;

The National Directorate of Water and Sanitation (DNAS) provides water and sanitation services to rural and urban areas of the country.

To date **drafts** of the following have been produced:

- Water Resources Decree by MTCPW on controlling water quality and quantity for household consumption
- Law on Environmental Impact Assessment by MDE that takes into account pollution control and discharge licenses
- Law on Pollution Control by MDE

Other laws in draft that have relevance or could impact tropical forest and biodiversity conservation are:

- Draft of a Sustainable Mining Law
- Draft of a National Forestry Policy, Strategy and Legislation

Pending are National Policies for Agricultural Use of Land, Natural Resources and Agrarian Reform.

MAFF has drafted a forest policy and management strategy with funding from the World Bank and DfID for watershed rehabilitation.

There are also traditional regulations and customs which in some areas have been successful in conserving natural resources such as forests and crops. This system of communal protection is known as *tara bandu*. Villagers designated as *cab-leha/tobe* are responsible for seeing that village laws are followed (Sandlund, *et al*, 2001). Also, there were designated village foresters. *Tara bandu* includes temporary prohibitions on resource extraction, such as tree cutting including mangroves and the designation of specific areas as sacred; for example, Jaco Island and its surrounding reef are considered sacred by the local community. *Tara bandu* prescribes fines for violations and also provides for mediation of land disputes. Timor-Leste's Constitution states in Section 2 line 4 "The State shall recognize and value the norms and customs of Timor-Leste that are not contrary to the Constitution and to any legislation dealing specifically with customary law."

In the State of the Nation Report (MoED, 2008), the Ministry of Economy and Development notes that the government is committed to developing environmental policies. The government aims to also have policies that integrate environmental sustainability across all development sectors. The government

plans to update UNTAET regulations, comply with international conventions, including a national strategy to conserve biodiversity and establish a protected area system.

Donors and International Organizations

During the transition period, there was not much support for the environment from donors or the UN. USAID's current program is focused on sustainable economic growth and democracy and good governance. The ongoing economic growth programs support the diversification and sustainability of agricultural systems including improvements in coffee production in agroforestry systems. In this way, USAID has been reducing agricultural pressure on forests and their biodiversity.
UNDP has identified environmental governance and biodiversity management as priorities. Environmental governance consists of legislation, capacity and environmental information systems. They are just developing the framework for biodiversity management that includes an assessment of the country's biodiversity, legislation and community-based biodiversity management. Although there are plans, these activities are not fully funded. The UNDP has partial funding for a preliminary analysis of firewood consumption through household surveys. In the first phase, the UNDP is planning to improve cook stoves and to introduce alternative cooking fuels such as coffee (husks, wastes, shells, hulls).

UNDP's Ainaro and Manatutu Community Activation Project (AMCAP) has agroforestry initiatives including the reforestation of catchments and road bank protection. The project is developing nurseries for seedlings to be planted on communal, state and private lands. This project will continue up to 2007 and is working with NGOs. The World Bank Trust-fund administered Agriculture Rehabilitation Project II (ARPII) worked with communities on reforestation.

MAFF also has funding from the World Bank and DfID for reforestation in watersheds. The World Bank has a team for a study on Rural Energy development. Other donors with activities linked to environmental issues include the GTZ assistance in linking candlenuts to markets. The Canadian International Development Agency is working in rural communities to improve agriculture, sanitation and access to water.

There are indications that the lack of early attention to the environment by the UN and donors has resulted in some of today's environmental degradation. For example, without a subsidy for kerosene, there has been widespread tree felling for firewood. Also, the high population concentration around Dili, in part due to the international presence, has resulted in significant deforestation for firewood. The rebuilding of infrastructure has led to increased pressures on the forest estate for raw materials.

2009:

The European Commission which is supporting an integrated rural development program that includes forestry and environmental management. Japan is focusing on fisheries, watershed management and rice production; Portugal is focusing on coffee shade trees and nursery production. GTZ is also assisting with watershed management.

UNDP and AusAID contribute to improving sanitation in primarily rural areas. AusAID also contributes to the Fisheries Management Capacity Building Project.

Non-governmental Organizations Active in Timor-Leste

Timor-Leste currently has numerous NGOs providing assistance, but few are playing a direct role in the conservation of biological diversity and tropical forests. The Haburas Foundation is a prominent local environmental NGOs. Haburas works on environmental education, management and advocacy as well as networks for popular education and sustainable agriculture. Demetrio do Amaral de Carvalho, director of Haburas was a recipient in 2004 of a Goldman Environmental Prize for his leadership in sustainable development. The international conservation NGO, BirdLife International has been working with the Ministry of Development and Environment on bird inventories and the identification of protected areas.

As economic opportunities are few and people greatly depend on natural resources, many types of assistance such as humanitarian aid, capacity-building, and technical assistance indirectly reduce subsistence pressures on tropical forest and biodiversity. Over 100 international NGOs have conducted activities, including CARE, Habitat for Humanity International (HHI), International Committee of the Red Cross (ICRC), OXFAM (OXFI), The Asia Foundation (TAF), and World Vision (WLDV). There are approximately 25 local NGOs; several of these are working on urban environmental issues that have can have an impact on biodiversity and tropical forest conservation. A list of these NGOs is included in Appendix 2 of this report.

Some NGOs are working to distribute improved cookstoves to reduce the demand for fuelwood. These are the Haburas Foundation, the ETADEP Foundation and the Permatil Foundation.

C. BIOPHYSICAL AND ECOSYSTEM CHARACTERISTICS

Climate and Topography

Timor-Leste is located in the Lesser Sunda Islands (part of the Australian continental plate), and includes the eastern end of the island of Timor, the Oecussi enclave in West Timor, and the islands of Atauro and Jaco. The total area encompassed is approximately 1,460,937 ha (Sandlund *et al*., 2001). The total length is approximately 265 km, with a maximum width of 97 km.

The bedrock is primarily sedimentary calcareous rock, with fossil coral reefs found at high altitudes (up to 2000 m) (Monk *et al.*, 1997). Soils are generally thin, with poor water holding capacity (Carson, 1989). The topography is quite dramatic, with mountain peaks reaching as high as 2964 m. Steep slopes (incline over 40%) characterize as much as 44% of the total area (Monk et al, 1997). Over 78% of the land area is over 100 m (MED, 2008). Lakes are relatively few and small, apart from the Iralalaru Lake basin. Few of the approximately one hundred rivers flow regularly throughout the year. The largest river system (80 km in length) is the Lois River, on the north side of the mountains.

Climate varies greatly across Timor-Leste. The South coast is “permanently moist” with more than 2000 mm of rain for 9 to 12 months per year. The northern part is “permanently dry” with rainfall of 500 to 1000 mm or more occurring in only four months or less. Hard torrential rain is common, with maximum daily rainfall recorded as high as 398 mm. This causes a high degree of surface runoff and increased soil erosion. The mean annual temperature at sea level is 27.5 ^{o}C and 19.8 ^{o}C at 1432 m above sea level (Keefer, 2000).

Natural Ecosystems

Timor-Leste contains six major ecosystem types (adapted from Sandlund *et al*., 2001). These are the:

- Marine and coastal zone
- Arid lowland areas
- Moist lowland areas
- Mountainous areas
- Highland plains
- Wetlands and lakes

Marine and coastal zone

Description – includes the mangrove and other specialized coastal vegetation, the shallow seas adjacent to land, coral reefs, and seagrass beds.
Conservation status – mangroves and coral reefs are protected by the UNTAET regulation 2000/19. Some mangroves, but not all, are also protected under traditional practices (*tara bandu*). The marine and coastal areas have maintained their environmental quality for the most part. A recent trend towards the use of destructive fishing techniques (bombing coral reefs, and cyanide fishing) could have significant negative impacts on biodiversity and endangered species if it continues. Due to internally displaced person camps near mangroves after the 2006 violence, there has been increased extraction and degradation of mangroves for fuelwood.
Ecosystem functions – mangrove and coastal vegetation protect the coastline from erosion, and the coral reefs from sedimentation. Productivity in mangroves and coral reefs is extremely high; these areas are the primary breeding grounds for many fish and shellfish species. Seagrass beds also protect coral reefs from erosion and provide feeding grounds for the endangered dugong.
Importance – in 1997, fisheries contributed approximately US$ 481,000, less than 1% of all revenues generated. Few people fish as their primary livelihood, although those located in coastal areas may fish for partial subsistence. Mangrove trees are used for fuelwood. The area is extremely important in the conservation of marine biodiversity and endangered marine species, such as turtles, dugong, and dolphins.

