

OKAVANGO UPPER CATCHMENT

Freshwater Community-Based Conservation Scoping Plan

The Nature Conservancy

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grassland habitats – either seasonally flooded or permanently saturated (Figure 2). In the south, towards the Namibian border, the catchment becomes flatter and drier, and large and intense bushfires are frequent. In these lower regions the vegetation is primarily Zambezian *Baikiaea* woodland and savanna.

Human settlement and use of the basin have been significantly influenced by colonialism and Angola's 27-year civil war. The region became a battlefield and stronghold for the opposition's army during the civil war. During this period, many who lived in the region were displaced. Following the conclusion of the civil war in 2002, landmines were left scattered throughout the region preventing resettlement. The government has invested \$60 million to clear landmines from the basin, slowly reopening the Cubango and Cuito catchments to resettlement, agriculture, and development (GICHD, 2019). However, mine contamination continues to be a major obstacle in the region, impacting sustainable development and communities' access to land and water (GICHD, 2019).

The region's tumultuous history, in combination with poor yielding soils and an arid climate, have made the Cubango and Cuito catchments one of the least densely populated areas of Angola. Approximately 1.6 million people live within Angola's 151,460 km² portion of the Basin (Mendelsohn & Martins, 2018). The region is seeing both the phenomenon of urbanization and settlement of a rural frontier. In southeastern Angola, 57% of households are in urban areas, while the remaining 43% of households are rural (Mendelsohn & Martins, 2018). Urban areas in the catchments are increasing rapidly in size, with annual growth rates estimated between six and 13 percent from 2004 to 2018 (Mendelsohn and Martins, 2018). Rural areas are also seeing growth, with annual rates estimated at 2.7% (Mendelsohn & Martins, 2018). Much of the growth is associated with people returning to the region after displacement from the civil war.

Approximately 90% of the population of the Cuito and Cubango catchments resides within the upper Cubango, the densest region of southeastern Angola. The higher population is due to relatively more fertile soils and higher rainfall compared to the rest of the catchment area, established trade routes for access to services and commercial activities, and the presence of larger urban areas – the largest of which is Menongue (Mendelsohn & Martins, 2018). Most urban residents live in low income, informal housing with few services. Infrastructure for potable water, sewage, and electricity is rarely available. Areas directly around urban centers often have dense peri-urban populations where smallholders farm or raise livestock to be sold in town. Urban residents use nearby rivers for washing and drinking water. The impacts of urban areas on the region's freshwater resources are little understood (Mendelsohn & Martins, 2018).

Rural residents generally live in villages concentrated along roads and rivers. More remote villages are often along rivers that offer a permanent source of water for drinking and agriculture, as well as transportation. Most rural people are smallholder farmers who

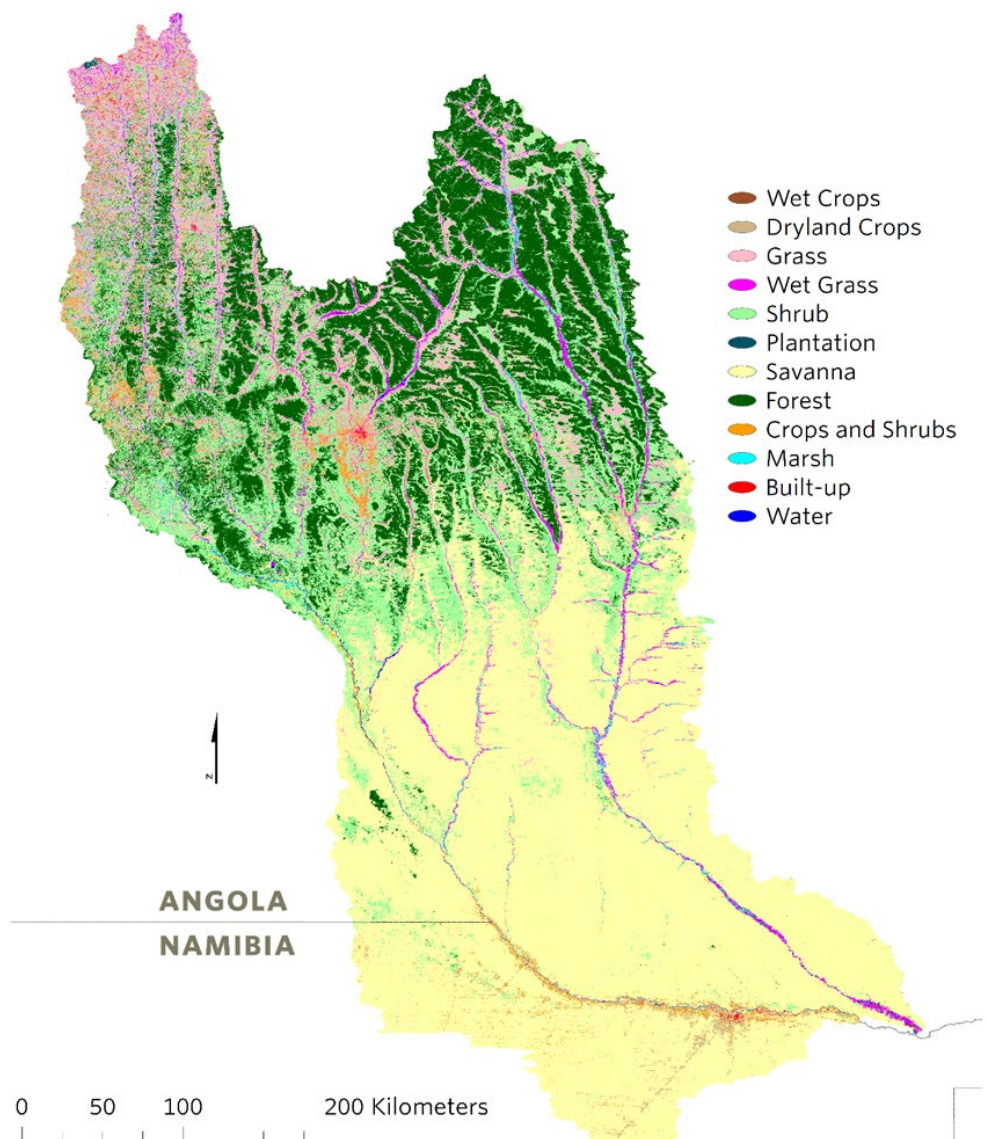


Figure 2: Land cover of the Cubango and Cuito catchments. The upper catchments are primarily characterized by Miombo woodlands and wet grasslands due to higher elevations and rainfall. The lower regions of the catchments are flatter and more arid, mainly consisting of savanna. Agriculture and development are focused around the Cubango River along the Angola-Namibia border and in the northwestern reaches of the Cubango catchment.

produce crops for sustenance and/or income. Crop yields are low in the region's poor soil, a major limiting factor to population growth and welfare in the region. Rural residents will harvest natural resources for food and markets. Even remote areas, like the Cuito's source lakes, show evidence of access by humans for fishing, bushmeat, and honey collection (von Brandis & Boyes, 2017). Deforestation in the region is common to clear land for more farm fields once previous fields are exhausted. Access to services – like healthcare, schools, and markets – is extremely limited in rural areas.

Very little systematic and reliable information is available on the demographics of the region. Features of the rural population include high fertility, infant and child mortality and immigration rates, and a skewed sex ratio caused by war time male mortality (Mendelsohn & Martins, 2018). Nearly 50% of the population is under the age of 15. Several ethnic groups and languages are found in the region, though Nganguela constitute the majority of the population. Portuguese is the lingua franca of the region, consistent with Angola as a whole.

Due to its remoteness and decades of inaccessibility, little is known of Angola's Okavango Basin wildlife resources. During the civil war and subsequent decades, significant populations of wildlife have been extirpated in some regions of the basin, while other areas remain unaffected by anthropogenic influences. Surveys from the National Geographic Okavango Wilderness Project and Panthera indicate low densities of animal species but have documented a considerable diversity of wildlife species in the wetlands and Miombo woodlands of the catchments (Mendelsohn & Martins, 2018).

This strategic plan recognizes the conservation significance of the Upper Okavango Basin not only for Angola, but also Namibia and Botswana, and the globally significant Okavango Delta. Conservation efforts that target the Cuito and Cubango catchments can improve the lives of Angola's citizens, protect this unique and biodiverse headwater region, and preserve the ecosystem services millions depend on across three countries.

2.2. Thematic Scope

Freshwater represents 3% of the planet's water supply, with only 0.5% accessible to humans. Freshwater resources (FWR)—defined as any body of water that is fresh (not salty), together with its associated species and ecosystem services—are under stress from agriculture, climate change, population growth, industrialization, resource over-extraction, and other factors linked to human behavior (Zhang et al., 2020). Freshwater is a difficult resource to sustainably manage because it is mobile, has temporal and spatial fluctuations, and externalities that shape and influence power dynamics among users (Zhang et al., 2020). To better equip local populations to manage FWR under these stresses, TNC has aimed to advance community-based natural resource management in freshwater ecosystems that strengthen the voice, choice, and action of indigenous peoples and local communities. TNC defines a "community" as a well-defined group that self-identifies as a people and that has a shared identity, culture and/or values, in particular communities that possess a close relationship with their natural landscapes (territory, area, or habitat) which they depend on for cultural, religious, health and economic needs.

This three-year planning effort seeks to align TNC's community-based work in the Okavango Basin with the Voice, Choice, and Action (VCA) Framework developed by TNC's Indigenous People and Local Communities Team, and the associated freshwater guidance developed in partnership with the International Food Policy Research Institute. The VCA framework for FWR includes four interconnected pillars implemented to achieve improved and sustainable FWR management:

1. Secure Rights to Territories and Resources
2. Strong Community Leadership and Capacity
3. Effective Multi-Stakeholder Platforms for Decision-Making
4. Environmentally Sustainable Economic Development Opportunities

The VCA Framework further recognizes two additional cross-cutting considerations that need to be integrated across all four pillars for achieving CBC objectives:

- Connection to Place
- Equity

2.3. Strategic Scope

A decade ago, the Okavango Region was identified by TNC as a geography with overlapping freshwater and terrestrial priorities where place-based investments in conservation would benefit both humans and nature. The Angolan headwaters of the Okavango Basin is the source of water for the globally significant Okavango Delta and Africa's largest and most viable elephant population, and threats to the basin spurred efforts by TNC to better understand how to protect it. Through this scoping plan TNC will continue to build a better understanding of the Okavango Basin and the interconnectedness of the region's human population and natural

resources, while beginning to implement community-based conservation initiatives that will form the foundation of conservation efforts in the Angola Headwaters. Recognizing that freshwater is influenced by activities throughout an entire watershed, this plan will also introduce strategies that are not community-based (i.e., legal framework for conservation, influencing infrastructure and dams) but required to support the existence and success of grassroots conservation efforts.

TNC will implement strategies that promote and strengthen grassroots to regional integration of conservation, and use lessons learned and proven methodologies to promote community-based freshwater resource management across Angola's Okavango Basin. The strategies identified in this plan will contribute to five of the Africa Program's primary strategies.

- *Protect Integrated Landscapes*: TNC aims to maintain habitat connectivity and movement corridors in targeted areas of sub-Saharan Africa, as well as the wildlife and local communities that depend on them. TNC will achieve this by scaling application of a mutually beneficial model of integrated private, public, and community-led conservation.
- *Protect Source Waters*: TNC aims to catalyze and enable replication of public-private partnerships across Africa that proactively invest in securing healthy water catchments for nature, climate change mitigation, and/or sustained urban water supplies that support economic growth and livelihoods among dependent communities.
- *Improve Fishery Health*: TNC aims to safeguard productive freshwater fisheries for ecosystem health and as important foundations of food and livelihood security. Through partnerships with fishers, industry, and governments, TNC is improving fisheries monitoring, demonstrating sustainable community-based management practices, advancing supportive policies, and creating market incentives that reward sustainable fishing practices.
- *Sustainably Intensify Agriculture*: TNC aims to reduce unplanned habitat conversion, improve soil health, and minimize harm to freshwater resources by sustainably intensifying smallholder agricultural production, influencing agriculture siting in east and southern Africa, and influencing major institutional players in agriculture and food systems that are working to achieve U.N. Sustainable Development Goals in Africa.
- *Power Africa Sustainably*: TNC aims to equip sub-Saharan African countries with science-based solutions to maximize the deployment of low-impact and low-carbon renewable energy and infrastructure projects. We will do this using system-scale "smart energy" siting that creates direct and indirect conservation benefits. We are also developing innovative strategies to link growing investments in new grid-connected renewable energy facilities to create long-term conservation funding streams.

Additionally, this plan will address the pillars of TNC's Okavango Program, designed to integrate sustainable place-based development and conservation of wildlife and their habitat.

- *Conservation*: Support conservation & sustainable management of priority headwaters areas.
- *Smart Development*: Enable smart development that balances the needs of people and nature.
- *Sustainable Finance*: Create sustainable financing for conservation and community development.

This scoping plan provides significant contributions to TNC's Shared Conservation Agenda (SCA) – an organizational path that maximizes TNC's efforts to creating a sustainable future for our planet. TNC's freshwater resource management work in the Okavango Basin is focused on the region's natural resource dependent communities and inland fishery as an opportunity for broad biodiversity protection and improved human well-being. The strategies developed from this planning process will empower local communities to protect and manage their freshwater resources and will ultimately provide significant contributions to the SCA's core themes: 1) ensure healthy freshwater, oceans, and lands; 2) climate change mitigation and adaptation.

2.4. Ten-Year Vision

We envision an Okavango Basin that is both wild and prosperous — where conservation protects the basin’s unique natural wonders, improves peoples’ lives, and underpins vibrant and sustainable economies in Angola, Namibia, & Botswana.

3. KEY DYNAMICS AND CONTEXT

3.1. Conservation Primary Interests

Key to ecology of the interior Okavango region is the system of rivers that give it life. To preserve the ecological function of the region from the highlands of Angola to the Okavango Delta, TNC’s Okavango team identified the plan’s conservation primary interests as key elements of the freshwater system. These include the mainstem Cuito and Cubango Rivers, their adjacent floodplains and wetlands, and the important ecological processes that maintain them, including hydrologic flows and nutrient and sediment cycling.

The Cuito River originates from a network of source lakes over 1,400 meters above sea level in the Angola Highlands (von Brandis & Boyes, 2017). The area around these lakes is comprised mostly of peat—rare in tropical Africa—and groundwater slowly seeps through the peat to form the lakes. At the lakes’ outlets, vegetation forms a natural dam and steadily releases water to begin a meandering and slow journey to the Okavango Delta. The Cuito flows clear and nutrient poor, and its slow and sustained release makes the river more resilient to seasonal changes in precipitation (von Brandis & Boyes, 2017). This process is critical because the lower catchment has little freshwater input due to the sandy Kalahari soils. On its journey to the confluence with the Cubango, the Cuito flows through wide sandy valleys and maintains a higher base flow than the Cubango. (King & Chonguica, 2016). Additionally, little is understood of the Cuito’s complex interactions with groundwater and the deep Kalahari sands of the region. Groundwater recharges and discharges the river at different points in the system. Water lost to the deep sand seeps to unknown depths, where it is possibly stored in aquifers.

The Cubango River begins on Angola’s Bié Plateau, over 1,700 meters above sea level. The Cubango is a much different river compared to the Cuito. It maintains a much lower baseflow during the dry season, but annual rains cause the Cubango to flood sending a pulse of water that moves through its system in a matter of weeks. During its journey to the Delta, the Cubango can be a wild and rushing river, flowing down V-shaped valleys of bedrock and carrying significant amounts of sediment and debris.

It’s these flood pulses that inundate the Okavango Delta each year, and the two rivers complement one another to deliver a sustained flow to the delta. The flood pulse is intricately linked to the extent of inundation, flooding wetlands that are inundated seasonally as well as some floodplains only inundated in particularly wet years to create habitat for wildlife (Ramberg et al., 2006). This flood pulse expands the delta from its annual low of 2,500 – 4,000 km² to its annual high of 6,000 – 12,000 km² (Ramberg et al., 2006). While water moves through the Cubango system in a matter of weeks, the Cuito’s sustained flow safeguards permanent wetlands during the rest of the year (Lyman, 2019).

Freshwater System Connectivity and Natural Flow. The Okavango system and the ecosystem services it provides depend on the continued, uninterrupted connection of the Cubango and Cuito, and their tributaries, from their headwaters to the Okavango Delta. Without connection to the headwaters in Angola’s highlands, ecosystems downstream in southern Angola, Namibia, and Botswana may receive little, if any water. An interconnected web of rivers, tributaries, wetlands, and forests are responsible for the processes that bring life to the region. Fish and other species that rely on river connectivity for migration, spawning, and dispersal can be significantly impacted by interruptions in river connectivity. The natural flow of the rivers is important for maintaining fish habitat and spawning areas, which is an important source of protein and income for the region’s population. Changes in Angola that reduce natural flow or inhibit connectivity will have both regional and global consequences.

Wetland Function, Basin Wide Processes, and Aquatic Habitats. The Okavango River Basin is a floodplain dominated system. This is most apparent in the Delta, where seasonal flooding is responsible for giving life to vast wilderness that has become the centerpiece of Botswana’s tourism. However, across both the Cubango and Cuito catchments, natural flow and flood dynamics are critical for ecological function of wetlands and aquatic habitats. Soils poor in nutrients and water holding capacity result in poor agricultural opportunities and low densities of wildlife. When floodplains are inundated, there’s a surge of production in both plant and animal life.

Wetlands and floodplains act as points of interaction between the rivers and groundwater, filter sediments and nutrients, and provide floodwater storage and conveyance during seasonal floods. These ecosystem services are priceless to the freshwater resource users throughout the basin. Wetlands and other aquatic habitats are also important habitats for the region’s biodiversity. These habitats are used by fish for spawning or protective cover for juveniles. The diversity of habitats along the rivers—from rapids

and waterfalls to oxbow lakes and wetlands—supports over 105 species of fish throughout the entire system (Ainsworth et al., 2021). This includes at least five endemic fish species (Ainsworth et al., 2021).

Near Natural Sediment Regime. The natural sediment regime of the Cuito and Cubango systems is fundamental in the ecological function of the system. However, heterogeneity between the hydrology and geology of the neighboring catchments means input, transport, and storage of sediment differs between the two rivers. Like the differences between natural flow regimes and water inputs, the differing sediment regimes complement each other in their delivery of sediment to the Okavango Delta, but also support unique sediment regimes within each catchment. In general, both rivers carry low amounts of sediment downstream and run clear. This is a product of sandy soil, wetlands, and large reed beds that reduce the input of sediment into the rivers. However, during the Cubango's peak flows during the rainy season the river runs dark and full of suspended sediments. The flood pulse pushes this sediment onto floodplains and across the Okavango Delta. Conversion of forest to cropland and the loss of vegetation to human-set fires threatens the natural sediment regimes of the system.

Water Quality – Nutrients. The Okavango Basin is an oligotrophic system. Terrestrial and aquatic biodiversity throughout the basin have adapted to low concentrations of nutrients in the soils and water. What little nutrients do exist in the system are generally trapped in floodplains and vegetation beds. Here they mineralize and are recycled by a unique diversity of macrophytes, contributing to the primary productivity concentrated in the catchment's floodplains and islands in the Okavango Delta (Schoelynck et al., 2017). For the human populations living in the Okavango's catchment, the oligotrophic nature of the system means lower levels of algae and bacteria, providing a clean source of drinking water. This suggests the Basin's function and biodiversity are sensitive to changes in water quality and the input of nutrients. This must be considered as the population in the region grows and increases nutrient input from agriculture, industry, and sewage runoff.

3.2. Human Well-Being Primary Interests

TNC's Okavango team identified four human well-being primary interests that are critical to the success of community-based conservation in this geography. All human primary interests were recognized as an opportunity to improve human livelihoods, while addressing key conservation outcomes. Appropriately addressing community-based solutions to the following interests will require implementation of the VCA Framework.

Fish Catch. Poverty in the Okavango Basin in Angola can be attributed to the region's lack of opportunities for income generation from agriculture due to nutrient poor soils, and poor infrastructure. For many communities in the region, fish are an important traded food commodity and a nutritious staple food. The basin's fishery provides nutrients important for human health and child development, and dried fish is a traded commodity between rural communities and urban markets. In Angola, fishing is generally conducted for subsistence at the household level using traditional gear, and fishing makes up to 50% of freshwater resource extraction in the region (Barnes et al., 2009). The freshwater fishery in the region is small, and fishers generally do not produce a significant enough surplus for a sustainable market and income. Another challenge is the longitudinal trend in nutrient availability, with reducing nutrient levels and fish resources as you travel upstream toward the headwaters.

Research into the African tigerfish (*Hydrocynus vittatus*) demonstrates the importance of both connectivity and fisheries management to protect the fishery. The tigerfish is an important food and income source for the local populations, an attractive sportfish in the tourism industry, and a top predator in this freshwater ecosystem. Research findings of tagged tigerfish in the Kavango River of Namibia showed a mix of high site fidelity and dispersal. While many of the tagged fish used small sections of the river, a third of the study population moved upstream and downstream to new sites, swimming as far as 400km (Jacobs et al., 2019). This pattern of use by a keystone predator indicates the importance of river connectivity for dispersal and the efficacy of freshwater protected areas in this system (Jacobs et al., 2019).

