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MOZAMBIQUE BIODIVERSITY AND TROPICAL FORESTS ANALYSIS

April 2019

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MOZAMBIQUE BIODIVERSITY AND TROPICAL FORESTS ANALYSIS

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Cover photo: Mirazane, a neighborhood in Quelimane Municipality, Zambezia Province. This coastal community depends on fishing and subsistence agriculture for food, firewood for cooking, and local wood and palm thatch for house construction. It is situated only a few meters above sea level, partly protected by mangroves from high tides and storm surges associated with tropical cyclones. The USAID/Mozambique Coastal City Adaptation Project supported mangrove restoration here from 2013 to 2018.

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ABBREVIATIONS AND ACRONYMS

ANAC	National Administration of Conservation Areas
BRIDGE	Biodiversity Results and Integrated Development Gains Enhanced
CBD	Convention on Biological Diversity
CBNRM	Community-Based Natural Resources Management
CBO	Community-Based Organization
CDCS	Country Development and Cooperation Strategy
CITES	Convention on the International Trade in Endangered Species of Wild Flora and Fauna
DAI	Development Alternatives International
DEPTADER	Provincial Directorate of Lands, Environment and Rural Development/ <i>Direção Provincial de Terra, Ambiente e Desenvolvimento Rural</i>
DFID	Department for International Development
DINAS	National Directorate of Agriculture and Silviculture
DO	Development Objective
EEZ	Economic Exclusion Zone
EIA	Environmental Impact Assessment
FAA	Foreign Assistance Act
FAO	Food and Agriculture Organization of the United Nations
FNDS	National Fund for Sustainable Development
FTF	Feed the Future
GDP	Gross Domestic Product
GLTFCA	Great Limpopo Transfrontier Conservation Area
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome
IUU	Illegal, Unreported, and Unregulated Fishing
LNG	Liquefied Natural Gas
LPG	Liquefied Propane Gas
MASA	Ministry of Agriculture and Food Security
MICOA	Ministry for the Coordination of Environmental Affairs
MICTUR	Ministry of Culture and Tourism
MIMAIP	Ministry of Seas, Inland Waters, and Fisheries
MIREME	Ministry of Mineral Resources and Energy
MITADER	Ministry of Land, Environment, and Rural Development
MozDGM	Dedicated Grant Mechanism for Local Communities Project
MozFIP	Mozambique Forest Investment Project
MZN	Mozambican Metical (currency)
NDC	Nationally Determined Contribution
NGO	Non-Governmental Organization
PCBG	<i>Parceria Cívica Para Boa Governação</i> /Civic Partnership for Good Governance
SPEED+	Support Program for Economic and Enterprise Development
SOW	Scope of Work

UN	United Nations
UNDP	United Nations Development Program
USAID	United States Agency for International Development
USG	United States Government

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EXECUTIVE SUMMARY

Purpose of the Analysis

The main objectives of this Biodiversity and Tropical Forests Analysis are to assist USAID/Mozambique to comply with Sections 118 and 119 of the Foreign Assistance Act and to inform the development of the Mission's new Country Development Cooperation Strategy (CDCS). The analysis will:

- Review the current state of Mozambique's ecosystems and species;
- Summarize the legal and institutional context for the conservation and management of Mozambique's biodiversity;
- Describe the direct biophysical threats to the country's forests and biodiversity and identify their causes;
- Identify actions needed to reduce and/or mitigate the causes and underlying drivers of those threats in the current political, economic, and social context;
- Describe the extent to which USAID/Mozambique's current programs are contributing to actions needed;
- Identify opportunities to contribute to actions needed in the future; and
- Describe and recommend opportunities for USAID/Mozambique to increase the effectiveness, sustainability, and resilience of its sectoral development outcomes by taking advantage of the benefits of biodiversity to human social and economic development.

This analysis fulfills a legal requirement of the Foreign Assistance Act (FAA), which requires that a Tropical Forests and Biodiversity Analysis be conducted in conjunction with the development of new U.S. foreign assistance strategies and programs. It is also intended to identify opportunities to better integrate the Mission's portfolio across development sectors by suggesting linkages with democracy and governance, economic growth, agriculture, health, and education activities.

Methods

Information for this analysis was gathered by a six-person analysis team through review of relevant documents and web-based information, meetings and interviews with representatives of key stakeholder groups, and field site visits. We talked to many people, including staff from USAID/Mozambique; USAID/Washington, the U.S. Department of State, and U.S. Fish and Wildlife Service; relevant national government agencies in Mozambique; international and national non-governmental organizations (NGOs); international donors; private-sector representatives; and residents of natural resource-dependent communities. Our information also came from site visits to: 1) Quirimbas National Park; 2) Mecuburi Forest Reserve; 3) Nacala Bay; 4) Lake Niassa; 5) Bazaruto National Park; 5) Pomene Reserve; and 6) Maputo Special Reserve.

Notes from the team's interviews with key informants were analyzed to identify the categories of "actions necessary" for biodiversity and forest conservation perceived to be most important. All information the team gathered was synthesized to identify opportunities for USAID's sectoral programs both to contribute to, and benefit from, the actions needed to conserve Mozambique's rich natural heritage of forests and biodiversity.

Status of Biodiversity

The terrestrial, aquatic, and marine ecosystems of Mozambique, including its diverse tropical forest ecosystems, and the many thousands of species that comprise them, are a foundation for the country's economy and the livelihoods of its people. Biodiversity is the source of diverse benefits, providing the ecosystem products, services, and non-material benefits on which Mozambique's social and economic development depend. Conserving, sustainably using, and in some cases restoring Mozambique's ecological resources takes place in the context of the system of laws, policies, and institutions that have been put in place for that purpose. This report summarizes these issues and references sources of more detailed information about all of them.

Threats, Causes, and Drivers

In this analysis, we used the threats-based approach that guides USAID's biodiversity programming as the conceptual framework for our analysis. We first identified the direct, biophysical threats to Mozambique's ecosystems and species. The most important direct threat is the conversion, loss, degradation, and fragmentation of natural ecosystems. Overexploitation of high-value species is the second most serious threat, and introduction of invasive non-native species, pollution, and climate change round out the list. Climate change is a potential threat of unknown magnitude that may accentuate other direct threats, especially habitat loss and degradation and the threat from invasive species. In some ways, climate change falls into a gray area between cause and threat, being itself a cause of some of the other direct biophysical threats. Next, we identified the causes and/or "drivers" of the direct threats. Although many diverse activities act as causes, they generally fall into one of three categories: 1) political, institutional, or governance-related; 2) economic; or 3) social (related to, for example, cultural beliefs, lack of awareness, information, science, or technology). Demographic pressure from Mozambique's high population growth rate is a driver that underlies many of the political, economic, and social causes of threats to the country's biodiversity.

Actions Necessary

FAA Sections 118 and 119 call for an analysis to identify the "actions necessary" to conserve tropical forests and biological diversity, respectively. We reviewed documents prepared by the Government of Mozambique, including their *Fifth National Report* to the Convention on Biological Diversity (2014) and *National Biodiversity Strategy and Action Plan* (2015a) as sources of "actions needed." Our interviews with key informants and meetings with representatives of key stakeholder groups were another important source of actions needed. Content analysis of interview notes resulted in a list of more than 100 actions that were perceived as needed for biodiversity conservation by our key informants. Actions needed that were mentioned repeatedly clustered naturally in thematic categories, which are listed below in ranked order according to the number of times mentioned in interviews:

- 1) Promote conservation-friendly sustainable agriculture and livelihood practices;
- 2) Strengthen community rights and capacity to manage and benefit from biodiversity;
- 3) Strengthen coastal and marine management;
- 4) Stop illegal wildlife and timber trade;
- 5) Control environmental impact of extractive industries;
- 6) Strengthen enforcement of environmental laws;
- 7) Improve capacity and coordination of government agencies;
- 8) Strengthen natural resources governance;
- 9) Improve finance and management of protected areas;

- 10) Improve wood fuel and charcoal management, production, and use; and
- 11) Other (e.g., education, awareness; health; reforestation; donor coordination; climate change; ecosystem services; conservation finance; research and monitoring).

These “actions necessary” for biodiversity conservation are those that remove or reduce the causes and drivers of the direct, biophysical threats to Mozambique’s ecosystems and species. We present details about what would be needed to implement each of these actions-needed themes that came both from our key informants and our review of documents.

Extent to Which Current Programs Contribute to Actions Needed

FAA Sections 118 and 119 require that these analyses examine “the extent to which the actions proposed for support by the Agency meet the needs thus identified.” It should be noted that this language is *prospective*, but since USAID/Mozambique is in the very early stages of developing its next CDCS and no actions have yet been proposed, our analysis takes its current portfolio as the framework for identifying “extent to which” opportunities.

Opportunities for the Future

In the spirit of USAID’s 2014 Biodiversity Policy, which describes biodiversity as an essential foundation for human development and calls for it to be integrated as a cross-cutting issue in all development sectors, this analysis has identified two kinds of opportunities for USAID/Mozambique to consider as it develops its next CDCS. One kind of opportunity is to incorporate and integrate support for biodiversity and tropical forest conservation in the activities of the Mission’s development sectors. In this view, carefully designed activities in any sector can support biodiversity conservation objectives, creating a “win-win” situation. A second kind of opportunity is to take advantage of the benefits of biodiversity to human social and economic development in order to increase the effectiveness of the Mission’s development objectives in all sectors and also make them more sustainable and resilient. In this view, the “actions needed” for biodiversity conservation are used as tools, or “means,” for achieving democratic governance, economic growth, education, and health objectives.

The analysis team learned about USAID/Mozambique’s development portfolio from interviews with Mission staff and a review of documents describing its programs and activities. We used a matrix to illustrate the potential interaction, overlap, and synergy of “actions necessary” for biodiversity conservation and the sectoral development objectives of USAID/Mozambique. This led to a rich menu of opportunities for the Mission’s sectoral development activities to contribute to actions needed for biodiversity conservation and for actions needed for biodiversity conservation to contribute to and enhance sustainable, resilient development outcomes. The opportunities are especially diverse in the democracy and governance sector, where biodiversity conservation and natural resources management issues can act as entry points and leverage to achieve more robust and sustainable democratic governance objectives including the reduction of corruption and illegality, the participation and empowerment of communities and civil society, and the capacity and accountability of Mozambican government institutions. The economic growth and agriculture sector could provide important support for developing the kind of smallholder agricultural system that would finally stop the expansion of shifting cultivation and stabilize the agricultural frontier, perhaps the top priority of all for the long-term conservation of Mozambique’s biodiversity. Linkages between health outcomes and biodiversity conservation are extensive, including the relationship of clean water and natural forests and mangroves, the contribution of fish and wild foods to nutrition, and the importance of reproductive health services and family planning, and these provide entry points for integrating the Mission’s health sector programs

with biodiversity conservation. Because the Mission’s current education sector programs are so narrowly targeted at early-grade reading outcomes, there is almost no room for integration with biodiversity conservation. However, the analysis team believes that there are ample opportunities for a more broadly construed education program both to benefit from the cross-cutting integration with conservation and natural resources knowledge, and also to contribute to many of the actions needed for biodiversity conservation.

Recommendations

Potential synergies between some of the actions-needed themes identified in this analysis and USAID/Mozambique’s sectoral development objectives lead to a handful of general recommendations:

- 1) Integrate biodiversity conservation into mission development objectives;
- 2) Support conservation-friendly sustainable agriculture and livelihood practices;
- 3) Support and empower coastal communities to manage and benefit from biodiversity;
- 4) Support anti-corruption efforts and law enforcement to reduce illegal international trade in wildlife and timber; and
- 5) Build capacity to minimize biodiversity impacts of oil and gas development and other extractive industries.

The FAA 118-119 analysis team recommends that USAID/Mozambique works to integrate biodiversity conservation into its development portfolio, as called for in the *USAID Biodiversity Policy*, both as a way to increase the effectiveness and sustainability of its sectoral development objectives, and to allow those sectoral programs to contribute to the actions necessary to conserve tropical forests and biodiversity in Mozambique.

No action is more necessary for conserving Mozambique’s biodiversity in the long-term than stabilizing the agricultural frontier, but changing the traditional smallholder farming system of the country is a complex social, economic, and political challenge. A strategically designed program in support of “conservation agriculture” would require the input and engagement of all of USAID/Mozambique’s development sectors, not only the economic growth and agriculture programs.

Mozambique’s long coastline and huge marine territory (42 percent of the national territory is marine), vital to the health and economic development of the country, has not received the attention and investment that is needed. Serious efforts are needed to conserve and benefit from the country’s coastal and marine ecosystems and species. A constellation of actions focused on empowering coastal communities and improving marine spatial planning, policy, management, and law enforcement calls for attention to these issues, and the analysis team recommends that USAID/Mozambique consider the opportunity to develop an integrated, strategic program of support for coastal communities. USAID/Mozambique’s democracy and governance, economic growth and agriculture, and health sectors would all have important contributions to make to, and benefits to realize from, such an integrated program.

The analysis team also recommends that the Mission continue supporting the anti-corruption and law enforcement efforts it has been making to control the illegal international trade in high-value wildlife products and timber, and to expand the efforts to illegal, unreported, and unregulated (IUU) fishing. A long-term solution will require a reduction in the demand for threatened wildlife, timber, and marine products (e.g., shark fins, marine turtle shells) in countries like China.

Finally, we recommend that USAID/Mozambique support the capacity building that will be needed to manage the potential impacts of offshore oil and gas development on coastal and marine ecosystems and species. Much of this capacity should be transferable to other extractive industries, such as coal or mineral sands mining. Among other things, improved capacity is needed within the Ministry of Land, Environment, and Rural Development (MITADER) for Environmental Impact Assessment (EIA) oversight and the enforcement of environmental laws, as is better coordination between MITADER, the Ministry of Seas, Inland Waters, and Fisheries (MIMIAP), and the Ministry of Mineral Resources and Energy (MIRENE) for large-scale spatial planning. Supporting the development of biodiversity surveys and information to steer development away from the most biologically sensitive and important areas, and promoting the use biodiversity offsets to mitigate unavoidable adverse impacts of infrastructure siting (both onshore and offshore), would also be an important contribution.

I. INTRODUCTION

I.1 Purpose

In amendments made to the Foreign Assistance Act of 1961 in 1986 (Sections 118 and 119), the U.S. Congress imposed mandatory “Country Analysis Requirements” related to the conservation and sustainable use of tropical forests and biological diversity on the U.S. Agency for International Development (USAID, 2017a; USAID, 2017b). The amendments state:

FAA Sec 118 (e) 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.

FAA Sec 119 (d) 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.

USAID/Mozambique is therefore required to prepare an analysis of tropical forests and biodiversity in Mozambique (USAID, 2017b) as a mandatory input in the development of its next Country Development Cooperation Strategy (CDCS), which is expected to cover the period 2020-2025. The process of developing the Mission’s next CDCS is in the very early stages; internal Mission working groups have been formed to begin exploring possible priorities and strategic questions, in preparation for CDCS development. USAID guidance (*Foreign Assistance Act Sections 118 and 119 Tropical Forests and Biodiversity Analysis: A Mandatory Reference for ADS Chapter 201*) states that USAID missions “should initiate the analysis before launching Phase I, the Initial Consultations and Parameters Setting, or early in Phase I of the CDCS process.” This timing provides the FAA 118-119 analysis team with an opportunity to identify and recommend ways of enhancing development through future biodiversity conservation actions. However, it also requires that the analysis team work mainly within the framework of the four development objectives (DOs) in the CDCS. USAID/Mozambique has confirmed to the team that the Mission is still in the very nascent stages of CDCS planning and could not provide any information about future planned activities that are substantially different from their current portfolio.

It should be noted that the analyses require a general assessment of “actions needed” now, and in the future, and a *prospective* assessment of “extent to which the actions proposed” for future support by USAID meet the identified needs. It should also be noted that FAA 118 and 119 do not require missions to support any actions identified as needed for biodiversity conservation by the analysis. However, by requiring these analyses, Congress clearly acknowledged and recognized the fundamental role that biodiversity plays in sustainable development. These analyses provide an opportunity for USAID

missions to better understand the linkages between a country's development and the conservation of its biodiversity in order to structure effective and sustainable programs.

The analysis presented here aims to provide USAID/Mozambique with a menu of opportunities for integrating biodiversity conservation considerations into its new CDCS and development portfolio. It will enable the Mission to:

- 1) Comply with the law;
- 2) Identify and avoid possible development actions that would cause threats to ecosystems and biodiversity;
- 3) Identify opportunities for increasing the effectiveness of the Mission's development objectives in all sectors (such as health, agriculture, democracy and governance, and economic growth), and making them more sustainable and resilient, by taking advantage of the benefits of biodiversity to human social and economic development;
- 4) Identify opportunities to incorporate and integrate support for biodiversity and tropical forest conservation in activities of its development sectors (e.g., democracy and governance, economic development, agriculture, health); and
- 5) Identify opportunities for using funds earmarked by Congress for biodiversity conservation.

1.2 Country Development Context

Mozambique has a population of approximately 30 million people, two-thirds of whom live in rural areas and one-third in cities and towns (FAO, 2018). It is one of the world's least-developed countries, with a Human Development Index ranking of 180 of the world's 189 countries, almost at the bottom of the list (UNDP, 2018). Gross national income per person is estimated to be \$1,100 (UNDP, 2018). With a population growth rate estimated at 2.9 percent per year (Population Reference Bureau, 2018), Mozambique's population doubling time is around 24 years, creating a major challenge to any sustainable development.

The majority of Mozambicans are heavily dependent on natural resources for their livelihoods. Eighty percent of the population is employed in farming, mostly small-scale, subsistence agriculture. With a land surface area of 786,000 km², its average population density is approximately 38 persons per km². The Food and Agriculture Organization (FAO) estimates that nutritional security has been falling for a decade, and that approximately 8.8 million Mozambicans, nearly one-third of the population, were undernourished in the period 2015-2017 (FAO, 2018).

Mozambique has had a turbulent history. In 1975, the country gained an abrupt transition to independence from Portugal after 500 years of colonization and a long war, followed soon after by a civil war from 1976 to 1992. These experiences, particularly the civil war, have had repercussions for natural resource management, biodiversity, and forests in Mozambique (Hatton, et al., 2001; Diallo, 2015). For example, more than 50 percent of the population was displaced during the civil war; communities lack trust in the government and have little social cohesion (Hatton, et al., 2001; USAID, 2011). The high levels of corruption contribute to this distrust (EIA, 2013). More recent changes after elections in 2014 include a restructuring of the government administration, with implications regarding which authorities have jurisdiction over land, forests, and water. Many of those responsibilities were consolidated in the new Ministry of Land, Environment, and Rural Development (MITADER), which was amalgamated from the transfer of authority over land and forests from the Ministry of Agriculture, environment from the now-defunct Ministry for the Coordination of Environmental Affairs (MICOA), rural development from the old Ministry of Planning and Development, and conservation areas from the Ministry of Tourism.

Although Mozambique has experienced relatively high economic growth, increased life expectancy, doubled agricultural production, and increased primary school enrollment, this has not translated into inclusive growth and development for all Mozambicans. According to the World Bank's 2018 *Mozambique Economic Update* (World Bank, 2018a), "While poverty has been reduced ... there is more inequality as economic progress increasingly becomes less inclusive." The report noted that although poverty had been significantly reduced between 2008 and 2014, the "gains were accompanied by a widening gap between the better-off and the poor ... hindering Mozambique's progress in achieving shared prosperity and making it now among the most unequal countries in sub-Saharan Africa."

USAID's "Mozambique Journey to Self-Reliance: FY 2019 Country Roadmap" rates the country as having a relatively strong commitment to self-reliant development, but relatively weak capacity. For the purposes of this analysis, it should be noted that one of the categories under the heading of "Commitment: Economic Policy" on the Country Roadmap is "Biodiversity and Habitat Protections," for which it was given a score of 90 percent compared to the most advanced countries globally. This is the highest score given in any of the categories on the Mozambique Country Roadmap, and it is based on the extent of the country's protected area system. Although it is true that Mozambique has, on paper, a very large fraction of its terrestrial area designated as national parks, national reserves, and other forms of conservation management, the capacity to conserve those areas is very weak, and the high score for biodiversity and habitat protections given in the Roadmap is therefore quite misleading, a topic that will be discussed in detail in other sections of this report.

1.3 Summary of USAID/Mozambique Programs

Given Mozambique's development context, USAID's CDCS is based on the following theory of change, or development hypothesis: *If a healthy and politically active citizenry has been educated and trained to succeed in a private sector and government that diligently pushes for competitive free-market practices and responsible natural resource management, then Mozambique will achieve sustainable, inclusive socio-economic development* (USAID/Mozambique, 2014).

USAID is focused on helping Mozambique achieve self-reliance by strengthening the rule of law and governance, promoting sustainable economic development, and improving health and education outcomes. The United States provides development assistance in the areas of HIV/AIDS, malaria, tuberculosis, maternal and child health, family planning, nutrition, agriculture and food security, water and sanitation, disaster assistance, democracy and governance, education, trade and private sector growth, and the environment. The current CDCS covering the period 2014-2019 (USAID/Mozambique, 2014) lists the following four Development Objectives (DOs): 1) Democratic Governance of Mozambican Institutions Strengthened, 2) Resilient, Broad-Based Economic Growth Accelerated, 3) Education Quality Improved, and 4) Health Status of Targeted Population Groups Improved. Improved management of natural resources is listed in the current CDCS results framework as an intermediate result under DO 2.

1.4 Methodology

This analysis was conducted with reference to information and recommendations provided in "Foreign Assistance Act Sections 118/119 Tropical Forest and Biodiversity Analysis: Best Practices Guide" (USAID, 2017a). USAID/Mozambique commissioned the Biodiversity Results and Integrated Development Gains Enhanced (BRIDGE) Project to conduct this analysis as one of four to be used in updating that guide. The methodology for this analysis fulfills the requirements of the Scope of Work

(Annex F). It was conducted by a team of biodiversity experts (see Annex A: Biographical Sketches of the Analysis Team) and involved the following steps:

- 1) Review background reports and other documents, including those recommended by USAID/Mozambique in the SOW;
- 2) Meet with and interview selected USAID/Washington and other relevant USG key informants in Washington, DC, prior to team leader's departure to Mozambique;
- 3) Meet with sectoral teams at USAID/Mozambique to gain a better understanding of current and prospective programs and projects;
- 4) Conduct field site visits to six sites to meet with administrators, managers, and other key stakeholder representatives: Quirimbas National Park (Cabo Delgado Province); Metangula and Cobue on Lake Niassa (Niassa Province); Nacala Bay and Mecuburi Forest Reserve (Nampula Province); and Bazaruto National Park and the Pomene Reserve (Inhambane Province);
- 5) Conduct interviews of key informants in Maputo and during site visits, using an interview guide to ensure coverage of key questions related to the FAA 118/119 analysis;
- 6) Prepare a draft report for review by USAID/Mozambique; and
- 7) Address comments and finalize the FAA 118/119 report.

The BRIDGE Project contracted a consultant who was not a member of the original analysis team as a senior technical advisor to complete Steps 6 and 7. The senior technical advisor reviewed the interview notes taken by the original analysis team and used content analysis to develop a list of "actions needed" recommended by key informants from those notes, and conducted a few additional interviews. He revised and expanded a draft report submitted by the original analysis team, which was submitted to USAID/Mozambique for review. He then responded to and addressed comments from the Mission, and finalized the FAA 118/119 analysis report.

2. STATUS OF BIODIVERSITY

The modern concept of biological diversity, or “biodiversity” for short, encompasses the variety and variability of life at three levels of organization: ecosystems, species, and genes. Since Mozambique lies within tropical latitudes, all of its forest ecosystems are tropical forests, and forests are treated in this report as a component of the ecosystem-level biodiversity of the country. In other words, because all of Mozambique’s tropical forest ecosystems are part of the country’s biodiversity, FAA Section 119 covering biodiversity basically includes and subsumes the narrower Section 118, which deals with tropical forest ecosystems.

This chapter provides an overview of Mozambique’s biodiversity at the ecosystem and species levels. More extensive information on Mozambique’s biodiversity can readily be found elsewhere, such as in the *Fifth National Report* to the Convention on Biological Diversity (CBD) (MICOA, 2014), the *National Strategy and Action Plan of Biological Diversity of Mozambique (2015-2035)* (MITADER, 2015), and for marine biodiversity, the *Mozambique Marine Ecosystems Review* (Pereira, et al., 2014). This chapter is meant only to provide context for understanding threats to biodiversity and forests in Mozambique and the actions needed to address the causes of those threats, topics that are discussed detail in later chapters of this report.

2.1 Biophysical Setting

Mozambique is located in southeastern Africa between South Africa and Tanzania, bordering the Mozambique Channel. Most of the country is tropical, lying north of the Tropic of Capricorn. It has a total land area of about 786,000 km², and about 13,000 km² of freshwater lake territory (mainly Lake Niassa), making it nearly twice the size of California. The Zambezi River is the largest of its rivers, cutting across central Mozambique. With an Indian Ocean coastline of around 2,750 km, and a marine Exclusive Economic Zone of 572,000 km², Mozambique’s territory is approximately 58 percent land and 42 percent ocean.

There are two distinct seasons: a warm, wet season from November to March, and a cooler, dry season from April to October. Rainfall varies from 1,400 millimeters a year near the Zambezi Delta to about 300 millimeters a year in the lowlands of the southern interior.

In the south and in a belt along the coast, the country has low-lying plains under 200 m covering about 42 percent of the land. In the north and west, there are plateau areas with average elevations between 200 and 500 meters covering about 29 percent of the country and highland areas ranging from 500 to 1,000 meters covering about 25 percent of the land surface. Mountain areas, with elevations above 1,000 meters, occupy about 4 percent of Mozambique, and are located mainly along the western border with Malawi and Zimbabwe.

About 25 main rivers flow through the country to the Indian Ocean; nine of these are transnational, originating in other countries. The Zambezi River is the largest of these, cutting across central Mozambique. Lake Niassa, one of Africa’s large Rift Valley lakes, is shared with Malawi and Tanzania.