Arid lowland areas

Description – located along the northern coast at altitudes of 0 to 600m, with temperatures above 24° C, and a five month dry season. Deciduous forest was the original vegetation; this has largely been converted to cultivated land, grasslands, or secondary forests.
Conservation status – no information.
Ecosystem functions – contributes to primary and secondary productivity.
Importance – contributes to the agricultural sector of the economy. The area contributes to biodiversity, particularly insect, bird, and small mammal communities.

Moist lowland areas

Description – located at altitudes between 0 and 600 m, with temperatures generally above 24° C, along the southern coast. The original vegetation is moist deciduous forest, semi-evergreen forest, or lowland rainforest. Almost all of this area has been converted for agriculture, plantations, or degraded to secondary vegetation and grasslands.
Conservation status - some sites are protected by UNTAET regulation 2000/19.
Ecosystem functions – vegetation cover prevents erosion into rivers and the ocean, thus protecting coastal marine areas, and helps maintain water flow and quality. It also contributes to primary and secondary productivity.

Importance – lowland areas typically have the highest degree of biodiversity in tropical areas. Most of the forest cover has been degraded or eliminated through human activities; the small remaining amount of forest probably harbors significant remaining biodiversity. The area contributes to the agriculture sector of the local economy.

Mountainous areas

Description – these areas are characterized by steep terrain, with altitudes 600 m and above. The original vegetation is semi-evergreen forest, moist deciduous forest, or non-deciduous forest. Landslides are frequent during the rainy season, partly due to the conversion of steep slopes for agriculture.
Conservation status – several sites are protected by UNTAET regulation 2000/19.
Ecosystem functions (erosion, water flow, productivity) – the area plays an important role in water flow. Vegetation cover on steep slopes helps prevent landslides, flooding, erosion, and droughts. The area contributes to primary and secondary productivity.
Importance (economic, ecological, socio-cultural) – montane areas are noted for their high levels of endemism; several of Timor-Leste's endemic species are montane forest species.
The remaining primary forest in Timor-Leste is mostly located in this area. This area is also used for agricultural purposes.

Highland plains

Description – located between 300 and 700 masl, with clay soils and large fluctuations in water level. This area is currently dominated by agricultural land, particularly irrigated rice production. Basically all original forest cover has been converted for agriculture.
Conservation status – no information
Ecosystem functions (erosion, water flow, productivity) – agricultural productivity is high in this area. Ground water levels are low, and the water retention attributes of the soil types contribute to flooding during the rainy season.
Importance – this area is the most important agricultural area.

Wetlands, freshwater rivers and lakes

Description - there is one large lake, Iralalaru Lake. Based on previous aerial photographs from 1972 (Sandlund *et al*., 2001), this area appears to have been a wetland previously. Several dead standing trees are visible in the lake. The Iralalaru lake basin is surrounded by forest. There are few other lakes, and these are quite small in comparison. Rivers are ephemeral, often drying up completely during the dry season.
Conservation status – wetlands are protected by UNTAET regulation 2000/19.
Ecosystem functions – essential to water quality and abundance, contribute to nutrient cycling, and primary and secondary productivity.
Importance – the areas are essential to maintaining human quality of life and agricultural (irrigation). The areas are essential for migratory bird species, endangered bird species, and endemic fish species.

D. CURRENT STATUS OF TROPICAL FORESTS AND BIODIVERSITY

Tropical Forest Status and Management

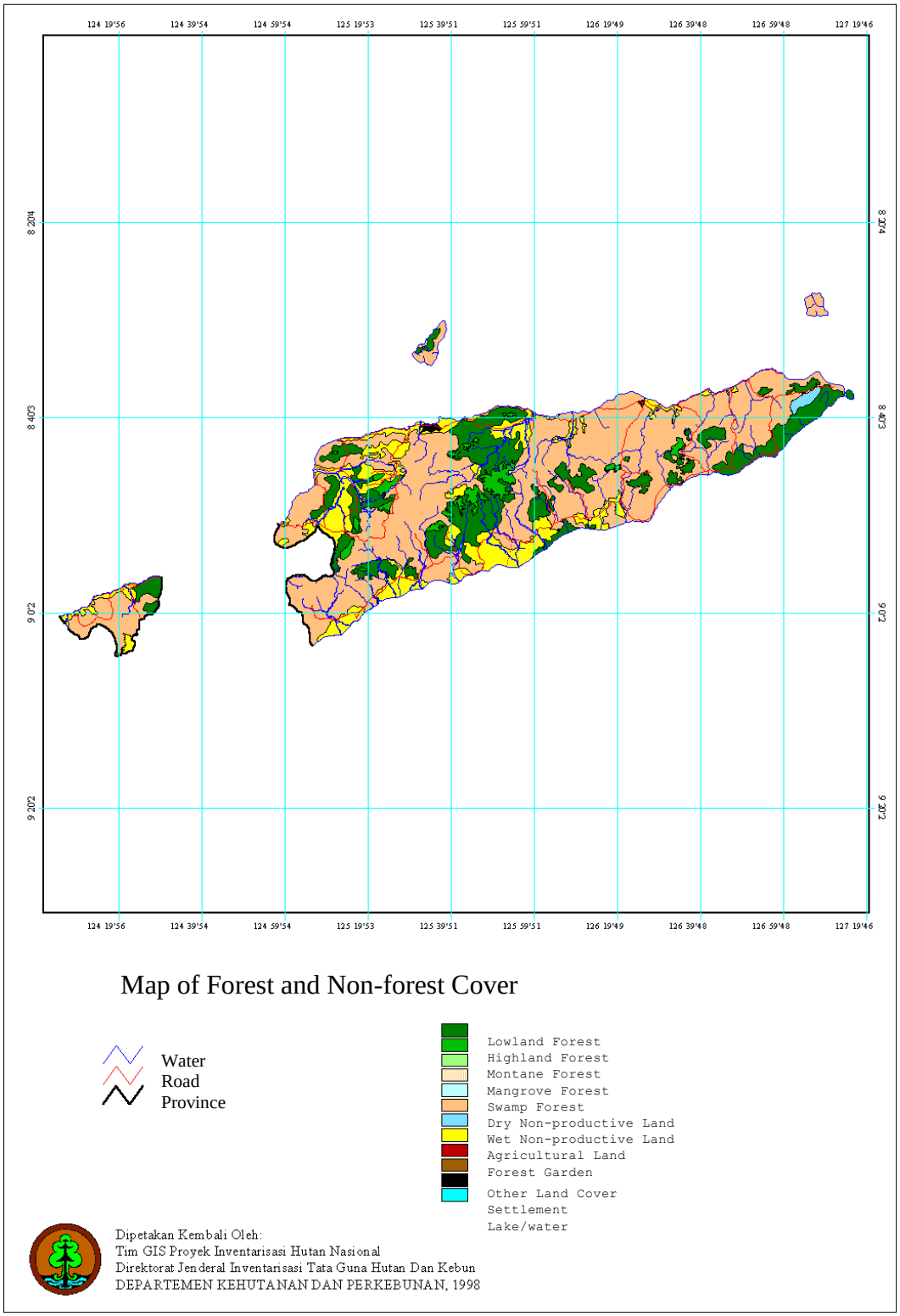
Timor-Leste has had a long history of colonization and occupation. To understand today's state of the forests, some review of past history is needed. Forest cover in Timor-Leste decreased by almost 30%

over the period of 1972 to 1999, based on analysis of satellite images (Sandlund *et al*., 2001) (Figure 2, green areas include both agriculture and forest cover). Approximately 35% (453,850 ha) of the land area (excluding approximately 22 km^2 of water bodies) has some type of forest cover (Figure 2). Remaining primary forest vegetation is minimal. Estimates range from 1 to 6% of the territory. 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. One reason given was to remove any cover that could protect guerrillas. Furthermore, during the Indonesian occupation, many people were displaced to the hills and cleared forests for agriculture.

Figure 2. Landsat 7 satellite image provided by ACRES September 1999

Figure 3. Government of Indonesia map of Forest Cover in Timor-Leste

PROPINSI TIMOR TIMUR



There are significant gaps in information concerning actual forest status. Management of the forest estate is currently under the National Direction of Forestry and Water Resources (NDFWR) of MAFF. Under NDFWR are the directorates of Reforestation and Rehabilitation; Protection and Utilization of Forest Products; and Services, for example for community forests and mangroves. The Forestry staff have few resources available. For example, there are 30 staff in NDFWR, five of whom are forest guards. There are hopes of hiring 21 more guards (National Direction of Forestry and Water Resources, 2003). MAFF has done a limited inventory of trees from the Consolidated Fund for Timor-Leste (CFET) administered by UNTAET. Reforestation projects are also being planned.

Say something about the DGIS map and fuelwood survey.