Though fishing pressure in this remote region is generally low, inadequate enforcement of regulations and monitoring of stocks places the fishery at risk of unsustainable use. Additionally, sustainable fisheries can help improve the lives of women, a vulnerable population in rural Angola. Globally, women make up over half the people engaged in inland fisheries, and most of the post-harvest sector (USAID, 2016). TNC and partners are working to understand the dynamics of the Okavango's fishery, understanding that a sustainable fishery is critical for both community welfare and the ecology of the Cubango and Cuito rivers.

Local Governance. Angola's history of colonialism, civil war, and communism has had significant impacts on the local governance of natural resources. Traditional practices have been disrupted and historically decentralized decision-making has been centralized. Land in south-eastern Angola is owned by the government with no effective limits on use by communities. Corruption, a lack of accountability, and centralized decision making has created suspicion of government in local communities. As populations move back into the previously war-torn region of the Okavango Basin, supporting local governance will be critical in promoting sustainable resource use and management.

The situation in the Okavango Basin provides an opportunity to promote functioning co-management institutions to give local communities representation in decision-making. Local governance is beneficial because it responds to the needs of the communities and gives more control to resource users, encouraging more buy-in to sustainable practices. National and provincial governments are encouraging decentralization of power and devolution of the governance of land and resources back to communities and local governments.

Food Security. Malnutrition is a significant threat to human well-being in southeast Angola. In Cuando Cubango province – which contains most of the Cuito and Cubango catchments – 43% of children under the age of five are stunted (Angola DHS, 2015-2016). The rate of anemia in children between 6 months and 5 years is 77% in Cuando Cubango province, the highest in Angola (Angola DHS, 2015-2016). From April 2019 – March 2020, 1.14 million people were estimated to be food insecure in the southern provinces of Angola, reflecting the effects of poor harvest and high prices of food staples (FAO, 2020). COVID-19 is expected to cause an increase in prevalence of malnutrition in the region due to a reduction in economic activities, the potential breakdown of food supply chains, depreciation of the national currency, and falling oil prices – the primary foreign exchange earner for Angola (FAO, 2020).

The primary livelihood among rural communities in south-eastern Angola is farming, despite the difficulty to produce crops in the nutrient-poor and water-poor soils of the region. Manioc, sweet potatoes, maize, and millet are the staple crops. Crop production is highest in the upper reaches of the Cubango, where rainfall is higher, and populations are denser. Despite the difficulty of farming, crops contribute up to 80% of household income and food earnings (Barnes et al., 2009).

Farming in the region's poor soils leads to incredible amounts of land degradation, as farmers clear and burn woodlands and savanna to create room for new fields once nutrients are exhausted. Yields in the poor soils are low, and any surplus is stored for hard times rather than sold. Among communities in the basin, nutrition is poor, mortality rates are high, and economic opportunities through farming are almost non-existent. Poverty thus undermines the ecological functioning of the system.

Food-insecure communities find it difficult to participate in natural resource management, and short-term goals of feeding themselves and their family will often take precedence over conservation. However, resource users can become strong advocates for freshwater resource conservation when sustainable use improves food security (Zhang et al., 2020). The community-based natural resource management strategies outlined in Section 7 will engage communities in sustainable management of fishery and forest resources and build the capacity for improved agricultural practices. A product of these strategies is improved food security and income generation opportunities for communities in the Cuito and Cubango catchments.

Sustainable Place-Based Livelihoods for Local Communities. Poor soil conditions and unsustainable farming limits welfare of communities, but a lack of financial opportunities also contributes to the high levels of poverty in the region. In the Cubango and Cuito catchments, the remoteness of rural communities, inadequate infrastructure, and poor access to education, health services, and markets results in limited options for income generation. This forces a pattern of rural-urban migration for income generating opportunities, especially among the region's youth. Most households are completely dependent on rain-fed agriculture and the exploitation of natural resources (charcoal, honey, bushmeat, fish) for their livelihoods. Overdependence on natural resources and unsustainable agriculture places incredible pressure on freshwater resources, especially during the region's dry season from July to December. Additionally, freshwater resources face external environmental pressures such as hydropower development and commercial-scale agriculture in other parts of the basin, placing resource users with high dependence at risk. Poverty drives many of the unsustainable practices that plague the region's ecology. Diverse and sustainable livelihoods can result in greater security for households, build resilient communities, and ultimately increase protection and sustainable use of freshwater resources.

3.3. Direct Threats to Conservation Values

Unsustainable Fishing. The artisanal fishery in the Okavango headwaters is generally low intensity due to the low population density (Bills et al., 2012). However, fishing activities are reportedly widespread, with evidence in remote regions (von Brandis & Boyes, 2017; Bills et al., 2012). A range of fishing gear is used throughout the basin including traditional traps, hooks with bait, mosquito nets, and monofilament gillnets. Unsustainable gear such as beach seine nets and mosquito nets can have detrimental impacts on

fish populations, even at low levels of use because they target juveniles and smaller species (Larsen et al., 2021; McClanahan & Mangi, 2004). These gears are often used because they are readily available or cheap. For example, Angola has free mosquito net dispersal programs to combat Malaria, making them readily available as a cheap option for fishing. However, using insecticide-treated mosquito nets for fishing can pollute water sources and impact human health (Larsen et al., 2021). Fish are generally caught for subsistence, though evidence of dried fish in local markets suggests some surplus fish are caught for income generation. The waters of the Cuito and Cubango are recognized as having a unique and diverse assemblage of fish species. A 2012 fish survey of the region recorded 107 species across 37 genera and 15 families (Bills et al., 2012).

Though fishing pressure in Angola's portion of the Okavango Basin is currently low, a growing population and unsustainable fishing gear can have detrimental impacts on the fishery, as it has in other inland fisheries throughout the world. South of the border, Namibia's portion of the Okavango river is feeling the pressure of exploitation, where populations are higher and use of gillnets and mosquito nets among fishers is prevalent. Transient fishers from neighboring countries (Namibia and Zambia) also pose a threat to the fishery, as they are more likely to operate unregulated. A lack of community control over natural resources and inadequate enforcement of regulations leaves the fishery vulnerable to over consumption.

Hydropower. Hydropower is the greatest threat to the Okavango Basin. To support a growing economy and population, the national government of Angola looks to its mighty southeastern rivers as a source of electricity and energy security for its citizens. As part of their 2025 vision, Angola is investing heavily in hydropower to improve energy access in rural areas (Lyman, 2019). Angola also plans to sell energy from its largest proposed dams to Namibia to generate national income (Lyman, 2019). TNC has mapped six proposed hydropower dams in the Cuito and Cubango catchments (Figure 5). The development of hydropower in the region will have devastating impacts on the flow and connectivity of the region's rivers, causing irreversible damage to the health of the Okavango Basin. Not only will these impacts affect river health within Angola but will also be felt across Namibia and Botswana who depend on the pristine rivers to deliver water to their countries and bring life to the Okavango Delta.

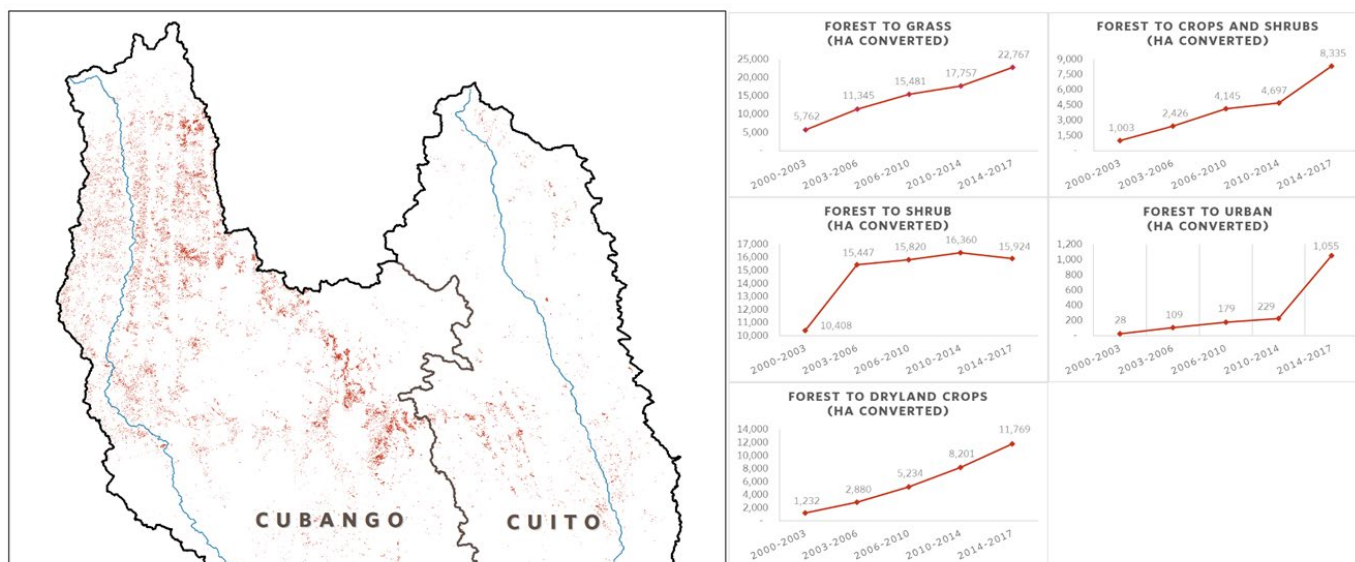


Figure 3: Conversion of forest land in the upper Cubango and Cuito catchments. The red on the map shows the extent of forest loss across the region, while the graphs indicate hectares of forest conversion to different land cover types. Conversion to grass and shrubs is often due to fire or abandoned agriculture land. Conversion to "crops and shrubs" is due to shifting agriculture between plots.

Angola is still in a process of building its country following its horrific civil war. Part of this process includes decentralization of government and giving power to local communities. Any decision to implement hydropower projects that bypass the interests and voices of local communities impedes local governance of natural resources. As seen in hydropower and damming projects across the globe, damming of rivers can negatively impact local fisheries and communities who rely on them for food and trade. Development of the region that is beneficial to people and nature will require local communities and resource users to have a seat at the planning table for energy development.

Deforestation and Human Set Fires. Undisturbed for decades, the Okavango Basin in southeastern Angola preserves some of the largest tracts of Miombo Woodlands in Africa. With the opening of the region, the Okavango Headwaters are under threat of deforestation from development and agriculture. Between the years 2000 and 2017, 200,000 hectares of forest and 40,000 hectares of savanna were lost in Angola's portion of the basin (Figure 3). Dry land crop conversion accounts for 84% of savanna loss, while 72% of forest loss was converted to shrubland or grassland due to uncontrolled fires originally set to clear plots of land for farming or abandoned infertile farmland.

Deforestation has been linked to charcoal production, the primary fuel for heating and cooking in the region, though most deforestation is done at the hands of smallholder farmers in a constant battle with the region's infertile soil. Farmers are forced to clear land every two to three years after exhausting the soil in previous plots. The primary tool for deforestation in the region is fire. Fires set by smallholder farmers are used to clear the land for farming. However, these fires quickly become large and intense, destroying large swaths of vegetation and wildlife habitat. In the near future, more smallholder farmers are expected to migrate into the basin, increasing pressure on soil and clearing the land using fire (Figure 6).

Fire affects floodplain productivity, including fish and fisheries production. While the magnitude of flooding is the key driver of overall productivity, fire can affect to important fish habitat variables including nutrient load, dissolved oxygen, and habitat connectivity (Ramberg et al. 2010). Without trees and vegetation, runoff into the region's rivers and tributaries increases, taking with it loads of sediments. When the fires rip through floodplains, they destroy vegetation critical for the floodplain's ecological function. Without phragmites and other vegetation, floodplains that were once critical fish spawning and nursery habitats during the region's ephemeral floods are destroyed. Rather than trap sediment, vast amounts of soil and nutrients are swept into the rivers. This alters the natural flow and sediment regime of the basin, decreases water quality, and destroys aquatic habitats.

Uncertain Rights to Lands and Resources. Angola has both traditional and legal institutions for rights to land and resource use. Traditionally, land access was granted through inheritance or allocation by community leaders (sobas), who were also responsible for outlining rules towards use of communal lands (Oglethorpe et al., 2018). Though sobas continue to play an important role regarding land allocation and resource use in rural communities, traditional rights and resource access have been disrupted and altered by colonialism, conflict, corruption, and the creation of a centralized national government. These issues are especially important in the remote Okavango region where civil war and land mines displaced the population for decades. The region is now open to settlement, but rights and access to land and resources remain uncertain.

Today, rural land is owned by the state, though sobas continue to play a crucial role in land allocation and resource access (Lyman, 2019, Lyman & Fromherz, 2020). The government of Angola supports community access to land, passing a Land Law in 2004 that allows communities and individuals to register land through local and provincial administration (Lyman, 2019). The country's Water and Land Law implies that customary practices and norms may supplement codified law, though they do not supersede it (Lyman & Fromherz, 2020). Additionally, the law posits that common uses are subject to "traditional" regimes, the State shall respect and protect traditional uses, landowners must provide access to traditional and historical water use regimes, and gives the community favor in competing claims for land between communities and private entities (Lyman & Fromherz, 2020; Oglethorpe et al., 2018). However, the scope of this authority and extent of practice is unclear.

Angolan law implicitly distinguishes between "public" and "private" waters, indicating there's a "right to exploit the land" for non-commercial uses which you do not need a water title (Lyman & Fromherz, 2020). Free to use water includes lakes, ponds, and swamps (wholly contained on property), spring waters (wholly contained on property), groundwater under the land that is not in a protection zone, and rainwater (Lyman & Fromherz, 2020). Notably, this does not include rivers. The law provides traditional common uses and title holders primacy in disputes over water rights (Lyman & Fromherz, 2020). This legal framework provides the opportunity to secure rights to land and water for communities in the region.

It is unclear in Angola law whether communities have the legal right to commercially exploit land and resources, and the extent to which communities can use and manage a resource outside their community land. This has implications for the success of cooperatives. For example, The Forest and Wildlife Base Law outlines individual and community rights to forest resources for subsistence and domestic uses (Lyman & Fromherz, 2020). However, the law is unclear whether a community can acquire a forest concession for commercial exploitation.

There is a broad lack of awareness among the population of their rights and that unregistered land can be given to anyone, local or not (Oglethorpe et al., 2018). People settling and farming in the Okavango region may lack the rights to the land they are using, or even be within the boundaries of protected areas or other lands owned by the state or other entities. Additionally, local knowledge of the registration process, the ease of registering, and the security of these rights are little understood. The law also fails to outline women's rights to land, a population often dependent on natural resources (Oglethorpe et al., 2018).

Smallholders and rural communities without legal rights to their land are vulnerable to losing their land, especially as the government of Angola looks to large-scale commercial agriculture to diversify the economy (Oglethorpe et al., 2018). For companies and elites that understand the legislation, the law has resulted in land-grabbing, and Angola lacks a centralized database of registered land holdings to record land rights (Lyman, 2019, Oglethorpe et al., 2018). Land rights are especially critical in the Okavango Basin because of the interruption of traditional uses due to the civil war. Access to resources and food sovereignty are critical in the Okavango region, but the security of land tenure and community rights remain an impediment to human well-being and sustainability/feasibility of conservation efforts.

No Institutional Provisions for Local Co-Management. Many rural households in the region are solely dependent on natural resources for their livelihoods. Over exploitation of resources is an ongoing threat due to the disruption of customary resource management institutions, inadequate enforcement of regulations in the remote region, and a growing population in an open-access environment (Oglethorpe et al., 2018). Very few community-based natural resource management schemes exist in the country (Oglethorpe et al., 2018). However, Angola does have a legal framework supportive of community-based management of freshwater resources and associated rights (Lyman & Fromherz, 2020). These include legislation to create community forests, use forest products, water management, small-scale fisheries, and agriculture (Oglethorpe et al., 2018). The Environmental Framework Law

(1998) provides a framework for community participation in protected area management, and the Land Law (2004) allows communities to register communal land for uses beyond agriculture and settlement (Oglethorpe et al., 2018). The Cooperatives Law (2015) allows individuals to develop cooperatives for the sustainable development of their community (Oglethorpe et al., 2018).

Angola's legal framework supports subsistence and common use and some opportunities for public participation in planning and certain decision-making processes, but it is less clear the extent at which it support the rights to community management of resources (Lyman & Fromherz, 2020). Ultimately, government entities (Hydrographic Basin Management Bodies) are primarily responsible for the management of freshwater resources. Co-management in this region will require a framework that allows communities to actively participate in resource management and influence government management bodies. Such a framework would engage local communities with state management entities and other resources users, maximizing management efforts. Legal institutions that support this framework can ease negotiations between communities and other resource users, integrate science and traditional practices, and legitimize community rights and access to resources that have a broad user base.

One example where the lack of institutional provisions for local co-management has threatened both conservation efforts and human livelihoods is the establishment of Mavinga and Luengue-Luiana National Parks within the headwaters of the Okavango Basin. The parks were established in 2011 and are virtually unmanaged. Spanning approximately 21 million acres (Figure 4), communities continue to live within their borders without knowledge of the protected areas – or inclusion in their management. Despite models in neighboring countries, Angola has not yet meaningfully adopted community conservation in policy or practice, giving resident communities little stake or voice in conserving these parks or other protected places around the country.

Future Development. Because this region is dry and prone to drought, all three basin countries look to the catchment area for hydropower and irrigation schemes for large-scale agriculture (Figure 5). As Angola develops its remote southeast region – bringing access to services and markets to a growing population – future development pressure threatens connectivity and function of the freshwater system. The process to allocate concessions is underpinned by corruption and inefficient legislation and enforcement, resulting in illegal land allocation for political gain. Local governments have little power or capacity to influence land use and allocation, or to enforce regulations.

Water Diversions. Water is diverted from the Okavango Basin for irrigation/agriculture, domestic use, and energy production to support a growing population in Angola and Namibia (Figure 5). Agriculture is the dominant form of water use (83.6% of water withdrawals) and irrigation schemes already exist in the Cubango and Cuito catchments (FAO, 2014; Oglethorpe et al., 2018). Within the Cuando Cubango Province there are plans to increase farming land to 4,000 km² by 2025 through mechanized and industrial agriculture (GICHD, 2019). Current levels of water withdrawal in the basin are low, but future development in the agriculture, domestic, and mining sectors may have significant impacts on flow reaching the delta, especially during years of drought (FAO, 2014). Increased water diversion for development can mean less water for smallholder farmers and impact the fishery. Water diversion schemes can also reduce the natural flow and connectivity of the Basin, with detrimental consequences to the region's biodiversity.

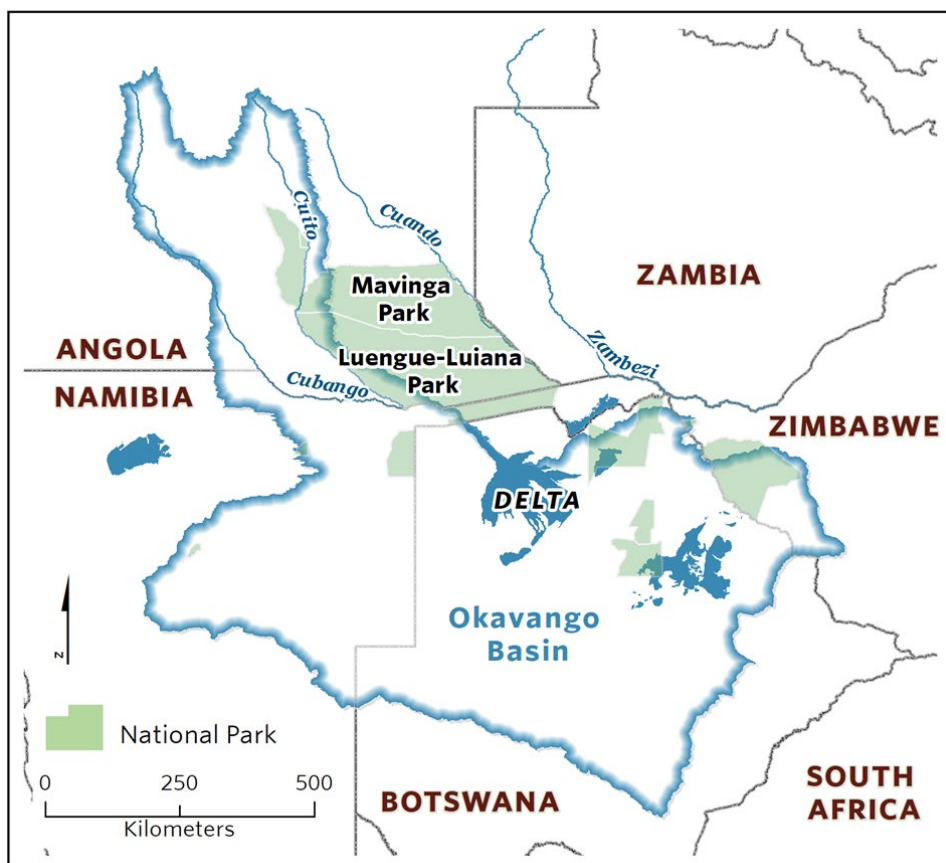


Figure 4: National parks within the Okavango Basin. The map shows the extent of the massive Mavinga and Luengue Luiana National Parks between the Cuito and Cuando catchments. Communities continue to live within the park borders with little to no knowledge of their existence.