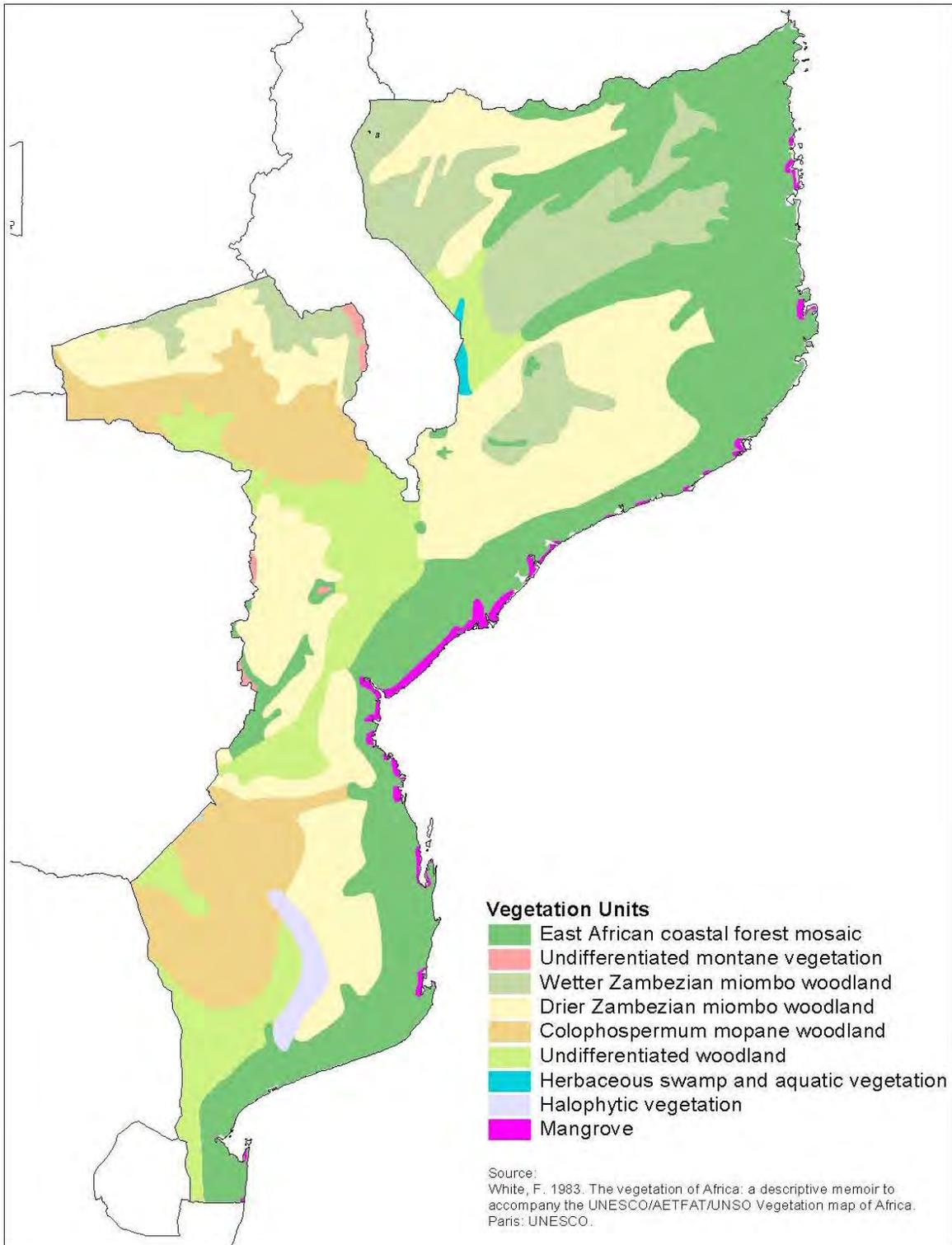
Soils in Mozambique are generally old and nutrient-poor, with low to medium fertility, except for fertile soils of river floodplains, which make up only about 6 percent of the soils of the country.

2.2 Ecosystems

Terrestrial Ecosystems

The topography, climate, and soils of Mozambique create the conditions for a range of terrestrial ecosystems, shown in Figure 1. Tropical forests and woodlands cover 34 million hectares, or approximately 43 percent, of the country's land area (World Bank, 2018b). Savanna woodlands called "miombo" make up about two-thirds of Mozambique's forests. Miombo woodlands are dominated by species of broad-leaved, leguminous trees, mainly in the genera *Brachystegia* and *Julbernardia*, which shed their leaves in the dry season. Mopane woodlands, which are dominated by another leguminous tree, *Colophospermum mopane*, are found at lower elevations in the west. Miombo and mopane woodlands make up the Zambezian region of Africa, which is distinct in terms of mammals, birds, amphibians, reptiles, and plants, with high levels of diversity and endemism (Ryan, et al., 2016). Coastal forest ecosystems are found in eastern Mozambique, and Afromontane moist forests occur in mountainous areas at elevations above around 1,000 meters. The central coast of Mozambique has the second-largest area of mangroves in Africa, centered on the Zambezi Delta.

Figure 1. Potential Natural Vegetation of Mozambique (White, 1983)



Freshwater and Wetland Ecosystems

Mozambique has freshwater and wetland ecosystems of recognized national, regional, and international importance, of which Lake Niassa and the Zambezi Delta are outstanding examples. The main types of freshwater ecosystems are rivers and their riparian zones and natural lakes. River deltas, such as the Zambezi Delta, are estuarine wetlands often dominated by mangroves, which can form wooded swamp forests. Mangroves are discussed below under marine ecosystems.

Lake Niassa, located between Mozambique, Malawi, and Tanzania, is the southernmost of the large Rift Valley lakes, with an area of 30,000 km², about 13,000 km² of which is the territory of Mozambique. Similar to other large lakes in the Rift Valley system, its fish fauna represent a striking evolutionary radiation in the fish family *Cichlidae* that has created high levels of endemism.

Marine Ecosystems

Coral reefs, seagrass meadows, sandy and rocky shores, and estuaries are found along Mozambique's 2,750 kilometer coastline. These are thoroughly described in the *Mozambique Marine Ecosystems Review* (Pereira, et al., 2014).

Coral reefs cover an area of about 1,860 km². These are mainly fringing reefs, and are found almost continuously in northern Mozambique as far south as the Primeiras and Segundas islands, and more sporadically farther south (Pereira, et al., 2014; Obura, et al., 2017).

Mangroves cover about 305,400 hectares (Rajkaran, et al. 2016), with major mangrove areas located along the so-called swamp coast in central Mozambique, centered on the Zambezi River Delta. Maputo Bay is the largest mangrove area in southern Mozambique; in the north, there are sizable mangrove areas in Pemba Bay and Quirimbas National Park, and around Angoche (Barbosa, et al., 2001; Ferreira, et al. 2009; Macamo, et al., 2018).

2.3 Species

As for its ecosystems, Mozambique's species-level biological diversity is described in detail in several recent sources, including the *Fifth National Report* to the Convention on Biological Diversity (CBD) (MICOA, 2014), the *National Strategy and Action Plan of Biological Diversity of Mozambique (2015-2035)* (MITADER, 2015), and for marine biodiversity, the *Mozambique Marine Ecosystems Review* (Pereira, et al., 2014). Mozambique's ecosystems include more than 6,000 plants and more than 4,370 animal species. There are 217 mammal species, 675 bird species (BirdLife International, 2018), 224 reptiles (Reptile Database, 2018), 90 amphibian species (AmphibiaWeb, 2018), and more than 3,075 known insect species (MICHOA, 2014).

Mozambique's mountainous areas are known to have high levels of endemic species (those with narrow and/or restricted ranges). The Chimanimani Mountains for example have an estimated 100 endemic plant species (MITADER, 2015a, van Wyk and Smith, 2001).

Mozambique's coastal and marine ecosystems host an estimated 2,718 fish species, 1,363 species of mollusks and crustaceans, 194 hard corals, 18 marine mammals (8 species of whales, 7 dolphins, 2 seals, and the dugong), 13 seagrasses, 9 species of mangroves, and 5 species of marine turtles (MICOA, 2014).

3. VALUES AND BENEFITS OF BIODIVERSITY

Biodiversity conservation is of fundamental importance to USAID, given its mission as a development agency. Biological diversity provides social and economic benefits of three distinct kinds: ecosystem products, ecosystem services, and non-material benefits. The examples given below for these different types of benefits were selected because they are important in Mozambique, but are meant to be illustrative and not an exhaustive list of all possible examples.

3.1 Ecosystem Products

Ecosystem products are direct material benefits for such things as food, fiber, building materials, medicines, fuel, and ornamental plants and pets. These products are extremely important to the functioning of the Mozambican economy and the well-being of the human population. Values and uses of some of the many products are discussed below.

Firewood and Charcoal

According to Mozambique's National Biomass Strategy (Ministry of Energy and EUEI-PDF, 2012), wood and charcoal are critical for household energy needs, with biomass accounting for 80 percent of total energy consumption in the country. Fuelwood is used in rural areas, while charcoal is utilized in peri-urban areas, supplying energy for 76 percent of households in Maputo, for example. Charcoal is an important source of income derived from forests; the charcoal industry is estimated to employ 136,000 to 214,000 people in rural areas (World Bank, 2018b).

Mozambique's Ministry of Energy has developed a national biomass energy strategy, which aims to transform the wood fuel and charcoal economy so that it is modern, ecologically sustainable, and economically competitive with other sources of energy for end-uses such as cooking.

Timber

According to the 2018 *Mozambique Country Forestry Note* (The World Bank, 2018b), "Forests are an important contributor to the country's economy and a source of employment, income, and livelihoods in Mozambique's rural areas. The sector contributed about US\$330 million to GDP in 2011 and directly employed 22,000 people (FAOSTAT, 2011). Forests provide goods and services to local communities, including food, energy, medicine, construction materials, and furniture. In some rural communities, miombo woodlands contribute almost 20 percent of household cash income and 40 percent of subsistence (non-cash) income."

Bushmeat

Wildlife is a source of food security and nutrition for many Mozambicans and also provides income. In some places, such as in Gile Game Reserve and Coutada 9 in Manica Province, bushmeat provides more dietary protein than domestic animals (Fusari and Carpaneto, 2006; Lindsey and Bento, 2012). In Gile, "hunting is part of an integrated system of subsistence activities," but it is illegal and not likely to be sustainable without adequate control and management of harvesting levels. While no systematic studies have been done on the subject, there is considerable anecdotal evidence that hunting for bushmeat is both a subsistence and an income-generating activity. Bushmeat can be found for sale in major urban centers such as Beira, Pemba, Nampula, Lichinga, and even Maputo. It is likely that this meat is sourced in and around the protected areas, but no definitive proof of this exists.

Trophy Hunting

An economically significant use of wild animals in Mozambique is trophy hunting, sometimes called “sport hunting,” “safari hunting,” or “hunting tourism.” This “use” of wild species is placed in the category of ecosystem products here because the animal is killed. However, this type of hunting is generally done by international clients who pay high fees to hunting operators, and the value of the activity is often viewed as a non-material benefit of biodiversity – something like nature-based recreation or tourism. A significant fraction of the revenues collected by the conservation area system in Mozambique come from hunting tourism; the *Fifth National Report to the CBD* (MICOA, 2014) estimated that hunting taxes provided 45 percent of the system’s income, more than entry fees to parks and preserves, at 41 percent.

Fisheries

Mozambique has extraordinary potential in fish production, given its coastal location, 25 major rivers with permanent water flows, Lake Niassa, and various other inland waters and floodplains. Artisanal fishing accounts for nearly 90 percent of national production, with 60 percent occurring in maritime waters, beaches, and the open sea and 40 percent occurring in inland waters, primarily Tete and Niassa (Pereira et al., 2014). Artisanal fishing also provides 50 percent of the protein consumed by Mozambicans (Pereira et al., 2014); 20 percent of the population depends on fisheries for income (World Bank Group, 2016).

Industrial and semi-industrial fisheries exploit valuable species, such as prawn and shallow and deep-water shrimp, as well as open sea (pelagic) species such as tuna and sharks. Sharks are killed illegally for the high value of their fins in Asian markets (Pereira et al., 2014).

3.2 Ecosystem Services

Ecosystem services are best defined as the benefits to humans that result from ecosystem functions and processes, such as:

- Major biogeochemical and nutrient cycles (e.g., of water, carbon, nitrogen, phosphorus);
- Natural pest control by predators in food webs;
- Pollination by insects, bats, and birds;
- Decomposition of biomass, wastes, and pollution;
- Soil formation, retention, erosion prevention, and maintenance of soil fertility;
- Coastal protection, and
- Climate regulation.

The diverse species in a given environment interact with each other and the physical environment to create the ecosystem functions and processes listed above. Because biodiversity is the source of ecosystem services, biodiversity conservation is a fundamental requirement for conserving these services. The role of species diversity in maintaining ecological processes and functions is not well understood scientifically, and is an active topic of research. However, studies often show a positive relationship between the number of species in an ecosystem and the level and stability of ecological processes.

Watershed and Hydrological Services

The natural ecosystems of Mozambique’s mountains protect many of the watersheds of the country (although most of Mozambique’s large rivers are trans-national, with headwaters in neighboring countries). This is especially true of the Afromontane moist forests found at elevations above 1,000

meters on Mounts Namuli, Mabu, and others, and the Chimanimani, Gorongosa, and Nyanga Mountains. A number of studies have shown that water quantity and quality can depend on forest cover that protects upstream watersheds (Herrera, et. al., 2017; Johnson, et al., 2013).

In coastal zones, intact mangroves provide an important hydrological ecosystem service by blocking saltwater intrusion into coastal aquifers, upon which coastal communities often depend for drinking, cooking, and washing. This valuable ecosystem service requires protection and restoration of mangroves, according to the evaluation of the mangrove restoration component of the USAID CCAP Project (USAID, 2017c).

Carbon Sequestration

Forests remove carbon from the atmosphere and store it in their biomass. This has obvious economic value if it mitigates costs predicted to result from CO₂-induced global climate change, so programs to protect, maintain, and enhance this ecosystem service are being developed worldwide. Mozambique developed a national strategy for the reduction of emissions from deforestation and degradation (REDD+) covering the period 2016-2030 (MITADER, 2016). An occasional paper commissioned by the Center for International Forestry Research (CIFOR) assesses “The context of REDD+ in Mozambique: Drivers, agents and institutions” (Siteo, et al., 2012). The World Bank *Mozambique Country Forestry Note* stated that “Based on the recent National Forest Inventory (NFI, 2018), the country’s above- and below-ground carbon stock totals more than 5.2 billion tons of CO₂. This carbon store is central to the country’s climate change mitigation commitments” (World Bank, 2018b). The National Fund for Sustainable Development (FNDS) is providing financial support to REDD+ activities in Nampula and Zambezia provinces.

Mangrove Coastal Protection

Mangroves build up coastlines because their extensive root systems slow water flow and trap sediment. They buffer coasts from winds, waves, tides, and storm surges caused by cyclones. Unregulated mangrove cutting is prevalent throughout the range of mangroves in Mozambique and has led to coastal erosion and sea level rise that has caused socio-economic losses in many areas. An example from Angoche, Nampula Province, was described in the last FAA 118-119 Analysis report for Mozambique (USAID, 2013a); the report recommended that mangrove conservation and restoration be included as a component of the Coastal City Adaptation Project (CCAP), which was then being developed. The Mission accepted that recommendation, and CCAP included a mangrove restoration component in its work in Quelimane, Zambezia Province. A midterm evaluation of CCAP (USAID, 2017c) identified some problems with the restoration practices being used and recommended changes, which were then made (USAID, 2018e).

The description of the Zambezi Delta Ramsar Site states that: “In addition to the rich biodiversity values, the Site provides a wealth of ecosystem services which are vital to food security and socio-economic development in Mozambique. It also provides hydrological functions including coastal protection, flood control and carbon sequestration” (Ramsar Sites Information Service. 2019).

3.3 Non-Material Benefits of Ecosystems

Besides providing direct material benefits to humans in the form of ecosystem products, and indirect material benefits in terms of ecosystem services, natural ecosystems and species also provide a range of non-material benefits that are important to human well-being and development. These include historical, cultural, spiritual, recreational, educational, and scientific benefits.

Tourism

Mozambique's scenery and natural beauty make it a potentially highly desirable tourist destination. The main attractions include beaches and islands along the country's long coastline and conservation areas both on the coast and in the interior. According to the *Fifth National Report to the CBD* (MICOA, 2014), tourism is the third-largest investment sector in Mozambique, is estimated to have contributed 32.7 billion MZN (US\$530 million) to the national GDP in 2013, and has been responsible for 6.4 percent of total employment (718,000 jobs). Only a small fraction of Mozambique's tourism centers on conservation areas. Revenue generation of the conservation area network is estimated to be approximately 10 percent of the tourism sector's total contribution to the economy, approximately US\$24.4 million in 2013 (Rylance, 2017). Of this amount, the total revenue that accrued to either the Government of Mozambique or conservation area management was US\$3.33 million in 2013, and only about US\$607,000 of this was distributed to communities surrounding conservation areas. In 2017, the World Bank estimated that the tourism sector generated US\$1.6 million of direct revenues for the national conservation area network.

Because trophy hunting is considered part of what is called nature-based tourism in Mozambique, it is not easy to understand the relative economic contributions of traditional, non-consumptive nature-based tourism versus sport hunting. As discussed in Section 3.1, trophy hunting is a direct material use of wild species that makes a significant contribution to the revenues collected by the conservation area system.

Scientific and Educational Values

Scientific knowledge is a societal benefit from research on species and ecosystems. Once obtained, scientific knowledge can have educational and entertainment value. One recent example from Mozambique, the 2017 research expedition to Mount Mabu, serves to illustrate this (Barbee, 2017; Wright and Kehrt, 2018). The E.O. Wilson Biodiversity Laboratory, a project of the E.O. Wilson Foundation that has received funding from the Carr Foundation and USAID, is another example that illustrates the value of biodiversity.

Spiritual Values

In some cases, traditional spiritual values are a powerful motivation for conservation, such as in the case of sacred forests in Mozambique. Many of these sacred forests, such as the Potone Forest near Angoche (Nampula Province) and Licuati Forest in Maputo Province, are sources of wild plants gathered by traditional healers for use in traditional medicine (USAID, 2013a).

4. LAWS, POLICIES, AND INSTITUTIONS

This section provides a summary of the legal and institutional context for biodiversity (including forest ecosystems) conservation in Mozambique, setting the stage for a discussion of threats, causes, and “actions needed,” which will be discussed in later chapters of the analysis report.

4.1 Laws and Policies

The Constitution of the Republic of Mozambique, approved by the Parliament in 2004, states that all citizens have both the right to a healthy environment and the obligation to protect it from degradation. The Constitution also states that all natural resources, renewable and non-renewable, terrestrial and marine, belong to the state. It calls for the establishment of areas for the conservation of nature, and for policies to protect the environment and encourage sustainable use of natural resources.

Mozambique is a party to the Convention on Biological Diversity (CBD), and its *Fifth National Report* (MICOA, 2014) describing its efforts to implement the convention emphasizes the importance of biodiversity in the country’s development, saying: “Biodiversity has a paramount role in the national economy; it contributes to poverty alleviation as well as for the general economic development. This report highlights some revealing features of this vital role, among which, the fact that more than 80 percent of the population uses medicinal plants and various non-timber products for their survival.”

Likewise, the *National Strategy and Action Plan of Biological Diversity of Mozambique (2015-2035)* (MITADER, 2015a) states that: “Biodiversity is a vital pillar for the development of Mozambique and for the support of the majority of the Mozambican population. It is therefore important that development [is] sustainable [and] the intrinsic value of biodiversity is recognized, valued, and preserved through the generations.” Chapter II of that document provides an extensive review of both the national and international legal and institutional framework for biodiversity conservation and should be consulted for further details beyond the brief summary provided below.

Table I summarizes the important provisions of the most relevant laws dealing with Mozambique’s biodiversity.

Table I. Laws and Regulations Governing Biodiversity

Law/Regulation	Key Provisions
Environment Law No. 20/97 of 1 October 1997	Calls for the need of wise use and protection of the environment; provides for the establishment of protected areas; prohibits activities that threaten biodiversity; opens space for community participation in environmental protection; requires environmental licensing for development projects, including Environmental Impact Assessments (EIAs), developed with public participation, and Environmental Management Plans (EMPs).
Regulation for the Prevention of Pollution and Protection of the Marine and Coastal Environment; Decree No. 45/2006 of 30 November 2006	Prohibits pollution by chemicals or solid waste; prohibits dumps and landfills of construction materials and toxic or hazardous products along the coast and in fragile ecosystems, including mangroves; prohibits activities that change hydrological regimes. Gives local communities the right to use native flora (such as mangroves), subject to regulation.

Law/Regulation	Key Provisions
The Tourism Law - Law No. 4/2004, of 17 October 2004	Establishes the legal framework for tourism development and requires compliance with environmental protection laws and regulations; states that tourism should contribute to the conservation of ecosystems, habitats, and species, and can take place within conservation areas only in strict compliance with their management plans.
Land Law No. 19/97 of 1 October 1997	Considers wetlands, mangroves, and salt marshes a partial protection zone measured from the line of maximum tidal highs up to 100 meters inland; establishes the participation of communities in the management of natural resources.
Forestry and Wildlife Law No. 10/99 of 7 July 1999 and Regulation of the Forest and Wildlife Law, Decree No. 12/2002 of 6 June 2002	Ensures the customary use of resources by communities and promotes the recovery of degraded areas through forest plantations; calls for establishing protected areas to conserve biodiversity, which should be managed with the involvement of local communities. Local communities should also be part of management councils responsible for the management of forests and wildlife resources outside protected areas. The regulations include details with regard to licensing procedures, forestry exploitation, game farms, fines, etc. The regulations list protected wildlife species, and classify tree species, including mangroves, according to uses of their wood.
General Regulation on Maritime Fisheries, Decree No. 43/2003 of 10 December 2003	Limits the sizes of fishing net meshes (e.g., prohibits fishing with mosquito nets); establishes minimum sizes of harvested animals; prohibits trawling and some seine fishing in bays and estuaries.
General Regulation of Aquaculture, Decree 35/2001 of 13 November 2001	Prohibits the transformation of wetlands such as mangroves into aquaculture facilities.
Regulation on the Environmental Impact Assessment Process, Decree No. 54/2015 of 31 December 2015	Regulation applied to all public or private activities that may directly or indirectly affect environmental components.
Law on Protection, Conservation, and Sustainable Use of Biological Diversity, Law No. 5/2017 of May 2017, and Its Regulation, Decree No. 89/2017	Amends several articles and republishes Law No. 16/2014 (the previous Conservation Law); establishes basic principles and standards for the protection, conservation, restoration, and sustainable use of biodiversity throughout the national territory, especially in conservation areas.
Fisheries Law No. 22/2013	Deals with zoning of fishing areas, quotas, seasons, and habitat protection; prohibits the use of substances dangerous to resources and to biodiversity; has a new chapter on fisheries policy that highlights ecosystem-based fishery management and community rights to participate in management of fisheries.
Regulation Establishing the Use of the National Maritime Space Decree No.21/2017 of 24 May 2017	Regulates the utilization and protection of marine areas in harmony with the International Law of the Sea (also ratified by Mozambique).

4.2 Government Institutions

Many national government agencies have responsibilities that affect biodiversity conservation. The roles and responsibilities of the most relevant of those are summarized in Table 2.

Table 2. Government Agencies Relevant to Biodiversity Conservation and Natural Resources Management

Ministry of Land, Environment, and Rural Development (MITADER) <i>Ministério da Terra, Ambiente e Desenvolvimento Rural</i>	Plans, directs, coordinates, controls, and implements policies and legislation in land management, forestry, environment, wildlife, conservation areas, and rural development; manages the national system of conservation areas through ANAC, the <i>Administração Nacional das Áreas de Conservação</i> ; administers donor funding for biodiversity conservation; responsible for environmental licensing in all sectors.
Ministry of Seas, Inland Waters, and Fisheries (MIMAIP) <i>Ministério do Mar, Águas Interiores e Pescas</i>	Responsible for management of sea and interior waters as well as fisheries. Conducts research and allocates fish exploitation quotas. Oversees and controls coastal resources such as mangroves.
Ministry of Agriculture and Food Security (MASA) <i>Ministério da Agricultura e Segurança Alimentar</i>	Promotes agriculture development through diversified production of goods for consumption, supply to the domestic industry, and for export, based on the sustainable use of natural resources and social equity, the promotion of agricultural production, agro-industry and commerce, and agricultural inputs and products; development of agriculture research and extension services and technical assistance to farmers.
Ministry of Culture and Tourism (MICTUR) <i>Ministério da Cultura e Turismo</i>	Responsible for coordinating tourism activities in the country and promotes tourism-related investment. Also promotes culture and preservation of cultural and environmental sites.
Ministry of Mineral Resources and Energy (MIREME) <i>Ministério dos Recursos Minerais e Energia</i>	Responsible for management of mineral resources exploitation, including oil and gas resources, and reduction of the environmental impacts associated with the sector.
Ministry of Public Works and Water (MOPHRH) <i>Ministério das Obras Públicas, Habitação e Recursos Hídricos</i>	Responsible for management of water supply infrastructure (e.g., dams, treatment plants) and water quality for domestic potable water supply.
Ministry of Gender, Child and Social Welfare (MGCAS) <i>Ministério do Género, Criança e Acção Social</i>	Responsible for policies related to gender, child health, nutrition, and education, and other social action in communities via civil society.

Ministry of Land, Environment and Rural Development (MITADER)

MITADER is responsible for: 1) land use planning and administration; 2) administration, management, and use of forest and wildlife; 3) administration and management of the national network of conservation areas through ANAC (*Administração Nacional das Áreas de Conservação*); 4) planning, promotion, and coordination of integrated and sustainable rural development, and 5) a large portfolio of donor funding for biodiversity and forest management (e.g. MozBIO, Sustenta, MozFIP). This ministry developed the *National Strategy and Action Plan of Biological Diversity of Mozambique (2015-2035)* (MITADER, 2015a), which is discussed in more detail in Section 6.1. It has developed strong public-private partnerships in national parks such as Bazaruto, Gorongosa, and Zinave.

ANAC oversees all conservation areas in the country, both terrestrial and marine. Its role in biodiversity conservation includes ensuring the implementation of biodiversity conservation policies; the management of wildlife; conserving species and ecosystems through the national conservation area system; defining the mechanisms for administration and sustainable use of conservation areas; and providing management inputs to the conservation area system (e.g., staff, infrastructure, equipment, law enforcement, research, and monitoring).

The National Fund for Sustainable Development (FNDS) is a strategic initiative of MITADER and the World Bank to promote and finance programs and projects that guarantee sustainable, harmonious, and inclusive development, with particular emphasis on rural areas. The FNDS promotes sustainable development models through multilateral funding mechanisms, in line with Sustainable Development Goal targets. FNDS runs more than ten programs, some of importance to the conservation and sustainable use of biodiversity, including MozBIO, Sustenta, Floresta em Pé, MozFIP, MozDGM, and Terra Segura.

Ministry of Seas, Inland Waters, and Fisheries (MIMAIP)

This ministry is a reorganization of the older Ministry of Fisheries (MIPE), with a mandate covering oceans, inland waters, fisheries, aquaculture, and marine critical habitats such as mangroves and coral reefs. It develops policies and strategies for the sustainable development of fisheries, and supervises planning, concessions, and research related to the use of marine and freshwater ecosystems. It promotes and coordinates the regulation of the sustainable use of water and the prevention and reduction of pollution of aquatic environments. MIMAIP contributes to the formulation of strategies, policies, and legislation or the development of marine conservation areas, and is responsible for their management. It establishes mechanisms for monitoring and control of fishing activities, as well as managing the Fisheries Promotion Fund. MIMAIP and MITADER collaborate on marine and coastal issues. This ministry is responsible for aquaculture development in both marine and inland waters, through its Aquaculture Department and the Aquaculture Division at the Fisheries Research Institute.

Ministry of Agriculture and Food Security (MASA)

MASA is responsible for the administration, management, protection, and conservation of natural resources associated with agricultural activities, especially land, water, forests, and wildlife, as well as the promotion of agricultural production, commercial and industrial agricultural, and agricultural research and extension services. The National Directorate of Agriculture and Silviculture (DINAS) is responsible for applying the laws related to the development of forest plantations. The rural development component of this ministry is currently housed with MITADER. MASA is responsible for Mozambique's 13 forest reserves.

Ministry of Mineral Resources and Energy (MIREME)

This ministry has a mandate for management of mineral resources and petroleum development and exploitation, and for controlling the environmental impacts of those activities. The National Petroleum Institute was created in 2004 as the regulatory authority responsible for the administration of fossil fuel resources. MIREME is also oversees the development of renewable energy resources, such as hydropower, solar, wind, and biofuels, which can help to reduce deforestation and carbon emissions.

Ministry of Culture and Tourism (MICTUR)

This ministry directs and plans the implementation of culture and tourism policies and strategies. Its primary mandate of promoting tourism is intrinsically dependent on biodiversity and the preservation of natural assets.

Mozambique does not have a functional multi-stakeholder entity to oversee and support mainstreaming biodiversity across institutions. The previous National Council for Sustainable Development (CONDES), established under the 1997 Environment Law as an advisory body to the Council of Ministers, is not currently functional. A forum for inter-ministerial coordination could perhaps help to resolve issues relevant to biodiversity conservation that involve diverse sectors and interests – as is often the case.