Timor-Leste: Change in Forest Cover

TOTAL FOREST COVER		
Forest 1990 (ha)		966,000
Forest 2000 (ha)		854,000
Forest 2005 (ha)		798,000
Annual Change 1990-2000 (ha | %)	(11,200)	-1.16%
Annual Change 2000-2005 (ha | %)	(11,200)	-1.31%
Total Change 1990-2005 (ha | %)	(168,000)	-17.39%
Change in rate (%)		13.11%

Forest Cover, Change in Forest Cover: The FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS's Global Forest Resources Assessment (2005) and the State of the World's Forests (2005, 2003, 2001) from http://rainforests.mongabay.com/deforestation/2000/Timor-Leste.htm

The collection of firewood is the main factor in deforestation (forest damage). The demand for firewood for cooking grew fast when the subsidy for kerosene, the cooking fuel, was stopped. Based on a JICA estimation, the demand for firewood ranges between 377,000 – 1.5 million m³ annually. Then, NGO's indicated that around 94 – 100% houses use firewood for cooking and around 80% of it is taken from the forest. In addition, the report by the Joint Agriculture Donors Year 2002 stated that the demand for firewood supply and the cut-and-burn agricultural method have reduced forest areas and worsened erosion in the highlands. Besides threatening the preservation of downstream irrigation systems and the main infrastructures like roads and bridges, it also increases sedimentation in the river and coastal areas, particularly in coral zone, creating another environmental problem.

The effect of these exploitation activities – collecting firewood and forestry, and the shifting agriculture, etc. is the risk of forest damage. This problem will create social and economic problems in the forms of decreasing forest cover, reducing farmer income, environmental damages that may lead to natural disasters such as floods, erosion and lack of water that is highly needed by the people.

Although current fuelwood collection is deemed as a major source of deforestation, historically, it is noted that there was also a great deal of deforestation during the Indonesian era (MoED, 2008).

The government is (more details on who) is working on reforestation, agro-forestry and soil conservation. For reforestation, tree nurseries are being established. The tree species chosen are those which can be used by households for food, fuel and sale, those which will improve soil fertility and prevent erosion and those with commercial value such as sandalwood. There are also 27 watershed areas identified that have been degraded by deforestation and forest fires. Efforts to rehabilitate these watersheds with the participation of communities are now being carried out through the Ministry of Agriculture and Fisheries and donors.

Biodiversity Status and Management

Protected Areas Status

Fifteen specific protected areas have been designated under UNTAET regulation 2000/19. These are:

16. The total land area of Jaco Island together with surrounding rocks, reefs, and other surface and sub-surface features;
17. Tutuala Beach together with forest adjacent to the beach;
18. Cristo Rei Beach and the hinterland;
19. The summit of Tata Mailau Mountain, all elevations on Tata Mailau Mountain above 2000 meters and the surrounding forest;
20. The summit of Sadoria Mountain, all elevations on Sadoria Mountain above 2000 meters and the surrounding forest;
21. The summit of Malobu Mountain, all elevations on Malobu Mountain above 2000 meters and the surrounding forest;
22. The summit of Mount Diatuto and the surrounding forests;
23. The summit of Mount Fantumasin and the surrounding forests;
24. The Riverlet Clere Sanctuary;
25. The Tilomar Reserve;
26. The Lore Reserve;
27. The Monte Mundo Perdido and the surrounding forest;
28. The summit of Monte Matebian and all elevations on Monte Matebian above 2000 meters and the surrounding forest;
29. The Monte Cablaque and the surrounding forest; and
30. The Manucoco Reserve.

Timor-Leste declared its first National Park in 2008. It is in Tutuala and known as Nino Conis Santana National Park. This national park covers both terrestrial and marine areas out to three nautical miles from the coast.

The protected areas designated contain the majority of the remaining primary forest cover in Timor-Leste and are found mainly in mountainous areas. These areas are likely to have high endemism. Lowland forest areas, typically higher in biodiversity and with greater numbers of threatened species, are not as well represented. The protected area system designated is provisional, and is not based on an

analysis of Timor-Leste's biodiversity and forest conservation needs. It is likely that the critical habitat necessary for the survival of some endangered and endemic species is not included in the current design. Jaco Island and Lake Iralalaru area have had surveys performed by BirdLife International and the Directorate of Environment and are among the first to be proposed as protected areas. Management plans, including management of tourism, have not been developed yet for these protected areas.

There were fewer than 500 foreign visitors in 1998 to Timor-Leste. There has been a significant influx of foreign visitors since 1999, composed primarily of UN and other international aid staff on temporary assignment. The lack of tourist management practices has put pressure on some protected areas, and is contributing to increasing levels of degradation and conflict with local communities. Jaco Island is one such site. The island is considered sacred and local customs prohibit use; however, it has become a popular destination for foreign visitors. There is some disagreement among communities about this tourism.

Species information

Collections of biological materials from Timor-Leste are located primarily in Indonesia, Australia, the Netherlands, Portugal, and the United States.

BirdLife International and the Directorate of the Environment have done recent inventories of threatened birds and 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. This inventory identified nine important Bird Areas: Tilomar, Tata Mailau, Fatumasin, Atauro Island, Sungai Clere, Lore, Monte Paitchau, Jaco Island and Mount Diatuto. Timor-Leste has numerous endemic and globally threatened bird species such as Timor Green Pigeon *Treron psittacea* (endangered); Timor Imperial Pigeon, *Ducula cineracea* (endangered), Timor Black Pigeon *Turacoena modesta* (vulnerable), Wetar Ground-dove *Gallicolumba hoedti* (endangered), Yellow-crested Cockatoo *Cacatua sulphurea* (critically endangered) and Timor Sparrow *Padda fuscata* (Vulnerable). There are now sixteen important bird areas identified (Trainor, *et al*., 2007).

Table 1. The Status of Timor-Leste's Birds and Their Dependence on Closed Canopy Tropical Forest.[2]

English name	**Species**	Status	**RR**	**Forest Fidelity**
Christmas Island Frigatebird	***Fregata andrewsi***	**CR**		None
Timor Green Pigeon	***Treron psittacea***	**EN**	RR	**HIGH**
Pink-headed Imperial Pigeon	*Ducula rosacea*	nt	RR	**MOD**
Timor Imperial Pigeon	***Ducula cineracea***	**EN**	RR	**MOD**
Timor Black Pigeon	***Turacoena modesta***	**VU**	RR	**MOD**
Barred-necked Cuckoo-dove	*Macropygia magna*		RR	**MOD**
Wetar Ground Dove	***Gallicolumba hoedtii***	**EN**	RR	**HIGH**

[2] This table is copied in its entirety from Appendix 1 of BirdLife International-Asia Programme. (2003). Status of globally threatened birds and internationally significant sites in Timor-Leste (Timor-Leste) based on rapid participatory biodiversity assessments with particular reference to the proposed 'Nino Conis Santana National Park (NCSNP)'. The legend of Appendix 1 explains states: "Approximate fidelity of globally threatened, near threatened and restricted-range birds to Closed Canopy Tropical Forest types in Timor-Leste, based on this study and previous reviews (Noske and Saleh 1996, BirdLife International 2001, Mauro 2003). Forest fidelity ranges from "none" (no dependence on closed canopy tropical forest) to "high" (highly dependent on closed canopy tropical forest)."

Olive-headed Lorikeet	*Trichoglossus euteles*		RR	**MOD**
Iris Lorikeet	*Psitteuteles iris*	nt	RR	**MOD**
Yellow-crested Cockatoo	***Cacatua sulphurea***	**CR**		**MOD**
Olive-shouldered Parrot	*Aprosmictus jonquillaceus*	nt	RR	**MOD**
Cinnamon-banded Kingfisher	*Halcyon australasia*	nt	RR	**MOD**
White-bellied Chat	*Saxicola gutturalis*		RR	Low
Chestnut-backed Thrush	*Zoothera dohertyi*	nt	RR	**HIGH**
Orange-sided Thrush	*Zoothera peronii*	nt	RR	**MOD**
Timor Stubtail	*Urosphena subulata*		RR	Low
Buff-banded Bush-bird	*Buettikoferella bivittata*		RR	Low
Timor Leaf warbler	*Phylloscopus presbytes*		RR	Low
Black-banded Flycatcher	*Ficedula timorensis*	nt	RR	**HIGH**
Timor Blue Flycatcher	*Cyornis hyacinthinus*		RR	**MOD**
Plain Fairy Warbler	*Gerygone inornata*		RR	Low
Fawn-breasted Whistler	*Pachycephala orpheus*		RR	Low
Red-chested Flowerpecker	*Dicaeum maugei*		RR	Low
Flame-breasted Sunbird	*Nectarinia solaris*		RR	Low
Spot-breasted Dark-eye	*Heleia muelleri*	nt	RR	**MOD**
Yellow-eared Honeyeater	*Lichmera flavicans*		RR	Low
Black-chested Honeyeater	*Myzomela vulnerata*		RR	Low
Streak-breasted Honeyeater	*Meliphaga reticulata*		RR	Low
Timor Friarbird	*Philemon inornatus*		RR	Low
Tricolored parrot-finch	*Erythrura tricolor*		RR	Low
Timor (Finch) Sparrow	***Padda fuscata***	**VU**	RR	Low
Olive-brown Oriole	*Oriolus melanotis*		RR	**MOD**
Timor Figbird	*Sphecotheres viridis*		RR	**MOD**
Oriental Darter	*Anhinga melanogaster*	Nt		None
Great-billed Egret	*Ardea sumatrana*	Nt		None
Malaysian Plover	*Charadrius peronii*	Nt		None
Eastern Curlew	*Numenius madagascariensis*	Nt		None
Beach Curlew	*Esacus magnirostris*	Nt		None

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD-data deficient. Restricted-range (RR): natural global distribution is less than 50,000 km2 (less than twice the area of Timor island).