Climate Change. Climate Change threatens the entire Okavango Basin, placing stress on both the ecology and human populations. The World Wildlife Fund and other partner organizations reported impacts on the region from a changing climate including changes in intensity and frequency of rainfall, flooding, more intense fires, and drought (Oglethorpe et al., 2018). Climate change models predict temperature changes up to 2.64 °C and annual mean reduction in flow by 20% by 2080 (Andersson et al., 2006). Precipitation is predicted to decline by 14% by 2050 (Folwell & Farquharson, 2006). The impacts on water availability are especially significant to the region's wildlife, smallholder farmers, fish production, and Miombo woodlands. Less water reaches the Okavango Delta each year, reducing the extent of permanently flooded wetlands and floodplains. All the above direct threats discussed are intensified through the effects of a changing climate, and degradation of the system by humans reduces its resiliency to the phenomenon.

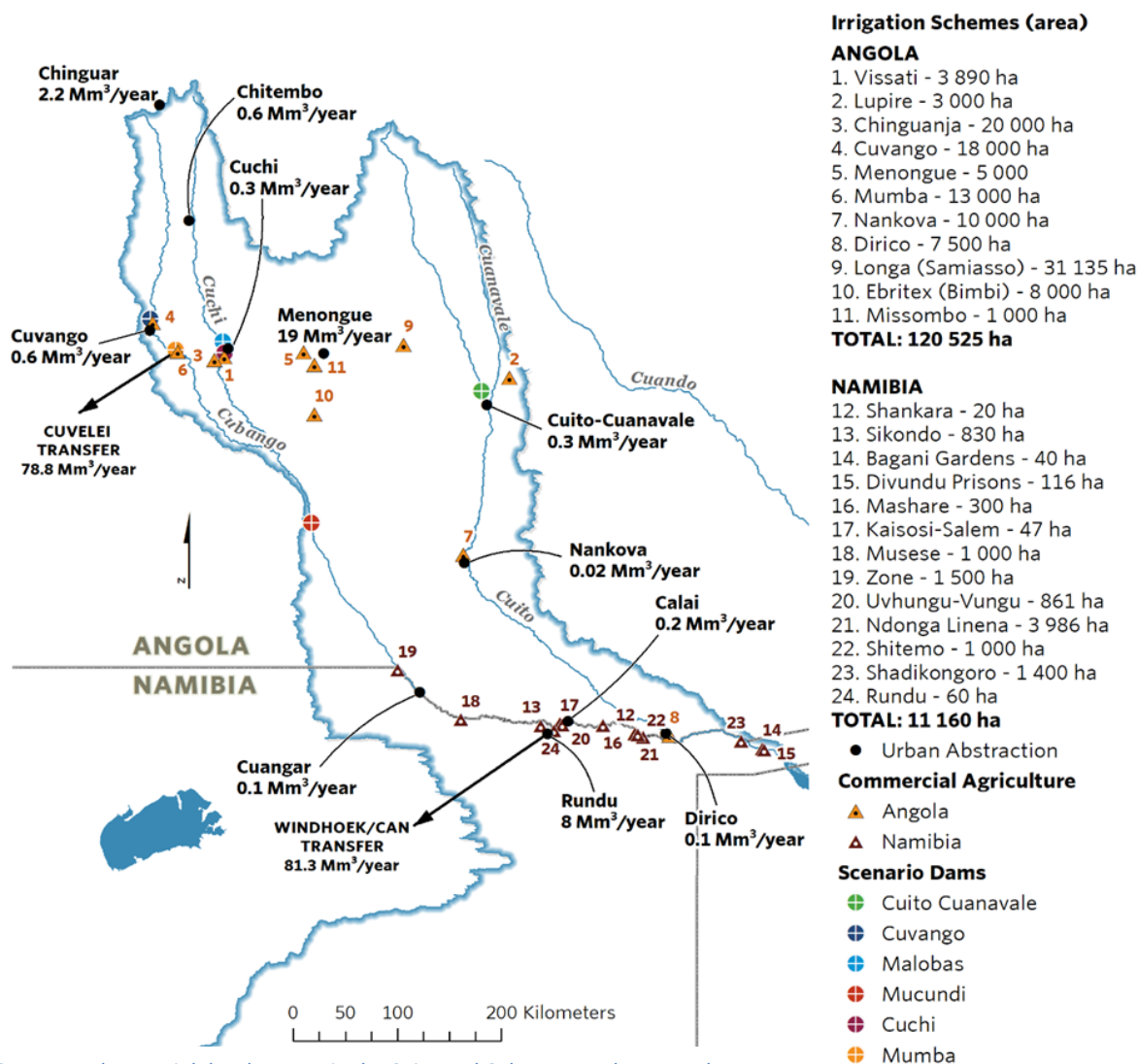


Figure 5: Current and potential development in the Cuito and Cubango catchments. The map shows irrigation schemes, urban abstraction, commercial agriculture, and potential dams.

CURRENT POPULATION

2030 POPULATION

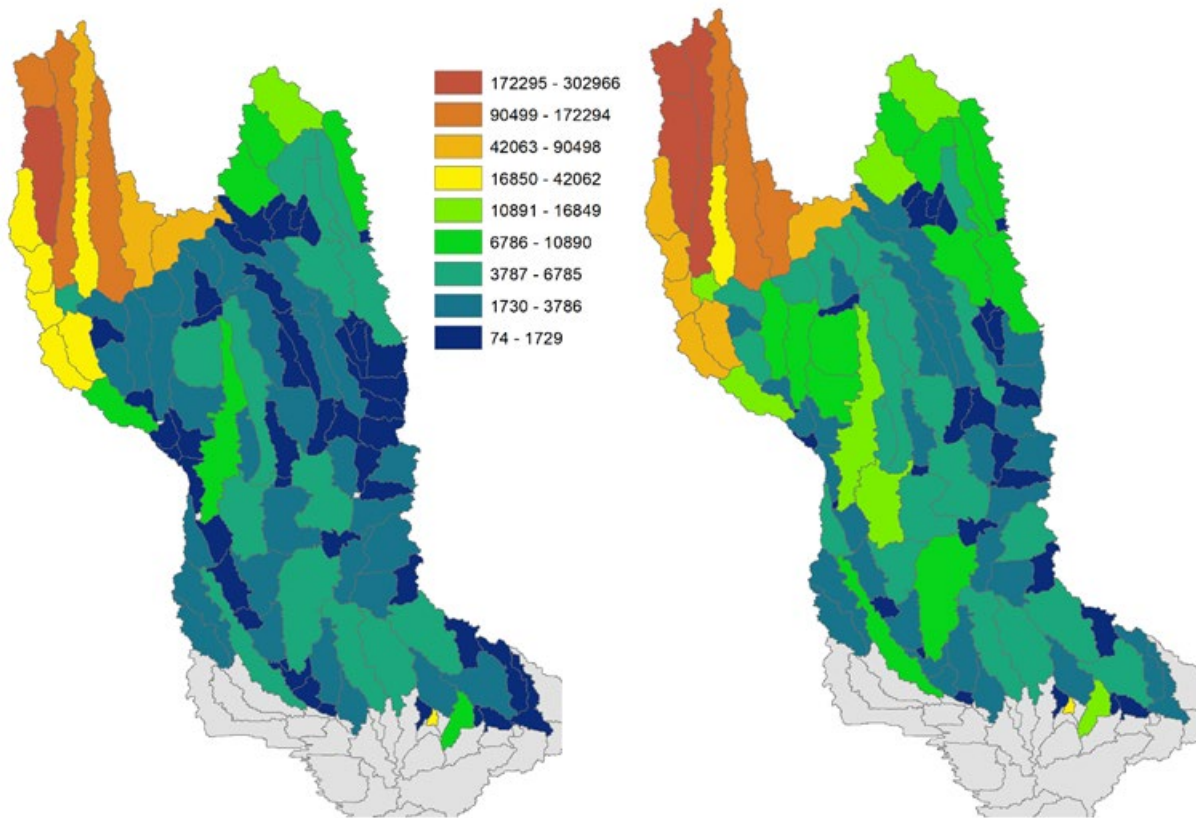


Figure 6: Estimated population growth in the Cuito and Cubango catchments over the next decade. Most migrants are smallholder farmers, increasing the pressure on resources to support crop yields in the region's infertile soils.

3.4 VCA Considerations

Secure Rights to Territories & Resources. As mentioned in the Uncertain Rights to Lands and Resource section, the State owns rural land, and Angolan laws do recognize traditional territories, land uses, and the validity of customary laws. However, the extent to which customary law is incorporated, the scope of its authority, and whether customary laws actually “win out” in practice is up for debate. While the country’s legal framework carves out a role for custom and traditional authority, the State ultimately functions as both manager of water resources and decider of rights-related conflicts. There is a law that allows communities to register their communal land, but there is little knowledge of this law or organization to make community rights official. Additional information and field interviews are required to better understand the practice of securing rights and territories in Angola. TNC expects to continue this work, though it has been delayed due to COVID-19.

Strong Community Leadership & Capacity. As mentioned in previous sections, colonialism and then civil war displaced the diverse communities of the Okavango, disrupting traditional practices and creating generations of unsettled and vulnerable people. Individuals and families started to return to the Okavango after the civil war ended in 2002, and migration continues to this day. As a result, local leadership and capacity is growing but is relatively recent. Local, traditional leaders are known as sobas and are put in place through heritage, from fathers to sons. The sobas are recognized by the government and speak on behalf of communities.

TNC’s local partner, ACADIR, is working with communities to establish associations and train leaders, including but not limited to sobas. In their outreach, they share information about communities’ rights to land and fish, sustainable resource management, and monitoring and evaluation of natural resources. Central to all ACADIR’s programs is a focus on building the capacity of communities to sustainably manage their lands and waters and developing institutions and people to lead and manage that process. Importantly, ACADIR also focuses on strengthening women’s technical, financial, and leadership capacity. Women occupy 49 percent of the leadership positions in the associations that ACADIR has formed at the community level. Despite the presence of these organizations, significant gaps in gender equity in leadership, low access to financial resources, and limited information about both human and natural resource management remain. Strategies #1, 2, 3, and 7 explored in depth below focus on expanding fishing cooperatives and strengthening finance mechanisms, gender equity, and natural resource management.

Effective Multi-stakeholder Platforms for Decision-Making. Currently, the communities of the Okavango Basin are the main users of the basin's resources. Their involvement in regional decision-making is essential for achieving desired environmental and economic outcomes, as well as to ensure human well-being. One important platform is the Okavango Reference Group (OKG).

The OKG is a multi-stakeholder platform formed to collectively manage the Okavango river basin. Leaders from Angola, Botswana, and Namibia select representatives with knowledge about the Cubango/Cuito catchments from relevant government departments and civil society to participate. ACADIR is the only NGO that participates in the OKG. Only one soba, who represents their community, participates. ACADIR and TNC intend to increase community participation on this platform. They have identified the importance of establishing reputational capital and strong relationships between the OKG and communities as foundational elements to increase their representation in basin-level decisions. To start this process, ACADIR will educate OKG representatives on the importance of community involvement. Community awareness of the process and buy-in is necessary to achieve OKG goals, and OKG can provide institutional support for communities in the basin. Further, efforts will focus on strengthening the relationship between the new OKG Governor and Coordinator and the communities, as they have expressed a desire for this connection. ACADIR envisions their role as convener and a messenger to share information about the projects in progress and their potential to achieve both human-well-being and natural resource goals. The ultimate objective is to have OKG elect to increase community representatives to take part in decision-making bodies so that communities can speak to their needs and projects directly.

If expanding the OKG to include community representation stalls, other options include working with the Hydrographic Basin Management Body or with the provincial government to create a new platform that better engages communities. To start this process, ACADIR and TNC need to sign a memorandum of understanding with the Cuando Cubango government, establishing clear targets and outcomes for natural resource management, human well-being, and community understanding of laws related to forest and fisheries management. The scope of this work would likely be limited to Angola. Strategy #6 in Section 7 addresses TNC's plans to facilitate communities' active and meaningful engagement in multi-stakeholder platforms in the Basin.

Environmentally Sustainable Economic Development. As mentioned in the "Income Generation for Local Communities" section, communities have limited access to markets, and as a result have very few economic opportunities and depend heavily on natural resources for subsistence and income. TNC and ACADIR's work will focus specifically on fostering sustainable economic development to decrease pressures on freshwater resources. Two potential pilots are establishing additional fishing cooperatives in communities and advocating for a strengthened fisheries law that promotes sustainable co-management. Both community-based initiatives provide the groundwork for providing alternative livelihood by leveraging collective resources that individuals may lack. Importantly, efforts will focus on building community capacity for establishing and managing fishing cooperatives, providing resources needed to maintain sustainable operations (e.g., financing, access to markets), and by serving as a bridge between communities and government officials to bolster support for fishing cooperatives.

Where fishing cooperatives are already established, ACADIR and TNC will accelerate their growth and increase their capacity by supporting the development of sustainable fishing plans, mobilizing financing for sustainable fishing activities, providing technical training, and building trust. Where cooperatives are not established, ACADIR will disseminate the sustainable fishing cooperative model by developing relationships with fishers, raising awareness and educating fishers on the advantages of cooperatives, which include recognizing their statutory rights to fish and developing a sustainable economic development plan with the community. The main barriers to this work are existing unfulfilled promises to communities, bureaucracy, limited funding, and ignoring the capacity of communities. Both existing and established cooperatives are also challenged by identifying potential investors and favorable markets, which Strategy #7 is attempting to address.

To reduce barriers, ACADIR and TNC are strengthening relationships with the government to increase leadership buy-in and support of cooperatives and community rights. A component of this work is mobilizing donors and interested partners to also advocate on the behalf of communities. Government buy-in increases the legitimacy of the cooperatives, which can facilitate market development and investor interest. ACADIR is also keen to engage cooperatives directly in this work by encouraging leaders to represent their community in government platforms.

Both pilots have the potential to stabilize access to, and management of, natural resources, which is necessary for developing a sustainable economic opportunity.

Gender & Equity. There are practical and principled reasons to elevate women’s voices in conservation. Evidence suggests doing so can increase effectiveness of projects (Leisher et al., 2016). While there are many components to equity unique to culture and context, this section is specific to gender¹ and provides a brief analysis of what we know and don’t know about women’s situation in Angola, and more specifically the Cuando Cubango province. In particular, we highlight the gender inequities within the laws and regulations and the factors that inhibit them to fully participate in managing natural resources so important to their own and household’s well-being.

Laws and regulations supporting gender equity are limited in Angola. Several laws establish non-discrimination and gender equity, and there is a Ministry of Social Action, Family, and Promotion of Women (MASFAMU) charged with leading on policies promoting gender equity in employment, education, and health care as well as combating domestic violence. MASFAMU also has the mandate to promote the participation of rural women in the decision-making bodies, associations, and cooperatives, in collaboration with other sectors. However, MASFAMU has weak representation in the rural provinces and the equity laws have limited influence in rural communities. In Cuando Cubango, both awareness and enforcement are inconsistent, and there is a strong prevalence of customary traditions.

One example of this is with land tenure. At the end of the civil war, land reform broke up communal land holdings, transferring land rights to the state. As mentioned previously, limited oversight in rural areas resulted in customary traditions overtaking statutory laws and regulations. Customary traditions dictate male ownership and inheritance of land. Land is passed to sons not daughters, and there is limited protection for women’s right to land regardless if they are heads of households or married. This is particularly jarring given that one third of households in Angola are headed by women (Angola DHS, 2015-2016). Lack of land tenure security can increase women’s financial insecurity and their dependence on men and have cascading effects to the overall household’s well-being (Meinzen-Dick et al., 2019) This is just one example of the discrepancy between laws that uphold gender equity and the awareness, enforcement, and respect of such laws in rural communities.

In addition to land tenure, access and management of natural resources is important for community-based conservation and specifically for gender equity. Currently, much of the power over natural resources is held by local leaders, sobas, 99 percent of whom are men (Cain, 2019). The soba position is hereditary passing from father to son, and the sobas are recognized by the state. This is a significant oversight to increase diverse perspectives on the management and use of natural resources, potentially limiting the efficacy and benefits/costs of community-based natural resource management systems. This is because women have distinct experiences and use-cases for natural resources. For instance, women generate income for their households through cultivation and/or participation in inland fisheries, particularly in processing and selling fish. These contributions often go unrecognized, and the knowledge and preferences of women in how inland fisheries are used and managed presents an opportunity to elevate women while improving the management of these resources (Castañeda et al., 2020). More research is needed to better understand the role of women in the fishing cooperatives and other natural resource management activities.

Finally, women in rural Angola also have limited access to healthcare facilities. Ninety-three percent of women from the Cuando Cubango province have challenges accessing health services (Angola DHS, 2015-2016) The two major barriers to women accessing health services are limited financial resources for treatment and the distance and cost for travel to healthcare facilities. Access to health care not only has implications for women and conservation but also newborn and child health. Only 21 percent of women in the province give birth at a healthcare facility with the help of a skilled birth attendant. A component of this percentage is also a preference to give birth at home. The World Health Organization advocates for skilled care at birth as a means of reducing unpreventable maternal and newborn deaths (WHO, 2021).

As Angola decentralizes its government to emphasize municipality control, championing gender equity particularly in relation to natural resource management is crucial. Significant gaps in gender equity in leadership, low access to financial resources and healthcare, and limited rights to natural resources remain. As part of the scoping plan, we intend to better understand gender dynamics in the Cuando Cubango province focused on gendered roles and activities, access and control over resources including financial services and education, and social and cultural patterns.

Connection to Place. Civil war forced people from their lands and waters in the Okavango basin for over 25-years. As people return, they are reconnected to their place and/or are tied to the land and natural resources. Connecting and learning from more communities will improve our understanding of connection to place and how this can be tied to the conservation and human well-being outcomes.

¹ We acknowledge and respect that binary gender (men/women) does not reflect the lived experience of many.

4. STAKEHOLDER ANALYSIS

Success of community-based conservation is tied to understanding stakeholders and their motivations, and the inclusion of stakeholders in conservation efforts. The Okavango team mapped partners and stakeholders that will support or be impacted by community-based conservation initiatives in Okavango Headwaters. This work lays the foundation for understanding partners and stakeholders in the headwater communities, and potential for their engagement in community-based initiatives. TNC recognizes this is not an exhaustive list of stakeholders. Through the implementation of this plan TNC will need to take a proactive approach to identify marginalized and unrecognized community members and ensure their voices are heard.

Local Communities

- **Subsistence farmers**
 - **Interests:** Improving farm productivity without requiring more input and providing enough food throughout the year for their families.
 - **Roles and influence in the system:** Some of the threats in the basin come from their agriculture methods. Subsistence farmers in the region have high influence on the health of the watershed, but their decision making is low. This is due to the region being a post-conflict area, a strongly centralized government in Angola that doesn't recognize local control of land, and local government systems that have been eroded by conflict and colonization. Additionally, subsistence farmers have few livelihood options available due to the geophysical factors influencing them.
 - **Involvement in community-based conservation:** Subsistence farmers have the opportunity to alter farming practices to be more sustainable. They don't currently use trees as a resource, but rather perpetuate deforestation through slash and burn agriculture and charcoal production. There may be an opportunity to integrate agriculture and community forestry. TNC and partners need to better understand their interest in changing farming practices, and their risk aversion to new practices.
 - **Engagement:** Farmers in the region have shown interest in building cooperatives for livelihood diversification (e.g. honey making, fishing, forest products). Local communities require capacity to organize themselves and support from local institutions.
- **Fishers**
 - **Interests:** Improved livelihoods through improved fish catches. Fishers in the region are interested in utilizing methods that require using less effort, time, and resources.
 - **Roles and influence in the system:** Unsustainable fishing practices and use of unsustainable fishing gear negatively impacts biodiversity and ecosystem health. Subsistence fishers in the region have limited options for livelihoods and little influence in decision making. Most are also subsistence farmers.
 - **Involvement in community-based conservation:** Depending on their willingness to cooperate and invest, fishers could adopt more sustainable fishing practices and become active managers of the resource. The national and local government has to create an enabling environment for them to participate in management of fish resources. Fishers may choose not to participate in CBC if they anticipate not deriving any benefits or the proposed strategies reduce yields and threaten their livelihoods.
 - **Engagement:** There are a few non-functional fishing cooperatives in the basin. There is also an opportunity to learn from fishing cooperatives across the border in Namibia.
- **Charcoal producers**
 - **Interests:** Charcoal production and trade is a livelihood diversification activity. Charcoal producers are interested in generating income, but deforestation requires increasing effort to access charcoal. Most charcoal producers are also subsistence farmers.
 - **Roles and influence in the system:** Charcoal producers have negative impact on forests through unsustainable charcoal production. They have little influence in decision making, but their activities have high impact on the health of the watershed.
 - **Involvement in community-based conservation:** CBC initiatives can help charcoal producers adopt sustainable and less impactful methods of producing charcoal, and adopt other income generating/livelihood diversification activities. Their inclusion in CBC depends on their willingness to be part of CBC initiatives and their perceived benefits of sustainable resource use.
 - **Engagement:** Some cooperatives exist in the region, though cooperatives require legal and perceived legitimization.