4.3. Conservation Areas

Protected areas in Mozambique are called “áreas de conservação,” or “conservation areas” in English. We will use the term conservation area in this report for consistency with Mozambique’s usage, and also because the words “protection” and “conservation” have slightly different connotations in English. Conservation, in general, suggests sustainable management and use, but not completely hands-off “protection” from human activities.

The establishment of such areas is one of the main strategies for the conservation of biodiversity. The conservation area network is shown on the map in Figure 2, and details are given in Annex D. Mozambique currently has 44 conservation areas according to the World Conservation Monitoring Center (UNEP-WCMC, 2019), including 7 national parks, 9 national reserves, 4 transboundary conservation areas, 13 forest reserves, and 17 *coutadas* (conservation areas managed mainly for sport hunting). The latter make up approximately 37 percent of the 170,500 km² conservation area system (UNEP-WCMC, 2019). They are managed by private companies (safari operators) through a concession contract between ANAC and the hunting operator and must comply with quotas determined annually by ANAC (World Bank, 2018c).

Conservation areas in Mozambique increased from approximately 16 percent of the land surface in 2009 to 26 percent in 2015 (MITADER, 2015a). The *Strategic Plan for Biodiversity 2010-2020* of the Convention on Biological Diversity, to which Mozambique is a party, outlined a list of targets for countries to work toward. Target 11 of these so-called Aichi Targets, was: “By 2020, at least 17 percent of terrestrial and inland water areas and 10 percent of coastal and marine areas, especially areas of particular importance for biodiversity and ecosystem services, are conserved through effectively and equitably managed, ecologically representative and well-connected systems of protected areas and other effective area-based conservation measures, and integrated into the wider landscape and seascape” (CBD, 2011).

Data from the World Conservation Monitoring Center currently estimate that conservation areas cover 170,600 km², or around 22 percent, of Mozambique’s land surface, but only 12,800 km², or 2 percent, of its national marine territory (UNEP-WCMC, 2019).

Although USAID’s “Journey to Self-Reliance Roadmap” (USAID, 2019) gives what it calls “biodiversity and habitat protections” in Mozambique a score of 0.9 score out of 1, or 90 percent, ranking it as very advanced globally, that score is mainly based on the fact that Mozambique has a very large fraction of its terrestrial area – 26 percent – designated as conservation areas, on paper at least. The score is not a very useful or accurate reflection of the effectiveness of biodiversity conservation policies and their implementation.

Figure 2. Map of Conservation Areas of Mozambique (BIOFUND, 2019a)



From ANAC, 2015. Game farms (*fazendas de fauna bravia*) are not shown and remain to be incorporated on this map.

4.4 International Agreements

Mozambique has ratified a number of international conventions and protocols pertaining to the management of natural resources (land and marine), conservation of biodiversity, and protection of the environment (Table 3).

Table 3. International Conventions and Regional Protocols Ratified by Mozambique to Protect the Environment

Convention or Protocol	Year Ratified
Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)	1981
United Nations Framework Convention on Climate Change (UNFCCC)	1994
United Nations Convention on Biological Diversity (CBD)	1994
United Nations Convention on the Law of the Sea (UNCLOS)	1997
Convention on Wetlands of International Importance (Ramsar Convention)	2004
Nairobi Convention for the Protection, Management, and Development of the Marine and Coastal Environment of the Western Indian Ocean	2010
Paris Agreement to the UNFCCC	2018
UNESCO Man and the Biosphere Program	2018

Convention on the International Trade in Endangered Species of Wild Flora and Fauna (CITES)

CITES implementation has been improving in recent years, especially given the engagement of both police and judicial entities in anti-poaching activities. More effort is needed to curb illegal smuggling of endangered wildlife.

Convention on Biological Diversity (CBD)

Mozambique submitted its *Fifth National Report* to the CBD in 2015 (MICOA, 2014), and its latest National Strategy and Action Plan (2015-2035) in 2015 (MITADER, 2015a). The country has nominally protected over 20 percent of its terrestrial country area and over 2 percent of its marine area as conservation areas.

Climate Change Convention and Paris Accord

In 2016, Mozambique prepared a National Strategy for the Reduction of Emissions from Deforestation and Forest Degradation (REDD+) covering the period 2016-2030 (MITADER, 2016), and ratified and put the Paris Accord in force in 2018. Mozambique’s nationally determined contribution (NDC) under the Paris Agreement prioritizes adaptation, but also highlights an ambitious mitigation commitment between 2020 and 2030, conditional on the provision of financial, technological, and capacity building from the international community. In November 2018, the Government of Mozambique approved a three-year plan to begin implementation of its NDC via the NDC Partnership, an international consortium of member states and organizations committed to ambitious implementation of the Paris Agreement and the 2030 Sustainable Development Goals.

Nairobi Convention

Mozambique joined other signatories to amend and strengthen this convention, a partnership between governments, civil society, and the private sector that is “working towards a prosperous Western Indian Ocean Region with healthy rivers, coasts, and oceans” under the auspices of the United Nations Environment Program’s (UNEP) Regional Seas Program. The convention has been active in providing training and demonstration projects on aspects such as spatial planning and management plans for critical habitats.

Convention on Wetlands of International Importance (Ramsar)

In 2015, Mozambique significantly extended the Zambezi Delta, its first Ramsar Site, which was originally declared in 2004 (formerly called the Marromeu Complex). Now covering more than 3,000 km², the

delta is a unique wetland and one of the most diverse and productive river delta systems in the world. Its second Ramsar Site, Lake Niassa and its coastal zone, covers an area of 1,364 km² (Ramsar Sites Information Service, 2019).

UNESCO Man and the Biosphere Program

Quirimbas became Mozambique's first UNESCO Man and the Biosphere (MAB) Program reserve in 2018 (UNESCO, 2018). MAB is an intergovernmental scientific program to establish a scientific basis for the improvement of relationships between people and their environments with an international network of 686 sites in 122 countries. Biosphere reserves are supposed to be laboratories and models for ecologically sustainable development.

5. THREATS, CAUSES, AND DRIVERS

We used the “threats-based approach” to biodiversity conservation that guides USAID’s biodiversity programming as the conceptual framework for our analysis (USAID, 2005; 2014; 2017). We first identified the direct biophysical threats to biodiversity and forests in Mozambique, organized under the five main categories recognized by the Convention on Biological Diversity (CBD, 2006), Government of Mozambique (MICOA, 2014), and USAID (USAID, 2014a):

- Conversion, loss, degradation, and fragmentation of natural habitats;
- Overharvesting or overexploitation of particular species;
- Pollution or contamination that harms natural habitats or species;
- Invasive non-native species that harm natural habitats or native species; and
- Climate change (or other macro-environmental changes such as ocean acidification).

Climate change is a potential threat of unknown magnitude; it may accentuate other direct threats, especially habitat loss, degradation, and fragmentation, and threats from invasive species. In some ways, it falls into a gray area between cause and threat, being itself a potential cause of some of the other direct biophysical threats to ecosystems and species.

The direct biophysical threats to biodiversity in Mozambique have many specific, proximate causes, and those have deeper, more systemic “root causes” or “drivers.” The next step in this analysis was to identify and describe the main causes and drivers of those direct biophysical threats. Causes generally fall into one of three categories: 1) political, institutional, or governance-related; 2) economic; or 3) social (related to, for example, cultural beliefs, lack of awareness, information, science, or technology). They can range from deep, systemic factors – which are sometimes also called “drivers,” “constraints,” or “root causes” – to more specific, immediate, local factors, which are sometimes also called “indirect threats” or “proximate causes” (USAID, 2005; 2014; 2017a).

The use of the terms “causes” and “drivers” in the literature on biodiversity conservation is not standardized and can be confusing. Reports from the Convention on Biological Diversity (CBD) use both terms, equating the term “driver” with “underlying cause” (CBD, 2011, 2014), “root cause” or “indirect driver” (CBD 2010). The USAID Biodiversity Policy defines “driver” as “the ultimate social, economic, political, institutional, or cultural factor that enables or exacerbates one or more threats” (USAID, 2014a). According to this definition, the term “driver” should be reserved for very broad root causes. This usage accords with that of the Convention on Biological Diversity (CBD, 2010) and earlier USAID guidance on FAA 118-119 analyses (USAID, 2005), which list drivers such as:

- Demographic change (rapid population growth, migration, and flows of refugees);
- Poverty, lack of access to resources necessary for subsistence;
- Inequitable economic policies and structures;
- Illegality and corruption;
- Global market forces; or
- Insecure land and natural resource tenure.

More simple, proximate causes, such as illegal logging, do not rise to that level or scale, and using the term “cause” or “proximate cause” for these makes sense. The simple and direct word “cause” is probably preferable except for those deep “enabling conditions” that themselves underlie suites of causes.

An example may help to clarify this issue. Some of the threats to biodiversity and forests in Mozambique stem from proximate causes rooted in illegality and corruption, such as the illegal wildlife trade, illegal timber trade, IUU fishing, and the siting of extractive industry or tourism infrastructure without adequate environmental impact assessments and their implementation. Although it may be true that addressing the drivers and reforming the system is a more sustainable, long-term method of addressing most threats (USAID, 2017a), the phrase “long-term” is key here. It suggests that the scale and complexity of addressing a deep underlying cause such as illegality and corruption can take a long time. In Mozambique, for example, if immediate, shorter-term actions did not address the proximate causes of the illegal wildlife or timber trade, elephants and high-value timber trees would be extirpated long before illegality and corruption in Mozambique as well as China and other Asian “demand-side” countries was controlled.

It is therefore important to distinguish between immediate or proximate causes of a specific threat and the deeper underlying conditions that may contextualize or enable the immediate cause, because the actions necessary to address proximate causes and drivers are usually at very different scales or levels of complexity. Any conservation planning must take these differences into account – so careful use of terms like “cause” and “driver” is important.

Using this logical framework of threats and causes (or drivers), the actions needed to address, reduce, and/or remove the causes – and thereby reduce the direct threats themselves – can be determined (USAID, 2005; 2017).

Although it is sometimes stated that population growth is a threat to biodiversity and forests, this claim is not technically correct. Population growth is not a direct threat, nor even a direct cause of these biophysical threats, although it acts as a “driver” underlying other political, economic, and social causes of many of the direct threats to biodiversity. If the population of a region, country, and the entire Earth is not ultimately stabilized, actions necessary to address the political, economic, and other social causes of threats to biodiversity will be more difficult to carry out.

Table 4. Examples of Threats to Biodiversity and Forests

Threat by Category (Illustrative Examples)
<p>Habitat Loss/Degradation</p> <ul style="list-style-type: none"> • Forest loss from clearing for shifting smallholder/subsistence agriculture • Forest loss from expansion of urban areas and infrastructure (e.g., roads, dams, ports, mines) • Forest degradation from selective cutting of high-value timber tree species • Tree cutting for firewood, charcoal • Destructive fishing practices (e.g., dragging nets, dynamite, poison) that damage coral reefs • Sea level rise leading to loss of coastal zone habitats (e.g., mangroves, coral reefs) • Loss of coastal ecosystems (e.g., beaches and dunes, coral reefs, mangroves from urban and infrastructure development (e.g., tourism facilities, ports, oil and gas development, mining, roads, towns, salt works, aquaculture ponds) • Dams that alter flow regime and nutrient runoff, degrading coastal and marine ecosystems
<p>Overexploitation</p> <ul style="list-style-type: none"> • Unsustainable harvest (sometimes/often illegal) killing of high-value wildlife (e.g., elephants) for international trade • Unsustainable harvest (sometimes/often illegal) of high-value timber species (e.g., <i>Azelia</i> spp, <i>Pterocarpus</i> spp., <i>Diospyros mespiliformis</i>) • Unsustainable bushmeat hunting for subsistence or local markets • Unsustainable fishing in marine and freshwater subsistence fisheries (e.g., use of small-mesh nets)

Threat by Category (Illustrative Examples)

- Unsustainable harvesting (often IUU fishing) of tuna, swordfish, other high-value pelagic species in international trade (plus by-catch)
- Unsustainable harvesting (often IUU fishing) of prawns (e.g., *Metapenaeus monocerus*, *Penaeus indicus*, *P. monodon*)

Invasive Species

- Non-native invasive aquatic plants (e.g., water hyacinth (*Eichhornia crassipes*), salvinia (*Salvinia molesta*))
- Non-native invasive shrimp in Maputo Bay (e.g., *Metapenaeus dobsoni*, *Parapenaeopsis sculptilis*)
- Non-native Nile tilapia (*Oreochromis niloticus*)
- Non-native Indian house crow (*Corvus splendens*)

Pollution

- Nutrient pollution (e.g., sewage) and sedimentation of coral reefs from onshore activities
- Pesticide and herbicide effects on terrestrial and aquatic ecosystems and species

Climate Change

- Increase of extreme weather events (e.g., floods, hurricanes, droughts) that affect other direct biophysical threats to biodiversity
- Changes in temperature and precipitation affecting ecosystems (e.g., reduction of Afromontane ecosystems at higher elevations) and species
- Sea level rise outpacing coral reef growth capacity, shifting mangrove zones, etc.
- Changes in ocean temperatures affecting ecosystems (e.g., coral reefs) and species
- Ocean acidification affecting ecosystems (e.g., coral reefs) and species

Table 5. Causes of Threats to Biodiversity and Forests in Mozambique

Proximate Cause (Illustrative Examples)

Political, Institutional, Governance-Related

- Inadequate land-use planning, zoning
- Low capacity of communities and civil society organizations to advocate, plan, and manage local natural resources
- Weak capacity of national government institutions to engage and empower community participation
- Low capacity to monitor and enforce forestry laws, regulations, and illegal international exports
- Corruption associated with illegal international timber trade
- Lack of sustainable fuelwood production system
- Inadequate coastal and nearshore spatial planning, zoning, and enforcement
- Weak capacity for environmental impact assessment and enforcement of standards and implementation of required safeguards

Economic

- Weak economic incentives for small-holder subsistence farmers to intensify production and stop shifting cultivation
- Lack of economically viable alternatives to firewood and charcoal for cooking
- International demand and markets for high-value wildlife and timber products (e.g., China)
- Economic incentives for corruption from high-value illegal trade in wildlife/timber
- Economic incentives for large-scale commercial agriculture including non-food and biofuel crops for export

Socio-Cultural

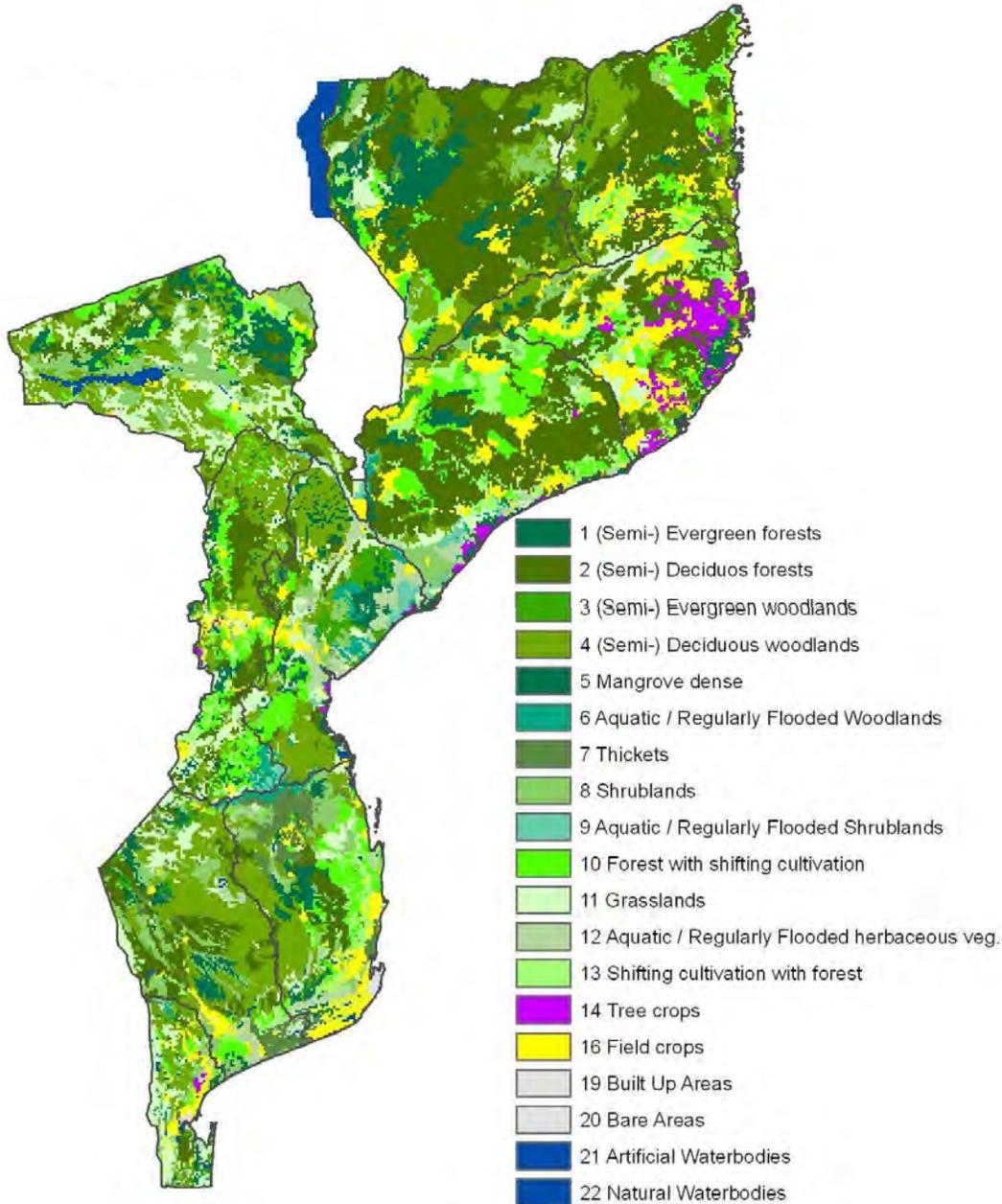
- Lack of knowledge and capacity for smallholder/subsistence agricultural intensification and conservation-friendly agriculture
- Weak knowledge of and capacity to monitor invasive non-native species

5.1 Habitat Loss and Degradation

Forests

Forests of various types are the main potential natural vegetation in Mozambique (see Figure 1), but significant areas of forest have already been converted to other land uses, as shown in the map of land cover in Figure 3.

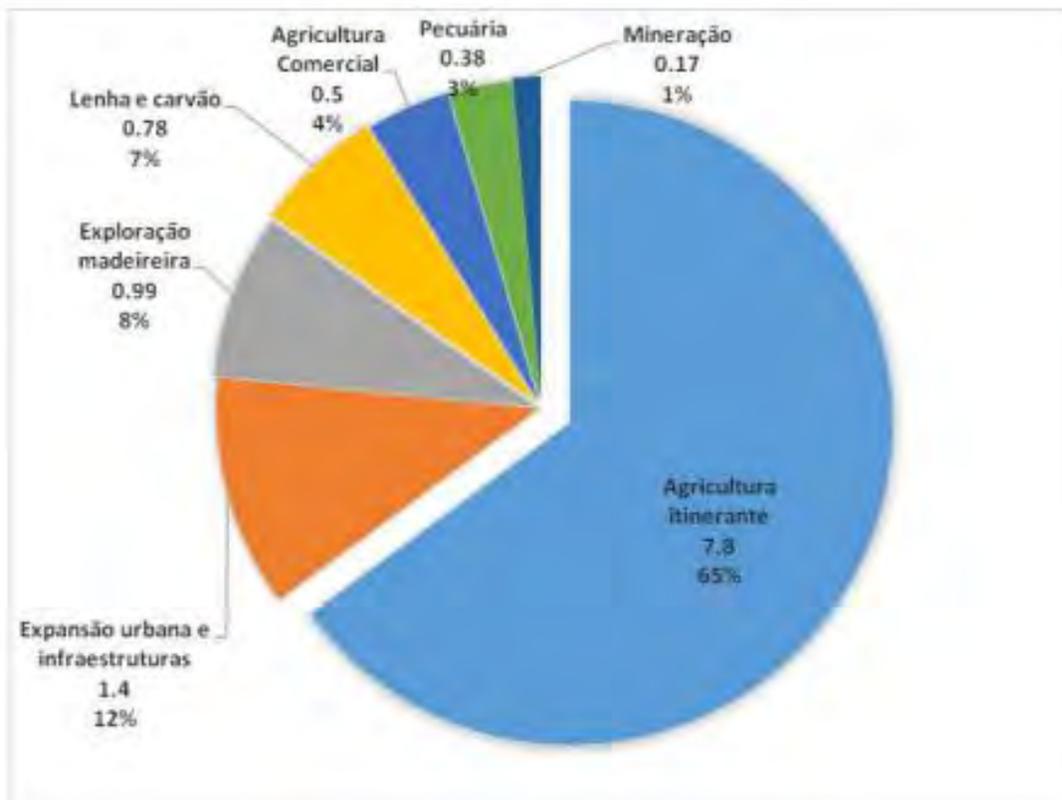
Figure 3. Land Cover Map of Mozambique (Drigo, et al., 2008)



Mozambique’s most recent National Forest Inventory (2018) estimates that 267,000 ha of forests were lost each year from 2003 to 2013, but that since 2014, the deforestation rate has fallen to half of that average of the previous decade. The Mozambique Bioenergy Strategy (Ministry of Energy and EUEI-PDF, 2012) summarized its view of the causes of forest loss as follows: “(i) institutional factors: weak capacity, lenient law enforcement, (ii) demographic factors: increasing urban population and associated demand for charcoal (iii) economic factors: high profitability of export markets (sesame, cotton, tobacco, timber); (iv) technological factors: low productivity agriculture; inefficient charcoal production and consumption; lacking alternative/ affordable energy sources.”

Two detailed analyses of the causes of forest loss and degradation (CEAGRE and Winrock International, 2016; MITADER, 2016) estimated the relative contributions of different causes of forest loss and degradation (Figure 5.2). These analyses estimated that small-scale subsistence agriculture causes two-thirds of Mozambican forest loss, across the country (CEAGRE and Winrock, 2016). They estimated that the second-most important cause of forest loss and degradation was the expansion of urban areas and infrastructure, responsible for approximately 12 percent of forest loss. Logging for wood production was the third-most important cause (8 percent), closely followed by production of firewood and charcoal (7 percent). The type of logging leading to this figure mainly represents the removal of high-value species, causing canopy-thinning and change in species composition, rather than complete cutting and conversion to another land use. Harvesting of firewood and charcoal production is similar in ecological terms as well.

Figure 4: Causes of Forest Loss and Degradation in Mozambique (Source: MITADER, 2016, citing CEAGRE and Winrock, 2016). Emissions given in millions of tons of CO₂/year averaged from 2000–2012.



Small-Scale Shifting Cultivation

Traditional practices of shifting cultivation (labelled “itinerant agriculture” in Figure 4) that were ecologically sustainable in Mozambique’s forest ecosystems for millennia are not now, due to population growth that drives a reduction of fallow periods. “The traditional shifting cultivation... is able to support 2-4 persons/km². Due to the increasing population density, the fallow period falls short and shorter not allowing the miombo vegetation to regenerate.” (Ministry of Energy and EUEI-PDF, 2012, p. 28).

Average population density in Mozambique is currently 38 persons per km², so shifting cultivation could not supply enough food for the country even if all land was converted to that type of agriculture – which would not be sustainable anyway, because there would be no more forest to which to shift.

Mozambique’s soils are generally nutrient-poor, and shifting cultivation was a technique for restoring soil fertility through forest fallowing. The use of commercial fertilizer, which could compensate to some degree, is still generally low among small farmers (Ministry of Energy and EUEI-PDF, 2012).

Large-Scale Commercial Agriculture

Commercial agriculture is responsible for 4 percent of forest loss in Mozambique between 2000 and 2012 (MITADER, 2016). Although not among the top causes of forest loss, it may be significant in some areas. All new large-scale commercial agriculture has been through foreign companies. While there is no specific geographic location that is the focus of these initiatives, these companies have attempted to go into the most fertile areas of the country, which are, not coincidentally, the areas most densely occupied by subsistence farmers. The result has been conflict over land, and the Mozambican government has so far not been able to reconcile traditional land rights with the desire for foreign direct investment in agriculture. Virtually none of these foreign large-scale agriculture initiatives has actually been successful.

Fuelwood and Charcoal

Over 80 percent of the population depends directly on fuelwood and charcoal for their energy needs. Fuelwood is generally used in rural areas while charcoal is primarily used in urban areas. Fuelwood use by local communities has less impact on forests than the production of charcoal for urban areas, which requires whole tree cutting rather than pruning, as well as the wood needed to produce it. “Charcoal and firewood accounts for 90.5 percent of rural energy use and 85 percent across the whole country, figures which indicate a high usage level in urban areas” (Norfolk and Cosijin, 2012).

Mangroves

Mangroves are a unique type of forest ecosystem; mangrove tree species are adapted to brackish water of coastal intertidal areas in the tropics. In Mozambique, mangrove swamps are being converted and degraded from clearing for salt production pans, urban and infrastructure development, and harvesting for construction materials, fuelwood, and charcoal production (Chevallier, 2013; Drigo et al., 2008; USAID, 2017c; Macamo and Siteo, 2017; Macamo, et al., 2018. MIMIAP, 2018; Pereira, et al., 2014).

Coastal and Marine Habitats

Offshore Oil and Gas Development

One of the largest liquefied natural gas (LNG) reserves in the world has been discovered in the Rovuma Basin off the coast of Cabo Delgado Province and is in the early stages of being exploited. A report from an IUCN workshop held in 2013 (IUCN, 2013) about the threats to biodiversity posed by this development came to the following conclusions: “Environmental and social impacts of construction and operations of facilities and infrastructure associated with the development of natural gas depend largely on the exact location and design of these facilities and infrastructure, as well as on the implementation of industry best practices designed to minimize adverse impacts.” Although some of the infrastructure locations, such as the Afungi Peninsula, are now known, much is still to be determined. For example, the

extent and locations of pipelines, new gas ports, additional infrastructure as imagined in the the national Gas Master Plan, the role of Pemba or Nacala as port facilities, adaptations to the rapidly deteriorating security situation, and new developments in all the new blocks under exploration, are all unknowns at this time.

Examples of risks and costs:

- Drilling operations have the potential to affect water quality (and marine fauna) and important ecosystems such as mangroves, sea grass, and coral communities.
- Coastal and seabed infrastructure would likely have adverse impacts on important habitats such as sea grass and corals and may adversely affect fish that use these areas for spawning.
- Vessel movement could potentially adversely affect marine mammals such as dugongs.
- The LNG plant will displace terrestrial habitats and could affect sensitive species of flora and fauna, as well as have important air emissions associated with combustion sources, and would generate waste in need of appropriate waste disposal.
- Drilling and construction of coastal and seabed infrastructure can temporarily displace fish, limit fishing, and decrease catch by artisanal fisheries.
- Exploration and production can affect the development of tourism in Cabo Delgado through visual impacts and by reducing the appeal of the area as a pristine environment.
- Natural gas leakages can be dangerous due to the flammability of gas clouds, and can also release large amounts of greenhouse gases into the atmosphere.
- Any potential liquid spills (such as oil and diesel spills from ships) can have major and long-lasting adverse impacts on marine and coastal ecosystems, including human populations and nearby protected areas (IUCN, 2013).

The weakness of environmental oversight capacity by the Government of Mozambique is a major issue. “The challenge of ensuring the adequacy, completeness, rigour, public participation, and sufficiency of EIAs [Environmental Impact Assessments] in Mozambique lies not in the legal and legislative framework but in the relative lack of capacity to fully realize and actualize the provisions of existing laws and regulations” (IUCN, 2013).