Terrestrial Species

Tropical forests are in poor condition, and continue to be degraded and converted, putting several species, particularly frugivorous birds and mammals, at risk. Coastal habitats are largely in good condition. This is probably due in part to traditional prohibitions against destruction of mangrove. Wetland areas are limited and ephemeral, generally drying up during the dry season. Ten endangered mammals and three endangered reptiles are found in Timor-Leste (Table 2). The majority of the mammals and the python are all forest dwellers, and the remaining two lizards inhabit wetlands.

Table 2. Endangered Terrestrial Species		
Taxonomic Name	**English Name**	**IUCN/CITES**
Paradoxurus hermaphroditus	Mentawai Palm Civet	VU
Macaca fascicularis	Long-tailed macaque	LR/nt, CITES
Phalanger orientalis	Northern common cuscus	CITES
Hipposideros crumeniferus	Timor leaf-nosed bat	DD
Nyctophilus timoriensis	Greater long-eared bat	VU
Rhinolophus philippinensis	Philippine horseshoe bat	LR/nt
Rhinolophus simplex	Lombok horseshoe bat	EN
Pipistrellus papuanus	Papuan pipistrelle bat	LR/nt
Miniopterus schreibersii	Schreibers' bent-winged bat	LR/nt
Crocidura tenuis	Timor shrew	VU
Varanus timorensis	Timor monitor lizard	CITES
Crocodylus porosus	Estuarine crocodile	CITES
Python timoriensis,	Timor python	CITES

Table 3. Endangered Marine Species		
Taxonomic Name	**English Name**	**IUCN/ CITES**
Chelonia mydas	Green turtle	EN, CITES
Eretmochelys Imbricata	Hawksbill turtle	CR
Dermochelys Coriacea	Leatherback turtle	CR
Caretta caretta	Loggerhead turtle	EN
Lepidochelys Olivacea	Olive turtle	EN, CITES
Dugong dugon	Dugong	VU
Physeter catodon	Sperm whale	VU
Orcinus orca	Killer whale	LR/cd, CITES
Stenella longirostris	Spinner dolphin	LR/cd, CITES
Tursiops truncatus	Bottlenose dolphin	DD
Rhincodon typus	Basking shark	VU
Tridacna derasa	Southern Giant Clam	VU
Tridacna gigas	Giant Clam	VU
Tridacna maxima	Small Giant Clam	LR/cd
Tridacna squamosa	Fluted Giant Clam	LR/cd

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD-data deficient

Marine Species

Threatened and endangered marine species include turtles, dugong, whales, dolphins, sharks, crabs, and clams. Marine habitat degradation, from destructive fishing practices and pollutants, is beginning to occur, and could have serious implications for these species in the near future. Coral is also harvested as a building material. Illegal fishing occurs which is depleting fish stocks. AusAID is supporting a survey of fish resources.

Hippopus hippopus	Bear Paw Clam	LR/cd
Hippopus porcellanus	China clam	LR/cd
Birgua latro	Giant coconut crab	DD

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD-data deficient

Aquatic (both marine and freshwater) biodiversity are affected by environmental degradation from a number of causes. Sand extraction can affect the flow of the rivers. Informal settlements along river and stream banks dispose waste directly into the water. Sanitation services are being established, yet waste entering coastal areas is still a threat to biodiversity. Solid and hazardous wastes also contribute to the pollution of rivers and the seas. Villagers are also concerned about fertilizers and pesticides polluting the rivers.

Vegetation

Two tree species are endangered in Timor-Leste (Table 4). Sandalwood was formerly abundant, but has been severely over-harvested.

Table 4. Endangered Tree Species		
Taxonomic Name	**English Name**	**IUCN/CITES**
Santalum album	Sandalwood	VU
Mangifera timorensis		EN

Red List categories for endangered species: CR – critically endangered, EN – endangered, VU – vulnerable, LR – lower risk (nt – near threatened, cd – conservation dependent), DD-data deficient

Timor-Leste, prior to the 1999 referendum, was in the process of developing a local system of seed multiplication for several crops. Two Central Seed Centers were set up in Balai Benih Induk , Maliana, Bobonaro district (rice) and in Loes, Liquica district (corn, soybean, peanuts and mung beans) (Timor-Leste Joint Assessment Mission, 1999). The transitional government and the international donor community have undertaken efforts to conserve and support the sustained production of commercially important plant species through restoration and additional development of local seed resources and seed production stations. USAID is supporting efforts to maintain locally-adapted coffee plants.

E. ASSESSMENT OF THREATS TO TROPICAL FORESTS AND BIODIVERSITY

Energy Poverty

The great irony of Timor Leste is that it is a country with ample petroleum resources and revenues coming online, but its citizens lack access to energy. Around 98% of people are dependent on fuelwood for cooking. A lack of economic alternatives drives deforestation, coral reef destruction and over-exploitation of wildlife in Timor-Leste. Deforestation is the single most pressing problem in Timor-Leste. The majority of Timor-Leste's endangered species, and much of its biodiversity are found in its remaining forests. Pressures on forests are driven primarily by the need for firewood, clearing for agriculture and escaped fires during land clearing or hunting. Illegal logging is also a threat. From March 2002 to November 2003, the police confiscated over 572,000 tons of sandalwood (National

Direction of Forestry and Water Resources, 2003). Hunting for meat or sale for the pet trade appears to be common, but there are few concrete data. Destructive fishing practices are contributing to the degradation of coral reefs. During the UN transition period, corals were also used for construction material.

Demand for firewood around the Dili area has increased as the population of Dili has tripled in 3 years. Moreover, there is increased use of firewood because there is no longer the Indonesian subsidy for kerosene, the distribution networks for kerosene no longer exist and many people lost their kerosene stoves during the violence of 1999. The price of kerosene during the Indonesian occupation was 10 cents per liter and in January 2004 was 50 cents per liter. In the urban areas of Dili and Baucau, 86% percent of households use firewood. In other parts of the country, 99% of households rely on firewood (UNICEF, 2002).

Mangrove exploitation for fuelwood has also been steadily increasing. One reason for which is the siting of internally displaced persons camps near the mangroves and their need for fuelwood.

Lack of Economic Opportunity

Habitat degradation also occurs through the conversion of forests to agriculture. Given the low amount of appropriate agricultural land, and a growing human population engaged primarily in subsistence agriculture, the pressure on forest resources will continue unabated, unless steps are taken in the immediate future.

Given Timor-Leste's sloping terrain and the rainfall pattern of short, intense rains, soil erosion from farming and deforestation have negative impacts on both terrestrial and aquatic biodiversity. Conservation impacts of high erosion include loss of forest habitat through landslides and degradation of river and coastal habitats through sedimentation. Stream sedimentation is very high from upland soil erosion. Livestock grazing also contributes to erosion and the appearance of weeds that are difficult to eradicate.

Poaching is also a major problem for endangered species. Endangered species are hunted for food, medicine, and ornaments, and collected live for the pet trade. Conservation efforts in Timor-Leste are nascent. A start at protecting endangered species has been made by the formulation of UNTAET regulation 2000/19, but enforcement has been lacking. A number of illegal wildlife products have been observed openly for sale in the capital, Dili. These products have included marine turtle eggs and Hawksbill turtle shell ornaments (Sandlund *et al*., 2001). Unemployment and demand from foreigners fuels the trade in rare birds and turtles. Now there is a display in the airport of the wildlife products that are not allowed to be taken. Some checking of bags at the airport is also occurring. The Directorate of Environment is planning joint patrols with the National Police force to improve enforcement. They have also created information cards on endangered species.