- **Honey producers and other forest products users**
 - **Interests:** Honey and other forest products are livelihood diversification activities. Resource users are interested in generating income, but deforestation requires increasing effort to access resources. Most honey producers and forest product users are also subsistence farmers.
 - **Roles and influence in the system:** Forest product users have negative impacts on regional forests through unsustainable resource use. For example, honey producers often utilize methods such as tree debarking, which ultimately kills trees. Like other subsistence resource users in the region, they have little influence in governance and decision making.
 - **Involvement in community-based conservation:** CBC initiatives can help forest resource users adopt new and less impactful methods. This includes new and sustainable honey production technologies with the ability to improve productivity of honey production. Honey and forest product initiatives can also help local community members diversify income generating activities. Their inclusion in CBC depends on their willingness to be part of CBC initiatives and their perceived benefits of sustainable resource use.
 - **Engagement:** Some cooperatives exist in the region, though cooperatives require legal and perceived legitimization.
- **Women**
 - **Interests:** Women play an important role in communities as resource users and engage in all the above livelihoods. Community-based resource management can improve the lives of women and households if women are proactively engaged and empowered.
 - **Roles and influence in the system:** Women are significant natural resource users with high dependence on these resources to support themselves and their families. Women often occupy unique roles that men may not. For example, many fish processors and sellers are women, women collect most of the firewood and water for a household, women often take care of family farms while men are engaged in other income generating activities, and women are care givers in the family and are responsible for teaching children. Unsustainable resource use and climate change have greater negative impacts on women compared to men.
 - **Involvement in community-based conservation:** CBC initiatives can provide a platform for engaging women in resource management and giving a voice to this often-marginalized group. Women also bring a unique perspective and understanding of resources that can improve sustainable management.
 - **Engagement:** TNC and partners will need to proactively engage and empower women to ensure their equitable representation in CBC initiatives and leadership positions.

Private Companies

- **Agriculture input suppliers**
 - **Roles and influence in the system:** Agriculture input suppliers provide products to local communities such as seeds, fertilizers, agrochemicals, and fishing gear. They have low influence in governance and decision making.
 - **Involvement in community-based conservation:** It's important to make sure they sell inputs that are suited for the watershed, because their products are likely to have a high impact on the basin's ecological health and human well-being. Input suppliers are also responsible for shaping capacity and awareness of best management practices among resource users. They can inhibit the progress of CBC by providing inputs that are damaging to the system (e.g., harmful fertilizers & other chemicals, illegal fishing gears, etc.)
- **Financial institutions – micro-lenders**
 - **Roles and influence in the system:** Provide financial resources to invest in CBC.
 - **Involvement in community-based conservation:** These institutions can support CBC by committing to provide financing to CBC initiatives and cooperatives. They can also provide capacity building on financial literacy and revenue generation to local communities. However, a lack of recognition of CBC as eligible for financial support inhibits their involvement.
- **Private developers (mining companies, commercial farmers, commercial loggers, carbon traders)**
 - **Interests:** The basin provides development opportunities for private companies and for the country of Angola to grow its economy.
 - **Roles and influence in the system:** Private developers have a high influence in the region, both through their impact on the landscape and their power in decision making. Poorly planned and sited developments can negatively impact the basin's ecology, watershed function, and human well-being.
 - **Involvement in community-based conservation:** Private developers can support CBC by embracing community needs and livelihoods in their project design and implementation. However, they can be extremely detrimental to the success of conservation and local communities by implementing projects that undercut CBC and compromise the ability of local communities to sustainably and productively use resources.

Local Government

- **Provincial leadership**
 - **Roles and influence in the system:** Provincial leadership makes decisions around project interventions (type and locations) and provides project support through extension services and project financing. The provincial government has high influence in decision making.
 - **Involvement in community-based conservation:** Provincial leadership is critical in CBC success. They support CBC through extension services and capacity building, including CBC principles in local bylaws, and incorporating CBC projects in provincial plans. If there is no buy-in from provincial leadership CBC cannot be implemented.
 - **Engagement:** There are some provincial offices and departments near project sites in the basin. Provincial government can be directly engaged through extension services. However, provincial governments have limited budgets and capacity, and a strong influence from national government may reduce their willingness to make decisions on CBC. TNC and partners plan to engage provincial leadership through continuous meetings and dialogues and ensure the multi-stakeholder platform (Reference group) is continuously involved and updated.
- **Provincial departments of Forestry, Agriculture and Fisheries Directorate**
 - **Roles and influence in the system:** Provide extension service support, capacity building, and advice on policy and bylaws.
 - **Involvement in community-based conservation:** Provincial resource departments will have a role in CBC initiatives by providing extension services, ensuring government buy-in, and including CBC in their annual plans. Their involvement is critical for provincial government to recognize ownership of CBC projects. They may inhibit CBC success by not providing support to projects, or if there is a lack of government buy-in.
 - **Engagement:** The provincial resource departments have demonstrated willingness to support CBC. TNC and partners will continue to engage through meetings and workshops.
- **Community leaders - Regidor (politically appointed) and Sobas (traditional leaders)**
 - **Roles and influence in the system:** Community leaders have strong influence on their local community. They have a role in community cohesion, encouraging community members to adopt CBC, and implementation/enforcement of local bylaws and codes. However, they have low influence in the regional and national government decision making process.
 - **Involvement in community-based conservation:** Community leaders can create community mobilization for CBC and support CBC implementation arrangements – such as monitoring and enforcement of bylaws and codes. If community leaders feel they have ownership of a project they can promote government recognition of the CBC project as well. A lack of ownership or interest in CBC can impede project implementation and legitimization.
 - **Engagement:** TNC and partners will engage with local leaders through community meetings and regular communication.
- **Local Administrators (Cuchi and Quito-Cuanavale municipalities)**
 - **Roles and influence in the system:** The primary role of local administrators is they are a major link between local communities and the provincial government. Additionally, they can facilitate implementation of CBC at the local level, support community mobilization and buy-in, and support promulgation of bylaws and local codes.
 - **Involvement in community-based conservation:** Community mobilization for CBC and support CBC implementation arrangements – such as monitoring and enforcement of bylaws and codes. A lack of ownership or interest in CBC can impede project implementation and legitimization.
 - **Engagement:** TNC and partners will engage with local administrators through community meetings and regular communication.
- **Extension officers (forestry, fisheries, agriculture) at Cuchi and Quito-Cuanavale municipalities**
 - **Roles and influence in the system:** Extension officers can support capacity of CBC throughout the basin. They are close to project sites and can support implementation. However, they have low level of influence in decision making processes.
 - **Involvement in community-based conservation:** Can support CBC implementation, capacity building, and can help communities propose the right codes and bylaws.

Government Agencies

- **Okavango River Basin Water Commission (OKACOM)**
 - **Interests:** Partnership between all three basin countries. Interested in improved management of the shared watershed resources as well as sustained economic development.
 - **Roles and influence in the system:** Function as technical advisor to the OKACOM member states. OKACOM influences decision making that ultimately has implications on the functioning of Okavango system. Having been established by the governments of the member states, OKACOM has strong influence on the decision-making process.

- **Involvement in community-based conservation:** Can create an enabling environment for CBC by facilitating government buy-in and resource mobilization. Provides an opportunity for lessons learned and exchange of experiences from ongoing OKACOM supported demonstration projects.
- **Engagement:** OKACOM has various structures that can facilitate CBC (e.g., technical committees) and currently has an existing MoU with TNC to support TNC's work in the basin. OKACOM will be engaged through continuous communication, sharing data and project progress, and involvement with on the ground impact.
- **Ministries responsible for water in Angola, Botswana, and Namibia**
 - **Roles and influence in the system:** The decisions they make on water development in the Okavango catchments will influence local livelihoods and the ecosystem.
 - **Involvement in community-based conservation:** The role water ministries in each country will play in CBC implementation includes facilitating buy-in from relevant ministries and provincial governments, securing resources, and creating an enabling environment for CBC. If there is no buy-in the government will not allow CBC to be implemented.
 - **Engagement:** Continuous engagement, regular update meetings, and formalized partnership through MoU.
- **Ministry of Fisheries and Sea – Angola**
 - **Roles and influence in the system:** Institution responsible for policy and legislative framework in fisheries. The Ministry's decisions will affect the basin's fishery. It has a high level of influence on decision making.
 - **Involvement in community-based conservation:** The Ministry can support fisheries co-management institutions and cooperatives through facilitating buy-in from relevant ministries and provincial government, securing resources, and promulgating laws and regulations that support CBC. Lack of buy-in from the Ministry will impede any CBC initiatives related to fisheries.
 - **Engagement:** TNC has already met with the Ministry's leadership and they have demonstrated commitment and support. There is a need for further cultivation of trust by continuous engagement through regular meetings and joint planning.
- **Ministry of Environment – Angola**
 - **Roles and influence in the system:** Institution responsible for managing natural resources and the environment, such as wildlife and protected areas. The Ministry creates policy and legislation to support CBC and has a high level of influence on decision making.
 - **Involvement in community-based conservation:** The Ministry is critical in the success of CBC in Angola by creating the legal framework to incorporate CBC in environmental law and protected area management. The Ministry is responsible for creating the institutional and regulatory environment for CBC to flourish.
 - **Engagement:** Most of the protected areas in the Okavango Basin are not under effective management. Co-management approaches are likely to interest the Ministry, as well as the economic opportunities from natural resources. TNC and partners will engage through continuous dialogue, policy briefs, and exchange programs for knowledge transfers.
- **Ministry of Agriculture and Forestry – Angola**
 - **Roles and influence in the system:** The Ministry is responsible for implementing agriculture policy, supporting agriculture initiatives, forest conservation, and generation of revenue from forest resources. The ministry has a high level of influence on agriculture and forestry initiatives.
 - **Involvement in community-based conservation:** The Ministry can support CBC by implementing forestry co-management approaches, creating a legal framework for local forestry management, investing in and creating markets for forestry products, and promoting forest conservation. A lack of buy-in from the Ministry will impede CBC forestry initiatives.
 - **Engagement:** Food security is a major issue in the basin and unproductive agriculture is an important contributor to this issue. Provincial departments of Agriculture and Forestry have demonstrated willingness to participate in CBC activities.
- **Gabinete para a Administração da Bacia Hidrográfica do Rio Cunene (GABHIC)**
 - **Roles and influence in the system:** Provides extension service support, capacity building, and advice on policy and bylaws related to water management in the Cubango basin. GABHIC is an Institution in the Ministry of Energy and Water.
 - **Involvement in community-based conservation:** GABHIC will support CBC by ensuring its inclusion in the Angola National Action Plan and the integrated management plan for the upper catchment. The Ministry of Energy and Water has demonstrated support and willingness to facilitate implementation of CBC.
 - **Engagement:** An MoU is currently being drafted to support a partnership with GABHIC. So far, the agency has demonstrated willingness to participate.

Civil Society/NGOs.

- **University of Quito-Cuanavale**

- **Roles and influence in the system:** The university conducts research on the system and builds capacity for natural resources management. The university has a low level of influence on decision making.
- **Involvement in community-based conservation:** The university will have limited involvement in CBC. However, the university can support CBC through targeted capacity building and providing research on the impacts of CBC.
- **Engagement:** The university is based in the basin and presumably has capacity to engage on CBC issues.
- **Reference Group (multi stakeholder platform – Menongue, Angola)**
 - **Roles and influence in the system:** The Reference Group was established by the provincial government to bring stakeholders together to create dialogue on issues affecting the basin. The organization has some influence on decision making at the provincial level.
 - **Involvement in community-based conservation:** The Reference Group will help ensure ownership by the provincial government of CBC initiatives.
 - **Engagement:** The Reference Group exist as a multi-stakeholder platform to support work in the basin. They will be engaged in CBC activities through regular meetings and workshops.
- **Local NGOs (e.g., Associação de Conservação do Ambiente e Desenvolvimento Integrado Rural (ACADIR))**
 - **Roles and influence in the system:** Local NGOs create community mobilization and work to improve livelihoods and human wellbeing. NGOs in the region have an interest in environmental conservation. Low level of influence in decision making.
 - **Involvement in community-based conservation:** Important partners in CBC to support implementation through capacity building, resource mobilization, and fundraising.
 - **Engagement:** ACADIR is a regular partner of TNC. ACADIR is based within Cuango Cubango Province and currently TNC has a cooperative agreement with the organization to support implementation of CBC initiatives. Other local NGOs will be engaged with CBC when it aligns with their work.
- **Resource user associations (e.g., fisheries cooperatives, farmer's groups, forest groups)**
 - **Interests:** Interest in the sustainable management and use of specific resources.
 - **Roles and influence in the system:** Resource user associations work to promote best management and resource use practices. Ultimately, they have a low level of influence on decision making but can have influence on local group members.
 - **Involvement in community-based conservation:** Resource user groups can lobby for policy change and contribute to community mobilization for CBC.

International Organizations.

- **Donors and multi-lateral agencies (USAID, UNDP, EU)**
 - **Interests:** Interest in protecting the Okavango Basin as a globally significant biodiversity area.
 - **Roles and influence in the system:** These agencies and funders can offer significant project financing. However, if not carefully analyzed and understood, their investments can have negative consequences. They have platforms and some influence to engage government around investment decisions.
 - **Involvement in community-based conservation:** They can support CBC by providing financing, capacity building, providing support through knowledge and skills, and lobbying for policy support. Their financial decisions can impact funding available to CBC.
- **International NGOs (WWF, National Geographic Okavango Wilderness Project, UNDP)**
 - **Interests:** Interest in protecting the Okavango Basin as a globally significant biodiversity area. Some international NGOs already have projects in the basin.
 - **Roles and influence in the system:** Involvement of these organizations in the basin can help mobilize resources and communities, build capacity for conservation outcomes, and provide knowledge and skills. Some of these organizations have the influence to lobby government.
 - **Involvement in community-based conservation:** They can be critical partners in project implementation.
 - **Engagement:** International NGOs have committed to partnering with TNC to fund and implement CBC.

5. LESSONS LEARNED FROM CURRENT PROGRAMS

Much of TNC's community-based freshwater work in Africa is driven by nearly a decade of experience from the Tuungane Project (Kiswahili for "Let's Unite") on Lake Tanganyika. The project implements integrated solutions that promote healthier families, fisheries, and forests, through an approach addressing both health and the environment simultaneously. This program has made meaningful progress in fisheries co-management outcomes, forest conservation, livelihood improvements, and health outcomes. Yet, as described in Leisher and Hess (2017), areas such as education, food security, adequate water and

sanitation, desired family size, and malaria prevalence have not been meaningfully impacted by the Tuungane Project approach to date. Although the Tuungane Project has at times hoped that transformational change across many sectors could come from a Population, Health, and Environment (PHE) approach, our impact has been more limited in the natural resource sector. Internalizing this learning, this plan focuses more narrowly on community-based fisheries and freshwater biodiversity conservation and management to obtain conservation outcomes and improve human well-being.

Lessons learned around the financial sustainability of freshwater conservation in Africa has also been a product of the Tuungane Project. Although the Tuungane Project has had notable successes, including a carbon finance deal that is already benefiting communities near Lake Tanganyika's shore, the community-based freshwater conservation work is only starting its journey towards financial sustainability (Anderson, 2018). This is in part due to a lack of models globally of how to pay for improved management of common pool resources. Through the literature and our experience in the field, we know a lot about enabling conditions and incentive structures for fisheries co-management. Having strong leadership in place at the village level, clear bylaws and institutional structure, the backing of the government for difficult enforcement issues, and incentives to avoid free riders have all proved critical to the success of co-management institutions on Lake Tanganyika. The strategies outlined in this plan are designed to achieve these enabling conditions to promote financially sustainable community-based conservation in the Okavango headwaters.

Finally, our work on community-based freshwater conservation on Lake Tanganyika has taught us the challenge of assessing the ecological impact of TNC's work with communities. As documented by Leisher and Hess (2017) and elsewhere, we can get promising results from social surveys of those in the fishing community with regards to the value of TNC's work with them. But given the scale of the lake and our many village sites, and given the challenge of fish identification in the field, the seasonal and inter-annual variation, and the importance of consistent methods and observers, we are only now starting to get a picture of our ecological impacts in the water. Complicating the situation, some of the Tuungane small-scale, community-based protection sites appear to have been placed in a location of limited habitat value, and we will need to consult with communities on whether we modify their location to protect more valuable habitat and fisheries aggregation locations. This will further complicate long-term monitoring, which has already been stalled for a year due to COVID-19. Overall, the lesson is that up-front investment in monitoring and evaluation can save money over the longer term.

6. GOAL STATEMENTS

Nature Goals

1. Maintain timing and volume of natural flow basin-wide to no more than 20% alteration from long-term hydrograph.
2. Maintain natural annual suspended sediment load within 10% alteration through reduction of activities that result in vegetation clearing and avoiding threats such as dam construction, large scale mining, and poorly managed industrial agriculture.
3. Establish well-functioning and effectively managed protected areas that incorporate adjacent community conservation areas.
4. Maintain over the long-term well-functioning freshwater habitats of at least 100,000 ha (e.g. fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the Cuito and Cubango sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels.
5. Maintain and conserve forest areas that support important freshwater areas by reducing annual rate of deforestation by 25% in community managed forest areas.
6. Maintain longitudinal connectivity in the mainstem Cubango and Cuito Rivers by avoiding dams or reservoirs.

Human Well-Being Goals

1. By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
2. Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.

7. STRATEGIES

Through the guidance of Conservation by Design 2.0, TNC's Okavango Basin team developed results chains to explore potential intervention points for achieving outcomes that address threats to conservation and human well-being interests (Appendix B). Strategies developed through this process underwent a ranking exercise to ensure chosen strategies 1) appropriately address freshwater community-based conservation, 2) strengthen the pillars of the VCA Framework, 3) have significant and measurable benefits to conservation and human well-being, 4) are feasible through available capacity and local and government support, and 5) have no or limited potential risks for conflict or negative impacts to vulnerable populations. Considering the context and key dynamics of the region, past learning experiences, and available science, nine strategies were identified that address the threats to ecological function and human well-being interests linked to the health of the region's freshwater resources.

Community-based conservation is a focal point of this plan because of the benefits of co-management to ecosystems and populations. Co-management institutions that allow communities to play an active role in resource management are essential to achieving community-based and equitable conservation. Effective co-management institutions require a framework – backed by supportive government policies and enforcement – that actively engages communities in the management of natural resources. The first five strategies of this plan utilize CBC to address terrestrial and freshwater conservation across the watershed.

To facilitate equitable and meaningful participation of communities across all strategies and interventions, TNC will facilitate community entities' active & meaningful participation in stakeholder platforms for effective natural resource decision-making that includes community interests. Using experience from other TNC geographies across Africa, TNC will seek to ensure grassroots to regional integration is a cross-cutting pillar of all the strategies. Communities will be meaningfully engaged in the decision-making processes to address development and resource management in the basin. This will inform government decisions and private sector investments. These efforts will include addressing leadership and building capacity of local community members and partners and working with target villages to obtain legal rights to land and form co-management institutions.

TNC will also seek the intentional engagement of youth and women in all strategies and interventions, recognizing the importance of equity in sustainable resource management. Women and youth are often ignored in natural resource governance and management. Equitable participation in governance processes by all those who bear the cost of resource management provides incentive to comply with management decisions and regulations. Additionally, equitable participation improves capacity of managing entities, and introduces new perspectives (view, understanding, and solutions) into resource use and management.

7.1. Community-Based Conservation Strategies

Strategy #1: Work with communities to form fishing cooperatives to improve fish catch while maintaining ecological integrity.

Description. Communities along the Cuito and Cubango Rivers (Figure 7) benefit from co-management of local fisheries because of the number of small-scale fishers, the difficulty of top-down enforcement, the importance of the fishery to livelihoods and nutrition, and the alignment of co-management with regional goals (Ainsworth et al., 2021). Local cooperatives that empower fishers and ensure coordination of local regulations and management efforts are critical in engaging communities in co-management of their fishery. TNC uses fisheries management as an entry point for freshwater conservation, promoting the role of fisheries as a source of food and income to encourage sustainable freshwater resource use and protection of freshwater habitats.