Dams that Alter Flow Regimes and Nutrient Runoff

Dams constructed for hydroelectric production, irrigation, and industrial and urban water supply alter the natural flows of water, nutrients, and sediment, with generally harmful effects to coastal and marine ecosystems in deltas and offshore marine areas (Pereira, et al., 2014). Controlling river discharge to produce a steady flow throughout the year leads to an unusually high flow during dry season and a low flow during the rainy season, which contrasts with naturally occurring flows. The Cahora Bassa Dam on the Zambezi River exemplifies the negative impacts on marine ecosystems, and in particular the shrimp fishery on the Sofala Bank, caused by controlling river output. “River runoff would otherwise provide the necessary nutrients to coastal waters and stimulate shrimp recruitment. Shrimp larvae enter mangrove swamps during the dry season to settle and juveniles migrate seaward. However, the controlled runoff, which is characterized by a uniform flow throughout the year, is expected to affect the environmental cues that stimulate shrimp migration both in and out of the mangrove areas” (Pereira, et al., 2014).

The Zambezi Delta is a designated Wetland of International Importance under the Ramsar Convention, and “The major threat to the Zambezi Delta is the construction of dams for hydroelectric power” (Ramsar Sites Information Service, 2019).

5.2 Overexploitation of Species

Unsustainable Exploitation of High-Value Wildlife for International Trade

According to Mozambique's *Fifth National Report* to the CBD (MICOA, 2014), "In Africa the wildlife in general and in particular the two of its icons (elephant and rhino) are going through an unprecedented crisis. ... On careful analysis by specialized agencies, Mozambique emerges as one of the main places of slaughter of ivory and rhino horn transit in Africa." Although elephants and rhinos are the main species threatened by illegal killing for international trade in their parts, other species such as lions, leopards, pangolins, and marine turtles are also affected. Rhinos are reportedly already extirpated from Mozambique.

The high value of ivory and rhino horn in Asian (mainly Chinese) markets provides a strong incentive for illegal activities and corruption. "High-value wildlife products are often trafficked by organized criminal syndicates and are known to finance violent non-state actors including terrorist groups" (USAID, 2017d). The U.S. National Strategy for Combating Wildlife Trafficking (Office of the President of the United States, 2014) proposed three strategic priorities: to strengthen enforcement of laws prohibiting trade in endangered wildlife, to reduce demand for those products, and to expand international cooperation and commitment to stop the illegal trade. Mozambique is a focus country on the U.S. State Department's 2018 list of 26 countries designated for special attention under the Eliminate, Neutralize, and Disrupt (END) Wildlife Trafficking Act.

Unsustainable Harvest of High-Value Timber Species

Hardwood species with a high-value in the predominantly Chinese export market include *Pterocarpus angolensis* (bloodwood), *Millettia stuhlmannii* (Indian beech), *Azelia quazensis* (pod mahogany), *Dalbergia melanoxylon* (Mozambique ebony), *Combretum imberbe* (leadwood), and *Julbernardia globiflora* (African munondo) (MICOA, 2014; Macqueen, 2018). A study of the illegal timber trade by the Environmental Investigation Agency (EIA, 2013) reported that in 2011, more than 90 percent of all sawn timber and log exports went to China, a level similar to that of previous years. The study found a discrepancy of log and sawn timber exports in 2012 registered by the Mozambican government and imports from Mozambique registered in China of around 190,000 cubic meters of wood. The study concluded that around 48 percent of China's 2012 imports were not registered or licensed, and were thus illegal (EIA, 2013). Mozambique's *Fifth National Report* to the CBD (MICOA, 2014) largely repeats the EIA's statistics on the illegal timber trade. The lack of administrative and technical oversight in the licensing of harvest quotas, lack of field verification of harvested quantities, and a high degree of corruption have all been identified as key causes of this high level of illegal trade. In the last few years, control of illegal logging and export has improved significantly.

The legal and illegal timber trade results mainly in forest degradation, rather than complete deforestation, as high-value species are selectively removed. This type of logging may also increase access to otherwise closed and remote areas, leading first to further forest degradation from charcoal production, often followed by the opening of new smallholder agricultural lands.

Unsustainable Bushmeat Hunting for Subsistence or Local Markets

Hunting of small mammals for direct consumption or for sale in local markets, often referred to as "bushmeat" hunting, mostly targets relatively common small antelopes such as impala, reedbuck, bushbuck, and duikers; warthog and bushpig; hares; and small rodents (Fusari and Carpaneto, 2006; Lindsey and Bento, 2012; Lindsey, et al., 2015).

Unsustainable Fishing in Marine and Freshwater Subsistence Fisheries

While data on fish stocks harvested by artisanal fisheries are scarce, almost all fisheries are overexploited in Mozambique and facing declining production (Pereira, et al., 2014). Fish are threatened by illegal fishing methods, such as the use of fine mesh and mosquito nets (Benkenstein, 2013). “Artisanal landings are, on average, responsible for almost 90 percent of the total national production. This sub-sector has a high social importance since it is the most important source of food and employment for the coastal communities, which represent more than two-thirds of the population of Mozambique. At present, almost all fisheries are overexploited and facing crisis due to a declining production and increasing operating costs” (Pereira, et al., 2014). A study in 2011 “reviewed 34 species of small pelagics, demersal fish, and crustaceans, which contributed approximately to 66 percent of the total artisanal production. This study showed that 60 percent of these species are either heavily exploited or overexploited” (Pereira, et al., 2014).

Unsustainable Ocean Fishing

In 2017, WWF estimated that illegal, unreported, and unregulated (IUU) fishing was costing Mozambique about \$36 million a year; in 2018, MIMAIP estimated that lost value at \$60 million (Club of Mozambique, 2018). The Mozambican shrimp fishery is not sustainably harvested, and the catch is declining. With IUU a large, but unknown, component of fisheries in Mozambique, sustainable management is impossible. Foreign trawlers are said to be responsible for most of the illegal activity, affecting many high-value species in international trade, including shrimp, tuna, sharks (for fins for Chinese markets), and rays (Pereira, et al., 2014).

5.3 Invasive Species

Mozambique’s *National Strategy and Action Plan* for biodiversity states that “records on the migration routes, occurrence, distribution, and impacts of invasive species are very scarce in Mozambique, resulting in poor knowledge of the real threats they represent. Thus, the actions set out in this strategy aim to considerably improve the knowledge on these species and initiate control protocols and eradicate them” (MITADER, 2015).

The *Fifth National Report* to the CBD (MICOA, 2014) emphasized the threat from introduced plants, especially invasive aquatic plants: “Among the plants, the water hyacinth (*Eichhornia crassipes*), water lettuce (*Pistia stratiotes*), Salvinia (*Salvinia molesta*), red water fern (*Azolla filiculoides*), parrot feather (*Myriophyllum aquaticum*), and lantana (*Lantana camara*) are the most distributed in the country causing major impacts in terrestrial and aquatic, forest and agricultural ecosystems. However, the specific studies are lacking, which [makes it] difficult to estimate the rate of invasive species in Mozambique.” Also mentioned in that report were two invasive species of shrimp (*Metapenaeus dobsoni* and *Parapenaeopsis sculptilis*) that are being monitored in Maputo Bay (MICOA, 2014).

The previous FAA 118-119 analysis for Mozambique discussed an invasive fish, Nile tilapia (*Oreochromis niloticus*), which had been reported to have negative effects on the native fish fauna of Lake Cahora Bassa, and the Indian house crow (*Corvus splendens*), an invasive bird that can displace and harm populations of native birds (USAID, 2013a).

Fifty-two invasive plants are listed in the Global Invasive Species Database as occurring in Mozambique (ISSG, 2012).

5.4 Pollution

Mozambique's *Fifth National Report* to the CBD (MICOA, 2013) discusses pollution only briefly, stating that "Due to poverty, the use of fertilizers and other chemical products such as, for example, pesticides is low, and therefore it can be deduced that water pollution is not significant," but that their increased use in agriculture could present a future threat, especially to aquatic ecosystems. In coastal areas, untreated sewage and sediments that result from agriculture and construction harm corals and other marine ecosystems. The report states that "research in the area of pollution and its impacts on biodiversity are still very scarce in Mozambique and that they are localized and do not allow to generalize for the whole country."

In the vicinity of major urban settlements, especially Maputo, several forms of pollution were identified as threats to both the marine environment and human health, including those from industry, human sewage, agriculture, port and shipping activities, and marine trash and litter (Pereira, et al., 2014).

5.5 Climate Change

According to USAID's Climate Vulnerability Profile for Mozambique (USAID, 2012a), average annual temperatures are projected to increase in the country by 1.0-2.8°C by the 2060s and by 1.4-4.6°C by the 2090s. Rainfall projections are varied and divergent across models, particularly depending on season and region. The models indicate an overall increase in precipitation, especially during the wet season and in coastal regions. Extreme weather events such as droughts and floods are likely to become more frequent and intense.

Increased terrestrial temperatures will cause altitudinal shifts in the climatic conditions governing the distribution of species and ecosystems. Afromontane moist forests are especially threatened. They are currently found above 1,500–2,000 meters (4,900–6,600 ft) in elevation, but climate warming will shift the conditions they require upward, reducing their range and threatening to eliminate them altogether on some lower mountain areas. In Mozambique, Afromontane forests are found on Mounts Namuli, Mabu, and Morrumbala, and mountains in Gorongosa, Nyanga, Vumba, and Chimanimani. They provide important ecosystem services, especially water, to lower-elevation ecosystems and communities.

Increased ocean temperatures will also have an effect on marine species and ecosystems, especially corals. High water temperatures can cause coral bleaching and mortality (Pereira et al., 2014).

Sea levels are projected to rise between 0.18 m and 0.59 m by the 2090s (USAID, 2012a; 2018f), outpacing coral reef growth capacity (Kuffner, 2018). Sea level rise will also shift the intertidal hydrological regime inland, thus shifting areas suitable for mangroves.

Ocean acidification, an indirect effect of increasing concentration of CO₂ in the atmosphere, is an emerging threat that has not yet been discussed in Mozambique. It is mentioned only once in the *Fifth National Report* to the CBD (MICOA, 2014), and not at all in the *National Strategy and Action Plan* for biodiversity (MITADER, 2015).

A 2010 World Bank study on the Economics of Adaptation to Climate Change in Mozambique (World Bank, 2010) used global circulation models to project changes in temperature and precipitation under four emissions scenarios, and how those would affect agriculture, energy, transportation, and coastal zones. Adaptation measures were then discussed.

6. ACTIONS NEEDED TO CONSERVE BIODIVERSITY AND TROPICAL FORESTS

The language of FAA Sections 118 and 119 calls for assessments to identify the actions necessary in that country to conserve tropical forests and biological diversity. These “actions necessary” will address and reduce the causes of threats to biodiversity, as discussed in Chapter 5 of this report. Such actions include, in general, those that address the political, institutional, and governance causes; the economic causes; and the social causes.

6.1 Actions Needed According to the Government of Mozambique

Mozambique’s own official view of what actions they consider necessary to conserve biodiversity in the country were taken as a starting point in this analysis. We reviewed Mozambique’s *Fifth National Report* to the Convention on Biological Diversity (MICOA, 2014) and the *National Strategy and Action Plan of Biological Diversity of Mozambique (2015-2035)* (MITADER, 2015a), which contains (on pp. 56-58) what is essentially a list of 20 actions that the Government of Mozambique considers necessary to conserve the country’s biodiversity. In the *National Strategy and Action Plan*, these are organized under four headings called “strategic objectives,” each with a number of “targets” that really represent “actions needed,” including:

- Increase awareness about the values of biodiversity and the impacts that human activity can cause;
- Adopt and effectively implement policies and legal instruments for preventing and mitigating the impacts of human activities likely to cause degradation of biodiversity;
- Define ecologically sustainable systems for the production and consumption based on sustainable practices and adequate investment;
- Develop, disseminate, and encourage sustainable management practices in agriculture, livestock, aquaculture, forestry, and wildlife;
- Establish and implement strategies for controlling invasive species;
- Respond to climate change with adaptive ecosystem management;
- Evaluate and redefine current conservation areas, and incorporate ecosystems currently under-represented in the system, including 100 percent of Afromontane mountains and up to 5 percent of marine ecosystems;
- Increase the effective and equitable management of conservation areas;
- Restore degraded ecosystems and restore their biodiversity to mitigate the effects of climate change;
- Create and integrate a payment mechanism for environmental goods and services into the national accounts to promote fair, equitable, and sustainable use of biological diversity;
- Strengthen the capacity of key stakeholders and improve the integration of gender issues; and
- Strengthen national and international partnerships and establish innovative mechanisms for financing and supporting biodiversity.

There is no shortage of good, actionable ideas within the Government of Mozambique. It is interesting to note that the list of actions needed that the analysis team developed from key informant interviews, discussed in the next section, overlaps significantly with the list from the *National Strategy and Action Plan*.

6.2 Actions Needed According to Key Informants Interviewed

Written notes from 21 interviews conducted by the analysis team in Mozambique with non-USAID key informants (see Annex C, Interviews Conducted) were provided to the senior technical advisor. The notes did not consistently follow a “script” that ensured that the same questions about threats, causes, and actions needed were asked in every interview, and were of mixed quality. It was nevertheless possible to search the notes for any statements about “actions needed” to conserve biodiversity, including tropical forests, and analyze this content.

Content analysis is a research technique that social scientists often use to make replicable and valid inferences by systematically analyzing documents or oral communications. It allows semi-quantitative results to be extracted from replicated qualitative information such as interviews. Our analysis assumes that our diverse group of informants – professionals and experts working on biodiversity conservation and natural resources management in Mozambique – know more about these issues than anyone else. The relative frequency with which a certain type of “action needed” was mentioned provides a way of ranking the relative importance of the spectrum of possible “actions needed” according to the perceptions of the key informants. While this analytical approach is not perfect, we believe that it is less biased and more informative than other non-quantitative methods of trying to develop such a list. Although the frequency with which they were mentioned by key informants provides a measure of the perceived importance of the many actions needed, frequency cannot necessarily be equated with priority. In general, prioritization is a very tricky concept because it depends on the values and objectives of those doing the prioritizing, and criteria can vary widely among stakeholders.

Content analysis of the 21 sets of interview notes yielded a list of 111 “actions needed” statements (see Annex E: Actions Needed from Key Informant Interviews). The 111 statements cluster under ten general themes, as shown in Table 6.

Table 6: Actions Needed Themes from Key Informant Interviews

Theme: “Need/Need to...”	Number of Times Mentioned	Percent of Total Responses
1) Promote conservation-friendly agriculture	18	16
2) Strengthen community rights and capacity to manage and benefit from biodiversity	14	13
3) Strengthen coastal and marine management	14	13
4) Stop illegal wildlife and timber trade	10	9
5) Control environmental impact of extractive industries	8	7
6) Strengthen enforcement of environmental laws	8	7
7) Improve capacity and coordination of government agencies	8	7
8) Strengthen natural resources governance	8	7
9) Improve finance and management of protected areas	5	5
10) Improve woodfuel and charcoal management, production and use	5	5
11) Other: education, awareness; health; reforestation; donor coordination; climate change; ecosystem services; conservation finance; research and monitoring	13	11
Total	111/111	100

Actions needed that were mentioned repeatedly clustered as “themes”; the key issues and topics encompassed in these main themes are summarized below.

Promote Conservation-Friendly Sustainable Agriculture and Livelihood Practices

The production of basic food staples in Mozambique is dominated by subsistence farmers, who cultivate farms of two hectares or less. Maize and cassava are the major staples, but sorghum, beans, groundnuts, millet, and rice are also grown. Tree crops, especially coconuts and cashews, are also grown by smallholder farmers and are a significant source of income in coastal areas of Inhambane and Gaza Provinces.

Our analysis concluded that a major threat to Mozambique's tropical forest ecosystems and the species they contain is the continuing loss of forest from expansion of agriculture, especially, but not exclusively, itinerant, shifting cultivation of basic subsistence crops like cassava and maize by smallholder subsistence farmers. Stabilizing the agricultural frontier through a suite of practices that together can be called "conservation-friendly sustainable agriculture and livelihood practices" is a very high priority.

Mozambique's *National Strategy and Action Plan* for biodiversity recognizes this need, and it was mentioned more times than any other type of action needed by our key informants. The 18 specific actions offered by the people we interviewed outline the dimensions of these practices, and include:

- Increased uses of tree crops and agroforestry systems;
- More diversified crops, including traditional legumes like cow peas and pigeon peas to provide more dietary protein and improve soil fertility;
- On-farm woodlots and fuel-efficient stoves for cooking fuel;
- Improved varieties and crops (e.g., drought resistant, more productive, pest resistant);
- Minimized use of pesticides and herbicides through integrated pest management and mulching;
- Increased use of compost and mulching to maintain soil fertility and prevent erosion;
- Small livestock (e.g., goats, chickens, guineafowl) to take pressure off of bushmeat;
- Improved water conservation and management;
- Community watershed forest protection;
- Maintenance of riparian buffer zones;
- Upstream/downstream linkages between upper watershed practices and water/irrigation needs downstream (e.g. payments for ecosystem service models);
- Soil conservation practices;
- Firebreaks to contain escaped agricultural fires;
- Control of invasive species;
- Integration with artisanal fisheries in coastal and lakeside communities; and
- Access to small-scale renewable energy technology (e.g., solar/photovoltaic, wind, biogas) for smallholder farmers.

In the last decade, the U.N. Food and Agriculture has promoted what it calls "conservation agriculture," which it defines as a rather narrow suite of farming practices (FAO, 2019) including minimum tillage, mulching, and other soil and water conservation practices. This is a subset of the suite of actions needed to stabilize the agricultural frontier in Mozambique.

Strengthen Community Rights and Capacity to Manage and Benefit from Biodiversity

Empowering communities was mentioned in key informant interviews almost as often as the need to stabilize the agricultural frontier through conservation agriculture. The 14 specific actions mentioned by key informants provides a menu of needs that link directly with some of the current activities in USAID/Mozambique's democracy and governance program. For example, key informants suggested the need to:

- Train and support communities to advocate for their needs and their own benefit;
- Strengthen community organizations in order to defend community rights and implement community responsibilities;
- Improve the process for community consultations used by national, provincial, and departmental governments;
- Develop financial mechanisms for community-based collaborative management;
- Promote and provide benefits to community fisheries councils to encourage their participation;
- Increase the devolution of natural resources management authority to communities; and
- Support community-based organizations, especially in benefit-sharing from natural resources.

One of the most effective ways to protect forests and habitats that people depend on for their livelihoods is to support communities so that they can manage the natural resources on which they depend and gain benefits from them (USAID, 2012; USAID, 2013b). The need for community participation exists inside conservation areas, almost all of which have people living within their boundaries, as well as outside of them.

The theme of strengthening community rights and capacity to manage and benefit from biodiversity aligns closely with the 2018 Maputo Declaration of Community-Based Natural Resource Management (CBNRM), and the World Bank’s Integrated Landscape and Forest Management initiative (Rodrigues de Aquino, 2017; 2018).

The Support Program for Economic and Enterprise Development (SPEED+) supported a study on *Collaborative Management Models for Conservation Areas in Mozambique* (USAID and BIOFUND, 2018), which outlined the benefits of various management models and made recommendations about public-private “co-management” partnership agreements. The report, and another study by some of the same authors (Baghai, et al., 2018), used the term “collaborative management” in a way that potentially may confuse issues of empowerment of community participation and decision-making with mechanisms of funding protected area management such as public-private partnerships. The team heard in interviews that the emphasis on what the *Collaborative Management Models* study called “collaborative management partnerships” for managing conservation areas, which give international NGOs or donors a prominent role in the governance of the area, has in some cases led local communities to feel that the biodiversity is owned by those partners, not them. True “collaborative management” is an old concept in conservation (Borrini, 1996; Stolton, et al., 1999; USAID, 2013b) and requires significant devolution of management and sharing of governance responsibilities with communities. Public-private partnerships between ANAC and international organizations such as the African Parks Foundation at Bazaruto National Park, the Carr Foundation in Gorongosa, or the Wildlife Conservation Society (WCS) in the Niassa National Reserve would not automatically qualify as collaborative management unless communities had a strong voice in governance of those conservation areas.

Strengthen Coastal and Marine Management

The need to strengthen coastal and marine management was mentioned often by our key informants in Mozambique. Their 14 specific suggestions fell into two general categories, one relating to coastal communities and artisanal fisheries and the other to higher-level government planning, policies, and law enforcement in the marine zone. In terms of coastal, artisanal fisheries, actions needed include:

- Establishing local marine protected areas;
- Seasonal closures to maintain sustainable populations of harvested species; and
- Enforcing existing legal gear restrictions (e.g, prohibiting use of fine-mesh nets).

In terms of marine planning and policy issues, recommendations include:

- Strengthening coastal and ocean spatial planning;
- Surveillance of fishing activity in the economic exclusion zone (EEZ);
- Controlling and enforcing regulations for pelagic fishing in the EEZ; and
- Enforcing gear restrictions to protect seabed habitats and reduce by-catch (e.g., turtle-excluding devices).

Stop Illegal Wildlife and Timber Trade

A diverse range of actions will be needed to reduce the illegal trade in wildlife products and high-value timber (and to control IUU fishing in Mozambique's EEZ, a related issue because it involves high-value wild ecosystem products involved in international trade). They include the need for:

- Better human systems and technology to reduce/prevent bribes and corruption that enables and motivates the illegal timber and wildlife trade;
- More surveillance, enforcement, and prosecution of illegal wildlife and timber actors;
- Better surveillance of ports and airports to stop illegal export of ivory, rhino horn, and high-value timber;
- A better strategy for ivory management (e.g., burn, sell, or store confiscated ivory);
- Law enforcement linkages between source (e.g., Mozambique) and market countries (e.g., China, Vietnam) involved in the wildlife trade;
- Behavior-change campaigns in demand countries (esp. China) for ivory, rhino horn, and high-value woods; and
- More investigative journalism to raise public awareness of topics such as illegal logging and wildlife crime and show how it is hurting ordinary Mozambicans.

It should be mentioned here that legitimate trade in wildlife and timber products, if conducted within Mozambique's legal framework, theoretically would be sustainable and would not cause a threat to any species or ecosystem. In fact, it has been argued, such trade could provide economic benefits, and because it was regulated for sustainability, lead to greater profits to more people over the long term than the short-term profits of the illegal trade. While focusing on the immediate threats from illegal trade of wildlife and timber, their potential economic contributions should not be forgotten (TRAFFIC, 2019).

Control Environmental Impact of Extractive Industries

The Sustainable and Fair Coasts Initiative for Cabo Delgado (IUCN, 2013) developed recommendations for five general kinds of actions needed, aimed specifically in this case at controlling the impacts of oil and gas development in the Rovuma Basin. They recommended:

- An Independent Scientific Advisory or Review Panel to review and advise the companies on the environmental and biodiversity impacts of their activities onshore and offshore;
- A knowledge management portal to help provide easy access to relevant information on gas exploration and production, and to biodiversity and environmental management plans and policies;
- A civil society "platform" to provide a forum for all stakeholders;

- Capacity-building of government, communities, and civil society to transparently and accountably regulate and/or monitor gas exploration and production and social and community development; and
- Creation of a long-term financial mechanism such as a fund or foundation to support biodiversity.

These five recommendations are still relevant today even though much has occurred since they were developed in 2013. Regarding the final bullet point, although BIOFUND was created as a long-term financial mechanism to support biodiversity conservation, it is not specifically focused on impacts related to extractive industries. Project COMBO has recently produced some analyses of potential relevance:

- A gap analysis on the *Policies, Laws, Capacity and Experience of Mozambique* for the implementation of a policy of no net loss of biodiversity, and
- *A Review and Gap Analysis to Improve the Availability and Use of Data for Mitigation Planning Activities and Development Projects.*

Our key informants also suggested more specific actions, such as to:

- Develop mechanisms for mitigation of biodiversity impacts of extractive industries (e.g., biodiversity offsets);
- Fully implement existing new EIA regulations;
- Set aside small marine protected areas (MPAs) near and around areas affected by oil and gas (or other extractive industries);
- Create independent oversight of the EIA process to prevent corruption by government or private sector; and
- Provide better training and increase capacity for ecological impact assessment of extractive industries.

In practice, the quality of the EIA process now depends largely on the goodwill and degree of corporate social responsibility of the project developer. Ideally, EIAs would be prepared by a neutral third party, selected from a list of EIA consulting companies approved by MITADER. The EIA process is now overseen by both the project developer and MITADER, with MITADER having the ultimate say in whether or not the study is of an acceptable quality, and provides effective mitigation measures for the main impacts projected. Because EIA oversight capacity within MITADER is currently weak, detailed oversight is less than optimal (Nazerli, 2013).

Environmental impact assessments need adequate information on the distribution of species and ecosystems in order to assess the effects of development on them. Various methods of acquiring and compiling such biodiversity information exist, one of which is the identification of what have been called “Key Biodiversity Areas” (Dudley, et al., 2014).

A significant, related need is to strengthen compliance with approved Environmental Management Plans. Unlike the EIA phase, Mozambican legislation does not require public presentations or consultations on the company’s compliance with the approved environmental management plan, and monitoring reports are not being made public even though they are supposed to be. MITADER has the responsibility to ensure that the environmental management plan has been implemented and complied with, but a lack of resources and qualified technical staff for field monitoring, so this part of the process is almost completely dependent on the desire (or lack thereof) of the relevant company to comply with the environmental management plan.

Strengthen Enforcement of Environmental Laws

Interviews with key informants provided many specific recommendations of actions needed under this theme, including:

- Strengthen the capacity of the judiciary to enforce environmental laws and prosecute environmental crimes;
- Develop a national communication strategy for raising knowledge about existing conservation laws, especially in rural areas and among young people;
- Provide adequate funds and means (e.g., staff, training, equipment) for environmental law enforcement; and
- Improve MITADER’s capacity to oversee and enforce the EIA process.

Improve Capacity and Coordination of Government Agencies

There is a need for improved coordination among ministries and agencies responsible for implementing the many new laws and policies that affect biodiversity, created through the government reorganization that occurred after the 2014 elections. This will require coordination between central ministries, such as MITADER, MIMAIP, and Minerals and Energy; within ministries, such as between ANAC and DINAB, or DINAF and AQUA, within MITADER; and at the provincial and district levels of government, where national policies, laws, and regulations must be implemented on the ground. At the district offices, a few government staff are responsible for overseeing all sectors, such as agriculture, forestry, and energy.

Strengthen Natural Resources Governance

The topic of “governance” is broad, and includes several of the themes already mentioned, such as empowerment of communities, enforcement of environmental laws, and coordination of government agencies. A participatory assessment of forest governance by the World Bank Group’s Program for Forests (PROFOR, 2017) found “... a consensus among stakeholders that governance is weak, particularly around the implementation of laws and regulations. Forest law enforcement is absent and forest crimes often go unpunished, permitting widespread illegality. Forest sector policies contradict those in other sectors, while measures to combat corruption do not exist. Stakeholder participation in planning and decision-making in the sector is low, particularly the inclusion of women. Participants identified priority interventions including policy reforms, institutional strengthening, and incentives for stimulating sustainable forest management.” The assessment generated an excellent list of ten “priority areas for interventions,” which are essentially “actions needed” themes related to forests, Mozambique’s most extensive ecosystem.

Large-scale planning (referred to as regional, landscape, or spatial planning) is an aspect of governance that needs strengthening in Mozambique. Spatial planning is recognized as critical by the Ministry of Fisheries; coastal and marine planning and zoning needs to be coordinated with MITADER.

An important aspect of large-scale planning is the need to recognize and further develop the full range of conservation areas and land and resource tenure systems needed for biodiversity conservation across the landscapes and ecosystems of Mozambique. Conservation areas currently include national parks, nature reserves, forest reserves, community-conserved areas, *coutadas*, tourism concessions, and game farms.

Improve Finance and Management of Protected Areas

Approximately one-quarter of Mozambique’s terrestrial land area is under nominal protection in the conservation areas system, but ANAC’s capacity to effectively manage that area is lacking. The *National Strategy and Action Plan of Biological Diversity of Mozambique (2015-2035)* (MITADER, 2015a) stated

that: “The national management system of protected areas in the country is currently weak, and although there is an improvement in the management structure in recent years, there has been the need for greater investment. Effective management requires the strengthening of human capacity and infrastructure, mobilization of financial resources, among others.”