Youth stats – youth discussion

Lack of Legal Framework for the Environment and Natural Resources

As noted by Barreto (2007), Timor-Leste's legal framework is still not sufficient to protect forests and biodiversity. Rights to natural resources such as forests, land and water are not yet clarified. The lack of clear rights deters investments for conservation for the small-scale farmer, while facilitating the negotiation of the handover of large tracts of land to foreign investors. Draft legislation for

environmental and social impact assessments has occurred; however, has not yet been approved by the National Parliament. Protected area, endangered species??, forest management policies and laws all need to be formulated (???) and formalized. From MED "To support the Timor-Leste government in putting in place such a framework, a detailed environmental analysis is currently underway led by the World Bank Team.

In summary, the legal framework is still in development and still unclear with regards to the environment. The enforcement of even existing regulations is and any future enforcement will be a challenge due to an overall lack of financial and human resources.

Pollution

Pollution from a variety of sources has potential for negative impacts particularly upon aquatic biodiversity. For example, upstream pollution of rivers from agricultural inputs and human wastes is not only contaminating rivers and streams, but also, makes its way out to the coasts and coral reefs. It is estimated that about 45% of households have access to toilet facilities and of those who do, half are unsafe (UNICEF, 2002). Wastes is a large issue; for example, Dili dumps its waste into the river. Ships also release their wastes along the coast. The UN had contracted with a company for the disposal of waste oil; however, the contract ended and there are currently 200,000 liters of waste oil stored by the Comoro River. It was reported that some of the drums are leaking oil posing a threat to aquatic biodiversity.

Investments for "Economic" Growth

Threats to biodiversity may arise due to outside investments. For example, hydroelectric, oil palm and sugar cane plantations. Oil palm and sugar cane plantations are planned in Los Palos. The Norwegian Water Resources and Energy Directorate (NVE) is formally cooperating with the Ministry of Transport, Communication and Public Works to develop hydropower including transmission lines. NVE has invited tenders for feasibility studies. Norplan and Norconsult were awarded the contract by NVE. They have identified potential for a mini-hydropower plant of 150-300 kW in Baucau and dams of 30-60 m in gorges on the river Laclo. Another possibility identified hydroelectric energy generation is the redirection of water underground from the Lake Iralalaru. The water from this lake flows downstream through the Ira Siquiro River into a sinkhole and underground veins. According to Norplan's Newsletter, "The engineering challenges lie with design of the intake to catch the water and design of the waterway in this kind of poor rock with low ability to withstand pressurized water" (Norplan, 2004). Transmission lines to Dili would be built to produce 190 GWh/year of electricity. Further tenders for implementation will be invited upon the completion of feasibility studies. The development of the plantations and hydroelectric energy generation are just outside of the proposed park border in Lore. The area around the proposed hydroelectric site is the only pristine area of forests that remains in Timor-Leste and has been described as "best tropical closed forest on the island" (Birdlife International-Asia Programme, 2003). The lake is a stabilizer for the region including for wetlands and rivers to the South coast. The wetlands are important for crocodiles and large resident water bird populations. The NGO Haburas is collecting information on how the livelihoods of the people are dependent on the environment and how the generation of hydroelectricity could affect them.

Lack of Human Capacity and Public Awareness

In the environment sector, the government has limited budget and limited staff. Further development of capacity of staff are needed in scientific and management skills. In Timor-Leste, there is an overall lack

of information on the environment and biodiversity such as extent of forest cover, hydrology, water catchment and wetland areas. The lack of knowledge hinders conservation. New legislation is being drafted and information to the public on these laws will need to be disseminated.

Climate Change

Under climate change, Timor-Leste will likely experience greater variability in rainfall from more intense rains for short periods and lengthening periods of drought. The State of the Nation report attributes flooding in the West and East to climate change (MED, 2008). Such changes could affect the ability of species to survive in their current habitats. Sea level rise will also change or eliminate coastal ecosystems. Coral reefs are most at threat from temperature rises.

Invasive Species

Invasive species such as *Chromolaena odorata* and xxxx hinder the rehabilitation of degraded lands. The cane toad also entered in 1999 with international troops and is poisonous to animals.

F. USAID'S CURRENT ACTIVITIES

USAID's current activities focus on three areas: accelerating economic growth; strengthening key foundations of governance and improving the health of the Timorese people, especially women and children. Of these the economic growth and governance activities have the greatest potential linkages to the environment and biodiversity conservation as they address principles fundamental to sound resource management. Such linkages are further discussed under the recommendations to meet conservation needs in section H below.

Given that unsustainable agricultural practices contribute to land degradation, deforestation and biodiversity loss, USAID's current economic growth activities work to improve livelihoods and incomes while conserving natural resources through sustainable agricultural practices. For example, the "Timor Economic Rehabilitation and Development Project" (TERADP), is an eight-year project which is implemented by National Cooperative and Business Association (NCBA) that supports the development of organically certified coffee grown in an environmentally-sustainable manner. The coffee plantations involved in this project were planted during the time when Timor-Leste was a Portuguese colony. The coffee produced is a very strong tasting coffee 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. Given this coffee's local adaptation and pest resistance, inputs such as inorganic fertilizers or pesticides are not needed or used. The coffee project has taken advantage of these conditions and has achieved organic certification for smallholder-produced coffee. The project has organized farmers into cooperative, "Cooperativa Café Timor" which is the largest private sector employer in the country and the largest single-source producer of certified organic coffee in the world. TERADP has also been focusing on providing technical assistance to farmers to move away from subsistence agriculture to a more diversified farming system which includes livestock, agro-forestry products (e.g. teak, mahogany, sandalwood, fuel wood, cattle fodder species and selected fruit tree varieties), and on assisting farmers through market linkage development.

TERADP is also initiating the coffee rejuvenation activity to address a decline in coffee yields over the past few years by pruning existing coffee plants and the planting of new coffee seedlings and shade trees. Tree plantings occur not only within farmer agro-forestry systems but also along slopes to reforest the areas and reduce soil erosion. These trees can later be sold. Overall, TERADP contributes to

increased international sales of selected agricultural commodities which are essential for sustainable increases in income, jobs and poverty reduction in rural areas while supporting the conservation of natural resources.

The Bolstering Agriculture and Sustainable Agribusiness/Private Sector Reform (BASAR) is a five-year project awarded in July 2005 and implemented by DAI. The program is focusing on providing technical assistance to farmers to explore alternative export commodities, develop horticulture for domestic market and develop regional market linkages. This support is critical to rural farmers as it improves agricultural productivity and provides opportunity to rural farmers to increase their incomes.

To improve private sector competitiveness, USAID is facilitating the development of private land and property law, along with a process for registration and titling. US assistance will: support the passage of a national land law and the development of implementation regulations; raise public awareness regarding land issues; facilitate communication between the government and civil society, thereby fostering transparency and trust regarding the administration of land and property; develop dispute resolution mechanisms to resolve conflicting property claims in ways that foster reconciliation and develop technological tools, procedures and systems for claims registration. Land rights are an important incentive for resource conservation.

The economic growth portfolio also includes workforce development that focuses on the employability of youth. Youth account for a quarter of Timor-Leste's population and their share is expected to rise in the coming years. As a result, it is estimated that between 10,000 and 20,000 new jobs must be created each year to absorb new entrants to the labor force. However, this is not happening; unemployment among urban youth is estimated to be 43%. The conflict vulnerability assessment identified a disaffected population as one of the root causes of the crisis and youth have engaged in sporadic violence since the crisis began, both as instrument of the political elite and as opportunists in a prevailing environment of lawlessness. Numerous surveys have identified employment as a key aspiration for most youth. They nevertheless generally lack the skills and experience sought by the relatively few employers that exist in Timor-Leste. US assistance will engage youth in a combination of various types of training, education and skills development, much of which will be devoted to practical-especially on-the-job-training. While the private sector places a high value on practical experience and on-the-job training, they currently do not feature prominently in most vocational education and training programs in Timor-Leste. There is opportunity to include environmental education as a part of skills development.

USAID assistance in support of water supply and sanitation works towards the goals of the Paul Simon Water for the Poor Act. A "ridge to reef" approach builds and sustains water supply and sanitation for improved livelihoods and health among rural communities in Timor-Leste. More specifically, US assistance supports innovative interventions to treat and maintain the quality of water at the point of use, a strategy that is now acknowledged as more effective and less costly than conventional water treatment at the source and distribution points. Support is also provided for hygiene awareness and capacity-building of community-based organizations for the sustainable management of water and sanitation systems. Water source protection and resource management efforts in the environment area and agro-forestry activities in the agriculture area will complement these interventions.

Among USAID's democracy and governance activities are efforts to strengthen civil society to advocate for greater accountability and transparency from the government. USAID is supporting selected civil society activities through the UNDP project: "Supporting Civil Society Organizations in Promoting Citizen Participation and BELUN, a network of NGOs to build the conflict prevention capabilities of

community-based organizations. As of March, 891 land claims have been registered through the USAID-supported Strengthening Property Rights in Timor-Leste projectknown locally as Ita Nia Rai or Our Landworking with the National Directorate for Land and Property.

