



ADAPTATION FUND

CONCEPT NOTE FOR REGIONAL PROJECT/PROGRAMME

PART I: PROJECT INFORMATION

Title of Project/Programme: Enhancing the bamboo value chain in Ethiopia and the United Republic of Tanzania to leverage bamboo as a nature-based solution for climate resilience and adaptation

Countries: Ethiopia, United Republic of Tanzania

Thematic Focal Area¹: Innovation in adaptation finance

Type of Implementing Entity: Multilateral Implementing Entity

Implementing Entity: United Nations Industrial Development Organization (UNIDO)

Executing Entities: United Nations Industrial Development Organization (UNIDO), International Network for Bamboo and Rattan (INBAR), Ethiopian Forestry Development (EFD), Ministry of Natural Resources and Tourism

Amount of Financing Requested: 30,000,000 (in U.S Dollars Equivalent)

Project Formulation Grant Request: Yes No

Amount of Requested financing for PFG: 150,000 (in U.S Dollars Equivalent)

Letters of Endorsement (LOE) signed for all countries: Yes No

NOTE: LOEs should be signed by the Designated Authority (DA). The signatory DA must be on file with the Adaptation Fund. To find the DA currently on file check this page: <https://www.adaptation-fund.org/apply-funding/designated-authorities>

Stage of Submission:

- This proposal has been submitted before including at a different stage (pre-concept, concept)
- This is the first submission ever of the proposal at any stage

In case of a resubmission, please indicate the last submission date: 21 November 2025 [Click or tap to enter a date.](#)

¹ Thematic areas are: Food security; Disaster risk reduction and early warning systems; Transboundary water management; Innovation in adaptation finance.

Please note that the Concept note proposal document should not exceed 50 pages, including annexes.

A. Project/Programme Background and Context:

A1. Background and project context

1. Climate change impacts are accelerating globally, with adaptation needs growing more urgent, particularly across vulnerable regions. The Intergovernmental Panel on Climate Change (IPCC) Sixth Assessment Report on Impacts, Adaptation and Vulnerability² highlights that current adaptation efforts are insufficient, poorly funded, and unevenly distributed, leaving Least Developed Countries (LDCs)—especially in Africa—disproportionately exposed to climate risks. The UNEP Adaptation Gap Report 2024³ further emphasizes that the adaptation finance gap is widening and that most developing countries are off track in implementing effective adaptation measures. Within this context, Ethiopia and Tanzania—both LDCs with high climate vulnerability—face pressing challenges in addressing localized impacts on livelihoods and ecosystems. Ethiopia's National Adaptation Plan⁴ identifies community-based adaptation, ecosystem restoration, and climate-resilient livelihoods as key pillars of national resilience strategies. In Tanzania, the National Climate Change Response Strategy (2021–2026)⁵ and ongoing subnational adaptation planning processes similarly prioritize nature-based and locally led approaches to reduce vulnerability. This project directly responds to these national priorities by focusing on strengthening the adaptive capacity and resilience of vulnerable communities in Ethiopia and Tanzania.
2. **Geography and country background:** Ethiopia is a landlocked country located in the Horn of Africa, covering an area of approximately 1.104 million square kilometers, making it the 27th largest country in the world⁶. The country's diverse land cover includes highlands in the central and northern regions, arid lowlands in the east and west used for pastoralism, and significant but declining forest cover in the southwest. Tanzania is located in East Africa, spanning an area of approximately 947,300 square kilometers⁷, making it the largest country in the region. Its topography varies significantly, with altitudes ranging from 358 meters to 5,950 meters above sea level. The country's terrain is diverse, comprising coastal plains, inland plateaus, highlands in the northeast and south, and the Great Rift Valley which runs through the country from north to southwest. Land use includes 3% arable crops, 1% permanent crops, and 40% pasture, while forests cover approximately 33.5 million hectares, representing about 40% of the total land area.
3. **Economic structures and trends:** Ethiopia remains one of the poorest countries, with a per capita gross national income of \$1,020, and aims to achieve lower-middle-income status by 2025. Ethiopia's has a low adaptive capacity to climate change, as reflected in its Human Development Index (HDI) which is 0.492 for 2022, placing it in the low human development category and ranking it 176th out of 193 countries and territories. Between 2000 and 2022, Ethiopia's HDI value increased by 72.0%, from 0.286 to 0.492. However, despite this progress, the country's low HDI underscores its limited capacity to adapt to the growing challenges posed by climate change, exacerbating its vulnerability in both the short and long term. The country has experienced strong growth, with an average real growth rate of nearly 10% per year between 2004 and 2018, driven primarily by infrastructure investments that expanded access to services and improved living standards⁸. However, since 2018, multiple shocks, including persistent droughts, floods, locust infestations, conflict, and global factors, have affected the country, causing a deterioration in living standards for the first time in over two decades. About 15 million people now rely on food aid, and food insecurity is increasing due to adverse weather events, heavy reliance on rainfed agriculture, locust invasions, conflict, and rising food prices⁹. The agriculture sector plays a significant role in Ethiopia's economy, contributing 34.5% of GDP in 2020, with smallholder farming accounting for approximately 95% of agricultural production and 85% of total employment.
4. Tanzania, which achieved lower-middle-income country status in 2020, has made significant social and economic progress in recent decades. Tanzania has one of the lowest Human Development Indices in the world, currently at 0.521. Only 15% and 55% of the population have access to electricity and potable water, respectively. Productive

² IPCC (2022). Sixth Assessment Report: Impacts, Adaptation and Vulnerability. Intergovernmental Panel on Climate Change

³ UNEP (2024). Adaptation Gap Report 2024: Underfinanced. Underprepared. United Nations Environment Programme.