Almost all conservation areas in Mozambique face a shortage of funds to cover operational expenses and infrastructure, and allocations from the national budget are insufficient. BIOFUND estimates that the contribution from the international community covered about 81 percent of the operating costs of the national conservation area system in 2014 (BIOFUND, 2019a). Some 60 conservation initiatives with an investment of around \$379 million are currently being implemented by the Mozambican government, NGOs, other donors, and the private sector. BIOFUND maintains a database of these initiatives (BIOFUND, 2019b). Funding by international donors is not equally distributed among conservation areas. In 2014 for example, only five conservation areas received 95 percent of donor funds; just two (Limpopo and Gorongosa) received 69 percent of the total.

One key informant expressed the opinion that “The government needs the capacity and resources to be a prime driver for biodiversity conservation. At this point, donors and international NGOs are leading efforts to conserve biodiversity in Mozambique.”

The Government of Mozambique has viewed nature-based tourism as a main strategy to generate revenue for financing conservation areas and to support the livelihoods of local communities. Many conservation areas are in remote locations, with poor road access and accommodations, which has resulted in low revenues from tourism. The uncertainty of financial returns from nature tourism has also resulted in low investment by the private sector. In response, with support from the World Bank, the Government of Mozambique held a conference on nature-based tourism in June 2018 (Government of Mozambique, 2018), where it was declared that Mozambique is “ready for investment” in tourism in its national parks and reserves: “In Mozambique, nature-based tourism is expected become one of the country’s largest growth sectors.” The glossy report from the conference includes promotional information on “a selection of investment-ready sites”: 14 of the country’s national parks and reserves.

A recent study of tourism’s potential contribution to conservation area finance (Rylance, 2017) stated that “conservation authorities are under pressure to demonstrate the revenue generation potential of their conservation area network in order to compete for central government budget support, in the short term, and potentially against land use change to agriculture, in the longer term. However, quantifying the cost of the conservation area network is problematic where virtually no central statistics on public expenditure for conservation areas exist.” The World Bank has supported the idea of tourism as a potential funding mechanism for conservation areas, but also been honest about its current limitations. In the 2018 Project Appraisal Document for the Mozambique Conservation Areas for Biodiversity and Development - Phase 2 Project (World Bank, 2018c), they note that “Mozambique’s [conservation areas] hold untapped potential for the development of tourism that can directly generate revenues for [conservation areas] and contribute more broadly to the local and national economies. The travel and tourism industry is regarded as a key priority economic sector for the country, but its contribution to the economy is still modest. Despite its improving travel and tourism competitiveness, which relies heavily on the country’s rich natural resources, Mozambique remains uncompetitive as a tourism destination internationally.”

The *National Biodiversity Strategy and Action Plan* (MITADER, 2015) seems to downplay tourism, calling attention to the weaknesses in that sector, and saying tourists do not really want to come to Mozambique very much right now because of poor infrastructure and access, communities are not really

benefitting, and that the benefits are going to the private sector, mainly foreigners. It mentions trying to develop “benefit sharing schemes” with communities in conservation areas around tourism and other uses of biodiversity.

Only one of 111 suggestions for “actions needed” from our key informant interviews mentioned tourism, suggesting that our key informants did not think of it as a high priority for biodiversity conservation. It does not, in our analysis, seem to be a very high-priority theme among the actions needed for biodiversity and forest conservation. One concern is that tourism development, whether in conservation areas or not, has a fairly high opportunity for “elite capture” – a situation where the benefits flow to very few people. The high value of tourism sites may also present temptations for corruption and weak enforcement of environmental laws.

The main causes of the threats to biodiversity, and thus the actions needed to conserve it, relate to direct material uses, such as ecosystem products (fish, timber, wood fuels), and indirect material uses, such as ecosystem services of many kinds (watershed protection, coastal protection). Tourism is a non-material benefit of biodiversity (unless trophy hunting is considered a type of tourism), used mainly by foreign visitors, and does not seem to clearly and directly address the main causes of the threats identified in this analysis. Placing a high priority on the development of nature-based tourism may not be a top priority at this time, although perhaps when other more pressing needs have been met, it could become such.

Improve Wood Fuel and Charcoal Management, Production, and Use

A report on a *Mozambique Biomass Energy Strategy* (Ministry of Energy and EUEI-PDF, 2012) offers a menu of actions needed to develop a sustainable wood fuel and charcoal economy. The report states that charcoal is “Mozambique’s dominant commercial fuel in terms of volume and value, which exceeded \$250 million in 2011. Charcoal is widely perceived as a destructive and inefficient energy source, however, this does not need to be so, and biomass could also be considered a clean and modern fuel that remains affordable to the majority of the population for the foreseeable future” (Ministry of Energy and EUEI-PDF, 2012). Other recent studies also contain ideas for actions needed with regard to wood fuel and charcoal (Baumert, et al., 2016; Luz, et al., 2015).

Our key informants offered the following suggestions regarding this theme:

- Promote the use of more efficient cookstoves for both wood fuel and charcoal;
- Promote the use of tree coppicing for firewood and charcoal production, rather than cutting the entire tree; and
- Promote the use of Casamance or other improved charcoal kiln designs to improve charcoal yield.

6.3 Comparison of Actions Needed According to Key Informants, 2012-2018

It is interesting to compare the list of actions needed developed from key informant interviews in late 2018 and discussed above with a similar list from the last Mozambique FAA 118-119 analysis, conducted six years earlier (USAID, 2013a). Table 7 shows the comparison. Note that:

- Conservation-friendly agriculture and stabilization of the agricultural frontier, perceived as one of the top needs in 2012, is still seen as such, and probably the top need;
- Empowering community participation in conservation and natural resources management is still seen as one of the top needs;
- The need for more attention to coastal and marine ecosystems is still seen as very important;
- Enforcing existing laws is still seen as a top need; and
- The need to develop a sustainable system for cooking fuels like wood and charcoal, or alternatives to them is still perceived as important.

The consistency of these findings is strong evidence for the fundamental necessity of addressing these actions.

Table 7. Comparison of Actions Needed from Key Informant Interviews in 2012 and 2018 (USAID, 2013a)

Theme: “Need/Need to....”	# and % of Times Mentioned	Theme: “Need/Need to....”	# and % of Times Mentioned	Ranking Change from 2012
2012		2018		
1) Improve enforcement of environmental laws	28 (16%)	1) Promote conservation-friendly agriculture	18 (16%)	Up from #3
2) Build capacity of communities, civil society organizations, and the media for meaningful engagement in environmental decision making	23 (13%)	2) Strengthen community rights and capacity to manage and benefit from biodiversity	14 (13%)	Same
3) Stop forest conversion to agriculture and stabilize the agricultural frontier	20 (12%)	3) Strengthen coastal and marine management	14 (13%)	Up from #4 and #7
4) Improve land use and coastal zone planning	14 (8%)	4) Stop illegal wildlife and timber trade	10 (9%)	Down from #1 but more specific
5) Coordinate and harmonize actions of relevant ministries and agencies and develop a functional institutional structure for sustainable environmental management	13 (7%)	5) Control environmental impact of extractive industries	8 (7%)	Up from “other”
6) Develop livelihood and economic alternatives/opportunities to destructive practices	13 (7%)	6) Strengthen enforcement of environmental laws	8 (7%)	Down from #1
7) Sustainably manage artisanal (and other) fisheries	9 (5%)	7) Improve capacity and coordination of government agencies	8 (7%)	Down from #5
8) Improve woodfuel efficiency and find alternatives to wood and charcoal	6 (4%)	8) Strengthen natural resources governance	8 (7%)	Down from #4 but more specific
(9) Other (climate change adaptation, environmental information, behavior-change, fire control, human-wildlife conflict, financial sustainability of PAs, etc.)	48/174 (28%)	9) Improve finance and management of protected areas	5 (5%)	Up from “other”
		10) Improve woodfuel and charcoal management, production, and use	5 (5%)	Down from #8
		11) Other: education, awareness, capacity; health; reforestation; donor coordination; climate change; ecosystem services; conservation finance; research and monitoring	13 (11%)	
Total	174/174 (100%)	Total	111/111 (100%)	

7. EXTENT TO WHICH USAID/MOZAMBIQUE'S CURRENT PROGRAMS ARE CONTRIBUTING TO ACTIONS NEEDED

7.1 Overview of USAID/Mozambique's Current Programs

The current Country Development Cooperation Strategy (CDCS) covering the period 2014-2019 (USAID/Mozambique, 2014) lists four Development Objectives (DOs): 1) Democratic Governance of Mozambican Institutions Strengthened, 2) Resilient, Broad-Based Economic Growth Accelerated, 3) Education Quality Improved, and 4) Health Status of Targeted Population Groups Improved. A brief summary of activities and projects in each of these development sectors follows, focusing on those that may be the most relevant for future opportunities to link with actions needed for biodiversity and forest conservation.

Democracy and Governance

USAID/Mozambique's democracy and governance (DG) sector "briefer" (USAID/Mozambique, 2018a) describes its work under three headings, each of which is directly relevant to the actions needed for conserving biodiversity in the country. One theme is "Civil Society Engagement for Good Governance," under which "USAID provides technical assistance and grants to selected local non-governmental organizations to strengthen citizen participation in the democratic governance of Mozambique." Activities support civil society organizations in policy dialogue and debate, and access to public information, especially at the provincial and district levels of government. "USAID strengthens the ability of organizations to advocate for specific improvements in the priority areas of biodiversity conservation, health, and education services, and greater transparency in extractive industries."

USAID's Media Strengthening Program supports "the development of a professional and independent media sector that promotes debate as well as transparency and accountability." The program strengthens the quality of reporting and the financial and editorial management of commercial broadcasters and community radios, and connects news outlets in the capital with community radios in the rest of the country. "Hands-on training for journalism students in a media lab allows them to produce real stories and learn digital editing. Established journalists receive training in investigative journalism on key issues related to, for example, the highly lucrative and emerging mining and gas industries, or to causes of social concern..."

Economic Growth and Agriculture

USAID/Mozambique's website says that its programs "focus on increasing growth in the agriculture and tourism sectors, which show strong potential to attract private investment and create jobs. Our programs provide business development services and access to financial services that help small- and medium-sized enterprises become more efficient and productive." A number of current components of the Mission's agriculture program have some potential relevance to actions needed for biodiversity and forest conservation. The Mozambique Climate Smart Agriculture Activity – Beira Corridor (2016-2021) says that "Climate smart agriculture [is] a promising pathway to sustainable intensification of agriculture and increased farm productivity, income and resilience for smallholder farming families." The Improved Seeds For Better Agriculture (2015-2020) project is promoting "seeds [that] are drought tolerant, resistant to endemic pests and diseases, have end-user preferred traits, and show significant increases in yields on farmers' fields. The Mozambique Innovations INOVA (2017-2022) project aims to "build the

capacity of, and facilitate linkages between, private and public sector actors to create more effective and competitive value chains in priority sectors – groundnut, sesame, soybean, common bean, cowpea, pigeon pea, banana, and cashew.”

Education

USAID/Mozambique’s Education Program collaborates with the Ministry of Education to improve early grade reading outcomes. It is predicated on the context that “high illiteracy impedes economic and social progress.” A rapidly growing population and increase in access to education has put pressure on the school system, stressing its capacity, and there is an “acute learning crisis,” beginning with very low levels of literacy” (USAID/Mozambique, 2018b).

Health

The health program “is our largest and most complex portfolio in Mozambique and focuses on ending preventable maternal and child deaths, treating and preventing infectious diseases, and assisting the government to develop a health system and budget to sustain major improvements over the long term. To reinforce and protect health gains, we also address critical nutrition, water, sanitation and hygiene needs and use social and behavior change communications to reach communities and households, the majority having very low levels of literacy or schooling, with life-saving information and practices.” Water, sanitation, and hygiene activities “strategically complement nutrition activities in households, schools, and health facilities. Interventions to address emergency or chronic malnutrition also complement nutrition projects...” (USAID/Mozambique, 2018c).

USAID’s family planning and reproductive health (FP/RH) program “aims to: 1) increase access to a wide range of modern contraceptive methods and high quality services for post-partum women, HIV positive women and adolescents, high parity women, and post-abortion care women at both community and facility levels; and 2) increase demand for modern contraceptive methods and high quality FP/RH services.”

7.2 Extent to Which USAID/Mozambique Programs Are Contributing to Actions Needed

It will be useful to reiterate here that the language in FAA Sections 118 and 119 requires: (1) a general assessment of “actions needed” now, and in the future, to conserve biodiversity and tropical forests, and (2) a *prospective* assessment of the “extent to which the actions *proposed*” [emphasis added] for future support by USAID meet the identified needs. It should also be noted that FAA 118 and 119 do not require missions to support any actions needed for biodiversity or tropical forest conservation identified by the analyses. Clearly, however, the intent of Congress in requiring them was to influence USAID programs at the planning stage, with the anticipation that USAID would support actions needed to the extent possible in order to increase the effectiveness and sustainability of their development programs.

A recent USAID guide to “best practices” for conducting these analyses (USAID, 2017a) broadens the “extent to which” analysis beyond the forward-looking legal requirement of FAA 118-119, and requests that these reports “describe how the mission’s *current* CDCS *and/or* planned CDCS and activities” [emphasis added] contribute to actions needed for conserving biodiversity and tropical forests. In fact, analysis of the “extent to which the *planned* CDCS could contribute is the legal requirement, and is not optional.

However, sometimes these analyses are conducted at such an early stage of CDCS development that it is hardly possible to specify what the “actions proposed” will be. That is the case for the timing of this

assessment. We were told by USAID/Mozambique that the Mission is in the very early stages of developing its next CDCS, and instructed to use its current portfolio as the framework for identifying “extent to which” opportunities. Therefore, in this report, we:

- Analyze the extent to which USAID/Mozambique’s current portfolio is contributing to actions needed, as requested by the Mission and in the best practices guide (USAID, 2017a); and, separately,
- Analyze the extent to which the Mission’s future portfolio under a new CDCS structure could contribute to the actions needed, in order to fulfil the legal requirement of FAA 118-119.

Table 8 summarizes USAID/Mozambique’s most direct current contributions to “actions necessary” for biodiversity and forest conservation now being made through current CDCS and programs. Some less-direct contributions may not necessarily be reflected in this table. More details are presented in the text below.

Table 8. Actions Needed and Contribution of USAID/Mozambique Programs

Actions Needed Theme	Current USAID Contribution
1) Promote conservation-friendly agriculture	GDA activities in the buffer zone of Gorongosa National Park are assisting farmers to increase agricultural production for improved nutrition and livelihoods
2) Strengthen community rights and capacity to manage and benefit from biodiversity	
3) Strengthen coastal and marine management	The Civic Partnership for Good Governance (PCBG) awarded two sub-grants that focus on marine biodiversity conservation in Inhambane province
4) Stop illegal wildlife and timber trade	The Counter Wildlife Crime Judiciary Partnership trains prosecutors, judges, wildlife law enforcement officials and rangers to improve prosecution of wildlife crimes GDA activities in Niassa National Reserve (with WCS) and Gorongosa National Park (with Integrated Gorongosa and Buffer Zone Program) aim to strengthen wildlife laws and regulations and reduce poaching The Khetha Project aims to reduce wildlife trafficking of endangered rhinos and other wildlife in the Great Limpopo Transfrontier Conservation Area
5) Control environmental impact of extractive industries	SPEED+ Project “key biodiversity areas” (KBAs) mapping helps to close a data gap that is important for environmental impact assessments (EIAs)
6) Strengthen enforcement of environmental laws	
7) Improve capacity and coordination of government agencies	
8) Strengthen natural resources governance	SPEED+ Project work with MITADER and ANAC to support the creation and implementation of policy related to biodiversity and forest conservation
9) Improve finance and management of protected areas	SPEED+ Project study of public-private partnerships for shared management of conservation areas provided models of this type of financial mechanism
10) Improve woodfuel and charcoal management, production, and use	
11) Other: education, awareness, capacity; health; reforestation; donor coordination; climate change; ecosystem services; conservation finance; research and monitoring	The Civic Partnership for Good Governance (PCBG) awarded a sub-grant to FRUTICAD to strengthen forest protection as a strategy for ecosystem-based adaptation to climate change in Cabo Delgado

It is worth noting here that biodiversity activities currently undertaken by USAID/Mozambique are described as being part of the Economic Growth portfolio. It is interesting, however, that the actions-needed themes identified from our key informant interviews include themes strongly related to democratic governance, as well as those related to economic growth and agriculture. This can perhaps be taken as a validation of USAID's Biodiversity Policy, which argues that biodiversity is supposed to be integrated and cross-cutting – not “under” any particular development sector. We summarize the current biodiversity-relevant activities being supported by USAID/Mozambique below.

USAID/Mozambique implements biodiversity conservation activities through a collaborative Global Development Alliance approach (USAID/Mozambique, 2018d). In the Niassa National Reserve, USAID works with the Wildlife Conservation Society (WCS) to “strengthen government planning and monitoring capacity, law enforcement, as well as promotes income generating and revenue sharing plans to improve the social and economic status of residents and deter cooperation with traffickers.” In Gorongosa National Park, the Integrated Gorongosa and Buffer Zone Program is “strengthening local capacity to enforce wildlife laws and regulations,” and using “its expertise in the buffer zone communities to improve health and education services, foster science leadership, and enables farmers to increase agricultural production for improved nutrition and livelihoods.”

The Civic Partnership for Good Governance/*Parceria Cívica Para Boa Governação* (PCBG) (2016-2020) Project supports “Interventions focused on improving the advocacy and organizational capacities of motivated, committed Mozambican partners.” It is intended to build the capacity of civil society organizations to advocate more effectively for specific changes in government policies, procedures, services, and enforcement, and thereby contributing to accountable, effective democratic governance in Mozambique. In the conservation arena, the project has awarded two sub-grants that focus on marine biodiversity conservation in Inhambane province, one to BIOFUND, and one to a local NGO called *Associação Ntumbuluku*. One of the two climate change sub-grants is also relevant to biodiversity and tropical forests; the grantee, FRUTICAD (*Associação Fruticultores e Horticultores em Cabo Delgado*), aims to strengthen forest protection as a strategy for ecosystem-based adaptation to climate change in Cabo Delgado.

The Counter Wildlife Crime Judiciary Partnership evolved out of the Wildlife Crime Prosecution Support Program (USAID/Mozambique, 2019b), which was a two-year agreement that supported the Mozambican Attorney General's Office to improve the prosecution of wildlife crime cases, in particular those perpetrated by transnational criminal syndicates. The initiative now has five partners, including the Khetha partnership, the SPEED+ Project, and the United Nations Office on Drugs and Crime (UNODC), and has expanded beyond training of prosecutors to include judges and wildlife law enforcement officials and rangers. USAID biodiversity funds are used to support these activities.

USAID/Mozambique also provides biodiversity funds to the Kheta Project, a partnership to reduce wildlife trafficking of endangered rhinos and other wildlife in the Great Limpopo Transfrontier Conservation Area, a transboundary area bordering Mozambique, South Africa, and Zimbabwe.

The Supporting the Policy Environment for Economic Development (SPEED+) (2016-2020) Project is of direct relevance to many aspects of biodiversity conservation and natural resources management. The project provides “expert technical services to the Government of Mozambique in support of economic and structural reform” related to agriculture, energy, and environmental governance. It is providing technical assistance and training for public sector institutions and civil society organizations at the national and local levels, and works directly with MITADER and ANAC to support the creation and implementation of policy related to biodiversity and forest conservation (USAID/Mozambique, 2019). A

mapping exercise to identify “key biodiversity areas” (KBAs) has recently begun under the SPEED+ project, and will provide data relevant to the siting of extractive industry, tourism, and transportation infrastructure and for EIAs.

At the national policy level, the SPEED+ project (USAID/Mozambique, 2019a) supports the Government of Mozambique in ways that contribute to community empowerment. For example, SPEED+ supported a study on *Collaborative Management Models for Conservation Areas in Mozambique* (USAID and BIOFUND, 2018) that outlined various kinds of management and public-private partnership arrangements. As discussed in Chapter 6, however, the study used terms such as “collaborative management” in a way that potentially may confuse the issues of empowerment of community participation and decision-making with mechanisms of funding protected area management such as public-private partnerships.

The USAID/Mozambique website states that: “Tourism is a small but growing driver of Mozambique’s economy. Our biodiversity and tourism program builds on the Government’s recent commitment to the tourism sector and to enacting of conservation laws and policies.”

8. OPPORTUNITIES FOR USAID/MOZAMBIQUE TO CONTRIBUTE TO ACTIONS NEEDED

The fact that USAID/Mozambique is only in the early stages of developing its new CDCS means that this analysis cannot describe how “proposed actions” could contribute to meeting the actions necessary for biodiversity and forest conservation in Mozambique. However, the timing provides the FAA 118-119 analysis team with an opportunity to identify and recommend ways of enhancing development through future biodiversity conservation actions before the new CDCS becomes too firmly set to encompass such ideas.

USAID’s Biodiversity Policy described two goals for the agency: 1) conserve biodiversity in priority places; and 2) integrate biodiversity as an essential component of human development (USAID, 2014a). The policy recognizes that “biodiversity loss can be driven by unsustainable development, that there are trade-offs between biodiversity conservation and development goals that must be understood and managed, and that biodiversity conservation itself can be a critical tool for achieving sustainable development.” The central implication of the USAID Biodiversity Policy is that biodiversity conservation is not a development “sector” per se; rather, biodiversity should be seen as a foundation for any and all sustainable development. It is thus cross-cutting in the same way gender or climate risk are; all must be “mainstreamed” for effective, sustainable, resilient development.

In this context, this analysis has identified two types opportunities for USAID/Mozambique to consider as it develops its next CDCS. One type of opportunity follows directly from the view of biodiversity just described – that is, opportunities for increasing the effectiveness of the Mission’s development objectives in all sectors (e.g., democracy and governance, economic growth, education, health), and also making them more sustainable and resilient, by taking advantage of the benefits of biodiversity to human social and economic development. In this view, biodiversity conservation and natural resources management is the means to a development objective “end,” and the “actions needed” for biodiversity conservation are used as tools for achieving democratic governance, economic growth, education, and health objectives.

A second type of opportunity for the Mission is to incorporate and integrate support for biodiversity and tropical forest conservation in the activities of its development sectors. In this view, carefully designed activities in any sector can support biodiversity conservation objectives while also achieving their own, creating a “win-win,” “more bang for the buck” situation. For example, protecting a watershed forest above a village will provide cleaner and more dependable flows of water, improving the health and sanitation of the community, and conserve biodiversity at the same time. Or for another example, promoting more efficient cookstoves will reduce the respiratory health hazard to women and children from indoor wood smoke pollution, and also reduce forest degradation because less firewood is needed. Funding for such activities could easily be justified under the health program, but would contribute to biodiversity and forest conservation. We argue that these two views are both valid and provide strong opportunities for USAID/Mozambique.

Table 9 presents a matrix to illustrate the potential interaction, overlap, and synergy of “actions necessary” for biodiversity conservation and sectoral development objectives of USAID/Mozambique. We intend it to illustrate both kinds of opportunities just described – opportunities for actions needed for biodiversity conservation to contribute to and enhance sustainable, resilient development outcomes; and opportunities for sectoral development activities to contribute to actions needed for biodiversity

conservation. Highlighted cells in the matrix show potential opportunities, which are briefly discussed below.

Table 9. Actions Needed and Opportunities for Future Contributions by Development Sector

Theme: “Need to...”	USAID/Mozambique Program/DO			
	DO1: Democratic governance of Mozambican institutions strengthened (More effective civil society participation; improved government effectiveness, transparency, and accountability)	DO2: Resilient, broad-based economic growth accelerated (Increased ag. sector growth and food security; increased investment and jobs; improved management of natural resources)	DO3: Education quality improved (Improved reading outcomes, educational achievement of vulnerable children)	DO4: Health status of target populations improved (Improved health and nutrition services, systems, behaviors, outcomes)
1) Promote conservation-friendly agriculture		X		X
2) Strengthen community rights and capacity to manage and benefit from biodiversity	X	X	X	
3) Strengthen coastal and marine management	X	X		X
4) Stop illegal wildlife and timber trade	X	X		
5) Control environmental impact of extractive industries	X	X		X
6) Strengthen enforcement of environmental laws	X	X		X
7) Improve capacity and coordination of government agencies	X	X		X
8) Strengthen natural resources governance	X	X		X
9) Improve finance and management of protected areas	X	X		
10) Improve woodfuel and charcoal management, production, and use	X	X		X
11) Other: education, awareness; health; reforestation; donor coordination; climate change; ecosystem services; conservation finance; research and monitoring	X	X	X	X

Opportunities in Democratic Governance

The most diverse and numerous opportunities for USAID/Mozambique to contribute to actions needed for biodiversity conservation seem likely to fall within its democracy and governance portfolio. Activities currently being supported under USAID/Mozambique's DOI area contribute to a few of the "actions needed" identified by this analysis, and contributions of this sector could be increased and expanded in the future.

As explained above, we also want to point out opportunities for the Mission to use biodiversity conservation and natural resources management issues as entry points and leverage to achieve more robust and sustainable democratic governance objectives – in other words, to use them as means to broader sectoral ends. Three examples illustrate what we envision.

Corruption and Illegality

A general goal of democratic societies is rule of law. Corruption and illegality are almost always fueled by opportunities for a few who break the law to realize large financial gains from their illegal activities, and to ensnare politicians and the judiciary in a net of corruption to cover up those activities for their own financial gain. High-value commodities whose production and trade are regulated under the law are a major "fuel" for corruption and illegality, whether they are drugs, "blood" diamonds, wildlife products, timber, or highly valued marine species. As has been discussed, Mozambique presents a rich opportunity to reduce corruption and illegality through activities to curb the illegal wildlife and timber trade, as well as IUU fishing. Of the ten "actions needed" themes identified by this analysis, two relate directly to this topic.

Participation and Civil Society

Broad, democratic participation in decision-making is a hallmark of democratic societies. Civil society organizations are a main vehicle for fostering such participation, enabling individual citizens and communities to advocate with the government and private sector for their views and needs. Because Mozambique is a poor country, its people are highly dependent on the benefits of biodiversity – ecosystem products, services, and non-material benefits – for their livelihoods and development. Therefore, natural resource management issues provide the most important opportunity of any as an entry point for strengthening democratic participation and the capacity of civil society. Two themes for actions needed identified in this analysis, "strengthen community rights and capacity to manage and benefit from biodiversity" and "strengthen natural resources governance" speak directly to this critical topic.

Government Capacity and Accountability

Democratic governments require the capacity to plan, create strategies and policies, and make and enforce laws and regulations. Of the ten "actions needed" themes identified by this analysis, at least five are strongly related to this topic. Even the actions-needed theme of "promote conservation-friendly agriculture" will require adequate government plans, policies, laws and regulations, and financial and technical support.

The current Civic Partnership for Good Governance (PCGB) project seems ideal for supporting work on theme of community empowerment, especially if it is expanded to focus more directly, and with more resources, on issues of community-based empowerment for conservation and natural resources management.

Empowering communities and strengthening civil society will contribute to decreasing corruption and illegality, as communities act as watchdogs over natural resources. The current CDCS notes that

“... with the influx of international mining and gas firms descending upon small communities, there is a need to strengthen community leadership in partnership with civil society organizations (CSOs) to negotiate resettlement rights and to monitor and hold these private and public entities accountable to local communities” (USAID/Mozambique, 2014).

A free press and robust investigative journalism are important to democratic societies, and in Mozambique, USAID’s Media Strengthening Program provides a good opportunity to address a number of the actions-needed themes we identified, including reducing the illegal wildlife and timber trade (and IUU fishing), controlling the environmental impact of extractive industries, and strengthening enforcement of environmental laws.