G. ACTIONS NECESSARY TO CONSERVE BIOLOGICAL DIVERSITY AND TROPICAL FORESTS

Watershed Management through Sustainable Agriculture and Reforestation

Watershed management including sustainable agriculture and reforestation would address the two primary threats to Timor-Leste's forests and biodiversity. These threats are unsustainable, low-yielding agricultural practices and deforestation for firewood collection.

Improving agricultural production on existing cleared lands would reduce the need of farm families to clear forests for new fields. Support needs to be provided that will help Timor-Leste diversify the types of products grown and develop economic alternatives to subsistence agriculture, thus reducing pressure for forest conversion. Agriculture sector development should also focus on decreasing erosion and maintaining soil quality. Practices such as bank stabilization and terracing can decrease the risk of landslides.

Agro-forestry systems such as coffee with shade trees are a valuable example of a practice beneficial to the environment. The benefits of planting of multi-purpose species in gardens, agro-forestry systems and large-scale reforestation would be an increase in tree cover, income generation, improved food security, erosion control, firewood supply and improvements in water quality and quantity.

Enabling conditions to ensure the success of such environmental rehabilitation would be the institutional capacity of Timor-Leste's Ministry of Agriculture, Forests and Fisheries to provide assistance and continuation of such programs, along with clarification of the rights, roles and responsibilities of government, NGOs, communities and the private sector. Tenure rights to land and forests will be of primary importance for clarification (see also D'Andrea, *et al*., 2003).

Water Quality and Quantity

Humans along with terrestrial, aquatic, coastal and marine wildlife are dependent upon a steady water supply of good quality. Fresh water is needed for irrigation and high value crops. Water scarcity is a major challenge because of the relatively low levels and sporadic rainfall in some parts of Timor-Leste combined with deforestation and the sedimentation of rivers. Such water scarcity can become a flashpoint for conflict.

Overall, there is very little information of the hydrology of the country and the impacts that the wide-scale deforestation may have or had on groundwater supply. Existing water supplies are also threatened by wide-scale erosion and siltation of rivers. Run-off affects aquatic and marine ecosystems and their biodiversity. Additionally, many rivers are contaminated with human and livestock waste. There is no sewage treatment and the waste flow from Dili is released along the coast. Recommendations related to watershed management would also benefit the quality and quantity of Timor-Leste's water supply.

Firewood and Energy

Most informants in Timor-Leste identified deforestation for firewood collection as the major threat to forests. After the conflict in 2006, camps for internally displaced people were set up near mangroves.

As a result, there has been extensive cutting of mangroves for firewood. Furthermore, energy for small and large-scale industries is needed to attract investment and economic growth to provide alternatives to subsistence agriculture, which also threatens forests and biodiversity.

Energy generation from diesel fuel supplies electricity mainly to people in the urban centers of Dili and Baucau where approximately 92% have some degree of service. In other urban areas about 47% of households are serviced. In rural areas only 14% have electricity for lighting. The majority use oil lamps (UNICEF, 2002). Furthermore, most people rely on firewood for their cooking needs. Timor-Leste's oil and natural gas reserves are coming on line, but more slowly than expected. In the meantime, there is not a reliable supply of energy in the country. Renewables may have potential for electricity generation in remote areas. Some pilots have been started to explore off-grid energy for the rural poor that may show promise for scaling up across the country.

The production of renewable energy resources may also have the potential to create jobs in rural areas while providing the necessary energy for the establishment of other industries. Renewable energy will be a sound foundation for the sustainable development of Timor-Leste to reduce greenhouse gas emissions and to plan for the eventual depletion of its gas and oil reserves. Investment in renewables may also provide an opportunity for developing public-private sector partnerships.

Efforts to explore renewable energy are also needed to mitigate climate change. Currently Timor-Leste has plans to install older models of generators to burn heavy fuel for electricity. This investment will increase greenhouse gas emissions contributing to global climate change from which Timor-Leste will experience negative impacts.

Policies and Planning for Forest and Biodiversity Management

Timor-Leste as a new nation of 7 years, continues to develop its legal infrastructure, and the regulations and procedures necessary to conserve its resources. Assistance in developing transparent, equitable, and sustainable systems is paramount to conserving its biodiversity and remaining tropical forests. Capacity building of government staff to develop, implement and enforce environmental legislation is also necessary.

Furthermore, the laws from Indonesia and the UNTAET period are still on the books so there needs to be a way to update laws, as well as harmonize laws across the government in support of resource conservation. There are also gaps in legislation in support of biodiversity and forest conservation that need to be filled. National laws also need to be harmonized with customary laws on resource use and protection. Existing customary laws under *tara bandu* provide grassroots examples of the types of policies that could contribute to sound environmental management. NGOs could use assistance to enhance their skills in analysis and advocacy for specific environmental policies and their implementation.

Biodiversity Conservation

There is limited biodiversity data and inventories of Timor-Leste's species are needed. Although the Global Environment Facility has funded a National Biodiversity Strategy Action Plan and protected areas have been designated, assistance to the government is needed to develop a functional protected areas system and to train protected area managers. Management plans should be developed for protected areas, including buffer zone development with community participation and active management. These activities that promote participatory planning of Timor-Leste's natural resources

are important methods to build local governance and human capacity for biodiversity conservation and management.

Both government and non-governmental organizations require a building of capacity to sustainably manage Timor-Leste's forests and conserve their biodiversity. Training in basic principles of ecology and conservation, ecological restoration, sustainable management of fisheries and forests, habitat requirements of endangered species, and eco-tourism management are some of the most pressing training needs.

Environmental Education and Awareness

There is a lack of information in Timor-Leste on the state of the environment, including endangered species and sustainable agricultural and other environmental management practices. Existing legislation and policies are unclear to the Timorese public and international community. Environmental education and awareness can contribute to an informed citizenry and promote good governance of natural resources. Laws and information must be translated into the *Tetum* language.

Conservation of Marine Biodiversity within the Coral Triangle

Little is known of the marine ecosystem surrounding Timor Leste, yet the country sits within the Coral Triangle, the epicenter of the world's marine biodiversity and nursery for the world's fisheries. In Timor Leste, the marine environment is reasonably healthy; therefore, numerous opportunities and benefits exist for its explicit conservation prior to any negative impacts from large-scale development. Among the conservation efforts needed which are also priorities for the Coral Triangle at large are: 1) the identification and management of priority seascapes; 2) a vision and plan for an ecosystem-based approach to fisheries management including sustainable catch plans; 3) the establishment of marine protected areas; 4) adaptation measures to climate change; and 5) the conservation of threatened species. Ecotourism is another option to demonstrate financial benefits from Timor's natural wealth and beauty.

Adaptation to Global Climate Change

Timor-Leste's forests, biodiversity and its people will be impacted from climate change. These impacts possibly include erratic rainfall patterns, sea level rise, water scarcity, altered growing periods for crops and an increase in disease vectors. To maintain resiliency to climate change, natural systems must remain intact to the fullest extent possible. In other words, maintaining biodiversity and forests are critical to assisting communities to adapt to climate change in the future.

H. MEETING CONSERVATION NEEDS: RECOMMENDED ACTIONS

USAID's new country strategy can meet the above conservation needs through the continuation of existing programs with the explicit integration of forest and biodiversity concerns within the economic growth and governance sector portfolios. Such integration is needed because the majority of Timor-Leste's population depends on natural resources for food and income. Furthermore, the sound management of these resources will be an indication and mechanism for good governance at national and local levels. The below are possible actions for the new USAID strategy in Timor-Leste that will meet Timor-Leste's needs to conserve forests and biodiversity. They are a range of options for consideration within the new strategy; it is not suggested that all recommendations be carried out. With additional funding stand alone activities could be carried out as well on the below topics. The recommended priority activities would include, in no specific order: clarification of tenure rights; large-

scale reforestation; off-grid renewable energy; conservation of the coral triangle and conservation of the remaining forests. There are numerous linkages within this set of priorities because for example, deforestation will impact the sea and corals while clear land tenure is needed for reforestation. Off –grid renewable energy would reduce deforestation for firewood and reduce pollution which currently affects all ecosystems and their biodiversity. NB: should make reference to how natural resource management activities can help employ youth.

Economic Growth through watershed management and reforestation

The government of Timor-Leste and donors recognize the importance of watershed and water resources management. Reversing the declines in biodiversity, forest areas and agricultural productivity can be accomplished through sustainable natural resource management interventions in fragile land areas such as watersheds. Such interventions can include slope stabilization, reforestation and agricultural diversification. USAID's identification of a critical watershed for rehabilitation and conservation in Oecussi could act as demonstration for the government of Timor-Leste. Working at a watershed level not only will conserve biodiversity and rehabilitate degraded lands, but also will improve water quality and quantity. Reforestation could utilize firewood species and others that have qualities for slope stabilization and water retention. Active protection of seedlings and trees from fires will be a critical component of any reforestation activity and would generate income.