TNC's work in Tanzania, Gabon, and elsewhere has proven that freshwater protected areas are an effective

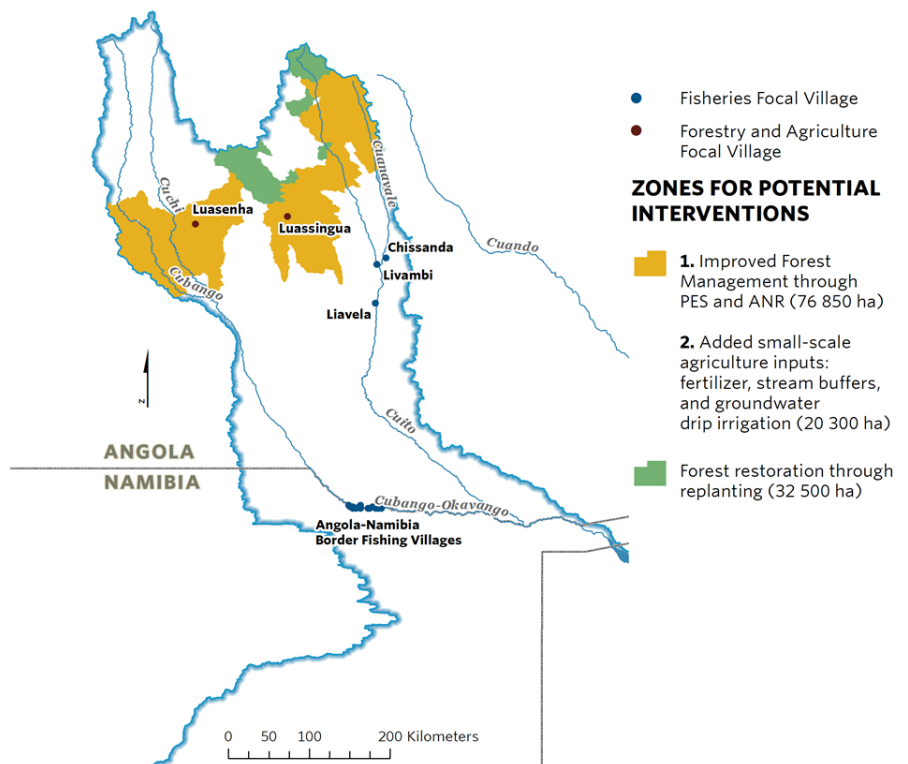


Figure 7: Communities and areas identified for implementing community-based conservation Strategies #1-3 outlined in this plan.

means to reduce pressure on fish breeding sites and improve fish stocks. Community involvement in protecting fish spawning/aggregation sites is a particularly effective strategy because the smaller scale of these sites allows communities with limited capacity to still conduct monitoring and enforcement, while providing big benefits to entire fish stocks (Erisman et al., 2015). Additionally, fishers generally understand the link between protecting fish spawning sites and healthy fisheries (Erisman et al., 2015). However, protected areas are most successful when communities have a voice and stake in their creation. Designation of these sites using science and local knowledge can ensure the greatest return on investment for local communities dependent on the fishery. Community involvement will hand more control over to local communities, leading to greater compliance in the protection and management of fish breeding zones.

Fisheries cooperatives also provide an entry point for gender equity. Though cultural expectations have reduced women’s power in decision making and involvement in governance, their specific roles in natural resource use and fisheries means they have experience and knowledge that can inform natural resource management decisions (Biswas, 2015). Targeting women leadership development and capacity building in community-based fisheries management has the benefit of more informed decisions around fisheries while advancing gender equity and household well-being.

Key Interventions.

- Develop an educational plan and training materials/guidelines for capacity building, including specific plan/training for women.
- Identify and map fish breeding areas with local authorities and communities and ensure formal protection by provincial and national laws.
- Establish legal fishing cooperatives in target villages and strengthen these cooperatives through the adoption of bylaws and integration with cultural norms.
- Build capacity of cooperatives to patrol fish breeding sites and collect fisheries data.
- Establish fish monitors from participating communities.
- Educate cooperatives and government on sustainable fishing regulations.
- Build capacity of local government and community cooperatives to implement and enforce sustainable fishing regulations.
- Organize exchange visits to share lessons and experiences with other communities (e.g., CBC projects in Namibia)
- Develop a sustainable finance mechanism to increase capacity of fishing cooperatives.
- Proactively promote, encourage, and advocate for set asides within local management institutions to ensure women and youth are provided the opportunity to join.
- Build capacity of women and youth to ensure their voices are at the table when making management decisions.

Outcomes
By 2023 • An educational plan and training materials/guidelines for capacity building are developed and implemented. By 2025 • At least two TNC supported fisheries cooperatives are established covering over 100 fishers, two villages, and over 1,000 ha of fish protection/conservation areas generating benefits.
Goals Addressed
• Nature Goal 4: Maintain over the long-term well-functioning freshwater habitats of at least 100,000 ha (e.g. fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the Cuito and Cubango sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels. • Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.

Strategy #2: Reduce deforestation rate to protect freshwater resources by successfully designing and implementing sustainable community forest management.

Description. Community forest management is an entry point to work with communities to tackle both freshwater and terrestrial conservation efforts. The catchments’ Miombo woodlands are critical for wildlife habitat, watershed protection, and supporting sustainable place-based livelihoods. Poorly planned agriculture in the region’s infertile soils, leading to land clearing through catastrophic human-set fires, are a major threat to the watershed and freshwater conservation in the basin (Figures 8 and 9). Community forest management provides incentives for communities to engage in habitat and watershed protection, while benefitting from the ecosystem services and sustainable livelihoods forests provide.

Community forest management provides the opportunity to generate revenue and global benefits through carbon sequestration. This creates the opportunity to leverage community forests for sustainable finance, in combination with Strategy 7. TNC is positioned to lead these efforts in Angola because of its experience in community forest management and carbon development projects across the globe, including initiatives in Tanzania’s Northern Rangelands and Greater Mahale Ecosystem.

Figures 8 and 9 map a proposed community forest project area and the impacts of fire and forest thinning on the landscape. This example is a small scale but represents impacts across the watershed. This strategy seeks to reduce forest conversion through fire and other human activities by promoting community forest management as a sustainable place-based livelihood for local community. The strategy provides the opportunity to protect biodiversity, increase the livelihood portfolio of households, build resilient communities, and encourage a connection to place.

Key Interventions.

- Identify and map high quality forest zones for priority source water protection. Identify project areas for community forests using this data.
- Design and implement demonstration community forest reserves and associated management plans.
- Promote formal recognition of community forest reserves as protected areas.
- Develop an educational plan and training materials/guidelines for capacity building, including specific plan/training for women.
- Use demonstration sites and data to educate communities on the economic and ecological benefits of sustainable forest management and their rights to land and natural resource management.
- Establish a comprehensive forest monitoring program that includes communities.
- Build capacity of local communities to monitor their forest reserves (e.g., forest monitors).
- Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves. Strengthen and develop cooperatives to effectively manage their forest concessions with best practices and develop forest management plans. Connect cooperatives with government extension services.
- Proactively promote, encourage, and advocate for set asides within local management institutions to ensure women and youth are provided the opportunity to join.
- Build capacity of women and youth to ensure their voices are at the table when making management decisions.
- Develop a sustainable finance mechanism to support sustainable community forestry (e.g., participation in voluntary carbon markets).
- Provide government with data developed on high quality forests. Encourage sustainability forest guidelines and the allocation of commercial forest concessions that won’t impact community forests or high-quality forests that protect priority source water areas.

Outcomes	
By 2023	• An educational plan and training materials/guidelines for capacity building are developed and implemented.
By 2025	• Three TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.
By 2035	• The average annual rate of deforestation has been reduced by 25% in the priority source water protection areas (to be defined) in the Angolan portion of the basin.

Goals Addressed

- **Nature Goal 1:** Maintain timing and volume of natural flow basin-wide to no more than 20% alteration from long-term hydrograph.
- **Nature Goal 2:** Maintain natural annual suspended sediment load within 10% alteration through reduction of activities that result in vegetation clearing and avoiding threats such as dam construction, large scale mining, and poorly managed industrial agriculture.
- **Nature Goal 5:** Maintain and conserve forest areas that support important freshwater areas by reducing annual rate of deforestation by 25% in community managed forest areas.
- **Human Well-Being Goal 1:** By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
- **Human Well-Being Goal 2:** Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.

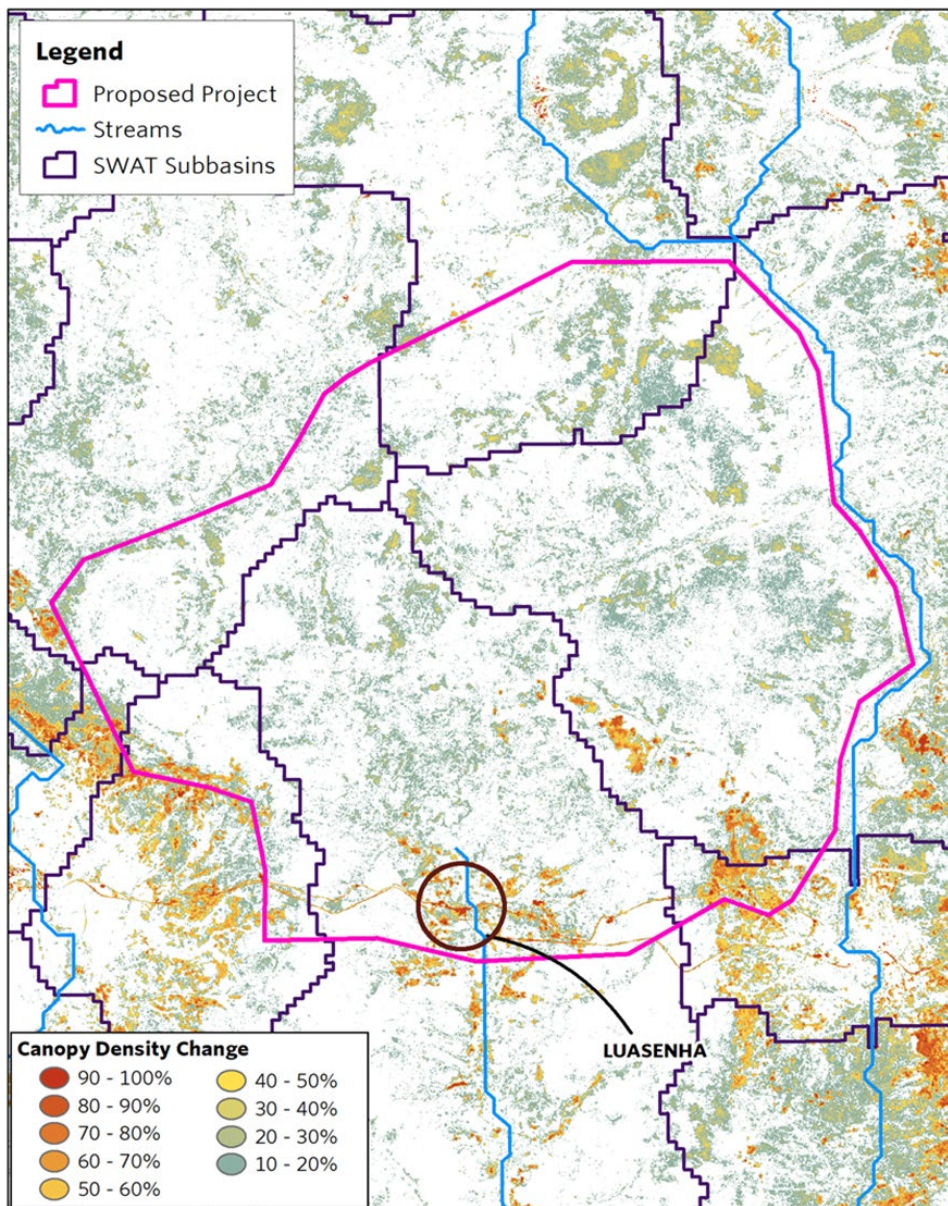


Figure 8: Map indicates the extent of forest thinning due to human activities between 2000 and 2015 around the community of Luasenha – one potential proposed project area for community forest management. Forest thinning is due to activities such as logging, charcoal production, and agriculture.

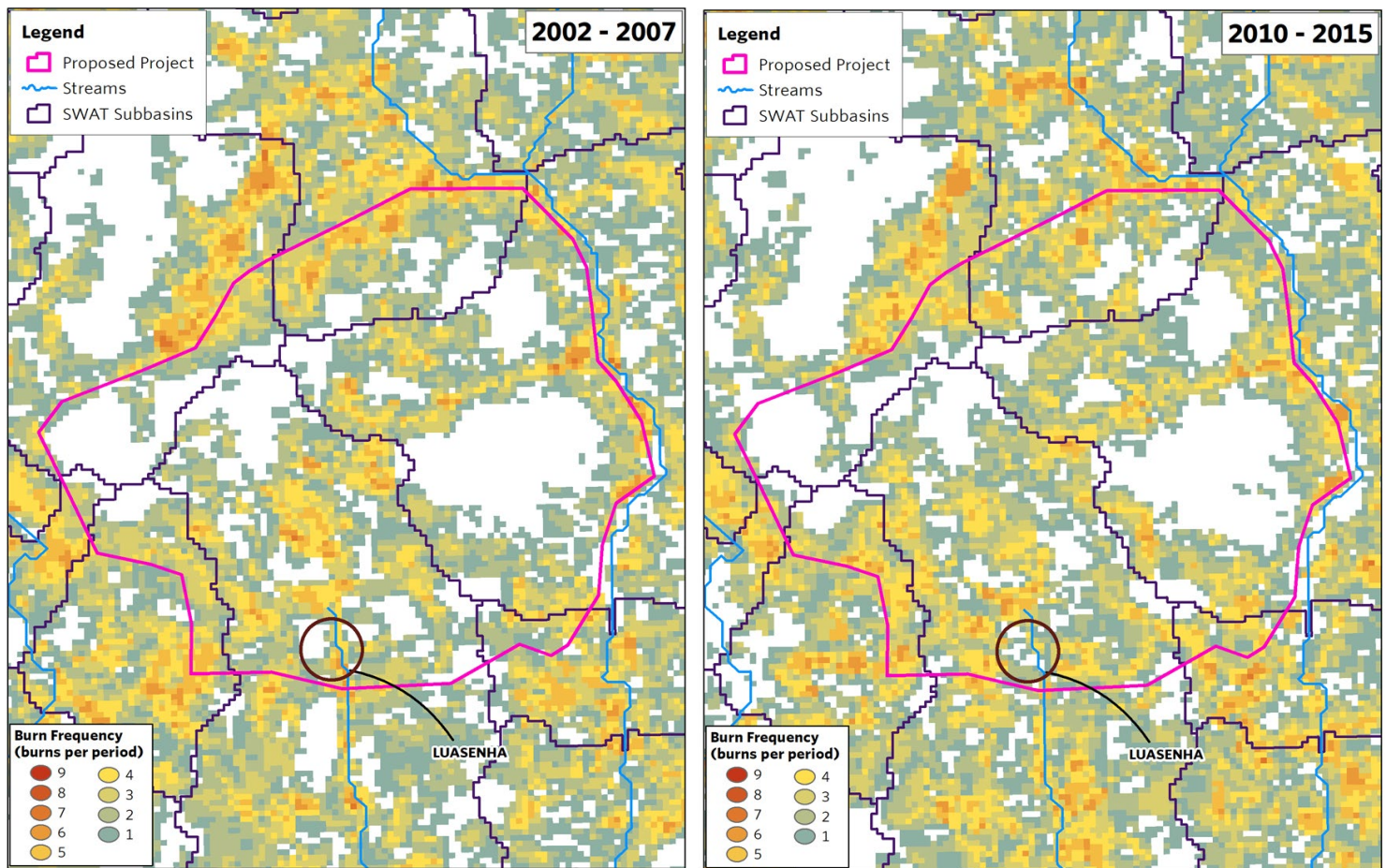


Figure 9: These maps indicate how often and where fire is being used on the landscape within the proposed community forest project site for two six-year periods. In many instances, there are multiple fires per year.

Strategy #3: Address misuse of fire, especially by transforming subsistence agriculture practices to reduce impacts and increase productivity and livelihoods.

Description. Most households in the Okavango Headwaters are smallholder farmers, dependent on rainfed agriculture for their livelihood. For populations across Angola – and Africa – farming is a way of life, a cultural tradition, and a means to food security. Climate change, growing populations, and a lack of income generating opportunities has exacerbated the reliance on rain-fed agriculture. However, in the catchments of the Cuito and Cubango, nutrient poor soils limit the productivity of the land to only two or three years of agricultural cultivation. To address this problem, farmers set fire to the land to clear it for new agricultural plots. These fires often get out of control and burn through thousands of acres of land, destroying critical wildlife habitat and increasing sedimentation of the rivers. Poverty, food insecurity, and poor health force people into the same vicious cycle of unsustainable resource management to support themselves and their families.

Like the last two strategies, this strategy utilizes community cooperatives to promote protection of freshwater resources, working in sync with fisheries and forest management to conserve the ecological function of the watershed. Forming cooperatives and introducing farmers to sustainable agricultural practices will increase residency of farmers on single plots, ending the practice of slash and burn agricultural practices and reducing deforestation among farmers involved in cooperatives. Through this strategy farmers will experience greater food sovereignty and self-sufficiency, while the Okavango system will experience a reduction of sediment loads into the Cuito and Cubango rivers.

Farming cooperatives have been used across Africa with success. Benefits include employment generation, food production, empowerment of marginalized populations, and improved livelihoods (Mhembwe & Dube, 2017). However, access to markets and finance, and lack of capacity and leadership skills remain major challenges to expanding and diversifying cooperatives (Mhembwe & Dube, 2017). To address these challenges this strategy will focus on capacity building of cooperative members and government officials and create access to markets and sustainable finance.

Key Interventions.

- Develop an educational plan and associated training materials/guidelines for capacity building for sustainable intensification strategies and fire management taking gender roles and equity into account.
- Work with communities on the adoption of sustainable intensification strategies including conservation agriculture, climate smart agriculture, ecological intensification, and others.
- Improve the capacity of government extension staff to help implement sustainable agriculture practices. Extension staff will create demonstration plots, local model champions, and farmer field schools to disseminate information on new practices and their benefits.
- Improve access to agriculture supplies and markets through the development of cooperatives as local hubs.
- Provide farming cooperatives access to sustainable agriculture products and social funding to improve implementation of sustainable practices.
- Assist farmers to develop and adopt best fire management practices (fire monitoring, use of fire as a management tool, fire suppression techniques, develop and implement fire awareness programs). The best practices will consider the roles of women and men.
- Incentivize migrants to the region to join cooperatives and/or implement sustainable agriculture practices through engagement through partner organizations and cooperatives.
- Proactively promote, encourage, and advocate for set asides within local management institutions to ensure women and youth are provided the opportunity to join.
- Build capacity of women and youth to ensure their voices are at the table when making management decisions.

Outcomes
By 2023 • An educational plan and training materials/guidelines for capacity building are developed and implemented.
By 2025 • Farmers' perception is that subsistence yields have increased with intensification methods.
By 2030 • 30% of agricultural plots in CBC sites use sustainable intensification and have been in place for at least five years to help reduce deforestation rate.
By 2035 • The average annual rate of deforestation has been reduced by 25% in the priority source water protection areas (to be defined) in the Angolan portion of the basin • Reduce human set fires index [frequency, timing, extent, intensity] in the priority source water protection areas (to be defined) portion of the basin by 25%.
Goals Addressed
• Nature Goal 2: Maintain natural annual suspended sediment load within 10% alteration through reduction of activities that result in vegetation clearing and avoiding threats such as dam construction, large scale mining, and poorly managed industrial agriculture. • Nature Goal 5: Maintain and conserve forest areas that support important freshwater areas by reducing annual rate of deforestation by 25% in community managed forest areas. • Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.

Strategy #4: Encourage adoption of legislation and policies that support community-based conservation, co-management, & effective protected area systems.

Description. Though legislation exists in Angola that supports community-based natural resource use, the extent to which the framework allows for management of resources or commercial use by communities is unclear. Additionally, the legislation that does exist has been largely unimplemented and ineffective, especially in the frontier landscape of the Okavango Headwaters. Building on the legal framework that exists, and utilizing expertise and lessons learned from countries that have successfully implemented frameworks for co-management, TNC and partners will promote policies that support community management of resources, strengthening community-based conservation, co-management, and protected area management in Angola. Working with communities directly, TNC and partners will ensure that communities have the knowledge of the legislation, understand their rights, and have the capacity to implement the legislation to support local management of natural resources.

Key Interventions.

- Prepare recommendations and proposed language for Angola’s government to improve and enact a legal framework for the creation of co-management institutions.
- Work with government to formally establish community conservation areas that are supporting neighboring protected areas and ensure that communities are deriving benefits from these areas.
- Develop management plans for the community conservation areas and ensure that they are formally recognized by national and provincial governments.
- Build capacity of target villages within the project area to understand co-management institutions and the process for formalizing and establishing these institutions.

Outcomes
By 2023 • Relevant fisheries laws that allow for co-management arrangements are developed and enacted.
By 2025 • Have 200,000 ha of freshwater resources and associated terrestrial ecosystems under formal government protection with efficient management and co-management institutions.
Goals Addressed
• Nature Goal 4: Maintain over the long-term well-functioning freshwater habitats of at least 100,000 ha (e.g. fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the Cuito and Cubango sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels. • Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community. • Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.