Mozambique received a great deal of support for community-based natural resources management (CBNRM) in the 1990s and 2000s. However, unlike other sub-Saharan countries (e.g. Namibia) where CBNRM is an important contributor to conservation, little remains of that investment in Mozambique (USAID, 2011). Some projects tried to devolve management to communities, such as Tchuma Tchato and Chipanje Chetu, but we heard in interviews that while these projects still had potential, their influence and recognition is limited. Revitalizing this old work provides a potential opportunity to learn from and leverage past investments.

Current approaches to communities in the context of conservation in Mozambique could benefit from considering the importance of secure tenure to resources (USAID, 2014b; USAID, 2018a). Community institutions already exist that can be supported and strengthened, such as the Community Management Committees in the terrestrial context and Community Fisheries Councils in the marine and freshwater context (USAID, 2018b). The best examples of community co-management are in coastal and marine ecosystems, such as the Locally Managed Marine Areas (Zoological Society of London and local NGO AMA: Associação do Meio Ambiente), the rotating harvest zones and temporary closures within Quirimbas National Park, and the community marine sanctuaries in Inhambane Bay.

An additional issue of community land tenure is the situation with communities living inside conservation areas. Formalizing their legal rights to land and resources is a critical need mentioned in some of our interviews with key informants. The current Five Year Program (Programa Quinquenal do Governo 2015-2019) of the Government of Mozambique includes a strategic priority to strengthen land use planning and regularize land rights and tenure (Republic of Mozambique, 2015). USAID has conducted studies of the devolution of forest rights and sustainable forest management (USAID, 2014b).

Mozambique is a signatory to many international conventions relevant to biodiversity conservation, as discussed in Section 4.4. It is not clear to what extent the Mozambique is, or has the capacity to, implement these international agreements, and a needs assessment could be a first step toward supporting the government in their implementation.

Opportunities in Economic Growth and Agriculture

USAID/Mozambique’s agricultural portfolio seems to provide a potential opportunity to contribute to the actions-needed theme at the top of the list, “promote conservation-friendly agriculture.”

Conservation agriculture requires appropriate seeds and varieties, better water management, ecologically sound pest and weed control, prevention of erosion and maintenance of soil fertility, and many other things. To reach the key “target audience” for conservation agriculture – poor, smallholder, subsistence farmers – a deliberate strategy is needed. But it may not always align 100 percent with a value-chains, market-driven, business-oriented strategy, at least in its first phase.

Neighboring USAID/Malawi has supported conservation-friendly agriculture and livelihood practices as a strategy for biodiversity conservation, and lessons learned there may provide ideas and models for USAID/Mozambique to test and implement (USAID/Malawi, 2013).

Agroforestry is an important component of conservation agriculture, and the U.S. Forest Service's International Programs (USFS-IP) recently supported a community-based organization, Milange Mozambique (Zambezia Province) to address deforestation and expanding agriculture. Model nurseries propagate economic tree species and native species for watershed restoration. USFS-IP has worked through a transboundary exchange with the Malawi-based Mulanje Mountain Conservation Trust. This work may be of interest to USAID/Mozambique.

Conservation-friendly livelihoods include rural renewable energy development as an important ingredient for success, and in Mozambique, that links it with the actions-needed theme of improving woodfuel and charcoal management, production, and use. As noted in the *Mozambique Biomass Energy Strategy* (Ministry of Energy and EUEI-PDF, 2012), firewood and charcoal should be considered “a clean and modern fuel that remains affordable to the majority of the population for the foreseeable future.” USAID/Malawi has recent experience combining conservation-friendly agriculture with biodiversity conservation (USAID/Malawi, 2013), experience that included support for sustainable rural wood fuel through on-farm woodlots and fuel-efficient cooking stoves.

Mozambique's National Fund for Sustainable Development (FNDS) is already supporting work along these lines – in conservation agriculture, agroforestry, charcoal and biomass, and agricultural value chains, for example. One key informant recommended that USAID not try to “reinvent the wheel,” but learn from the experiences of FNDS.

An article with the provocative title “A Charcoal Vaccine: LPG [Liquefied Propane Gas] in Mozambique” from a newsletter of the natural gas industry (LPG Business Review, 2017) presents an interesting idea of how natural gas might improve vaccine storage in rural clinics, and plants the idea that there may be opportunities to reduce the use of charcoal to sustainable levels through making natural gas more available in urban areas.

Broadly conceived, conservation-friendly agriculture and livelihoods in Mozambique must include artisanal fisheries for two reasons. One is that a disproportionate number of Mozambicans live along its coasts, and the second is that fish provide a large fraction of the protein in the Mozambican diet. Of all the countries in East Africa, Mozambique is the most reliant on fish for nutrition (USAID, 2018b). In terms of economic growth, exports, and jobs, fishing is also critical. Estimates of the loss to the Mozambican economy from illegal, unreported, and unregulated fishing range from \$36 million to \$60 million per year (Club of Mozambique, 2018).

Opportunities In Health

USAID/Mozambique's health program is currently addressing a fundamental driver of threats to biodiversity – rapid and unsustainable population growth – through its activities to improve maternal and child health and provide family planning and reproductive health services.

The health of Mozambicans depends in part upon adequate nutrition and access to sufficient amounts of clean water for drinking, cooking, and sanitation. These both depend to a large degree in Mozambique on ecosystem products (e.g., fish) and services (e.g., watershed services of forests), which are maintained by the sustainable natural resources management and the conservation of biodiversity. Curbing Mozambique's population growth is necessary to maintain or restore a balance between

population and resources. This constellation of facts creates an opportunity for integrating USAID/Mozambique’s health sector with cross-cutting activities that support biodiversity conservation.

A number of studies have shown that water quantity and quality can depend on nearby and upstream forests. The title of one study, “Upstream watershed condition predicts rural children’s health across 35 developing countries” (Herrera, et. al., 2017) is a summary of its conclusions. The authors state that “diarrheal disease due to contaminated water is a major cause of child mortality globally. ... maintaining natural capital within watersheds can be an important public health investment, especially for populations with low levels of built capital.” Data from Mozambique contributed to the conclusions of this study. A study that combined forest cover data with health data in neighboring Malawi (Johnson, et al., 2013) found that “greater forest cover is associated with reduced risk of diarrheal disease. These ... findings suggest that protection of natural ecosystems could play an important role in improving health outcomes.”

In coastal zones, intact mangroves provide an important hydrological ecosystem service by blocking saltwater intrusion into coastal aquifers. Coastal communities often depend on groundwater wells for drinking water and sanitation, and saline drinking water can cause diarrhea, especially in children. Protection and restoration of mangroves may help to maintain and restore this ecosystem function, according to the evaluation of the mangrove restoration component of the USAID CCAP Project (USAID, 2017c), and thereby improve the health of coastal communities.

Studies also show that proximity to natural forests improves the nutrition of children. In Malawi, “net forest cover loss over time is associated with reduced dietary diversity and consumption of vitamin A-rich foods among children” (Johnson, et al., 2013). An Africa-wide study of dietary diversity and tree cover found that “there is a statistically significant positive relationship between tree cover and dietary diversity. ... our findings suggest that children in Africa who live in areas with more tree cover have more diverse and nutritious diets” (Ickowitz, et al., 2014).

Artisanal fisheries are extremely important to food security and nutrition in Mozambique (Benkenstein, 2013; USAID, 2015; 2016; 2018b; 2018c). Fish provide almost 40 percent of dietary animal protein in the country, and around 85 percent of the annual catch is produced by small-scale fishers and consumed locally (Benkenstein, 2013; USAID, 2015). The artisanal fishery employs an estimated 334,000 people. Mangroves are an important nursery area for larval and juvenile fish and crustaceans, and therefore contribute to food security and nutrition.

An important threat to artisanal fisheries comes from the use of insecticide-treated nets for fishing. These fine-mesh nets, for covering beds at night, are part of the strategy to control malaria, but in poor communities they are sometimes used for fishing, and because they catch even the smallest larval and juvenile fish, they can quickly destroy fish populations in an area where they are used. A recent report discussed the causes of the misuse insecticide-treated nets for fishing and strategies for changing this behavior (VectorWorks, 2018).

USAID’s experience with an ecosystem-based approach to fisheries management in other regions presents an opportunity for USAID/Mozambique to bring the lessons learned elsewhere to bear on this important nexus of health, development, and biodiversity conservation. “USAID Missions have increasingly identified opportunities to integrate biodiversity conservation and food security in programming, including applying an ecosystem-based approach to fisheries management” (USAID, 2018d).

One form of air pollution with human health impacts comes from cooking with firewood and charcoal. Women and children are especially susceptible to respiratory diseases from this type of indoor air pollution, which is linked to the predominance of firewood and charcoal for cooking – one cause of forest degradation.

Opportunities In Education

USAID/Mozambique’s education program is defined in a very specific way, one that leaves almost no room for integration with biodiversity conservation. Because it focuses so strictly on early-grade reading outcomes, it is difficult to see avenues for cross-cutting integration. In Table 9, we have marked two cells of the matrix, in which we imagine the education program might now be contributing to an action-needed theme. By improving literacy in the youth of communities, the program is laying the foundation for community empowerment in the future. We also imagine that literacy will enable children to read about ecological and natural resource issues.

The analysis team believes that there are ample opportunities for a more broadly construed education program both to benefit from the cross-cutting integration with conservation and natural resources knowledge, and also to contribute to many of the actions needed for biodiversity conservation. Wildlife and environmental clubs at schools, curricula that provide information about ecology and the environment, and many other opportunities exist in the realm of school-based, childhood education. If the realm of adult education were considered, opportunities would expand further.

9. RECOMMENDATIONS

The Scope of Work for this Mozambique Tropical Forests and Biodiversity analysis directed us to “Develop recommendations that will guide the Mission in updating the ‘extent to which’ in the new country strategy,” and to recommend “potential biodiversity linkages with other sectors.” In Chapter 8, we discussed potential opportunities for USAID to integrate biodiversity conservation into its development portfolio; those opportunities were developed logically from the threats-causes-actions-needed analysis presented in earlier chapters. In this final chapter, we have selected and integrated some of the opportunities into a handful of general recommendations that we believe would enable USAID/Mozambique to support some of the most urgent needs for biodiversity conservation in Mozambique and at the same time make its sectoral development interventions more effective, sustainable, and resilient. Opportunities are a wide “menu,” and here we recommend a selected subset of those that we think are more important and/or higher priority.

9.1 Integrate Biodiversity Conservation into Mission Development Objectives

USAID’s policies and guidance describe biodiversity conservation as a cross-cutting, cross-sectoral theme. USAID’s *Biodiversity Policy* states that “USAID will promote the use of integrated approaches that support both biodiversity conservation and improved development outcomes,” and that “... opportunities to promote integration of biodiversity and development may be best addressed in the context of engagement with specific development sectors, i.e., as they relate to sustaining or increasing access to biodiversity goods and ecosystem services to support development outcomes in those sectors. USAID will pursue opportunities in key sectors such as agriculture, food security ... health, governance, economic growth, and trade” (USAID, 2014a).

The FAA 118-119 analysis team recommends that USAID/Mozambique strives to integrate biodiversity conservation into its development portfolio, as called for in the *USAID Biodiversity Policy*, both as a way to increase the effectiveness and sustainability of its sectoral development objectives, and to allow those sectoral programs to contribute to the actions necessary to conserve tropical forests and biodiversity in Mozambique. These two approaches were discussed in more detail in Chapter 8.

Integration of conservation and development is more than co-location of activities supporting biodiversity objectives and sectoral development objectives – but co-location may be better than nothing, except that it sometimes can have unintended consequences, such as attracting settlement and increasing populations on the borders of protected areas, and sometimes can function more as a “bribe” to communities for conservation than a true integration.

9.2 Support Conservation-Friendly Sustainable Agriculture and Livelihoods

Unless the agricultural frontier in Mozambique is stabilized and closed, forests and other natural ecosystems across the country will continue to be lost and degraded. This will require intensification of agricultural production, but that must be done in a way that is environmentally and socially sustainable. Our key informants indicated that supporting conservation agriculture in order to stabilize the agricultural frontier and protect the remaining natural ecosystems was of the highest priority.

A diverse suite of technical agricultural interventions that can be called “conservation agriculture” were discussed in Chapter 6, including crop diversification, more tree crops and agroforestry, reduction in agricultural burning, use of crop residues for mulching, minimum tillage, erosion control, improved water management, and many other things. The kind of farming systems needed to intensify smallholder

production in an environmentally safe manner will need to combine food production with other livelihood needs, such as wood for building and cooking. Cookstoves that burn wood or charcoal more efficiently and access to small-scale renewable energy systems can help make rural energy needs sustainable. Ultimately, halting population growth and stabilizing populations will be necessary. Because of the association of forests and tree cover with clean water – with its correlated health benefits – farmers will have to collaborate to protect and manage local watersheds. Such collaboration requires democratic, participatory governance, starting at the community level.

Supporting conservation agriculture therefore integrates development activities and outcomes in the democracy and governance, economic growth and agriculture, and health sectors. USAID/Mozambique could make important contributions through strategic adjustments in its sectoral activities.

9.3 Support and Empower Coastal Communities to Manage and Benefit from Biodiversity

Approximately 42 percent of Mozambique’s national territory is ocean. Marine ecosystem products and services provide essential benefits to the country, but the conservation and management of Mozambique’s ocean is in great need of attention. Tens of millions of dollars a year are estimated to be lost to IUU fishing; offshore oil and gas development threatens marine and coastal species and habitats; and coastal communities, heavily dependent on ecosystem benefits for their livelihoods, are overexploiting those resources in many cases.

We recommend that USAID/Mozambique develop a program to promote an “ecosystem approach” to development in Mozambique’s coastal zone – that is, an “integrated management across land, water and natural resources that promotes both conservation and sustainable use of the whole ecosystem” and that “strives to find a balance between ecological well-being and human well-being through good governance” (USAID, 2018d). Such a program would integrate activities from the Mission’s:

- Democracy and governance sector, such as community empowerment in coastal communities, spatial planning in coastal and offshore ocean zones that incorporates biodiversity information and conservation strategies, and enforcement of relevant laws and regulations;
- Economic growth and agriculture sector, such as fisheries and mariculture value chains, conservation agriculture in coastal communities, and mangrove conservation and restoration; and
- Health sector, including maternal/child health and nutrition, family planning and reproductive health, and water and sanitation.

Such a program could also support capacity-building within MIMIAP to:

- Interact with MITADER and MIREME in offshore oil and gas development planning and regulation;
- Develop ecosystem-based fisheries management plans and regulations for target/high-value species and important artisanal species; and
- Monitor and enforce fishing regulations in the EEZ.

An integrated program of support by USAID/Mozambique could continue elements of the important work started in the Coastal City Adaptation Project (CCAP), including municipal planning for sea-level rise vulnerability mapping, mangrove restoration, and municipal coastal development planning and zoning (USAID, 2017c; 2017d; USAID, 2018e).

USAID could explore opportunities for collaboration on some aspects of a coastal communities support program with the U.S. National Oceanic and Atmospheric Administration (NOAA) Fisheries International Programs, whose website states: “U.S. fisheries are a global model of success. We are leading the way in science-based management and in the use of innovative strategies to achieve and maintain sustainable fisheries and to preserve and rebuild protected species, including marine mammals and sea turtles. We engage with other countries bilaterally and through various multilateral international fisheries organizations to promote sound management and conservation of global fisheries resources in a manner consistent with U.S. domestic fisheries policy.” Through the State Department and NOAA Fisheries, the United States cooperates in various international bodies, including the Indian Ocean Tuna Commission (IOTC), an intergovernmental organization responsible for the management of tuna and tuna-like species in the Indian Ocean. Mozambique joined the IOTC in 2012 (IOTC, 2019).

9.4 Support Anti-Corruption Efforts and Law Enforcement to Reduce Illegal International Trade in Wildlife and Timber

USAID/Mozambique’s efforts so far have focused on strengthening the enforcement of laws protecting endangered wildlife – the “supply side” of the problem. This work has been important, and USAID should continue to support these law enforcement and anti-corruption strategies and activities at the national level. There are long-term needs to work with the judiciary, wildlife law enforcement entities, customs, the police, and other relevant actors. There may be opportunities to contribute to the second and third strategic “pillars” of the U.S. National Strategy for Combatting Wildlife Trafficking: to reduce demand for those products, and to expand international cooperation and commitment to stop the illegal trade. In the long term, reducing demand for threatened wildlife, and also timber products, in countries like China will be essential. Continuing support for the surveillance and monitoring of ports and airports (ROUTES, 2018a; 2018b) for illegal wildlife and timber products is also important. Programs control corruption and illegal trade should also consider the issue of IUU fishing (The Global Initiative, 2019).

Ten specific ideas for needed actions were proposed by our key informants; those can be reviewed in Annex E. One of those was to create a mechanism to improve donor coordination on illegal wildlife trade issues. This and other ideas could provide opportunities for further work on this theme.

9.5 Build Capacity to Minimize Biodiversity Impacts of Oil and Gas Development and Other Extractive Industries

USAID/Mozambique could play a valuable role in protecting biodiversity in Mozambique while assisting the country to benefit economically from extractive industries, such as mining for minerals or coal, and oil and gas development. It could do so, for example, by:

- Supporting capacity-building in MITADER for EIA oversight and enforcement of environmental laws;
- Building capacity for coordination with MIMIAP large-scale marine spatial and coastal zone planning;
- Supporting the development of biodiversity surveys and information to steer development away from the most biologically sensitive and important areas (such as the use of “Key Biodiversity Areas” (KBA) assessments); and
- Promoting the use of biodiversity offsets to mitigate unavoidable adverse impacts of infrastructure siting (both onshore and offshore).

Project COMBO conducted analyses on legal, institutional, and data gaps that need to be closed for improving biodiversity conservation aspects of environmental impact assessments. The Mission is already engaged in some relevant activities, such as the SPEED+ Project’s mapping of “key biodiversity areas” (KBA) activity.

An article in a publication of the natural gas industry (LPG Business Review, 2017) about how LPG might be able to provide refrigeration in rural clinics without electricity to improve vaccine storage raises a question about potential opportunities to make natural gas more accessible in Mozambique. Exploring whether gas production companies could assist in making natural gas affordable may be worthwhile, in part because competitively priced gas might help to reduce the use of charcoal for cooking in urban areas.

In the long term, of course, the countries of the world need to shift from fossil fuels to renewable sources of energy. Mozambique is richly endowed with fossil fuel resources, including coal exports from Tete Province, and, soon, large exports of natural gas from Cabo Delgado province. Mozambique is also a party to the UNFCCC and Paris Agreement on climate, which commits all parties to reductions in fossil fuel use and carbon emissions. In supporting short-term growth in fossil fuel exports, Mozambique must also plan for a post-fossil fuel future.

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II. Annexes

Annex A: Biographical Sketches of the Analysis Team

Dr. Teri Allendorf, Field Team Leader: Dr. Allendorf is a biodiversity conservation specialist with a Ph.D. in conservation biology and a focus on park-people issues. She holds a Ph.D. in conservation biology from the University of Minnesota and a B.A. in anthropology from Northwestern University. Dr. Allendorf was a member of the USAID biodiversity team from 2000-2002 and is familiar with relevant USAID policies, including FAA 118-119 analyses. She conducted FAA 118-119 assessments Guyana in 2002 and in Nepal in 2013, where she served as the team leader. In 2017, she was the team leader for the first USAID natural resources Whole of Project Evaluation in Tanzania.

Dr. Bruce Byers, Senior Technical Advisor: Dr. Byers is an ecologist and biodiversity conservation and natural resources management specialist with more than 30 years of experience working in more than 40 countries in Africa, Asia, Europe and Eurasia, and Latin America. He holds an M.A. and Ph.D. in ecology and evolution from the University of Colorado. Dr. Byers has led many multi-disciplinary and international teams in assessments, evaluations, and strategic planning exercises, on topics including biodiversity conservation, forestry, climate change adaptation and mitigation, ecosystem services, and environmental communication, outreach, and behavior change. He was the lead consultant and author of the 2005 USAID publication *Tropical Forestry and Biodiversity (FAA 118 and 119) Analyses: Lessons Learned from Recent USAID Experience and Guidelines for USAID Staff*. He has led or participated in more than a dozen FAA 118-119 assessments for USAID, including as team leader for previous USAID/Mozambique FAA 118-119 analyses in 2002 and 2012.

Dr. Federico Prado, Deputy Team Leader: Dr. Prado is an ecologist and evolutionary biologist with experience in biodiversity conservation, field research, natural resources management, program/project/grant management, international development, and scientific research. He holds a Ph.D. in biology from the University of Washington, an M.S. in biology from Texas State University and an M.S. in electrical engineering from the University of Texas.

Dr. Salomao Bandeira, Marine and Coastal Ecosystems Specialist: Dr. Bandeira is a marine and coastal ecosystems expert with a Ph.D. in marine botany from the University of Gothenburg, Sweden. He is an associate professor at Eduardo Mondlane University in Maputo. Dr. Bandeira's expertise includes coastal and marine biodiversity, governance and management, "blue carbon," and ecosystem-based approaches to climate adaptation. He co-authored books on *The Maputo Bay Ecosystem* and *A Field Guide to the Mangroves of Africa and Madagascar*. He serves as the CITES scientific coordinator for Mozambique and is a member of the Advisory Group to the Convention on Biological Diversity for Ecologically or Biologically Significant Marine Areas. He has coordinated several local and regional projects funded by European donors, and has advised the Mozambican ministries, MITADER and MIMAIP, on coastal and marine environmental issues.

Sean Nazerali, Senior Technical Advisor: Mr. Nazerali is a natural resource management professional with more than 20 years of international development experience. He holds a Master's degree in international relations from Charles University in Prague, Czech Republic. Over his career, he has specialized in innovative sustainable financing mechanisms for biodiversity, with an emphasis on biodiversity offsets and conservation trust funds, financial planning and management for protected areas, climate change resilience, REDD+ processes, and oil and gas industry impact mitigation. In Mozambique, he has worked as a long-term consultant to the World Bank, most recently serving as lead author for the Roadmap for Implementing Biodiversity Offsets in Mozambique and also as country expert for the

Technical Advisory Panel Review of Mozambique's Emission Reduction Program. He has also served as lead consultant for the development of the BIOFUND Mozambique Conservation Trust Fund.

Santos Nassivila, Logistics Specialist: Mr. Nassivila is a senior development practitioner with more than 22 years of experience working primarily in Mozambique, Zambia, and Zimbabwe. He holds a Master's degree in development management from Zimbabwe Open University. Mr. Nassivila has managed donor-funded programs in Mozambique and elsewhere in Southern Africa, and has extensive experience in policy analysis, program evaluation, operational research, human rights, and civil society.

Annex B: Persons Contacted

Name	Organization/ Institution	Position
USAID Washington and Other U.S. Government		
Fort Felker	U.S. State Department	Foreign Affairs Officer, Wildlife Trafficking Team
Brandon Neukam	U.S. State Department	Foreign Affairs Officer, Bureau of International Narcotics and Law Enforcement Affairs
Stephanie Arnold	U.S. State Department	Mozambique Desk Officer
Michelle Gadd	USFWS	Program Officer, African Elephant and African Rhino Programs
Mary Rowen	USAID	Senior Wildlife Advisor, Forestry and Biodiversity Office
Andrew Tobiason	USAID	Biodiversity Conservation Advisor, Forestry and Biodiversity Office
Colin Quinn	USAID	Climate Change Technical Advisor, Africa Bureau
Barbara Best	USAID	Senior Coastal Resources and Policy Advisor
USAID Mozambique		
Armando Abacar	USAID	Energy Specialist
Artur Chirindja	USAID	DG Program Management Specialist
Peter Cloutier	USAID	General Development Officer
Dercio Douto	USAID	M&E Specialist, SPEED+ Project
Todd Flower	USAID	Office Chief, AEB Office
Olivia Gilmore	USAID	Environment Officer
Stephen Gudz	USAID	Foreign Service Officer
Ken Hasson	USAID	Agriculture Team Leader
Rita Madalena	USAID	Program Specialist
Marcia Matenja	USAID	Program Development Specialist
Martin McLaughlin	USAID	Education, Democracy, and Governance Chief
Paula Pimentel	USAID	Agriculture Specialist
Nathan Sage	USAID	Environment Officer
Danielle Tedesco	USAID	Environment Team Leader
Ken Hasson	USAID	Agriculture Team Leader
Zachary Bailey	U.S. Embassy	Environment, Science, Technology, and Health Officer
Maputo		
Guilhermina Amurane	MITADER/DINAB	Head of Department
Alexandre Bartolomeu	MITADER/DINAB	Department Head
Mateus Mutemba	ANAC	General Director
Armando Araman	ANAC	Department Head
Carlos Lopes Pereira	ANAC	Director of Protection
Pejul Pedro Calenga	ANAC	Department Head/Project Manager

Name	Organization/ Institution	Position
Lola Lopes	WCS/ANAC	Coordinator
Felismina Antia	DIPOL	National Director
Moniz Mungambe	DIPOL-MIMAIP	Head of Department
Madyo Couto	FNDS-MozBIO	Coordinator
Camilo Nhancale	KUWUKA JPA	President
Peter Bechtel	Independent Consultant	Consultant
Gildo Espada	Independent Consultant	Consultant
Simao Joaquim	DINAT	
Luis Nhamucho	WWF	Program Officer
Avelino Mungambe	ADNAP	Services Director
Isabel Chauca	ADNAP	Deputy Director
Abu Saifodine	IHO/PMI	PMS
Luis Bernardo Honwana	BIOFUND	Executive Director
Alexandra Jorge	BIOFUND	Program Director
Sean Nazerali	BIOFUND	Advisor
Hugo Costa	WCS	Program Officer
Bruno Nhancale	World Bank	Environmental Specialist
Vitalina de S. Ambriroze	ESTAMOS	M&E Officer
Leonel Fevereiro	ESTAMOS	Manager C.P.N
Etelvina	ESTAMOS	Gender Program Officer
Hemergildo Jamo	ESTAMOS	Financial Manager
Flora Punduma	ESTAMOS	Programs Manager
Sergio Chitara	SPEED+ Project	Chief of Party
Afonso Madepe	SPEED+ Project	Biodiversity Partnerships Manager
Vera Julien	SPEED+ Project	Biodiversity Partnerships Coordinator
Tania Pereira	CTV	Director of Programs
Aida Salomao	CTV	Legal Advisor
Raquel Fernando	CTV	Marine Biologist
Carlos Libro	CTV	Marine Biologist
Cabo Delgado-Pemba		
António Domingos Mapure	Provincial Government	Permanent Secretary
Iolanda Almeida	Provincial Government	Provincial Director
Anibal Manuel	Provincial Government	Officer – DPAI
Arlindo Djedje	DPTADER	Provincial Director
Dulce Guambe	DPTADER	Env. Office
Momade Alvaro	DPTADER	Forest Officer
Norte Luali	DIPREME	Department Head
Salvador Zuarica	DIPREME	Mineral Resources Officer
Jake Walter	Independent Consultant	Consultant
Mariano Matias	Quirimbas National Park	Conservation Officer
Sonia Maciel	Unilurio	Vice Rector
António Hogueane	UEM	Director
Lourenço Nanhelo	Forum-Terra	Association President
Assane Simao Da Silva	Forum-Terra	Coordinator