The UNDP is implementing a program on sustainable land management. New opportunities outside the existing portfolio exist to partner with them to assess the relationship between deforestation and land degradation. A key incentive to improve land management and biodiversity management is to provide clear land tenure/title.

Coffee Project

Current USAID actions under the coffee project are meeting needs for the maintenance of forest cover, reforestation and sustainable agriculture that will slow the degradation of the environment. By improving and diversifying existing agricultural and agro-forestry systems, these activities prevent the further cutting of forests and loss of their biodiversity. The project's reforestation activities if scaled up could significantly increase Timor-Leste's land rehabilitation with positive benefits in improving water supply and quality.

The coffee project, implemented by the National Cooperative Business Association (NCBA), provides an excellent example of how to reconcile the need to generate income for the rural poor while protecting the environment. The project's assistance to existing shade coffee production systems maintains critical forest cover. The project is adding aspects of diversification; for example, the cultivation of vanilla that requires shade and the maintenance of tree cover. Appropriate sustainable agricultural practices are being explored to reduce wide-scale erosion causing the degradation of terrestrial as well as river and coastal habitats. Timor-Leste, however, is facing the demise of the trees shading coffee by the fungal infection known as gall rust. The project has been investigating ways to protect the tree cover and is promoting the planting of seedlings to replace diseased trees. Given the tremendous need to generate income for farmers and to reduce environmental degradation, USAID's coffee project provides a key foundation to future activities that improve farmer incomes without cutting the remaining forests.

Economic Growth and Conservation through Clean Energy

A stable energy supply at the local and national level is critical for the economic growth of Timor-Leste. USAID could explore opportunities between linkage of clean energy production and job creation. This effort would assist biodiversity conservation because one threat to biodiversity is the lack of economic alternatives to exploitation of forests and wildlife. On the one hand, oil and natural gas from the Timor-Leste Sea will be coming on line. How much of this will contribute to national energy generation versus foreign exchange earnings might be analyzed in the context of Timor-Leste's ability to generate other renewable energy resources; such as solar.

Biomass energy generation is another option where in some countries, rural communities earn income by growing trees as biomass fuel. An advantage to this type of planting is that the trees themselves can remain standing and continue to grow while only branches are cut as a fuel source. A further advantage is that biomass gassifiers can be located on a small-scale in rural areas for localized energy generation without dependence on a grid and would not require the installation of transmission lines that might otherwise, cut through forests. A sustainable energy supply in rural areas is particularly important for the development of processing industries for agricultural products. Efforts addressing sustainable energy supplies in rural areas that generate jobs and income will reduce the current pressure on forests for subsistence agriculture. It could also reduce some of the pressure of hunting and poaching of wild animals by those who have no other alternative for earning cash.

Energy considerations. If the economic growth activities encourage value-added processing, then thought will need to be given to an steady and sustainable energy supply. Access to electricity is a constraint in rural areas. In order to support the goals in creating jobs and increasing incomes in targeted rural areas, exploring renewable energy sources that are off-grid could be an option. Not only would renewable energy technologies overcome a barrier to processing efficiently, it could itself become a local enterprise generating employment. Studies and opportunities have been carried out for these technologies such as…….

Economic Growth through Workforce Development

Given high unemployment in Timor-Leste, a possible objective is expanded employment and income generating opportunities in rural areas. The most practical opportunities for income generation are within the agricultural production and associated agribusinesses. It is encouraged that efforts in improving agricultural production include approaches that promote the conservation of natural resources such as soil and water. Diverse production systems that include a variety of products rather than monocultures would also be beneficial to minimize risk to market fluctuations and weather as well as have positive benefits to biodiversity. Mixes of different agricultural and tree species have benefits for the overall biodiversity of rural areas because they provide habitat for beneficial insects and birds. Even agricultural diversity mimics to some extent natural biodiversity.

Workforce development – service industry for plantings – something the government could pay for? Further environmental degradation in Timor-Leste will exacerbate poverty as the land becomes less productive for food, water becomes scarce and contaminated and landslides destroy homes. The severity of the challenge in Timor-Leste warrants immediate action that mobilizes people for planting and erosion control through an employment generation program. Such an approach could be developed as a part of an environmental rehabilitation work program for sustainable development. In the short-term, this will create employment. In the long-term if environmental stewardship is institutionalized and continues with incentives for conservation, there will be available a variety of tree and agricultural

products for domestic and export markets. With careful market analysis, these products could also provide raw materials for the development of local industries. An additional consideration is that there are different types of lands that need to be rehabilitated; for example, those under government, private or communal control. The approach to their rehabilitation will be dependent upon the type.

Although USAID might begin such an employment program, a long-term investment will be needed for watershed rehabilitation including a large-scale tree planting (ie reforestation) project is needed. One option is working to raise the rehabilitation of Timor-Leste's environment as a priority for government funding. Another option is to consider private sector investment in valuable tree species and their products for development. Care must be taken with proposals for crops such as jatropha as usually these investors search for existing forests to clear rather than the higher-cost option of rehabilitating degraded lands. In any case, these types of plantations require large areas of land which are already occupied by people.

NB: should make reference to how natural resource management activities can help employ youth.

Payment for Environmental Services

A fairly new idea in international development and environmental conservation is the payment to communities for sound management of the environment. Such management for example, in the case of watersheds provides benefits of a steady water supply to downstream users such as urban populations and farmers who irrigate their fields. The initiation of such a payment program would depend upon whether there are any downstream users of water who would be able to provide some form of payment. In other countries, such downstream users of water are urban water authorities and irrigators. The payment is not necessarily a direct cash transfer to families, but can also take the form of communal funds managed for education or other community needs. It would be worth exploring whether there would be opportunities for payment to communities to manage the watershed that maintains water supplies to Dili residents.

Additional considerations in promoting watershed management are capacity building of government staff and NGOs to provide extension services to farmers. If it is decided to work at a watershed level, then there is the potential for conflicts regarding land uses between neighboring *sucos*. Provisions to resolve such conflicts would need to be made.

Economic Growth through Fisheries Management and Coastal Tourism

The fisheries and coastal tourism could provide both food and income for Timor Leste. The extent of Timor-Leste's fishery resources is not known. Some fishing occurs for local markets and vessels from other countries have been fishing off-shore. An inventory of aquatic and marine species and their abundance is needed to determine which species might be threatened and in need of protection. Such an inventory would also serve to identify what species may have market value and if their levels of abundance would allow commercial fishing and at what levels for sustainability. Marine protected areas should be established based on preferred locations of those species under threat and critical spawning grounds.

Coastal tourism that emphasizes biodiversity conservation has the potential to generate employment and income for the Timorese while protecting coastal resources. Examples include walking and shallow-water snorkeling tours that would educate tourists on local flora and fauna. SCUBA diving is another sub-sector that would, if properly managed, be highly successful given the diversity of coral that

currently exists in the shallow waters off of Timor-Leste. Limitations on tour group size and frequencies would need to be exercised. Small, unobtrusive campsites could be designated and plots rented to tourists. In the development of tourism, opportunities for direct community involvement and benefit-sharing should be explored.

USAID could invest in this area in a number a ways. It could dedicate funding to the Coral Triangle Initiative effort to provide advisors and assistance to Timor Leste's government and civil society. The Government of Timor-Leste needs further assistance to implement its Coral Triangle National Plan for Action. USAID could also incorporate ideas of fishing and/or coastal ecotourism for plans to work with medium and small-scale enterprise activities under the Economic Growth program.

Promoting good governance through public participation in environmental policy and natural resource management

The transition process has left some uncertainty about legislation regarding land tenure and natural resource management such as protected area management. Laws do exist from three sources: Indonesia, UNTAET and recently passed laws. In cases where new laws have not yet been passed by the new government, Indonesian or UNTAET laws are to be followed. However, it is said that the Timorese do not see these Indonesian and UNTAET laws and policies as acceptable or enforceable.

The uncertainty regarding land and property extends into forest lands and natural resources. The lack of clarity of rights and responsibilities has implications for sound environmental management. As mentioned previously, security of tenure to agricultural and forest lands can be an incentive for community conservation of these resources. Such rights and enforcement of sound management can be strengthened through the official recognition of customary law for natural resource management and conservation, *tara bandu*.

USAID/Dili has begun work on property rights in the urban area of Dili through the Land Law Program. Considering that over 80% of the population is rural and dependent upon land and forest resources for their livelihoods, it is recommended that work continue on clarifying land and property rights in rural areas with specific attention to agricultural and forested lands. The clarification of rights will also be important to avoid conflicts over land and forest resources (D'Andrea, *et al*., 2003). Another approach, if the focus were to be on strict biodiversity conservation, would be to work with government officials and communities, in a participatory manner on the identification and delineation of protected areas.