Strategy #5: Transform two national parks (Mavinga and Luengue-Luiana) spanning 21 million acres in the Okavango and Cuando headwaters into a functioning conservation system that includes new zonation, new community conservation areas; and enabling policy, management, and economic frameworks.

Description. Drawing on more than a decade of experience and proven results in other TNC geographies, TNC is positioned to help transform the “paper parks” in Angola’s Okavango-Cuando headwaters into a functioning conservation system that includes government protected areas and new community-conserved lands. Harnessing this experience, along with lessons from community conservation policy exchanges with Namibia, TNC will collaborate with WWF and the government of Angola to create a holistic and realistic plan for establishing new community conservation areas and putting in place the enabling policy, management, and economic framework to support this system. Co-management in association with protected areas lays the groundwork for expanding Strategies 1-3 into communities affected by the national parks.

Key Interventions.

- Evaluate the current conditions of Angola’s Mavinga and Luengue-Luiana National Parks (e.g., park boundaries, ecological assets and priorities, settlements and community use, threats, etc.).
- Develop zonation scenarios based on community engagement and assessed socio-economic and ecological enabling conditions for Mavinga and Luengue-Luiana National Parks and propose a nearby set of community conservation areas along with anticipated return-on-investment to the nature-based economy in southeast Angola.
- Complete an assessment of enabling conditions for community-based conservation and secure local input and buy-in around the concept of a mutually supportive government protected area and community-based conservation system in southeast Angola.
- Lead at least one study tour for stakeholders from Angola to learn from successful community-based conservation models relevant to the Angolan context (e.g., Namibia, Kenya, Zambia).
- Prepare recommendations and proposed language for Angola’s government to add community conservation into the national Conservation Areas Act, drawing on lessons from Kenya and Namibia.
- Build enabling conditions to implement one of the recommended landscape-level community and government conservation scenarios in southeast Angola.
- Pilot forest, fisheries, and/or agriculture co-management with three communities—improving livelihoods, conserving nature, and creating demonstrations for the new community conservation areas.

Outcomes	
By 2025	• There is enabling policy and legislative environment that support community-based conservation linked to formal protected area management. • The most effective zonation scenarios are developed based on local input and assessed socio-economic and ecological enabling conditions for Mavinga and Luengue-Luiana National Parks, which include a nearby set of community conservation areas along with anticipated return-on-investment to the nature-based economy in southeast Angola. • Enabling conditions are in place to implement one of the recommended landscape-level community and government conservation scenarios in southeast Angola.
By 2035	• 21 million acres of effectively managed protected areas and community conservation areas are providing economic benefits to local communities.

Goals Addressed

- **Nature Goal 2:** Maintain natural annual suspended sediment load within 10% alteration through reduction of activities that result in vegetation clearing and avoiding threats such as dam construction, large scale mining, and poorly managed industrial agriculture.
- **Nature Goal 3:** Establish well-functioning and effectively managed protected areas that incorporates adjacent community conservation areas.
- **Nature Goal 4:** Maintain over the long-term well-functioning freshwater habitats of at least 100,000 ha (e.g., fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the Cuito and Cubango sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels.
- **Nature Goal 5:** Maintain and conserve forest areas that support important freshwater areas by reducing annual rate of deforestation by 25% in community managed forest areas.
- **Human Well-Being Goal 1:** By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
- **Human Well-Being Goal 2:** Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.

7.2. Cross-Cutting Strategies

Strategy #6: Facilitate (through capacity building & other means) community entities' active & meaningful participation in stakeholder platforms for effective natural resource decision-making that includes community interests.

Description. As indicated in the above VCA Framework section, multi-stakeholder platforms (MSPs) are critical for elevating the voice of communities in decision-making processes. MSPs are particularly important in freshwater resource management given the extent of stakeholders utilizing freshwater resources and the limitation of government (Zhang et al., 2020). While establishing local institutions (cooperatives) in communities within the basin is critical for sustainable management of resources, the longevity and success of these institutions are impacted by the actions and decisions of a multitude of other entities. This has already been demonstrated in the Okavango Basin with the creation of Mavinga and Luengue-Luiana National Parks without the participation or consent of the communities living within and adjacent to each park. Additionally, development in the basin (Figure 5) has been driven by provincial and national government interests, as well as private industry. Angola has established the Okavango Reference Group (OKG) (see section 3.5), a multi-stakeholder platform in the Basin. However, community representation and involvement in OKG has been limited.

TNC recognizes three key factors affecting the dynamics and outcomes of MSPs: 1) the external and enabling environment, 2) existing power dynamics, and 3) member capacity (Zhang et al., 2020). This strategy aims to facilitate community involvement in multi-stakeholder platforms by addressing these three key factors through capacity building and an institutionalized framework for co-management and community involvement. Enabling conditions for this strategy are dependent on successfully establishing community cooperatives in natural resource management (Strategies 1 – 3)—providing a governance body at the community level to represent community voices—and the creation of a legal framework for CBC and local co-management under Strategy #4. These strategies will help to legitimize the community's involvement in basin-wide governance. TNC hopes to pursue greater representation of communities within the already established OKG. If this is not possible, this strategy will work with the government of Angola to pursue a new platform for community involvement.

Key Interventions.

- Build capacity of women, youth, and men in target villages within the project area to understand co-management institutions and the process for formalizing and establishing these institutions.
- Work with target communities and local authorities to formally establish community institutions for resource management.
- Build capacity of local communities, non-profits, and government authorities to participate in effective and meaningful stakeholder platforms.
- Work with government and stakeholders to develop formal provisions and framework for local co-management that includes community involvement in existing or new multi-stakeholder platforms.

- Proactively promote, encourage, and advocate for set asides within local management institutions to ensure women and youth are provided the opportunity to join.
- Build capacity of women and youth to ensure their voices are at the table when making management decisions.
- Proactively include women and youth in education and awareness raising campaigns, workshops, etc.

Outcomes
By 2025 • At least 12 of the target villages have formally established (e.g., documented & recognized) well-functioning community-based conservation & resource management institutions (e.g. forestry, fisheries, protected area management). • At least three communities have legal rights and are actively participating in the management of two protected areas.
Goals Addressed
• This cross-cutting strategy is key in achieving all Nature and Human Well-Being Goals

Strategy #7: Establish sustainable finance to support conservation and development initiatives.

Description. TNC will explore innovative ways of establishing sustainable finance mechanisms for the upper catchment in Angola. Freshwater sources are the natural resource components most at risk since there is no substitute for the basin’s watercourses and associated aquifers. Water funds are proven tools for leveraging additional resources to support livelihood activities as well as sustainable use actions in freshwater systems.

Since the end of Angola’s civil war, land use patterns in the Cubango and Cuito catchments have been significantly altered, leading to greater land degradation and habitat loss. Unsustainable land use patterns threaten the regions unique habitats, such as large, intact Miombo woodlands, source lakes, and peat wetlands, as well the region’s wildlife. Increasing deforestation is driven mainly by poverty, the need for fuelwood, and short-term, slash and burn agriculture on extremely poor soils. Associated with these activities are uncontrolled fires that derive from agriculture clearing and hunting activities. The ultimate consequences of these activities on the Okavango River are erosion and river sedimentation which diminishes water quality and the quantity of downstream flows. Few protection or community-based livelihood development programs are in place for this critical Okavango “water tower” area, and without interventions the pattern of degradation is likely to accelerate. Watershed protection funding mechanisms will provide sustainable financial resources to fund threat mitigation activities, create a coordinated response to threats in the basin, and support improved land use practices.

Exploring sustainable finance mechanisms through instruments, such as debt for nature swaps, voluntary carbon markets (REDD+), “green bonds,” and payment for ecosystem services schemes, will help raise financial resources that can contribute towards local communities’ ability to directly tackle the main threats facing the basin. The funding mechanism will support livelihood improvement activities as well as conservation of natural resources through better land use resulting in improved quantity and quality of water in the whole system.

Key Interventions.

- Carry out feasibility studies on REDD+.
- Investigate the capital potential of debt swap or debt conversions for nature.
- Develop a Business Case for the project area
- Develop a sustainable finance mechanism to support sustainable community forestry (e.g., participation in voluntary carbon markets)
- Build enabling conditions to implement sustainable finance mechanisms.

Outcomes
By 2023 A business case for sustainable finance is established.
By 2030 - Mobilize at least \$20M from other conservation finance opportunities (e.g., carbon finance, debt conversion) to sustainably finance ongoing conservation and development activities in the basin. - There are additional revenue streams from initiatives such as REDD+.
Goals Addressed
This cross-cutting strategy is key in achieving all Nature and Human Well-Being Goals

7.3. Sustainable Planning Strategies

Strategy #8: Support energy planning for the Upper Okavango Basin and Cuando-Cubango Province that leads to low impact development pathway.

Description. Though not directly linked to community-based conservation, TNC recognizes the need for energy planning in the Upper Okavango Basin to prevent the catastrophic and irreversible consequences of dams and poor energy planning. TNC seeks to promote land-based renewable energy in the region and ensure its availability to local communities, including small-scale dispersed solar and wind infrastructure. Traditionally, power sector planning does not seriously represent or attempt to minimize impacts to people and nature. Moreover, such planning exercises rarely incorporate platforms for community involvement to provide input during the process.

Multi-stakeholder platforms and integration of grassroots and regional development efforts offer an opportunity to bring community voices to the table in power sector planning. TNC's experience and expertise in sustainable financing and energy infrastructure planning will promote land-based renewable energy to power the communities of southeastern Angola. This strategy will prevent the construction of hydropower dams on the mainstem of the Cuito and Cubango Rivers, and unnecessary and excessive construction on their tributaries.

Key Interventions.

- Provide expertise in natural infrastructure investment and conservation finance to support national Angola in designing and implementing a long-term protection strategy.
- Utilize TNC's experience in power sector planning with integrated community engagement to ensure decisions about proposed dams incorporate community input and minimize impacts to people and nature.
- Generate the science and knowledge to inform decision making on the deployment of low-impact energy generation sources, e.g. solar.
Create enabling conditions that allow for private investment in land-based low-impact renewable energy for the country.
- Conduct an analysis of the energy procurement and/or planning process in Angola to understand how to incorporate community engagement into their existing framework.

Outcomes
By 2030 - Avoid negative impacts & provide positive benefits from hydropower/energy development to local communities. - Permanently avoid the need for construction of dams in the mainstem Cubango and Cuito Rivers by promoting alternative sources of energy from low impact land-based renewables (e.g. solar).
Goals Addressed
This cross-cutting strategy is key in achieving all Nature and Human Well-Being Goals

Strategy #9: Develop and support implementation of a water allocation plan to meet the needs of local communities & nature in the basin/Province.

Description. Like Strategy #8, this strategy seeks to influence planning of water allocation and infrastructure to ensure the protection of the Okavango Basin and success of community-based initiatives. Little is known of the complicated hydrology of the Okavango Headwaters. However, it’s critical that the Angola government understand how to work with the hydrology of the region rather than against it to reduce the need for dams and appropriately develop water infrastructure plans to support its growing population.

Spatially and temporally modeling the basin’s hydrology is key to providing the data and knowledge needed for future planning. TNC’s experience and expertise in sustainable financing and energy infrastructure planning will promote sustainable and efficient irrigation and energy management to supply water to communities of southeastern Angola without jeopardizing the ecological integrity of the region.

Key Interventions.

- Identify and map critical groundwater aquifers. Modeling of groundwater is shared with government and improves understanding of hydrology of the region under both current conditions and projected climate change scenarios.
- Promote sustainable use of ground and surface water to avoid the need for dams for irrigation purposes.
- Promote energy management strategies and efficient irrigation systems to reduce the demand for water and energy in the basin.

Outcomes
By 2030 • Promote conjunctive use of surface and groundwater resources to ensure assurance of water supply for irrigation.
Goals Addressed
• Nature Goal 1: Maintain timing and volume of natural flow basin-wide to no more than 20% alteration from long-term hydrograph. • Nature Goal 6: Maintain longitudinal connectivity in the mainstem Cubango and Cuito Rivers by avoiding dams or reservoirs. • Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.

8. THEORY OF CHANGE

TNC's theory of change for the Upper Okavango Basin is based on two fundamental assumptions. First, local communities are among the most effective stewards of freshwater resources within their territories. Second, lasting, sustainable change that benefits local communities and the broader natural environment must consider watershed boundaries that span multiple communities and jurisdictions. The strategies outlined in this plan place local communities at the center of conservation initiatives to achieve lasting solutions that address human well-being and watershed protection of the Cuito and Cubango rivers. Community-based conservation (CBC) is the optimal tool to apply TNC's VCA Framework in planning and projects, strengthening the voice, choice, and action of resource users. These efforts will mean Angolans are not just beneficiaries of conservation but actively involved in resource management and decision-making, ensuring socially just outcomes and long-term sustainable conservation and development in the Okavango Basin.

The greatest threats to the Upper Okavango Basin are unsustainable resource use and land degradation related to the region's growing population, high levels of poverty, and poorly planned development (Appendix A). With few opportunities for employment and income generation outside urban areas, the rural population within the basin relies on natural resource-dependent livelihood activities. Most of the population is smallholder farmers, but crop yields are low in the region's nutrient poor soil. To combat food insecurity, communities are pushed into vicious cycles to exploit resources and available land and water. Human set fires to clear land for agriculture have devastating impacts on the rivers and wetlands, while unsustainable fishing and charcoal production take their toll on freshwater and terrestrial resources. Poor infrastructure and its remoteness make accessing the region difficult, creating significant barriers to enforcing existing natural resource regulations. Further, community involvement in resource management is hindered by a lack of capacity and legal framework for local co-management and rights to resources. Feedbacks in the socioecological system can lock-in unsustainable practices (Larborde et al. 2018).

The current levels of poverty and food insecurity in the basin and Angola suggest an inevitable increase in resource use and land conversion to meet local and national food demand. The basin is under scrutiny for development and infrastructure schemes to bring its population access to services and markets and grow the country's economy. If not planned sustainably, development threatens ecological function, freshwater resource availability, and the autonomy of communities who depend on natural resources. No infrastructure project threatens freshwater resources more than hydropower, where the need to provide electricity can forever alter the connectivity and flow regimes of the Cuito and Cubango rivers.

The strategies in this plan will improve well-being and watershed protection by facilitating collaboration among government, local communities, implementing partners, and the private sector. TNC identified three areas of key strategic interventions (Figure 10). These include community-based conservation (blue), sustainable planning efforts (green), and cross-cutting strategies (orange). Outcomes associated with these strategies are shown in matching colored text in the figure. The broad range of strategies is required to account for the complex socio-economic, ecological, and political landscape in Angola and the Okavango Basin. Though CBC is central to this plan, it alone cannot achieve desired goals. Protecting the headwaters of the Okavango for people and nature requires policies and legislation that support conservation efforts, a pathway for smart development that balances the needs of people and nature, and sustainable finance mechanisms to support community conservation and development initiatives.

The first three CBC strategies: 1) **work with communities to form fishing cooperatives**, 2) **design and implement community forest management**, and 3) **address fire by transforming subsistence agriculture practices** (Appendix B), utilize natural resource cooperatives to address unsustainable resource use and food security. This approach builds on a strong foundation and familiarity of cooperatives in the region, allowing TNC to utilize culturally appropriate and practiced institutions, and strengthen community involvement in resource management through capacity building to accelerate project goals. TNC and partners will work to establish cooperatives in target communities and build the knowledge and technical capacity of community members and local government officials. This process will include an emphasis on gender equity. Mapping high-quality areas important for biodiversity (e.g. fish breeding areas, wildlife habitats, forests) will take place in conjunction with local authorities and communities. Consequent establishment of these areas as community protected areas will conserve biodiversity. TNC and implementing partners will generate buy-in for establishing cooperatives and community management zones from government and community leaders (sobas) to legitimize their creation. The project will establish several cooperatives within a few years by 2025. Early evidence of improved quality of life is critical for cooperative longevity and the future participation of communities. Over the next 15 years, outcomes from these cooperatives include sustainable fisheries management, reduced deforestation and human set-fires, improved food security and income generation from natural resources, and community empowerment.

To ensure a supportive environment exists in the Okavango Basin to implement the above community-based strategies, TNC will **encourage adoption of legislation and policies that support community-based conservation and co-management** (Appendix B). This strategy encourages the development of a legal framework that ensures rights of communities to establish co-management institutions are formally supported and protected. The strategy will also provide a template for future communities to form cooperatives and set aside community resources for protection and management. While communities are informally and locally

recognized as having the right to manage their resources, formal recognition and enforcement will be an important step in having security over those rights as new migrants and others put additional demands on natural resources.

The final CBC strategy—**transform two national parks into a functioning conservation system that supports local co-management** (Appendix B)—will support government and partner efforts to reevaluate and improve the zoning and management of Mavinga and Luengue-Luiana National Parks. Significant work needs to be done in collaboration with the national government and communities to achieve this strategy. TNC will work with the government of Angola to rezone both national parks, ensuring zoning achieves national conservation goals while preventing harmful impacts to the communities living within and adjacent to the established parks. Rezoning national parks with explicit considerations of neighboring communities has the potential for securing community cooperatives through community conservation areas. Over the next five years TNC will work with the national government and elevate community voices to encourage the legal framework and enabling conditions required for the integration of CBC in protected area management and develop park zoning scenarios that have the greatest benefit for biodiversity and people. These early wins will provide the opportunity for landscape level community-government conservation scenarios that employ community cooperatives in protected area and resource management. The community conservation areas adjacent to the parks will be a high priority for establishing community cooperatives that ensure local people are beneficiaries of the protected areas and associated ecosystem services.

Overall success of the CBC strategies depends on the enabling conditions created through the two supporting strategies: 1) **facilitate community entities’ active and meaningful participation in stakeholder platforms for effective natural resource decision-making**, and 2) **establish sustainable finance to support conservation and development initiatives** (Appendix B). The first strategy will develop a framework for multi-stakeholder platforms to represent community voices (including the elevation of women’s voices) and build the capacity of community members to participate in the decision-making process. The second strategy develops a finance mechanism to fund local communities and implementing partners, reducing the dependence on philanthropic dollars for implementing conservation and development initiatives. Over the next five to ten years, outcomes from these initiatives will elevate the voice of communities in decision-making, improve the functionality of co-management institutions, and mobilize sustainable finance opportunities to fund the initiatives in this plan and beyond. Both the stakeholder platform and sustainable financing strategies significantly strengthen the overall CBC initiative, and create an enabling environment for communities to be at the center of conservation and development in the Okavango Basin.

The sustainable planning strategies: 1) **support sustainable energy planning efforts**, 2) **develop and support implementation of a water allocation plan** (Appendix B), are critical for the future of the region. Though neither strategy is strictly CBC, there are existing organizations/federations that advocate on behalf of communities. Engaging communities from a Human Rights and Free, Prior, and Informed Consent (FPIC) perspective will be critical, because water diversion schemes and hydropower dams will have irreversible impacts on the watershed and its people. Supporting smart development in collaboration with the private sector, government, and local communities will ensure minimal impacts on the region’s terrestrial and freshwater resources. Sustainable planning efforts will promote alternative sources of energy and balance water needs between large-scale agriculture, local communities, and wildlife over the next ten years. These strategies ensure the mainstem Cubango and Cuito rivers will retain connectivity and ecological function from the headwaters to the delta.

TNC is uniquely positioned to implement these strategies due to its long history of sustainable planning efforts and CBC initiatives in Africa and across the globe. Community-based and integrated conservation-development projects are at the heart of TNC’s global conservation efforts. Notable projects in Africa include sustainable hydropower infrastructure planning in collaboration with the government of Gabon, water funds in Kenya and South Africa, and an integrated conservation and development program in Tanzania’s Greater Mahale Ecosystem. Over the last few years, TNC has built strategic partnerships with Angola government institutions and regional and local partners (OKACOM and ACADIR) and has mapped and modeled the Okavango Basin to better understand the enigmatic region. This work has created the enabling conditions required to begin implementing on-the-ground projects. TNC’s roles in these efforts are providing financial resources, building technical capacity, and guiding conservation efforts with science.

To achieve the nature and human well-being goals (see Section 6 and Figure 10) requires a concerted effort to implement strategies at the community, regional, and national scale. An Okavango Basin that is both wild and prosperous is one where rivers maintain connectivity and ecological function, and both watershed and people benefit from resource use and management. The goals in this plan are ambitious and the theory of change provides a clear path to their realization. The key strategic interventions collectively

work to ensure conservation protects the basin's unique natural wonders, improves peoples' lives, and underpins vibrant and sustainable economies in the Okavango Basin.