Name	Organization/ Institution	Position
Florindo Vahoche	Forum-Terra	Information Officer
Nampula-Nacala		
Veronica Ernesto Langa	Provincial Government	Permanent Secretary
N. Domingos	DPTADER	Deputy Director
Luis Tomas	DPTADER	Department Head
Graciano Gereu	DPTADER	Technician
Vasco Albert	DIPREME	Department Head
Camboio	DIPREME	Department Head
Abel Sibia	DIPREME	Legal Department
Antonio Mucussete	DIPREME	Geologist
Casimiro Ussene	DPMAIP	Department Head
Mahando Sunaie	DPMAIP	Planning
Omar Abdul Aquiamungo	Department of Culture & Tourism	Provincial Director
Mauro Monteiro	Department of Culture & Tourism	Technician
Geralda Januario	Department of Culture & Tourism	Department Head
Anastancio Quana	FNDS-Sustenta	Program Assistant
Danilo Singano	FNDS-Sustenta	Program Officer
Abdul Haje Antonio	FNDS-Sustenta	Program Assistant
M.J.M. Deolinda	Iago District	District Administrator
Jordao Matimula Junior	AENA	Executive Director
Juma Rogerio Momola	Forum- Terra	Field Technician
Pierino Luis Cassilote	ORAM-Niassa	M&E Officer
Leonardo	ORAM-Niassa	Provincial Representative
Silvia Elisa Manquene	ORAM-Niassa	Gender Program Officer
Inocencio Sotomane	FIS Lda	Director General
Niassa-Lichinga		
Rodrigues Ussene	Provincial Government	Permanent Secretary
Afonso A. Chizoma	DPTADER	Acting Director
Jose Varimelo	DPASA	Director
Servorgel ED. Brandao	DPASA-SPDS	Department Head
Arnaldo Maboia	DPASA-DEA	Department Head
Alberto Mucavele	DPMAIP	Director
Luis Aliasse	SPFFB	Department Head
Gracinda Maida Levene	SPFFB	Officer
Jormito Muamede	SPFFB	Ranger
Pedro Jose	SPFFB	Technician
Orlando Domingos	SPFFB	Technician
Horancio Eugenio Mouforte	SPGC	Technician
Valente Branahassane	SPGC	Technician
Rosa Pedro	SPGC	Technician
Manuel Simao	Conservation Areas	Department Head
Valentine Mpala	NKWI CHI	General Manager
Inhambane		

Name	Organization/ Institution	Position
Ilidio S.Wamusse	Bazaruto National Park	Tourism Officer
Armando G. Guenha	Bazaruto National Park	Warden
Pedro Pereira	Pomene National Reserve	Administrator
Jacinto Manuel	Pomene NR	Technician
Odilao F. Macamo	Pomene NR	Ranger
Palmira	Pomene NR	Ranger
Cornelio Nquito Aibo	Pomene NR	Ranger
Adelina F.Pelembe	Pomene NR	Student
Pedro Egas	MAHLAHLE	Project Officer
Olga Macupelane	MAHLAHLE	Coordinator
Pascoal Mapile	MAHLAHLE	Program Manager
Antonio Casamento	ORM/Bitonga	Human Rights Program Officer
Timotny Dykmau	ORM/Bitonga	Human Rights Program Officer
Mariana Coelho	Marine Megafauna Foundation	Accounts Manager
Jess Williams	Tartarugas para o amanha	Director
Nakia Cullain	Marine Action Research	Director
Inacio Handela	The Bazaruto	Head of Post
Crimildo Zivane	APABA Association	Association President
Carlos Bumane Mutando	APABA Association	Vice President of Fishermen
Fernando Tsa Tsabala	APABA Association	Association Member
Francisco Albino	APABA Association	Treasurer

Annex C: Non-USAID Key Informant Interviews Conducted

Institution	Name	Position	Contact Email
Agha Khan Foundation	(not recorded)	-----	-----
Amigos de Terra	(not recorded)	-----	-----
AENA Nampula	Jordao Matimula Junior	Executive Director	matimulajunior@aena.mz.org
BIOFUND	Luis Bernardo Honwana	Executive Director	luis.honwana@biofund.org.mz
	Alexandra Jorge	Programs Director	ajorge@biofund.org.mz
Independent Consultants	Sean Nazerali	Advisor	sean.nazerali@gmail.com
	Peter Bechtel	Consultant	bechtelpeterh@yahoo.com
	Gildo Espada	Consultant	gildoespada@gmail.com
Cabo Delgado Provincial Tourism Office	Iolanda Almeida	Director of Culture and Tourism	iolanda.almeida@gov.mz
Centro Terra Viva	Tania Pereira	Directora Programas	tpereira@ctv.org.mz
	Aida Salomao	Assessora Juridica	aida.solomao00@gmail.com
	Raquel Fernando	Biologa Marinha	
	Carlos Libro	Fisheries, Mangroves and Crustaceans Expert	clibro@ctv.org.mz
Fisheries	(not recorded)	-----	-----
Gorongosa Restoration Project	(not recorded)	-----	-----
Lichinga Agriculture Office	(not recorded)	-----	-----
Mozambique Ministry of Fisheries	(not recorded)	-----	-----
MozBio Program	(not recorded)	-----	-----
Nampula Agriculture Office	(not recorded)	-----	-----
Nampula Provincial Tourism Office	Omar Abdul Aquiamungo	Provincial Director	omarogogo1966@gmail.com
	Mauro Monteiro	Technician	mauromonteiro@yahoo.com.br
	Geralda Januario	Department Head	dinajanuario@yahoo.com.br
ORAM	Pierino Luis Cassilote	M&E Officer	piercassilote@gmail.com
	Leonardo	Provincial Representative	
	Silvia Elisa Manquene	Gender Program Officer	silmanquene@gmail.com
SPEED+ Project	Sergio Chitara	Chief of Party	sergio-chitara@dai.com

Institution	Name	Position	Contact Email
	Afonso Madope	Biodiversity Policy Portfolio Manager	afonso-madope@dai.com
	Vera Julien	Biodiversity Policy Portfolio Coordinator	Vera-julien@dai.com
Forum-Terra, Pemba	Lourenço Nanhelo	Associations President	
	Assane Simao Da Silva	Coordinator	assanedasilva@gmail.com
	Florindo Vahoche	Information Officer	vahoche86@gmail.com
Lúrio University/UniLurio	Steve Boahen	Legume Systems Agronomist	s.boahen@cgiar.org
Wildlife Conservation Society	Hugo Costa	Program Officer	hcosta@wcs.org
World Bank	Bruno Nhancale	Senior Natural Resources Management and Environmental Safeguard Specialist	brunonhancale@worldbank.org
World Wildlife Fund	Luis Nhamucho	Program Officer	inhamuch@wwf.org.mz

Annex D: Conservation Areas in Mozambique (ANAC, 2019)

Conservation Area	Institution(s) Responsible	Area (km ²)	Ecosystems Present
National Parks			
Banhine	ANAC-Peace Parks Foundation	7,250	Wetlands, grasslands, mopane woodlands, sandveld, open forests
Bazaruto Archipelago	ANAC-African Parks Foundation	1,430	Savannah, wetlands, coastal dunes, scrub, miombo woodland, mangroves, sea grasses, coral reefs
Gorongosa	ANAC-Carr Foundation	4,086	Afromontane forest, montane grassland, riverine forest, savannah woodland, open forest, grassland, savannah
Limpopo	ANAC-PPF	11,233	Sandveld, mopane woodland, savannah woodland
Mágoè	ANAC-EWT	3,558	Mopane and miombo woodlands, open and closed forests, scrub, open and closed woodlands
Quirimbas	ANAC-WWF	9,130	Mangrove, coastal thicket, acacia grassland, miombo woodland, mixed woodland, inselbergs, mangroves, sea grasses, coral reefs
Zinave	ANAC-PPF	4,000	Miombo woodland and riverine forests
National Reserves			
Chimanimani	ANAC-MICAIA	655	Afromontane forests, low- and mid-altitude rainforest, grasslands
Gile	ANAC-IGF	2,343	Open woodland, bushland, savannah, grassland, miombo woodland
Maputo Special Reserve	ANAC-PPF	1,040	Maputaland coastal forest mosaic, dunes
Marrromeu	ANAC	6,800	Seasonal and permanent wetlands, open and closed forests, gallery forest, gallery grassland, mangroves, coastal dunes
Niassa	ANAC-WCS	42,000	Miombo forests, savannah, wetlands, inselbergs
Lake Niassa Partial Reserve	ANAC-WWF	478	Miombo woodland and freshwater lake
Pomene	ANAC	50	Gallery forest, freshwater lakes, miombo woodland, wetlands, grasslands, coastal dunes, mangroves, coral reefs, sea grasses
Ponta do Ouro Partial Marine Reserve	ANAC-PPF	678	Intertidal rocks, coastal dunes, estuaries, mangroves, sea grasses, coral reefs
Environmental Protected Area			
ZPT São Sebastião	Private (the state is represented on a steering committee)	439	Savannah, wetlands, coastal dunes, scrub, miombo woodland, mangroves, sea grasses, coral reefs
Ilhas Primeiras e Segundas Environmental Protected Area	ANAC-WWF CARE Alliance	10,409	Coral reefs and mangroves
Malhazine Municipal Ecological Park	Maputo City	6	Maputaland mosaic
Community Conservation Area			
Chipanje Chetu	ANAC-Lipilichi Wilderness Investment	6,065	Miombo forests, savannah, wetlands, inselbergs
Tchuma Tchato	ANAC	2,500	Mopane and miombo woodlands
Coutadas			
20 Coutadas	ANAC and various private operators	> 62,329	Various
Game Farms			
50 Game Farms (Fazendas de fauna bravia)	ANAC and various private operators	> 6,208	Various
Forest Reserves			
13 Forest Reserves	MASA	4,945	Various

Annex E: Actions Needed from Key Informant Interviews

Promote Conservation-Friendly Agriculture

- 1) Promote agroforestry, tree crops, diversification of crops among small farmers
- 2) Promote use of tree-leaf compost that improves soil fertility
- 3) Promote firebreaks to contain escaped agricultural fires
- 4) MITADER should prioritize development activities (such as support for conservation-friendly agriculture) in buffer zones of protected areas
- 5) Develop and promote conservation-friendly agriculture
- 6) Small livestock projects (goats, guineafowl) to take pressure off of bushmeat
- 7) Small-scale irrigation may allow small farmers to stay in one place rather than move to a new area and clear it
- 8) Introduce farmers to technologies to increase yields: water, improved varieties, inputs, compost, agrodealers, blocks of fields (to access tractors)
- 9) Encourage crops with short growth periods and drought-resistant sweet potatoes
- 10) Encourage tree crops like cashews
- 11) Encourage conservation-friendly agriculture, including tree crops, diverse species, multiple crops per year
- 12) Improve water resource management (small dams, pumps, irrigation systems)
- 13) Promote beekeeping, fruit trees, and other livelihood/income options among small farmers
- 14) Provide access to small-scale renewable energy technology (solar, wind) for small farmers
- 15) Need new technologies and extension services, high quality seeds, irrigation, etc.
- 16) Promote integration of trees on farms, especially leguminous/nitrogen-fixing trees and shrubs
- 17) Promote improved seeds and varieties, compost and manure, and bacteria (inoculants) that fix nitrogen in soil
- 18) Promote growing of cow peas and pigeon peas

Strengthen Community Rights and Capacity to Manage and Benefit from Biodiversity

- 1) Train and support communities to advocate and change for their own benefit
- 2) Need more laws and instruments to focus on access to resources for local communities
- 3) Need process to make sure that the 20 percent (of license fees from concessions) are distributed to and used by communities
- 4) Need to assign and demarcate areas of forest to specific communities so outsiders don't come in and exploit community's forest resources
- 5) Strengthen community organization in order to defend community rights and implement community responsibilities
- 6) Use Namibia's experience with community-based natural resources management as a model
- 7) Improve the process for community consultations
- 8) Need to develop a financing system for community co-management
- 9) Promote and provide benefits to community fisheries councils to encourage their participation
- 10) Increase and support the devolution of natural resources management authority to communities
- 11) Support community-based organizations, especially in benefit-sharing from natural resources
- 12) Improve the process of community consultation by implementing best practices
- 13) Engage local fishing communities to define and monitor no-take zones during certain periods
- 14) Need better understanding of the potential to engage communities through community concessions or community managed areas

Strengthen Coastal and Marine Management

- 1) Mangrove restoration
- 2) Temporary closures of fisheries, such as for octopus near Quirimbas NP, to allow stocks to rebound after overharvesting

- 3) Promote sustainable fishing practices and discourage unsustainable fishing through behavior-change campaigns
- 4) Develop a vision for protecting Mozambique's coastal zone
- 5) Strengthen control of international fishing
- 6) Mozambique needs to adopt ecological management of ocean fisheries
- 7) Use us department of defense to support surveillance and enforcement of ocean fishing
- 8) Develop aquaculture when it can take pressure off of overexploited aquatic species
- 9) Introduce/require fishing nets that don't damage habitat or catch too small fish
- 10) Clarify and strengthen role of community fisheries councils in fishery co-management
- 11) A percentage of the fees from fishing licenses should go to conservation and management
- 12) Need a system of monitoring and surveillance of foreign fishing vessels
- 13) SPEED+ Project should assist with marine and mangrove issues
- 14) Increase the contribution of coastal and marine resources to the national economy

Stop Illegal Wildlife and Timber Trade

- 1) Improve donor coordination on illegal wildlife trade projects
- 2) Develop better relations and coordination with China on biodiversity conservation issues in Mozambique
- 3) Better human systems and technology to reduce/prevent bribes and corruption at ports that allow illegal export of timber or wildlife products
- 4) Government needs to face and deal with the issue of illegal timber trade
- 5) Need more "boots on the ground" to stop wildlife crime
- 6) Need better surveillance of ports and airports to stop illegal export of ivory, rhino horn, and high-value timber
- 7) Assist attorney general's office to develop a reference manual for prosecutors and investigators as a tool to reduce illegal wildlife exploitation
- 8) Need to develop a strategy for ivory management – now the government does not know what to do with confiscated ivory, whether to burn, sell, or store it
- 9) Create law enforcement linkages between source (e.g., Mozambique) and market countries (e.g., China, Vietnam) involved in the wildlife trade
- 10) Support investigative journalism to raise public awareness of topics such as illegal logging and wildlife crime and show how it is hurting ordinary Mozambicans

Control Environmental Impact of Extractive Industries

- 1) Develop more effective mitigation of biodiversity impacts of extractive industries (e.g., biodiversity offsets)
- 2) MITADER must properly implement existing new EIA regulations
- 3) Need to amend EIA law to cover extractive industries
- 4) Avoid mineral exploitation in areas critical to the survival of fauna and flora
- 5) Reduce impact from LNG industries by setting aside small marine protected areas near and around affected areas
- 6) Need independent oversight of EIA process to prevent corruption by government or private sector
- 7) Need better training on ecological impact assessment, especially as related to extractive industries (oil and gas, mining)
- 8) Ensure that oil and gas development is conservation sensitive and sustainable

Strengthen Enforcement of Environmental Laws

- 1) Improve training and support for attorneys in enforcement of environmental laws
- 2) Need a communication strategy for raising knowledge about conservation laws, especially among young people
- 3) Need to improve capacity to implement existing laws
- 4) Improve awareness of existing laws in rural areas
- 5) Need better capacity to enforce environmental laws

- 6) Need the funds and means, equipment, etc. For law enforcement
- 7) Need adequate enforcement of the EIA process
- 8) Strengthen the capacity of the judiciary to enforce environmental laws and prosecute environmental crimes

Improve Capacity and Coordination of Government Agencies

- 1) Strengthen the capacity of ANAC
- 2) Balance financial support to MITADER and ANAC (ANAC often suffers when funds go to MITADER)
- 3) Need to strengthen the capacity of government institutions across the board, especially ANAC and Forestry
- 4) Increase the marine expertise in ANAC
- 5) Need better coordination among government institutions responsible for conservation and natural resources
- 6) Need to improve communication between ministries managing forests and wildlife
- 7) Need stronger capacity in government agencies involved in natural resources management
- 8) Need better coordination among government agencies involved in natural resources management

Strengthen Natural Resources Governance

- 1) Support site visits to model sites where other sites can see positive models (e.g., Gorongosa)
- 2) Revise tenure policies so rights to natural resources go with land rights
- 3) Need participation at all levels, from community to national, in development of sustainable natural resources management
- 4) Need better land use planning and integration to reduce social conflicts, which will reduce environmental impacts
- 5) Strengthen land tenure to encourage farmers to stay in one location and discourage slash and burn practices
- 6) Provincial land use planning should include awareness of important areas for biodiversity
- 7) Improve land use planning
- 8) Improve natural resources governance

Improve Finance and Management of Protected Areas

- 1) Improve protection of existing protected areas
- 2) Lake Niassa Partial Marine Reserve should be placed under ANAC management
- 3) Build capacity within the government to determine appropriate strategies for park and protected area financing and management
- 4) Need to use controlled burning in some cases
- 5) Need a map of forest reserves in Mozambique, so they can be treated as a component of the protected-area system

Improve Woodfuel and Charcoal Management, Production, and Use

- 1) Promote the use of Casamance or other improved charcoal kiln designs to improve charcoal yield
- 2) Promote use of more efficient cookstoves for both wood fuel and charcoal
- 3) Promote use of tree coppicing for charcoal production
- 4) Promote tree-coppicing for firewood rather than cutting entire tree
- 5) Promote more efficient cookstoves

Other: Education, Awareness; Health; Reforestation; Donor Coordination; Climate Change; Ecosystem Services; Conservation Finance; Research and Monitoring

- 1) Work with women on maternal-child health and family planning to slow population growth that creates unsustainable pressure on natural resources

- 2) Establish local nurseries to cultivate indigenous trees for use in forest regeneration
- 3) Support family planning to reduce population growth
- 4) Strengthen education in natural resources management in Cabo Delgado Province and nationwide
- 5) Need to study and take into account climate change simulations to prepare for future scenarios
- 6) Need more applied science, and using university students to do applied studies is one way to get more
- 7) Give more attention and weight to the value of ecosystem services
- 8) Need to monitor two introduced shrimp species (*Metapenaeus dobsoni* and *Parapenaeopsis sculptilis*) and study their ecological and economic effects
- 9) Promote replanting/restoration of degraded forest land
- 10) Educate farmers to prevent wildfires
- 11) Revive the former Biodiversity Working Group to bring together the donors so they know who is doing what
- 12) Develop mechanisms for using tourism money for biodiversity conservation
- 13) Need a functional and active conservation donor group to improve donor coordination

Annex F: Scope of Work

I. Background

As part of the documentation for the 2020-2025 Country Development Cooperation Strategy (CDCS), USAID/Mozambique is required by Sections 118 and 119 of the Foreign Assistance Act (FAA), as amended, to prepare an analysis of tropical forests and biodiversity in Mozambique.

By mandating a FAA 118/119 analysis (hereafter referred to as the analysis), the U.S. Congress is recognizing the fundamental role that tropical forests and biodiversity play in sustainable development. Based on this analysis, USAID/Mozambique will define to what extent the CDCS will contribute to biodiversity conservation needs in Mozambique. The analysis will assist in strengthening the Mission's role in biodiversity conservation by integrating biodiversity and tropical forest conservation in the CDCS.

1.1 Summary of Relevant Parts of FAA Sections 118 and 119

FAA Sections 118 and 119, as amended, require that USAID Missions address the following:

1) FAA Sec 118 Tropical Forests

(e) COUNTRY ANALYSIS REQUIREMENTS. Each country development strategy, statement, or other country plan prepared by USAID shall include an analysis of:

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

2) FAA Sec 119 Endangered Species

(d) COUNTRY ANALYSIS REQUIREMENTS. Each country development strategy, statement, or other country plan prepared by USAID shall include an analysis of:

- the actions necessary in that country to conserve biological diversity, and
- the extent to which the actions proposed for support by the Agency meet the needs thus identified.

The FAA 118/119 analysis for USAID/Mozambique must adequately respond to the two questions for country strategies, also known as, “actions necessary” and “extent to which.”

1.2 Purpose

The primary purpose of this task is to conduct an analysis of tropical forests and biodiversity in compliance with Sections 118 and 119 of the FAA of 1961, as amended, and [ADS guidelines](#). The analysis will inform USAID/Mozambique in the development of the Mission's CDCS. USAID's approach to development requires that the Agency examine cross-sectoral linkages and opportunities to ensure a robust development hypothesis. Biodiversity conservation is a critical approach for achieving sustainable development and should be considered in Mission strategic approaches to improve development outcomes. The analysis therefore is an opportunity for the Mission to better understand the strategic linkages between the conservation of Mozambique's tropical forests and biodiversity and development, so that it can structure a sound Results Framework to support future programming. Notably, the analysis will identify strategic linkages at the Results Framework level, highlighting opportunities to integrate tropical forests and biodiversity conservation into priority development sectors identified in the CDCS.

The analysis will identify new developments that should be taken into consideration at a programmatic level. Evidence-based programming decisions must include consideration of issues that include climate change, food security, water management, natural resources management, wildlife trafficking, governance, and health, all of which will be informed by this analysis.

A number of developments relevant to this analysis are underway in Mozambique that require further scrutiny. The country is facing a wildlife poaching crisis of historic proportions, undermining rule of law, reducing tourism potential, and causing elephant populations in northern Mozambique to be on the brink of collapse. At the same time, multi-billion-dollar investments in the oil and gas sector are about to launch, which will create a multitude of direct and indirect impacts to Mozambique's tropical forests, marine landscapes, and biodiversity. The extractive industries in Mozambique is not only confined to natural gas; the country is home to the world's largest graphite mine, half of the world's rubies are mined in Mozambique, and coal is the largest export in terms of dollar value. Most of this activity is concentrated in northern Mozambique, in the provinces of Tete, Niassa, Cabo Delgado, and the industrial Nacala corridor in Nampula. Mozambique's challenge will be to promote economic development while maintaining the productivity of the resource base upon which most of the population depend for their livelihoods.¹

Illegal logging and illegal, unreported and unregulated fishing are also serious concerns. The Ministry of Land, Environment, and Rural Development has taken multiple steps over the past two years in an effort to curb illegal logging, including placing a ban on the export of all unprocessed wood. However, most observers believe that the ban is not fully implemented, and rampant logging and export continue.

Almost all of the Mozambicans engaged in agriculture do so at subsistence levels, and most smallholder farmers lack education, tools, and knowledge to take advantage of improved practices. Slash and burn agriculture and unregulated charcoal production pose a major threat to Mozambique's forests, with smallholders depleting soil quality extensively and clearing new land to increase production rather than using current land better.

Many coastal villages also unsustainably harvest wood from mangroves for use as housing materials and lack an appreciation for the protection that mangroves provide against flooding and for the important role they play in healthy fisheries.

The report will also serve as a vehicle for cooperation with and capacity building of institutions, such as local conservation non-governmental organizations (NGOs), USAID implementing partners (IPs) and other technical and financial partners. As such, the contractor will work closely with these institutions and stakeholders for planning and validation.

Mozambique is one of the most vulnerable countries in the world to climate change. Low-lying coastal plains cover nearly half of the land mass, leaving large parts of the country vulnerable to cyclones and extreme flooding. Average temperatures are projected to increase by 1°C in the next 20 years, with more marked temperature increases in the interior and southern and coastal areas. Droughts are also expected to increase in the central and southern regions. As such, the analysis will evaluate climate risks to the country's tropical forests and biodiversity. Depending on the analysis team's findings, climate

¹ Conservation and Development in Mozambique. World Bank Group. 2015.

change may be considered a direct threat or an indirect threat, or in some cases, the analysis team may determine that biodiversity is not threatened by climate change.

In addition to evaluating the climate risks to biodiversity and tropical forests, the analysis team should consider climate risks as a cross-cutting theme and should analyze and incorporate climate change, as appropriate, throughout the report. Climate risks and vulnerabilities should also be considered when developing the report's recommendations. For example, over 90 percent of Mozambique's energy is generated by the Cahora Bassa Dam in Tete Province, which is one of three major dams on the Zambezi River. Historically low rainfall in 2015-2017 has led to critically low levels of water for energy generation, putting the entire nation's energy supply at risk. Similarly, low water levels in the Pequenos Libombos Dam have disrupted water supply to Mozambique's capital city Maputo, with the Ministry of Water, Public Works, and Housing instituting extreme water saving measures in 2017 and 2018.

The analysis team should identify innovative, integrated strategic approaches that link tropical forests and biodiversity conservation to all USAID programming sectors, and to climate change adaptation and mitigation. Importantly, the analysis should attempt to quantify the relative level of risk to Mozambique's tropical forests, biodiversity, and overall development from the various threats in order to assist USAID in making programmatic decisions in an environment of scarce resources.

The analysis team should use Mission reports on climate change in the analysis (climate change reference materials are available at the Climate Links [website](#)).

1.3 Mission Program

Mozambique has a landmass area of 800,000 km², and is home to a wide diversity of habitats, including montane, Miombo and tropical forests, and wetland and coastal/marine ecosystems. Mozambique has 685 species of birds, 195 mammals, 228 reptiles, 59 amphibians, and nearly 5,700 species of plants, many of which are endemic. Approximately 70 percent of the country's surface is covered by forests, woodlands or other vegetation, and Mozambique has the second largest mangrove cover area in Africa – over 350,000 ha.

Mozambique's abundant natural resources and geography create both opportunities and risks. The exploitation of oil, gas, and minerals as well as biodiversity, such as wildlife, fisheries, and forests, help to promote economic growth, but when conducted unsustainably fuel corruption, environmental crime, and resource conflict. The country's long coastline and extensive borders serve as a commercial gateway to six countries and transcontinental trade routes, making Mozambique an attractive transit country for transnational criminal networks engaged in trafficking of wildlife products and timber.

The majority of Mozambicans rely directly on natural resources for their livelihoods. Eighty percent of the population is employed in farming, the clear majority of which are smallholder farmers practicing rain-fed agriculture. Mozambique is one of the world's poorest countries, with a Human Development Index ranking of 181 out of 188. It ranks in the bottom ten for HIV prevalence, infant mortality, agricultural productivity, secondary school enrollment, and total fertility rate. More than two thirds of the population lives on less than \$2 a day. Poverty, coupled with the absence of effective rule of law, contributes to the unsustainable exploitation of biodiversity and natural resources. The areas in which poaching occurs lack economic and employment opportunities, and high-value wildlife and timber products offer potentially big payoffs. Due to weak governance, those engaging in environmental crimes are often able to act with impunity despite the passage of a law in 2014 criminalizing wildlife trafficking and other environmental crimes (Conservation Law) and amendments in 2017 increasing minimum prison sentences to between 12 and 16 years for wildlife crimes. Demand for natural resources has also

increased with Mozambique's population growth rate of 2.8 percent, corresponding to an increase in demand for wildlife-based protein (bushmeat) and forest products (timber, charcoal, etc.) and increased human encroachment into conservation areas. Dense human populations in or near protected areas have led to increased human-wildlife conflicts and subsequent retaliation killings, as well as environmentally destructive practices such as uncontrolled burning for agriculture or expanding settlements.

USAID is focused on helping Mozambique achieve self-reliance by strengthening the rule of law and governance, promoting sustainable economic development, and improving health and education outcomes. The United States provides development assistance in the areas of HIV/AIDS, malaria, maternal and child health, nutrition, food security, water and sanitation, disaster assistance, democracy and governance, education, trade and private sector growth, and the environment with the following development objectives: 1) Democratic Governance of Mozambican Institutions Strengthened, 2) Resilient, Broad-based Economic Growth Accelerated, 3) Education Quality Improved, and 4) Health Status of Targeted Population Groups Improved. Improved management of natural resources is an intermediate result under Development Objective 2.

USAID's environment programming presently includes two projects (PADs): the Biodiversity and Tourism Project (BIOTOUR) and the Coastal Cities Adaptation Project (CCAP). BIOTOUR is comprised of two activities that have much in common: they are implemented through a collaborative Global Development Alliance (GDA) approach, they apply integrated approaches to conserve important biodiversity, and they focus on two of Mozambique's most important conservation areas. The Integrated Gorongosa Buffer Zone (IGBZ) activity (IP: Gorongosa Project/Carr Foundation) focuses on Gorongosa National Park (GNP); the Alliance for Ecosystem Conservation Systems, Markets and Tourism (ECO-SMART) activity (IP: Wildlife Conservation Society with three NNR concessionaires) focuses on Niassa National Reserve (NNR). Both activities are past their mid-point in implementation and can provide valuable insights into tropical forests and biodiversity in their respective conservation areas.