Regarding environmental policy in general, advisors could be provided to improve capacity for policy formulation with public participation. Such a policy program could be developed to strengthen biodiversity conservation, watershed management, and sustainable agricultural practices. An overall participatory process in the development of policies related to resource tenure and environmental management such as protected area delineation is a concrete manner to demonstrate the implementation of good governance.

Governance

At the community and household-farm level incentives for conservation and rehabilitation could include: official recognition of customary rights and resource management; secure resource tenure; the availability of good seeds, seedlings and livestock; and access to credit and markets. Land and resource tenure are fundamental to environmental conservation and management. More on this aspect will be discussed below under democracy and governance. Reforestation could occur with trees that could be pruned for firewood or that provide fodder for livestock. Other commercially-valuable trees should also

be considered for planting and income generation. For example, MAFF is trying to produce sandalwood in agroforestry systems. Some communities will already be managing forests. An analysis should be performed of the potential products of these forests that could generate revenue. Regarding livestock as a part of sustainable agricultural systems, the coffee project is already introducing livestock in some communities. These farm animals provide not only an income but also manure for fertilizer. Pressure on forested lands for firewood collection could be reduced through the development of alternative cooking fuel sources such as coffee husks and coconut shells. Another incentive to communities for conserving watersheds could be community block grants from the small grants program.

Clarifying tenure rights/good governance

New text: This work on clarifying land rights could also be directed to provide an incentive for conservation of forests and biodiversity. With clear tenure, the rural poor would have an incentive to invest in their land including reforestation and sustainable agricultural practices which would have downstream benefits in reducing soil erosion and rehabilitating degraded habitats.

From 08 op To improve the business enabling environment, US assistance will support the establishment of clear property rights in Timor-Leste. Conflicting claims to land and uncertainty over the legality of long-term leasing discourage productive investments in most sectors. Following the 2006 crisis, conflicting claims to land and property ownership have also impeded the reconstruction process and discouraged internally displaced persons from returning to their homes. There currently exists no process for registering property in Timor-Leste. The basic reason for this is the complete absence of a legal framework governing land ownership. Weak judicial institutions and disinformation campaigns that promote tensions over land compound the problem.

Work on good governance, participatory process and transparency in decision-making provides the enabling environment for the conservation of biodiversity and forests. It can contribute to the protection of endangered species, biodiversity conservation, and the retention of forest cover, as these issues slowly gain greater attention.

Democracy and Governance

Strengthening the rule of law has been a priority given it is a necessary pre-requisite to further democratic and economic development and to protect basic human rights. "US assistance in FY2008 [here or in the other section – finesse] will therefore continue to support the development of the justice system by strengthening personnel management systems for judges and prosecutors; improving basic management and administration of justice sector institutions, including the independent ombudsman that serves as citizens' recourse for complaints regarding corruption, administration of justice and ensure that it is delivered fairly; and increasing and expanding access to legal services and information to all citizens, with particular emphases on women and other marginalized groups. The long-term expected results of these efforts are improved citizen access to the formal justice system; expanded access to justice through informal dispute resolution, particularly for disadvantaged groups, such as rural populations and women; enhanced civil society capacity to monitor the administration of justice; strengthened oversight institutions." Assistance will also contribute to the environment by strengthening anti-corruption measures and improving land titling. Its efforts to share information on laws and legal services could also be of value if information is disseminated and legal services are provided in rural areas on/ in relation to natural resources and biodiversity.

"Since 2003, the government has been exploring options for decentralization. In 2004, it local development program supported by Ireland and UNDP, began piloting a range of procedures and institutional arrangements to simulate the experience of local government. To date, 28 local assemblies have been established in eight pilot districts. A modest amount of funding was provided to each assembly to manage, which has visibly empowered local communities to participate in government decision-making processes, take their own initiatives and assume responsibility for development in their areas. The experience led the government to recently make a decision to embark upon a program of decentralization and local government. US assistance will support the government's decentralization program by strengthening the capacity of local authorities to respond to communities' needs and work with civil society organization to improve both awareness and service delivery. US assistance will also develop local capacity for independent monitoring of the decentralization program, as well as mechanisms for public opinion information to reach national policy makers. Over time, it is anticipated that the development of these skills locally will help citizens better communicate their needs to local government officials and thereby raise the demand for improved service delivery."

""Representative and Responsive Local Government Plus Delivery of local goods and services: The program will strengthen the capacity of civil society organizations in for policy analysis, advocacy, coalition-building and engage in other activities aimed at fostering more peaceful and democratic societies, increase citizen participation in policy and decision-making processes, service delivery, resource allocation, the oversight of public institutions and in broader initiatives aimed a t creating more peaceful, democratic and pluralistic societies, as well as strengthen a political and civic culture which is supportive of democratic institutions and processes. The program aims to help strengthen the basic foundations of Timor-Leste's democratic system through increased transparency, accountability and citizens participation in political, social and economic aspects of their lives."

RESOURCE GOVERNANCE: There is also a need for mediation in the case of land and resource disputes. Need for information on resource/biodiversity laws in local languages. USAID has also been assisting with decentralization which could be a benefit to the sound management of local resources because those that are closest to the resource have the most to win by sound management or lose by degradation and loss of the resource base. Work on good governance, participatory process and transparency in decision-making provides the enabling environment for the conservation of biodiversity and forests. It can contribute to the protection of endangered species, biodiversity conservation, and the retention of forest cover, as these issues slowly gain greater attention.

Environment and health

Environment and health are closely linked with respect to foods and nutrition; clean water supplies and firewood and respiratory illnesses. As the health special objective is defined, some of these links might be appropriate for integration. For example, the production of education materials on these links might be an opportunity to improve both the health and environment of communities. The promotion of sustainable agriculture and reforestation with useful products such as fruits will improve the food security and nutrition of families. Clean water supplies will depend upon reforestation, the stabilization of slopes as well as the implementation of some form of water sanitation. Finding alternatives to the use of firewood for cooking, or making cooking with firewood more efficient could reduce the incidence of respiratory illness among families.

Cross-cutting Adaptation to Climate Change

Climate variability already impacts economic sectors in developing countries and adaptation to this variability will be critical to sustaining improvements in development. To begin with, a "risk-based approach" to planning is needed with the objective of ensuring the economic resilience while working to conserve the environment to the greatest extent possible in a changing climate. In considering adaptation, numerous interventions need to be taken into account focusing on health, water, food and income security. Adaptation of forest, marine and aquatic ecosystems as well as the wildlife they contain are paramount to maintaining current life on earth. Furthermore the most heavily populated areas are coastlines that will be directly impacted by sea-level rise.

Over goals in an adaptation strategy include: Counteracting water scarcity exacerbated by climate change; improving food security and food affordability; addressing hazard prone areas exacerbated by climate change (urban, rivers, coasts, hills & mountains); increasing the resilience of forests, wildlife and natural resources to climate change and increase adaptation benefits for human society; providing economic alternatives to those whose livelihoods will be affected by climate change; and assisting communities along coasts in adapting to climate change. Without these interventions there will be continued over-exploitation of the natural environment.

These interventions can be achieved by: incorporating climate change information into planning and implementation of programs in climate-sensitive sectors: agriculture, water, forests, urban, rivers and coasts; supporting applied agricultural research for crop adaptations to climate change; identifying economic alternatives to provide resilience to the poor harmed by climate change; protecting wildlife and endangered species to the extent possible to ensure genetic diversity and population numbers to adapt to climate change; and instituting biodiversity corridors and marine protected areas to provide resilience and adaptation to protected areas at fixed sites.

Cross-cutting actions: Capacity Building

Cross-cutting among all the recommendations is the need to build capacity among Timorese counterparts (including government and NGOs) in the design and implementation of conservation and sustainable production activities.

Environmental Awareness and Education

Coastal environmental education programs would serve to inform industry and local citizens of the impact of their actions on the coastal and marine environment. Such programs include the identification and execution of proper sewage treatment. Proper maintenance of sea-going vessels, waste disposal, and responsible fishing practices are also important focal points and could be a part of a comprehensive education program. Parallel to education, activities such as beach cleanups conducted by citizens would reveal trends in marine debris and solid waste as well as identify sources. Participation also promotes community awareness, increased morale and community involvement.

Cross-cutting: Capacity Building

USAID investments targeted towards biodiversity and forestry conservation of any type should consider integrating the building of government officials and civil society's capacity for safeguarding these resources.

Potential Negative Impacts to Forests and Biodiversity in New Strategy

Areas of concern would be small-scale infrastructure construction and the risk that improved yields could encourage the clearing of forests for expanding agriculture.

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