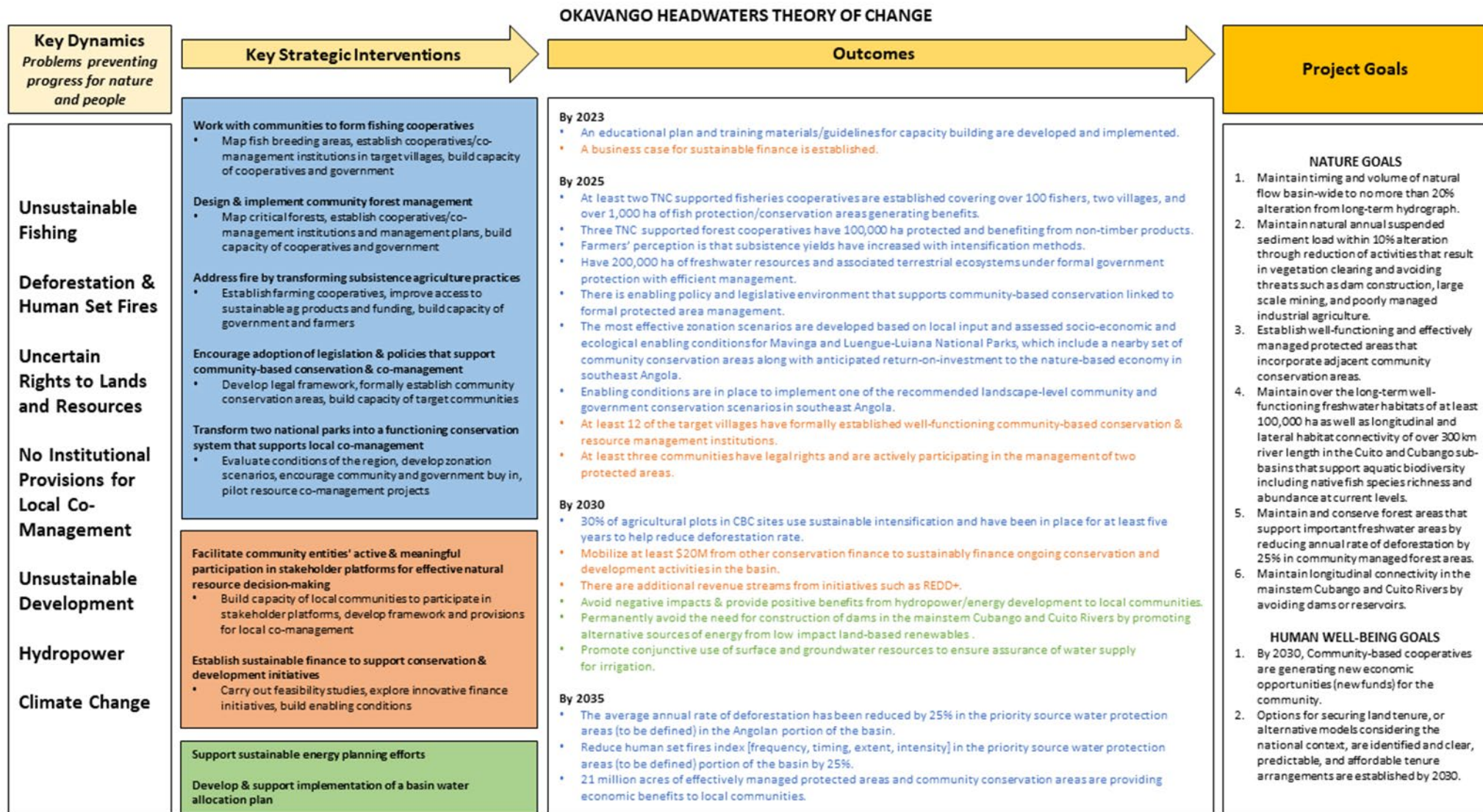


Figure 10: Okavango Headwaters theory of change diagram. Key strategic interventions are divided by color in the following categories: community-based conservation (Blue), cross-cutting strategies (Orange), sustainable planning (Green). Outcomes associated with these strategies are shown in similarly colored text. Implementing all strategies collectively will achieve Project Goals.

9. MONITORING AND EVALUATION FRAMEWORK

Table 1: Proposed output and outcome indicators for monitoring and evaluation. To the right are the high level VCA measures and TNC's 2030 organizational goals that these proposed indicators will report into. All indicators will be reviewed and revised in collaboration with partners, local communities, and local experts to develop the full monitoring and evaluation plan.

Note:

- All people-related indicators will be disaggregated by gender in reporting

Strategy	Objective statement	Activity / Intervention		Outcome / impact	Goals addressed		VCA measures	TNC 2030 goals (SCA outcome metrics)
		Description	Output indicators	Outcome indicators	Goal statement	Additional indicators (if necessary)		
Community-based Conservation Strategies								
Strategy #1: Work with communities to form fishing cooperatives to improve fish catch while maintaining ecological integrity.	Outcome: By 2025, at least two TNC supported fisheries cooperatives are established covering over 100 fishers, 2 villages, and over 1000 ha of fish protection/conservation areas generating benefits. Intermediate outcome: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented	Activity #1: Develop an educational plan and training materials/guidelines for capacity building, including specific plan/training for women.	Capacity building plan developed	Number of people (disaggregated by gender) with increased governance capacity	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community	% change in average income of targeted households in the project area Perception of increased household income for members engaged in sustainable fishing practices	Number of people with increased sustainable, place-based economic opportunity Number of people with increased governance capacity	Increased/improved sustainable, place-based economic opportunity (# of people) Increased/improved ability to meaningfully participate in decision-making about lands, waters, or resources (# of people)
		Activity #2: Establish legal fishing cooperatives in target villages and strengthen these cooperatives through the adoption of bylaws and integration with cultural norms.	# of fishing cooperatives established and recognized by law # of local bylaws developed and adopted by local governments	Number of people (disaggregated by gender) with increased sustainable, place-based economic opportunity Perception of improved capacity to patrol and manage fish breeding sites				
		Activity #3: Build capacity of cooperatives to patrol fish breeding sites and collect fisheries data.	# of people (disaggregated by gender) trained # of breeding site patrols conducted	Size of fish populations supporting subsistence harvest % of average fish size relative to size at maturity				
		Activity #4: Establish fish monitors from participating communities.	# of breeding sites with fish monitors in place	Nature Goal 4: Maintain over the long-term well-functioning freshwater habitats of at least 100,000 ha (e.g. fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the Cuito and Cubango sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels.	% of river reaches with improved or maintained habitat connectivity (indicated by connectivity status index) Km of river reaches with improved or maintained habitat connectivity Native fish species richness (average number of species per site surveyed) in project area Fish densities/abundance (Number of individuals/m² or number of individuals/survey)	Number of hectares /kilometers protected Number of hectares / kilometers under improved management	Freshwater ecosystems protected (hectares AND kilometers) Freshwater ecosystems with improved management (hectares AND kilometers)	
		Activity #5: Build capacity of local government and community cooperatives to implement and enforce sustainable fishing regulations.	# of people (disaggregated by gender) trained					

Strategy #2: Reduce deforestation rate to protect freshwater resources by successfully designing and implementing sustainable community forest management.	Outcome #1: By 2035, the average annual rate of deforestation has been reduced by 25% in the priority source water protection areas in the Angolan portion of the basin	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)	% of intact forest formally gazetted under community-based conservation	Nature Goal 1: Maintain timing and volume of natural flow basin-wide to no more than 20% alteration from long-term hydrograph. (Peak flow -maintain at least one peak flow pulse per year & Base flow).	# of peak flow pulses per year	Number of hectares /kilometers protected	Area of land protected (hectares)
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.		# of hectares under improved management (area managed by forest cooperatives)	% change in annual deforestation rate	Nature Goal 2: Maintain natural annual suspended sediment load within 10% alteration through reduction of activities that result in vegetation clearing and avoiding threats such as dam construction, large scale mining, and poorly managed industrial agriculture.		% change in flow volume compared with baseline	Number of hectares / kilometers under improved management
		Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented	Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	# of trained community members (disaggregated by gender)	# of people benefitting (disaggregated by gender) from non-timber products through forest cooperatives		Nature Goal 5: Maintain and conserve forest areas that support important freshwater areas by reducing annual rate of deforestation by 25% in community managed forest areas.	# of days of base flow disruption,
Perception of secured rights	% change in annual household income for members of cooperatives			Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	% alteration in the timing of flow	Increased/improved security of rights over avoided impacts (hectares AND kilometers)	At-risk freshwater ecosystems with avoided impacts (hectares AND kilometers)	
	Perception of increased income from non-timber products	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.		% change in annual suspended sediment load			Number of people with increased sustainable, place-based economic opportunity
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
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Intermediate outcome #2: By 2023, an educational plan and training materials/guidelines for capacity building are developed and implemented				Activity: Develop an educational plan and associated training materials/guidelines for capacity building, taking gender roles and equity into account.	Capacity building plan developed	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community.
	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.	Activity: Facilitate establishment of three cooperatives and their acquisition of legal and management rights of community gazetted Forest Reserves	# of forest cooperatives established with TNC support (and rights acquired)					
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	Intermediate outcome #1: By 2025, 3 TNC supported forest cooperatives have 100,000 ha protected and benefiting from non-timber products.							

	Outcome #2: By 2030, 30% of agricultural plots in CBC sites use sustainable intensification and have been in place for at least five years to help reduce deforestation rate.	Activity: Work with communities on the adoption of sustainable intensification strategies including conservation agriculture, climate smart agriculture, ecological intensification, and others	# of farmers (disaggregated by gender) practicing sustainable intensification # of agricultural plots within project areas implementing sustainable intensification Residency period on agricultural plots	% of households with no food shortages or worries about food shortages % change in annual household income for farmers practicing sustainable intensification	Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new economic opportunities (new funds) for the community			Increased/improved sustainable, place-based economic opportunity (# of people) People benefitting from nature to adapt to climate change (# of people)
	Intermediate outcome #2: By 2025, farmers' perception is that subsistence yields have increased with intensification methods							
Strategy #4: Encourage adoption of legislation and policies that support community-based conservation, co-management, and effective protected area systems.	Intermediate outcome: By 2023, relevant fisheries laws that allow for co-management arrangements are developed and enacted.	Activity #1: Prepare recommendations and proposed language for Angola's government to improve and enact a legal framework for the creation of co-management institutions	Legal framework for fisheries co-management adopted		Nature Goal 4: Maintain over the long-term well-functioning freshwater habitats of at least 100,000 ha (e.g. fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the <u>Cuito and Cubango</u> sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels.	% of river reaches with improved or maintained habitat connectivity (indicated by connectivity status index) Km of river reaches with improved or maintained habitat connectivity Native fish species richness (average number of species per site surveyed) in project area	Number of hectares /kilometers protected	Area of land protected (hectares) Area of improved management (hectares) Freshwater ecosystems protected (hectares AND kilometers) Freshwater ecosystems with improved management (hectares AND kilometers)
	Outcome: By 2025, have 200,000 ha of freshwater resources and associated terrestrial ecosystems under formal government protection with efficient management and co-management institutions.	Activity #2: Work with government to formally establish community conservation areas that are supporting neighboring protected areas and ensure that communities are deriving benefits from these areas.	# of community conservation areas formally established # of hectares of habitats (freshwater and terrestrial) protected as a result of formal government protection	% of protected areas (freshwater and terrestrial) under effective/efficient management (e.g. active patrolling and law enforcement) Local perception of enforcement	Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030	Fish densities/abundance (Number of individuals/m² or number of individuals/survey)		
		Activity #3: Develop management plans for the community conservation areas and ensure that they are formally recognized by national and provincial governments.	# of management plans developed	Perception of meaningful participation in co-management				
Strategy #5: Transform two national parks (<u>Mavinga</u> and <u>Luengue-Luiana</u>) spanning 21 million acres in the Okavango and <u>Cuando</u> headwaters into a functioning conservation system that includes new zonation, new community conservation areas; and enabling policy, management, and economic frameworks.	Outcome: By 2035, 21 M acres of effectively managed protected areas and community conservation areas are providing economic benefits to local communities	Activity: Pilot forest, fisheries, and/or agriculture co-management with three communities - improving livelihoods, conserving nature, and creating demonstrations for the new community conservation areas.	# of community-based organizations established # of hectares included under new zonation and community conservation areas	% of intact forest formally gazetted under community-based conservation Number of hectares under improved management Number of people (disaggregated by gender) with increased sustainable, place-based economic opportunity Perception of increased household income for members engaged in conservation area management Perception of meaningful participation in co-management	Nature Goal 2: Maintain natural annual suspended sediment load within 10% alteration through reduction of activities that result in vegetation clearing and avoiding threats such as dam construction, large scale mining, and poorly managed industrial agriculture. Nature Goal 3: Establish well-functioning and effectively managed protected areas that incorporate adjacent community conservation areas. Nature Goal 4: Maintain over the long-term well-	% change in annual suspended sediment load % of river reaches with improved or maintained habitat connectivity (indicated by connectivity status index) Km of river reaches with improved or maintained habitat connectivity Native fish species richness (average number of species per site surveyed) in project area	Number of hectares /kilometers under improved management Number of hectares /kilometers protected Number of people with increased sustainable, place-based economic opportunity Number of people with	Area of land protected (hectares) Area of improved management (hectares) Freshwater ecosystems protected (hectares AND kilometers) Freshwater ecosystems with improved management (hectares AND kilometers) At-risk freshwater ecosystems with avoided impacts (hectares AND kilometers)

	Intermediate outcome #1: By 2025, there is enabling policy and legislative environment that support community-based conservation linked to formal protected area management	Activity: Prepare recommendations and proposed language for Angola's government to add community conservation into the national Conservation Areas Act, drawing on lessons from Kenya and Namibia	# of meetings with key government agencies Recommendations are reflected in Conservation Areas Act Regulations	Number of enabling policies and legislative instruments that support community-based conservation linked to formal protected area management Number of enabling policies and legislative instruments for community-based conservation supporting generation of benefits as well as improving livelihoods	functioning freshwater habitats of at least 100,000 ha (e.g., fish spawning, other aquatic biota, seasonal refugia) as well as longitudinal and lateral habitat connectivity of over 300 km river length in the Cuito and Cubango sub-basins that support aquatic biodiversity including native fish species richness and abundance at current levels.	Fish densities/abundance (Number of individuals/m² or number of individuals/survey) Perception of secured rights	increased security of rights over traditional lands, waters, or resources Number of people with increased natural resource management capacity Number of people with increased governance capacity	Increased/improved security of rights over lands, waters, or resources (# of people) Increased/improved sustainable, place-based economic opportunity (# of people) Increased/improved ability to meaningfully participate in decision-making about lands, waters, or resources (# of people)
	Intermediate outcome #2: By 2025, the most effective zonation scenarios are developed based on local input and assessed socio-economic and ecological enabling conditions for Mavinga and Luengue-Lujana National Parks, which include a nearby set of community conservation areas along with anticipated return-on-investment to the nature-based economy in southeast Angola.	Activity: Develop zonation scenarios based on community engagement and assessed socio-economic and ecological enabling conditions for Mavinga and Luengue-Lujana National Parks and propose a nearby set of community conservation areas along with anticipated return-on-investment to the nature-based economy in southeast Angola	Analytical report with recommendations for re-zoning and enabling legal and policy reform	# of agreed on land use zones established & formally recognized % of agreed on land use zones established & formally recognized Number of people (disaggregated by gender) with increased governance capacity	Nature Goal 5: Maintain and conserve forest areas that support important freshwater areas by reducing annual rate of deforestation by 25% in community managed forest areas. Human Well-Being Goal 1: By 2030, Community-based cooperatives are generating new funds for the community.			
	Intermediate outcome #3: By 2025, enabling conditions are in place to implement one of the recommended landscape-level community and government conservation scenarios in Southeast Angola	Activity: Complete an assessment of enabling conditions for community-based conservation and secure local input and buy-in around the concept of a mutually supportive government protected area and community-based conservation system in southeast Angola	Assessment report completed	# of landscape-level government/community-based conservation systems implemented in southeast Angola # of local communities receiving economic benefits from National Parks	Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.			
Cross-cutting Strategies								
Strategy #6: Facilitate (through capacity building & other means) community entities' active & meaningful participation in stakeholder platforms for effective natural resource decision-making that includes community interests.	Outcome #1: By 2025, at least 12 of the target villages have formally established (e.g., documented & recognized) well-functioning community-based conservation & resource management institutions (e.g. forestry, fisheries, protected area management)	Activity: Build capacity of women, youth and men in target villages within the project area to understand co-management institutions and the process for formalizing and establishing these institutions.	# of target villages with established community-based conservation & resource management institutions	% of target villages with well-functioning conservation and management institutions Number of people (disaggregated by gender) with increased sustainable, place-based economic opportunity	All goals		Number of people with increased governance capacity Number of people with increased security of rights over traditional lands, waters, or resources Number of people with increased natural resource management capacity	Increased/improved security of rights over lands, waters, or resources (# of people) Increased/improved ability to meaningfully participate in decision-making about lands, waters, or resources (# of people) Increased/improved sustainable, place-based economic opportunity (# of people)
	Outcome #2: By 2025 at least 3 communities have legal rights and are actively participating in the management of 2 protected areas.		# of people (disaggregated by gender) trained # of communities with legal rights to land # of communities actively participating in the management of protected areas	Number of people (disaggregated by gender) with increased ability to meaningfully participate in decision-making about traditional lands, waters, or resources Perception of secured rights Perception of enforcement				

				Perception of meaningful participation in resource management				
Strategy #7: Establish sustainable finance to support conservation and development initiatives	Outcome: By 2030, mobilize at least \$20M from other conservation finance opportunities (e.g., carbon finance, debt conversion) to sustainably finance ongoing conservation and development activities in the basin.	Activity #1: Investigate the capital potential of debt swap or debt conversions for nature	# of sustainable finance mechanisms explored	# of sustainable funding mechanisms in place	All goals			Greenhouse gas mitigation (emission reduction or increased sequestration) (million tons CO2e/yr)
	Intermediate outcome #1: By 2023, a business case for sustainable finance is established	Activity #1: Develop a Business Case for the project area Activity #2: Develop a sustainable finance mechanism to support sustainable community forestry (e.g., participation in voluntary carbon markets)	Business case for sustainable finance developed Sustainable finance plan developed	Increased C stocks (tonnes) in project area that have access to C offset markets GHG reductions through avoided emissions or increased sequestration				
	Intermediate outcome #2: By 2030 there are additional revenue streams from initiatives such as REDD+	Activity: Carry out feasibility studies on REDD+	REDD+ Feasibility study report completed					
Sustainable Planning Strategies								
Strategy #8: Support energy planning for the Upper Okavango Basin and Cuando-Cubango Province that leads to low impact development pathway.	Outcome #1: Avoid negative impacts & provide positive benefits from hydropower/energy development to local communities Outcome #2: Permanently avoid the need for construction of dams in the mainstem Cubango and Cuito Rivers by promoting alternative sources of energy from low impact land-based renewables (e.g. solar)	Activity: Generate the science and knowledge to inform decision making on the deployment of low-impact energy generation sources, e.g. solar	Scientific studies and reports published and shared with government	Avoid construction of large hydropower dams on the mainstem Cubango and Cuito rivers # of km of connected river systems as a result of avoided development # of ha of floodplain habitat protected as a result of avoided development	All goals		Number of hectares /kilometers protected	At-risk freshwater ecosystems with avoided impacts (hectares AND kilometers)
Strategy #9: Develop and support implementation of a water allocation plan to meet the needs of local communities & nature in the basin/province	Outcome: Promote conjunctive use of surface and groundwater resources to ensure assurance of water supply for irrigation	Activity #1: Identify and map critical groundwater aquifers. Modeling of groundwater is shared with government and improves understanding of hydrology of the region under both current conditions and projected climate change scenarios	Scientific studies and reports published and shared with government	% of people (disaggregated by gender) practicing sustainable water use	Nature Goal 1: Maintain timing and volume of natural flow basin-wide to no more than 20% alteration from long-term hydrograph. (Peak flow -maintain at least one peak flow pulse per year & Base flow).	# of peak flow pulses per year % change in flow volume compared with baseline # of days of base flow disruption,	Number of hectares / kilometers under improved management	Freshwater ecosystems protected (hectares AND kilometers) Freshwater ecosystems with improved management (hectares AND kilometers)
		Activity #2: Promote sustainable use of ground and surface water to avoid the need for dams for irrigation purposes	# of people (or communities) trained # of people (disaggregated by gender) practicing sustainable water use	Adoption by government (and sectors) of the water allocation plan Perception of water use rights secured	Nature Goal 6: Maintain longitudinal connectivity in the mainstem Cubango and Cuito Rivers by avoiding dams or reservoirs. Human Well-Being Goal 2: Options for securing land tenure, or alternative models considering the national context, are identified and clear, predictable, and affordable tenure arrangements are established by 2030.	% of river reaches with improved or maintained habitat connectivity (indicated by connectivity status index) Km of river reaches with improved or maintained habitat connectivity	% alteration in the timing of flow % of river reaches with improved or maintained habitat connectivity (indicated by connectivity status index) Number of people with increased security of rights over traditional lands, waters, or resources	At-risk freshwater ecosystems with avoided impacts (hectares AND kilometers) Increased/improved security of rights over lands, waters, or resources (# of people)