The Coastal City Adaptation Project aims to increase climate resilience in Mozambican coastal cities by focusing on 1) improving the provision of climate-resilient services by municipalities; 2) increasing the adoption of climate resilience measures by communities and civic organizations; and 3) increasing capacity to implement economic risk-management tools such as insurance plans and contingency funds for at-risk urban infrastructure and livelihoods. CCAP works in six important coastal cities in Mozambique: Mocimboa da Praia, Palma (district), Pemba, Ilha de Moçambique, Nacala, and Quelimane. The project will end in November 2018 and can provide lessons learned in areas relevant to this analysis, including coastal mangrove conservation.

USAID/Mozambique also contributes biodiversity funds in the South Africa Regional Program Protecting Wildlife, Benefiting Communities in South Africa and Mozambique (KHETHA), which aims to reduce wildlife trafficking in the Great Limpopo Transfrontier Conservation area (GLTFCA), a transboundary area bordering Mozambique, South Africa, and Zimbabwe.

The Support Program for Economic and Enterprise Development (SPEED+) works directly with ANAC, MITADER, and the Attorney General's Office on the following areas:

- Strengthen biodiversity conservation policies
- Studies to support evidence-based decision making to combat wildlife trafficking
- Strengthen the ability of The Mozambique Association of Safari Operators (AMOS) and the Mozambican Federation of Tourism (FEMOTUR) to comply with the Conservation Law

- Co-Management Study for Conservation Areas
- Drafting implementing regulations for Conservation Law
- Help the Attorney General's Office to draft training materials for the country's judicial system (judges, prosecutors)
- Facilitate scientific youth-oriented events related to biodiversity conservation
- Provide assistance to MITADER in promoting public dialogue on biodiversity and conservation
- Develop tools to support conservation development decision-making, including a Red List of threatened species in Mozambique and identify and map key biodiversity areas (based on the Red List of threatened species)

Run out of the Mission's Democracy and Governance Officer, the Parceria Cívica Para Boa Governação (PCBG) project works to strengthen civil society advocacy in the area of biodiversity conservation. To date, one subgrant has been awarded to the organization BIOFUND for marine biodiversity conservation.

In September 2017, USAID/Mozambique and the Mozambican Attorney General's Office entered into an agreement to implement the Wildlife Crime Prosecution Support Program. The purpose of this activity is the development of reference and training materials for prosecutors on how to prosecute organized crime cases with a focus on wildlife trafficking, as well as provide support for personnel dedicated to supporting the prosecution of criminal entities involved in wildlife crime, including legal training.

Under Power Africa, the SPEED+ project assists the Ministry of Energy and Mineral Resources to debate and draft a new electricity law in order to simplify requirements for independent power production, especially geared toward allowing smaller scale renewable projects to be financially viable (such as solar and wind). SPEED+ is advocating for a reduction of fiscal barriers to importing renewable energy equipment such as solar panels and desalination equipment.

With one of the longest coastlines in Africa—2,700 km, a span similar to that between Miami and Maine (about 16 degrees of latitude)—Mozambique is home to a remarkable diversity of marine life. The Mozambican coastline is considered by many experts to be the second most biodiverse marine area in the world after the Coral Triangle.

Fisheries are important to Mozambique's economy and food security. It is estimated that artisanal fishing accounts for more than 85 percent of the approximate 150,000 tons of fish caught annually, supporting approximately 300,000 jobs, generating roughly 3 percent of the GDP, and providing about 50 percent of per capita protein.

However, catch data and reports from fishers show worrying signs of decline in fisheries productivity. Some estimates indicate that artisanal catch has dropped by 30 percent, compared to a volume of more than 200,000 tons about 25 years ago.²

USAID/Mozambique's biodiversity programs currently prioritize terrestrial biodiversity over marine. However, considering the importance of these ecosystems to economic growth—particularly the high potential of the country's coastal tourism sector—food security, and coastal resilience, this analysis should give marine and terrestrial ecosystems equal weight. It should particularly focus on the impact that the development of off-shore liquefied natural gas industries will have on marine biodiversity in the

² www.agrilinks.org/blog/fish-contributing-food-security-mozambique

Rovuma Basin. The study should consider the lessons learned and environmental outcomes of similar oil and gas activities around the world.

USAID/Mozambique’s agricultural programs focus on making markets work for smallholders farmers to access services, improved seeds, fertilizer, etc. Most smallholders currently rely on extensification rather than intensification and this has been a persistent and hard to break pattern. Since a major driver of deforestation in Mozambique is linked to agricultural expansion, this is an area which warrants attention. Lack of access to irrigation and increasing challenges with water salinization are also real challenges in rural areas. Approximately $\frac{1}{3}$ of all new boreholes in Mozambique find brackish water, according to one private sector observer.

The Mission has a large health portfolio—up to 80 percent of USAID/Mozambique’s total budget. The links between the environment and waterborne illnesses and malaria may be relevant to this study.

2. Statement of Work

This analysis will mainly involve synthesis and analysis of existing information, coupled with key stakeholder consultations and site visits to ground-truth information.

Under the direction of the team leader, the analysis team will evaluate the status of tropical forests and biodiversity in Mozambique. The focus of all activities undertaken will be two-fold:

- A) Identify actions necessary to conserve tropical forests and biodiversity and the extent to which the Mission meets the actions necessary, and
- B) Develop recommendations that will guide the Mission in updating the “extent to which” in the new country strategy.

To accomplish this task, the analysis team will perform the activities in Sections 2.1 and 2.2:

2.1 Data Collection and Analysis

Prior to in-country fieldwork, the analysis team will:

- Gather and begin to analyze existing information to identify tropical forest and biodiversity status, key biodiversity issues, stakeholders, policy and institutional frameworks, and gaps in the available information. Reports and other documentation to be reviewed include previous I18/I19 analyses; current ICS and project documents; information available online (websites of government ministries and other actors) on biodiversity conservation (and tropical forest conservation); project reports and evaluations; and Mozambique’s national strategies and laws related to conservation and use of natural resources. A preliminary list of resource materials is under the Appendix I.
- In coordination with the Mission, begin planning site visits based on the Mission’s recommendations and on the team’s preliminary review of key topics and information gaps.
- Mozambique is a large and diverse country, with numerous, often diffuse threats to biodiversity and forests, making it difficult to prioritize site visits based on biological criteria given the time and resource constraints of this study. Many of the biodiversity “hotspot” areas have been well documented by international conservation NGOs in terms of biodiversity value and threat. Therefore, this study should avoid replicating existing analyses of conservation and biodiversity hotspot areas. Site selection will be based on the following criteria, in order of importance:
- Areas of acute threat, i.e. affected by industrial scale developments or unchecked resource exploitation (oil/gas development, artisanal mining, logging, wildlife poaching) where written documentation and/or expertise is lacking and a site visit can fill gaps in knowledge.

- E.g., province of Cabo Delgado - Palma/Rovuma Basin area where mega-investments in offshore liquified natural gas are currently underway, and where a significant portion of the country's illegal logging and wildlife trafficking occurs (including in Niassa National Reserve and Quirimbas National Park).
- E.g., the Mozambican territory in and surrounding the Great Limpopo Transfrontier Conservation Area.
- E.g., the Nacala industrial corridor, including the railway between coal mining operations in Tete to the port of Nacala.
- Areas of substantial current or expected mission programming in other sectors, especially those affecting land and natural resource use or having an impact on biodiversity.
- E.g. areas of current biodiversity investment (by USAID or others) in which communities are primarily responsible for natural resource management and achieving conservation objectives (Niassa National Reserve, Quirimbas National Park, Limpopo National Park).
- E.g. health interventions, including warehouses, in the Province of Zambezia.
- E.g. the Feed the Future (agricultural) zones of influence.
- Additional priority areas may include:
 - Sites that illustrate emerging threats.
 - Private (non-government managed) protected areas and community conservation areas.
 - Ramsar sites (wetland site designated of international importance under the *Ramsar Convention*) (e.g., Lake Niassa and its coastal zone and the Zambezi Delta).
 - Non-biodiversity project sites with current or potential cross-sectoral linkages to biodiversity conservation (e.g., activities aimed at increasing agricultural productivity).
 - Infrastructure sites (USAID activities and private sector investments) affecting biodiversity (to expressly include marine biodiversity) and forests.
 - Other relevant USAID geographically prioritized project areas.
- Ten business days after signing the contract, submit a draft Work Plan (Deliverable I) to the mission. The draft Work Plan will include a proposed schedule of tasks and milestones, proposed assessment tools, and a discussion of information gaps. In the work plan, identify the type of information to be obtained and the key people to engage throughout the analysis process, i.e., USAID/Washington; Mission staff, including the Program Office, technical staff, and the Mission director; implementing partners; and biodiversity stakeholders, including host country government, international, national, local nongovernmental organizations, and private sector. The final work plan will be based on Mission comments/suggestions and submitted after the in-briefing of the analysis team.
- Hold an initial planning meeting with USAID/Mozambique through teleconference.
- Begin preparation of interview guides and a draft report outline based on the outline attached to the SOW (refer to Appendix 5: Analysis Report Annotated Outline).
- Provide a list of recommended consultations/meetings to be held in Washington, D.C. Coordinate with the designated Washington technical expert on the proposed list of USAID/Washington technical staff, and other Washington, D.C.-based organizations (such as conservation non-governmental organizations, multilateral development banks, and others with active programs in the country) to meet and gather relevant information about their programs and input into the status of tropical forests and biodiversity.

After arrival in country and before beginning site visits, in coordination with the activity manager, the analysis team will:

- Meet with the USAID Environment Team at the mission, which is managing the I18/I19 analysis with support from the Program Office, to gain an understanding of the status of the CDCS and its program goals and objectives.
- Meet with the Mission director and key USAID team members from the Program, Health, Democracy and Governance, and Agriculture, Environment and Business Offices, and other recommended staff at the Embassy, such as the Political/Economic Section, to get Mission perspectives on the assignment and an understanding of specific Mission interests, organizations to be contacted and site visits, including advice and protocol on approaching USAID partners and host country organizations with respect to the assignment. The Mission will brief the analysis team on any sensitivity related to the analysis (i.e., the potential for raising expectations, and the need to be clear about the purpose of the analysis, potential security risks associated with research related to environmental crimes and wildlife trafficking). Discussions should include the approach the analysis team will take to conduct the analysis, recommendations for potential biodiversity linkages with other sectors, and opportunities to influence national or regional development plans, and the best format and timing of recommendations to each sector.
- Confirm ability to travel in various parts of country according to latest security policy from U.S. Embassy Maputo.
- Meet with organizations, government bodies, the private sector, and individuals who are knowledgeable about and/or implementing projects on environment, biodiversity, and tropical forest conservation, and other sectors relevant to tropical forest and biodiversity conservation, such as agriculture, economic growth, health, and governance. See List of Key Stakeholders, Appendix 2.
- Continue to obtain, review and analyze existing reports, online information, and other data including a geographic information system and updated maps that will be part of the deliverables.
- Conduct site visits to supplement information gathered from consultations, literature review, and other second-hand sources. Site visit dates and locations will be finalized in consultation with the Mission.

Best practices include:

- Site visits should involve the participation of USAID staff, and preferably the activity manager or COR/AOR when visiting a USAID activity.
- Site visits should contribute to and be referenced in the analysis.
- Use a case study approach: describe each site visit concisely and include key case studies in annexes and/or use them to brief team members not involved in the visit and Mission staff.
- Visuals: photos help make reports interesting, break up text, and can be used to illustrate threats to biodiversity and links between biodiversity and other sectors. Maps and other graphics are recommended as well. In-brief consultations should include meeting with the Mission's GIS specialist.
- Prior to departing Mozambique, host an exit briefing with the Mission, including Mission management, Program Office, and technical teams, to provide them with an overview of the analysis and preliminary recommendations and report findings (Deliverable 3).

2.2 Preparation of the FAA 118/119 Analysis

1. The analysis team will analyze the information gathered and will prepare the analysis in accordance with the outline attached to the SOW (Appendix 4). The analysis team should also refer to the FAA 118/119 Best Practices Guide for useful information on producing the analysis, and Appendix 4, the Analysis Report Annotated Outline, which provides details on the information required in each section of the report.
2. The analysis team shall prepare a draft report of between 20-35 pages (excluding annexes) for review by USAID (Deliverable 4).
3. The analysis report will respond to the legislative requirements listed above and include recommendations on the extent to which the Mission can contribute to the actions necessary to conserve tropical forest and biodiversity.
4. The Mission review period for draft reports will be 15 working days. Following receipt of Mission comments on the draft report, the analysis team will prepare and submit a revised analysis (Deliverable 5) that incorporates Mission comments, in accordance with the schedule of deliverables below. The analysis report should be sent to the relevant Bureau of Forestry and Biodiversity in Washington for review and concurrence at the same time that it is sent to the mission. The Mission may review and provide comments on Deliverable 5 until the analysis is considered final and sufficient.
5. The FAA 118/119 analysis draft and final reports will follow the outline in Appendix 4 of the SOW, and should include the following maps and tables:
 - a) Map of main ecosystems in the country
 - b) Map of the forested areas, land uses, and if possible, land use change (e.g. areas of highest deforestation rates)
 - c) Map of conservation areas
 - d) Map of aquatic and marine resources
 - e) Conservation area (CA) table with:
 - A list of all declared CAs (including national parks, reserves, and community conservation areas)
 - Institution(s) responsible for the protection and management of each CA
 - Area of coverage
 - Ecosystems contained in each CA
 - CA management agreement and plan status
 - f) Table of the status of natural resources outside protected areas with:
 - Land cover and land-use type (e.g., wetlands/freshwater sources, major catchment areas, agriculture, etc.)
 - Institution(s) responsible for management
 - An overview of the major threats and challenges to conserving biodiversity outside CAs
 - Economic potential
 - g) Table of conservation initiatives including:
 - A list of the main conservation initiatives implemented by government, donors, non-governmental organizations, and private sector
 - Brief evaluation of effectiveness
 - Implementation dates
 - Funding levels
 - h) Table of largest threats to forests and biodiversity classified according to relevant weight of threat, with justification for classification.

2.3 Schedule and Logistics

The assignment will cover the period of on/about August 15, 2018 - March 1, 2019 from the date of contract signing to submission of the final deliverable. In-country consultations and site visits shall be conducted in September-October 2018. This schedule includes approximately 3-4 weeks of work in-country; 4 weeks to produce the draft report following in-country work; 3 weeks for USAID review of the draft report; and 2 weeks to revise and submit the final report following receipt of comments on the draft.

The level of effort (LOE) requirements for this task are:

- Approximately 20 working days for expatriate staff in-country.
- Approximately 55 working days for expatriate staff working from home base.
- Approximately 25-45 days for local staff.

Table 1: Weekly activities and milestones

Week	Activity/Milestone	Comments
Week 1-2 (early August)	Initial planning meeting with USAID/Mozambique through teleconference Submit work plan and interview guide	Clear understanding of USAID/Mozambique expectations Documents, contacts, and list of sites to visit gathered and reviewed Preparatory tasks for in-country meetings, and site visit logistics completed
Week 3-4	Pre-fielding document review by the team Consultations in person or by phone for the team leader with USAID/W and regional office	Bibliography of consulted sources Interviews summarized
Week 5 (In country) (mid-September)	In-brief with Mission director and Mission team Consultations/Interviews with stakeholders	Interviews summarized Maps collected
Week 6-7 (In country)	Site visits in field	Interviews and data from field visits summarized
Week 8 (In country)	Compilation of findings and recommendations Exit briefing	Preliminary report findings
Week 9-12	Report writing and submit draft report	
Week 13-14	Review of draft report	USAID/WDC and MG provide comments
Week 15-17	Incorporate comments and submit final report	USAID/WDC and MG review and approve

2.4 Deliverables

The following are the deliverables for this task:

6. **Deliverable 1.** Work Plan and schedule submitted within 10 days of start date. The Work Plan should include all tasks and a timetable, milestones, and deliverables and explain the following information:
 - Plan for coordination and consultations with the Mission, USAID Washington, and relevant Washington-based implementing partners
 - The analysis team's expectations of the Mission (activity manager and others)
 - A brief agenda for the in-briefing and exit briefing, and site visits in-country
 - Interview guide for in-country visits
 - Proposed coordination with implementing partners and donors
 - Coordination with the Mission to ensure the analysis team can respond to "extent to which"
 - Plan for communicating the recommendations (outside of disseminating the final report) to USAID/Mozambique technical teams

Deliverable 2. Submit weekly progress reports to the activity manager. These discuss progress, challenges and issues, and key findings to-date.

Deliverable 3. Submit preliminary recommendations and exit briefing presentation prior to the analysis team's departure from the country.

Deliverable 4. Draft FAA 118/119 submitted 20 working days after the conclusion of in-country work.

Deliverable 5. Following USAID review and comment, a revised final report, incorporating all comments, formatted and branded in accordance with USAID requirements, will be submitted within 10 working days of the receipt of comments on the draft.

3. Role of the USAID Mission

The USAID Mission will provide the analysis team with:

- A list of key documents to review.
- A list of key stakeholders to be contacted and will assist the team in making initial contact to arrange interviews.
- Criteria and list of preliminary/suggested site visits.
- A list of donor projects.
- Review and feedback on the draft analysis report.

The Mission activity manager will also assist with, and participate in, cross-sectoral mission meetings. To ensure continued coordination with the Mission over the course of the in-country work, the analysis team will submit (weekly - consistent with Section 4 Deliverable 2) progress reports to the activity manager, which discuss progress, challenges and issues, and key findings to-date.

4. Qualifications of the Consultants

The team leader will lead the analysis and should be a senior level biodiversity/natural resource management specialist with the following qualifications:

- Post-graduate qualifications (master's level degree or higher) in biology, ecology, zoology, forestry, ecosystem conservation, or a closely related field
- Expertise in assessing environmental threats
- Experience in the Africa region, preferably in Mozambique or Southern Africa

- Experience coordinating analyses and leading teams
- Exceptional organizational, analytical, writing, and presentation skills
- Experience using geographical perspectives, spatial data analysis and map-based communication to inform development programming
- Fluent in English, working proficiency in Portuguese

Analysis team will include the following members:

Deputy team leader, a senior conservation social scientist with the following qualifications:

- Expertise in Mozambique’s environmental policies, and institutional and legal frameworks
- Preference given to someone with specialty in forestry and environmental governance
- Knowledge of and experience working in Mozambique’s forest, biodiversity, conservation areas
- Strong contacts within Mozambique’s government agencies, non-governmental organizations, international donors, and private sector
- Excellent analytical skills, particularly concerning forest management, conservation, and environmental governance
- Experience using geographical perspectives, spatial data analysis, and map-based communication to inform development programming
- Excellent verbal and written communication skills
- Fluent in English and Portuguese

Marine and coastal ecosystem specialist with the below qualifications:

- Expertise in Mozambique’s fisheries policies, and institutional and legal frameworks
- Expertise in Mozambique’s marine resources and fisheries management
- Strong contacts within the relevant government agencies, non-governmental organizations, international donors, and private sector
- Excellent analytical skills, particularly concerning marine resources and fisheries management, and governance
- Excellent verbal and written communication skills
- Fluent in English and Portuguese

Economist and livelihoods specialist with the below qualifications:

- Expertise in economic valuation of natural resources and environmental economics, particularly as relates to the extractives industries, payment of ecosystem services, environment-related business management, fundraising, value chain development, conservation enterprise, and market opportunities
- Expertise in policies and regulations governing environmental management of concerned sectors (tourism, water, forest, extractives, etc.) and climate change
- Extensive experience in sustainable development and agriculture projects, natural resource and agribusiness development
- Expertise in the role of private sector investments related to environmental considerations and conservation areas
- Excellent analytical skills, particularly concerning the economic consequences of sector activities on biodiversity conservation and forests
- Excellent verbal and written communication skills

- Expertise in political economy/applied PEA analyses
- Fluent in English and Portuguese

Logistics specialist with the following qualifications:

- Excellent organizational skills
- Familiar with actors working in biodiversity conservation and development and ability to help identify and schedule sector key informants for meetings
- Experience working in the biodiversity conservation field and managing logistics in remote conservation areas in Mozambique
- Expertise in travel/logistic arrangements
- Experience in interpretation and translation
- Excellent verbal and written communication skills
- Fluent in Portuguese and English

APPENDIX I: List of Resource Materials

Government of Mozambique Strategic Documents

ANAC Strategy 2015 - 2024

<http://www.porqueanima.com/anac/wp-content/uploads/2017/07/Plano-Estrategico-da-ANAC-2015-2024-1.pdf>

Management Plan: Quirimbas National Park

<http://www.porqueanima.com/anac/wp-content/uploads/2017/07/Plano-de-Maneio-Quirimbas.pdf>

Other protected area management plans:

<http://www.porqueanima.com/anac/en/bio-arquivo/#1497448182496-fd9193a1-cb54>

National Forests Law and Regulation

<http://www.porqueanima.com/anac/wp-content/uploads/2017/07/Lei-de-Florestas.pdf>

<http://www.porqueanima.com/anac/wp-content/uploads/2017/07/Regulamento-lei-de-florestas.pdf>

<https://forestsnews.cifor.org/22055/surge-in-chinese-demand-exposes-cracks-in-mozambique-forest-policy?fnl=en>

<http://clubofmozambique.com/news/mozambique-bans-logging-and-export-of-six-species-of-wood/>

Analysis of the Conservation Law - practical aspects for its application

<http://www.biofund.org.mz/wp-content/uploads/2017/03/Interpretacao-da-Lei-de-Conservacao-ING.pdf>

USAID Strategic Documents

USAID Biodiversity Policy

http://pdf.usaid.gov/pdf_docs/pdacy300.pdf

Biodiversity Programming How-To Guides to help with these questions: 1) Developing Situation Models; 2) Using Results Chains to Depict Theories of Change; and 3) Defining Outcomes and Indicators for Monitoring, Evaluation, and Learning.

<https://usalearninglab.org/library/usaaid-biodiversity-programming-how-guides>

USAID Climate Change and Development Strategy

http://pdf.usaid.gov/pdf_docs/Pdacs780.pdf

Climate-Resilient Development Framework

<https://www.climatelinks.org/resources/climate-resilient-development-framework-understanding-and-addressing-climate-change>

U.S. National Strategy for Combating Wildlife Trafficking

<https://www.whitehouse.gov/sites/default/files/docs/nationalstrategywildlifetrafficking.pdf>

Measuring Efforts to Combat Wildlife Crime

<https://www.usaid.gov/biodiversity/wildlife-traffickingtrafficking>

U.S. Presidential Task Force on Combating Illegal, Unreported, and Unregulated Fishing and Seafood Fraud

http://www.nmfs.noaa.gov/ia/iuu/noaa_taskforce_report_final.pdf

USAID Vision for Ending Extreme Poverty; the USAID Democracy

https://www.usaid.gov/sites/default/files/documents/1870/Vision-XP_508c_1.21.16.pdf

USAID Democracy, Human Rights and Governance (DRG) Strategy

[https://www.usaid.gov/sites/default/files/documents/1866/USAID%20DRG_%20final%20final%206-24%203%20\(1\).pdf](https://www.usaid.gov/sites/default/files/documents/1866/USAID%20DRG_%20final%20final%206-24%203%20(1).pdf)

USAID Policy on Gender Equity and Female Empowerment

https://www.usaid.gov/sites/default/files/documents/1865/GenderEqualityPolicy_0.pdf

USAID's Securing the Future: A Strategy for Economic Growth

http://www.enterprise-development.org/wp-content/uploads/Securing_the_Future.pdf

Foreign Assistance Act 118/119 Tropical Forest and Biodiversity Analysis Best Practices Guide

USAID/Mozambique Resource Materials

Mozambique Environmental Threats and Opportunities Assessment (January 2013)

Country Development and Cooperation Strategy (CDCS) 2014-2019

https://www.usaid.gov/sites/default/files/documents/1860/Mozambique_CDCS_February_2019.pdf

Biodiversity, Livelihoods and Counter Wildlife Trafficking Sector Briefer (July 2017)

Relevant Program and Activity Fact Sheets

Mozambique Climate Vulnerability Profile

<https://www.climatelinks.org/resources/mozambique-climate-vulnerability-profile>

US Mission END Act Assessment

A Review of Conservation Area Partnerships in Mozambique: 1998-2017 (Supporting the Policy Environment for Economic Development (SPEED+) January 2018

Work plans and annual reports for relevant activities:

ECOSMART

Gorongosa Restoration Project

SPEED+

PGR FARA

Other Donor and Non-Governmental Organization Resources

Conservation and Development in Mozambique: Lessons from the Transfrontier Conservation Areas Program and New Perspectives for the MozBio Program (World Bank, 2015)

<http://pubdocs.worldbank.org/en/199741449520242770/Conservation-and-Development-in-Mozambique-TFCA-2015.pdf>

Mozambique Global Forest Watch

<https://www.globalforestwatch.org/dashboards/country/MOZ>

Mozambique Forest Investment Project (World Bank)

<http://projects.worldbank.org/PI60033?lang=en>

The Extractive Industry Transparency Initiative: Mozambique 2017 Validation

<https://eiti.org/validation/mozambique/2017>

Environmental Impact Assessments from Anadarko, Exxon Mobile, ENI, etc.

<http://www.mzlng.com/Responsibility/Environmental-Social-Management/Environmental-Impact-Assessment/>

WWF Mozambique Strategic Plan and other studies

http://awsassets.wwfmz.panda.org/img/original/wwf_mozambique_strategic_plan.pdf

http://awsassets.wwfmz.panda.org/downloads/af_brochura_2017_wwf_web_1.pdf

<https://www.wwf.org.mz/documentos/estudos/>

APPENDIX 2: List of Key Stakeholders to Meet (to be completed)

- ANAC
 - Mateus Mutemba, Director General
 - Carlos Lopes Pereira, Director of Law Enforcement
 - Dir. Cesaltina, Deputy Director
 - Alexis Chrisafis
- World Bank
 - Andre Aquino
 - Madyo Couto
- SPEED+
 - Sergio Chitara (previously National Director of Forestry)
 - Ashok Menon
 - Afonso Madope
 - Vera Julien
- Peace Parks Foundation
 - Antony Alexander
- BIOFUND
 - Maria Alexandra Jorge
 - Luis Bernardo Honwana
- AFD
 - Pierre Walter
- Gorongosa National Park

- Vasco Galante
- Mike Marchington
- KFW
 - Elina Penttinen
- WWF
 - Anabela Rodrigues
- Justicia Ambiental (JA)
- Attorney General's Office
- IUCN
- Technoserve Forestry Expert
- MITADER Forestry National Directorate

APPENDIX 3: FAA 118/119 Analysis Report Outline

Cover Page

Acknowledgements

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III. Status of the Country's Biodiversity

- 3.1 Major Ecosystem Types and Status
- 3.2 Species Diversity and Status
- 3.3 Genetic Diversity
- 3.4 Status and Management of Protected Areas
- 3.6 Status and Management of Key Natural Resources Outside Protected Areas

IV. Value and Economic Potential

- 4.1 Value of Biodiversity
- 4.2 Ecosystem Goods and Services

V. Legal Framework Affecting Conservation

- 5.1 National Laws, Policies, and Strategies
- 5.2 International Agreements
- 5.3 Government Agencies
- 5.4 Conservation Initiatives: Gap Analysis
- VI. Threats to Biodiversity**
 - 6.1 Direct Threats to Biodiversity
 - 6.2 Drivers of Threats
- VII. Actions Necessary to Conserve Biodiversity**
- VIII. Extent to Which the Mission Meets the Identified Actions Needed**
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 - 9.1 Recommendations Based on Actions Necessary to Conserve Biodiversity
 - 9.2 Other Opportunities
- X. Annexes Included in the Report**