10. RESOURCE AND CAPACITY NEEDS

Position/Capacity Required	Number of Units	Annual Cost (USD)	Ten Year Cost (USD)
CBC Project Manager (1FTE)	100%	80,000	800,000
VCA – Freshwater CBC Livelihoods Lead	100%	70,000	700,000
VCA – Rights	10%	7,000	70,000
VCA – MSP and Capacity/Leadership	10%	7,000	70,000
VCA – Gender	10%	7,000	70,000
Freshwater Fisheries Lead	100%	70,000	700,000
Forestry Lead	100%	70,000	700,000
Monitoring and Evaluation	10%	9,000	90,000
Communications	10%	7,000	70,000
Hydrology and Climate Scientist	25%	25,000	250,000
TOTAL		352,000	3,520,000

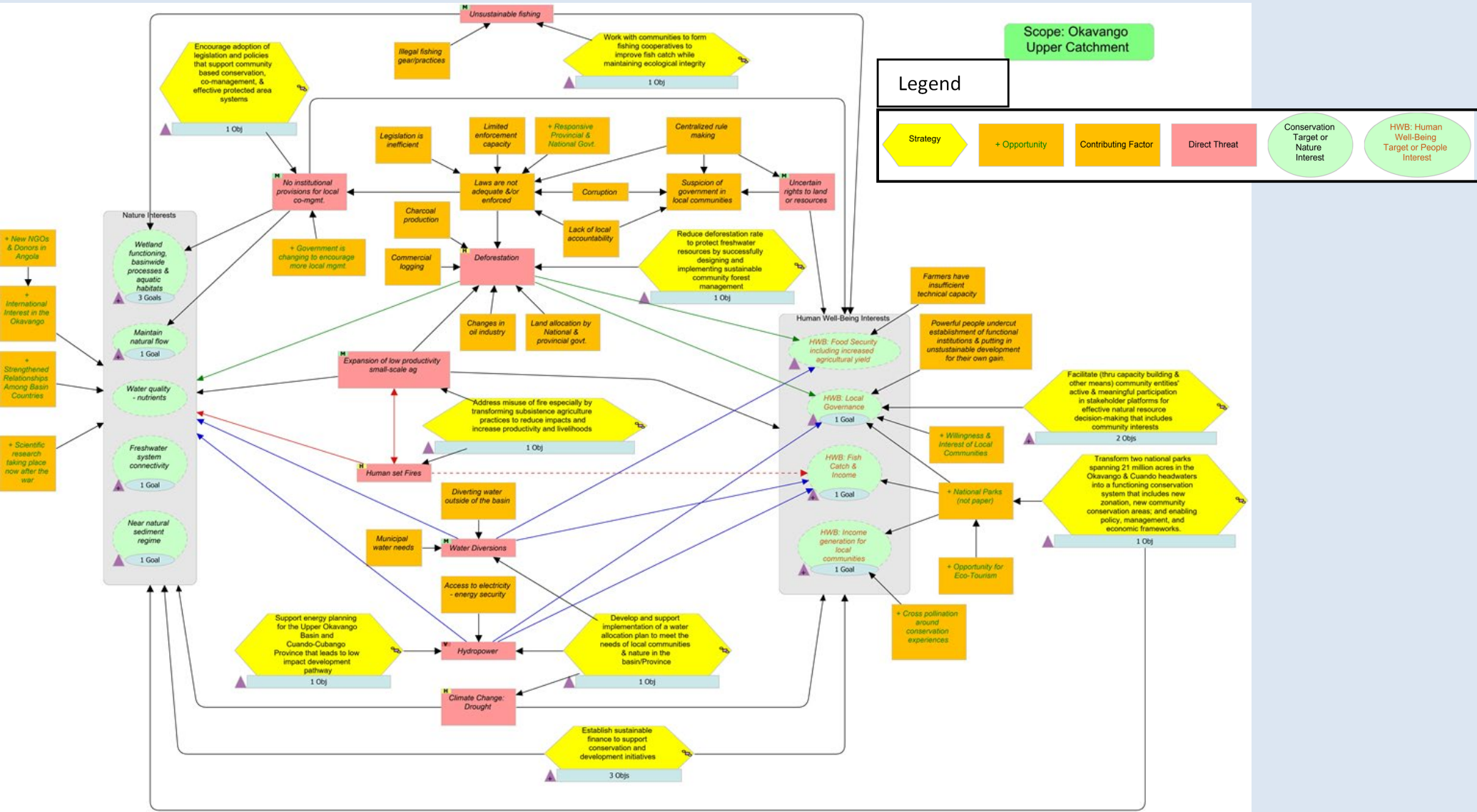
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APPENDIX A: SITUATION ANALYSIS

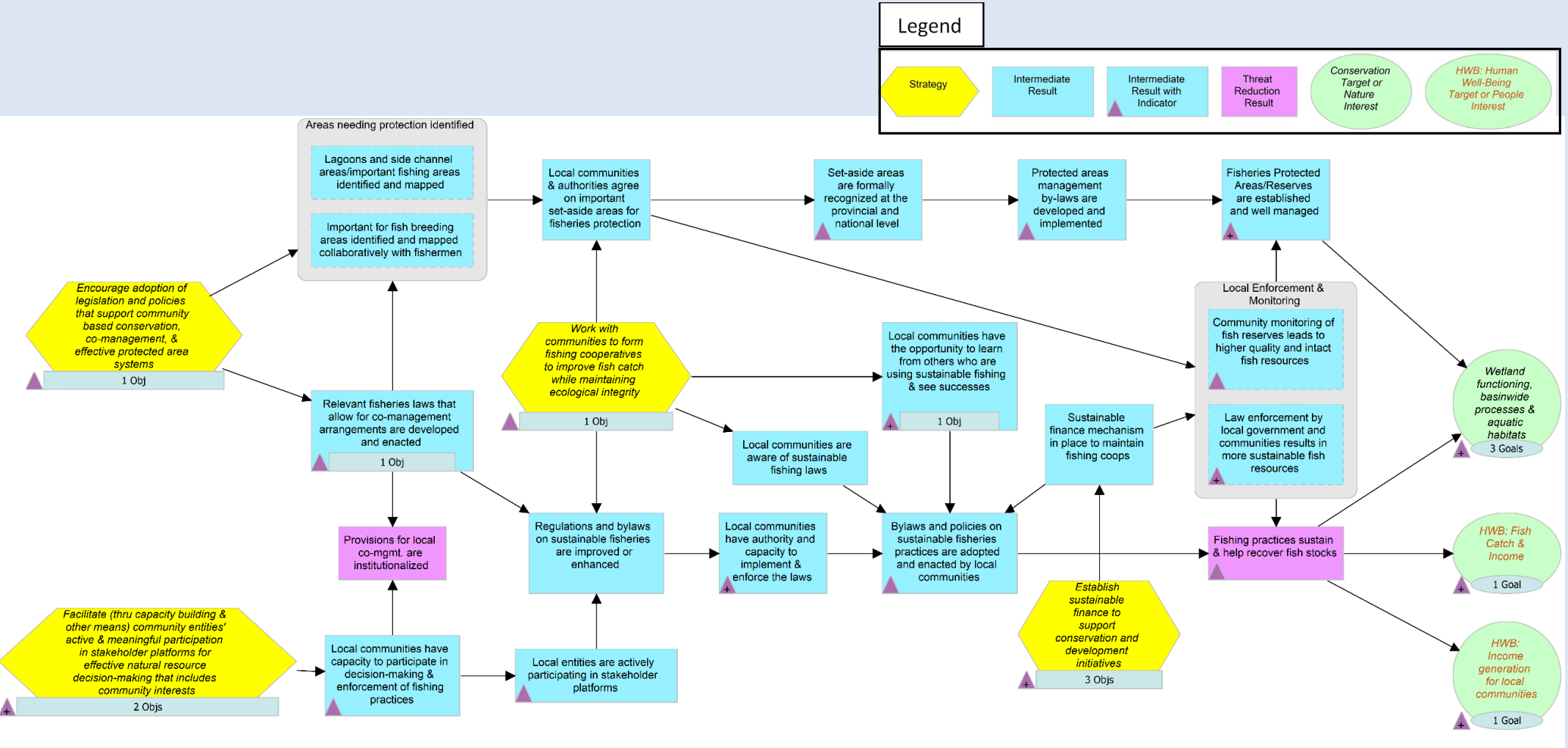
As part of the Conservation by Design 2.0 planning process, the Okavango team developed the following situation diagram to assess the key challenges and opportunities affecting primary interests in the Upper Catchment of the Okavango Basin. The process of mapping the socio-ecological system informed the team’s understanding of the drivers of conservation and human well-being challenges and helped to identify novel strategies aimed at systemic change. The diagram maps the relationships between primary interests (green), direct threats (red), opportunities/contributing factors (orange), and the team’s strategies (yellow). The situation analysis provided the framework for developing this plan.



APPENDIX B: RESULTS CHAINS

The following results chains were developed during Okavango planning meetings. The diagrams illustrate how the team expects the strategies outlined in Section 7 will unfold by depicting the linkages between each strategy (yellow) and the desired outcomes/goals (purple and green) through a series of intermediate results (blue). Developing and refining each results chain allowed the team to test the reasoning and logic behind each strategy through the planning process.

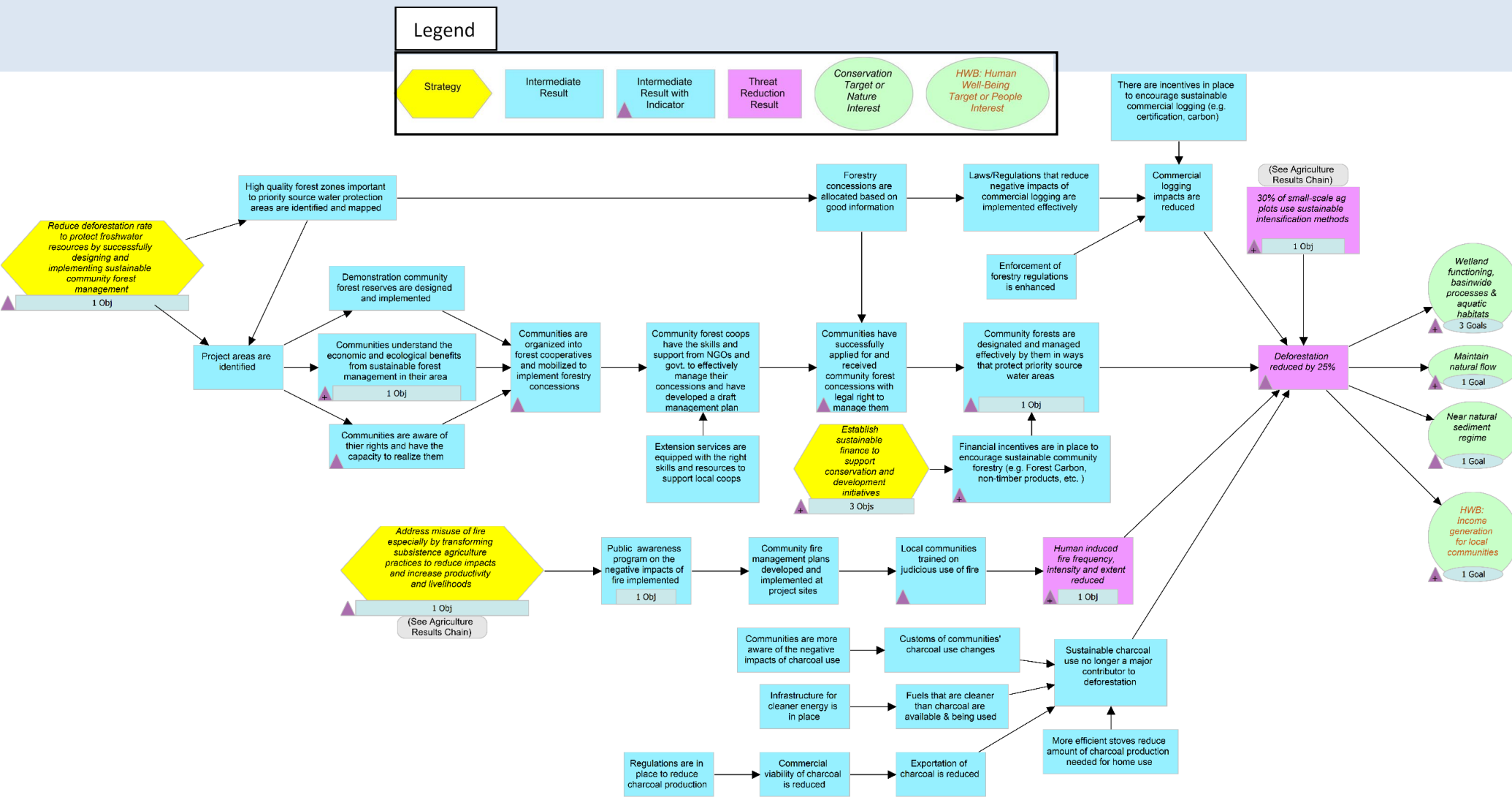
SUSTAINABLE FISHERIES RESULTS CHAIN



APPENDIX B: RESULTS CHAINS

The following results chains were developed during Okavango planning meetings. The diagrams illustrate how the team expects the strategies outlined in Section 7 will unfold by depicting the linkages between each strategy (yellow) and the desired outcomes/goals (purple and green) through a series of intermediate results (blue). Developing and refining each results chain allowed the team to test the reasoning and logic behind each strategy through the planning process.

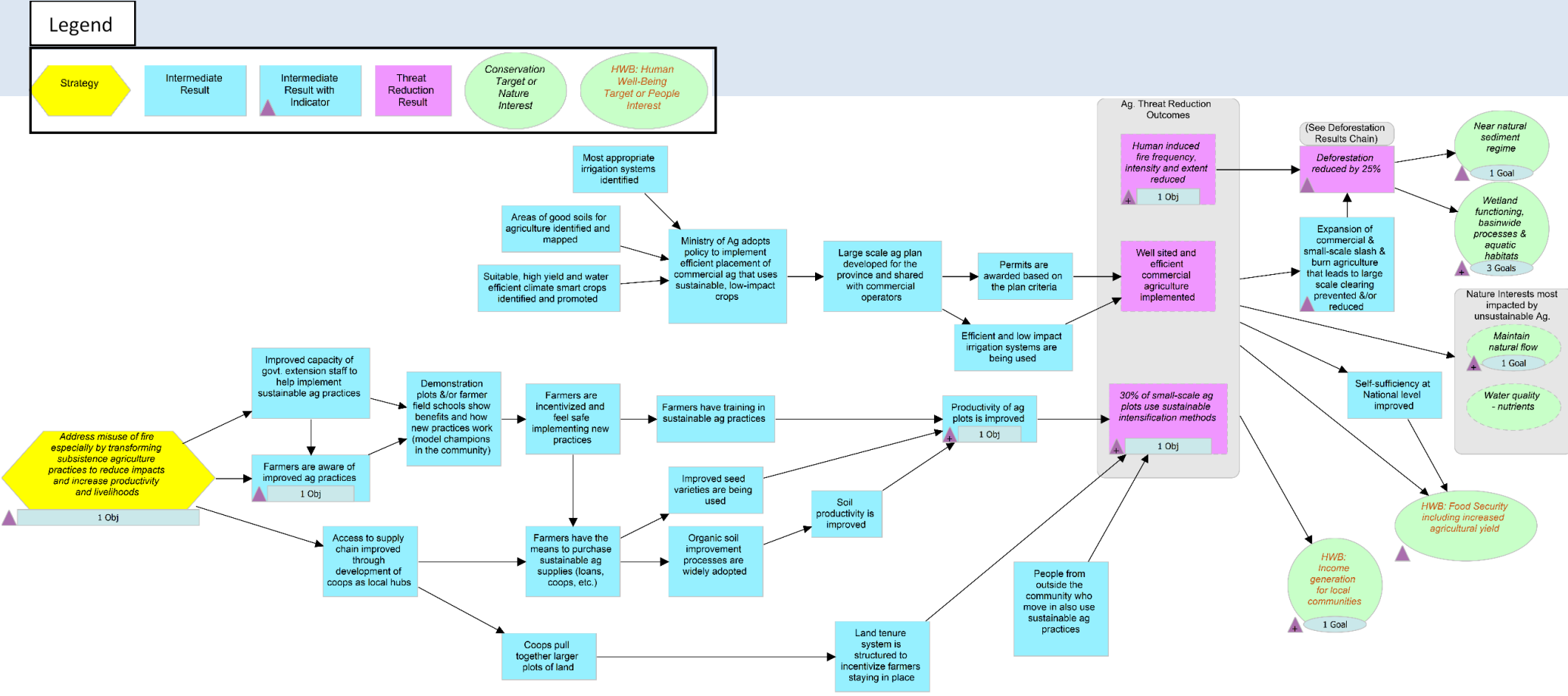
SUSTAINABLE FORESTS RESULTS CHAIN



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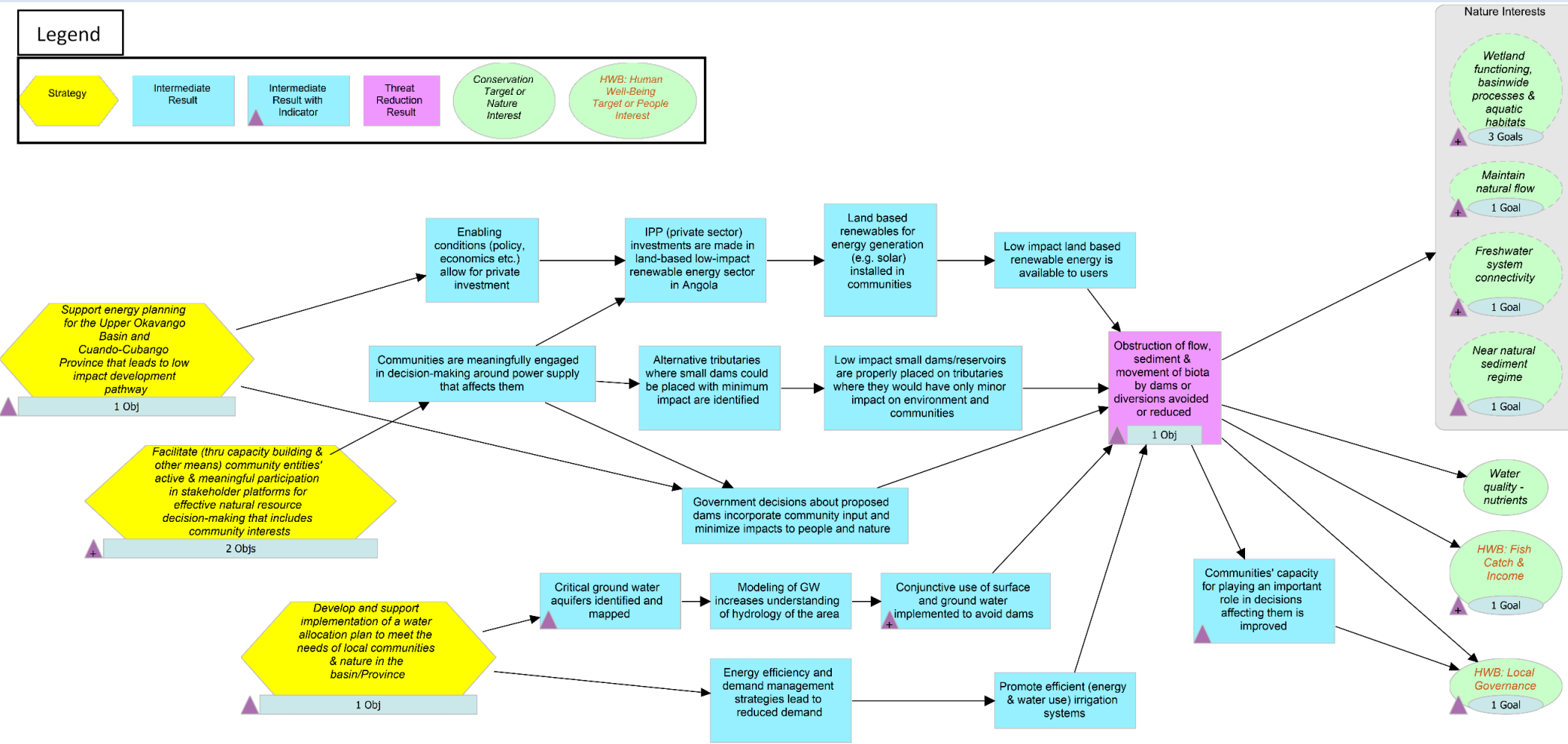
AGRICULTURE AND FIRE RESULTS CHAIN



APPENDIX B: RESULTS CHAINS

The following results chains were developed during Okavango planning meetings. The diagrams illustrate how the team expects the strategies outlined in Section 7 will unfold by depicting the linkages between each strategy (yellow) and the desired outcomes/goals (purple and green) through a series of intermediate results (blue). Developing and refining each results chain allowed the team to test the reasoning and logic behind each strategy through the planning process.

SUSTAINABLE PLANNING EFFORTS AND MULTISTAKEHOLDER RESULTS CHAIN



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