⁴ Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

⁵ Government of Tanzania (2021). National Climate Change Response Strategy 2021–2026.

⁶ Central Intelligence Agency (CIA). "The World Factbook: Ethiopia." <https://www.cia.gov/the-world-factbook/countries/ethiopia/>

⁷ <https://ideas.repec.org/b/wbk/wbpubs/2629.html>

⁸ <https://www.worldbank.org/en/country/ethiopia/overview#1>

⁹ <https://www.worldbank.org/en/country/ethiopia/overview#1>

resources are skewed toward men; only 20% of women own agricultural land¹⁰. Tanzania ranks 94th out of 113 countries in the Global Food Security Index¹¹, indicating slow progress toward achieving food security targets. One-third of the population is undernourished, while underweight and wasting rates among children under the age of five remain high¹². Food insecurity is prevalent in low-income households (particularly among people living below the poverty line), where there is high reliance on agriculture for subsistence. Between 2000 and 2020, life expectancy improved from 52 to 67 years, and school attainment increased from 3.8 to 6.4 years. Access to electricity also rose from 7% in 2011 to 43% in 2021¹³. Despite these achievements, Tanzania has yet to fully realize its growth potential for a more prosperous, inclusive, and resilient economy. In the first quarter of 2024, GDP growth accelerated to 5.6% year-on-year, following a 5.1% growth in 2023. However, 70% of the population is still dependent on agriculture, with many smallholder farmers being disproportionately vulnerable to climate change and ill-equipped to handle multiple climate shocks¹⁴. Agriculture remains central to creating jobs and reducing poverty in Tanzania, but it requires transformation, including using more inputs, hiring labor, and expanding land cultivation. The growth of medium-sized farms has positively impacted smallholders, contributing to their economic inclusion¹⁵.

A1a. Climate trends and projection

5. **Climate:** Due to the marked contrast in elevation and its proximity to the equator and the Indian Ocean, Ethiopia experiences significant spatial variations in temperature and rainfall. Ethiopia's average temperature is mild for its tropical latitude because of its topography, with considerable variation across the country based on altitude. Mean annual temperatures range from 15 °C to 20°C in the highlands, while the low-lying regions experience temperatures between 25°C and 30°C¹⁶. The mean annual rainfall is estimated at 805 mm, ranging from below 300 mm in the lowlands to above 1500 mm in the highlands during the period 1981–2016¹⁷. Ethiopia has three rainy seasons: June–September (Kiremt), October–January (Bega), and February–May (Belg). Kiremt, which is the main rainy season for most parts of Ethiopia, accounts for 50–80% of the total annual rainfall in regions with high agricultural productivity and major water reservoirs. For this reason, the most severe droughts usually result from the failure of the Kiremt rainfall to meet Ethiopia's agricultural and water resource needs. Western and northern Ethiopia experience monomodal rainfall patterns, with rainfall peaking during Kiremt. The temporal distribution in these monomodal rainfall areas shrinks from south to north, ranging from over eight months of rain in the southwest to only three months of rain in the northwest. Regions in the Rift Valley and adjoining highlands receive bimodal rainfall during the Belg and Kiremt seasons. In contrast, regions of southern Ethiopia experience a bimodal rainfall distribution during the Bega and Belg seasons¹⁸. Tanzania has diverse climates: tropical along the coast, semi-arid in the central plateau, and temperate in the highlands. The country's climate is characterized by two main rainy seasons: Masika (long rains) and Vuli (short rains), which last from mid-March to the end of May and from mid-October to early December, respectively. Average temperatures in the central, northern, and western parts of the country range from 20°C to 30°C, while along the coast and its islands, temperatures average between 27°C and 29°C, with the highest temperatures occurring between December and March. In the mountain areas and highland regions of southwestern Tanzania, temperatures can drop to 15°C at night and may even fall below zero during the months of June and July¹⁹.
6. **Temperature:** According to historical data, in Ethiopia average annual temperatures increased by 1.3 °C during 1960–2006, at an average rate of 0.28 °C per decade²⁰. Ethiopia's future climate change scenarios suggest that the mean annual temperature is projected to rise by about 1.5°C to 2.5°C under RCP 4.5 and by about 3°C to 4.5°C under RCP 8.5 by the end of the century. In Tanzania, near-surface temperatures are projected to rise by 2 °C by 2040, by 3 °C by 2070, and by 5 °C by 2100²¹. This increase in surface temperatures, compared to the reference period (1971–2000), is expected to further heighten the frequency and intensity of climate extremes. Specifically, Tanzania is likely to experience an increase in the number of warm days and nights during the present (2011–2040),

¹⁰ <https://climateknowledgeportal.worldbank.org/sites/default/files/2019-06/CSA-in-Tanzania.pdf>

¹¹ Global food security index. London: The Economist Intelligence Unit (EIU); Available at: <http://foodsecurityindex.eiu.com>

¹² World Bank, 2016. World Development Indicators. Available at <http://data.worldbank.org/indicator/NV.AGR.TOTL.ZS>

¹³ <https://www.worldbank.org/en/country/tanzania/overview#2>

¹⁴ World Bank Group, 2024. Tanzania Country Climate and Development Report. CCDR Series. © Washington, DC: World Bank Group. <http://hdl.handle.net/10986/42483> License: CC BY-NC-ND 3.0 IGO

¹⁵ Mungunasi, Emmanuel A. Tanzania Economic Update : Transforming Agriculture - Realizing the Potential of Agriculture for Inclusive Growth and Poverty Reduction (English). Tanzania economic update | Issue no. 13 Washington, D.C. : World Bank Group. <http://documents.worldbank.org/curated/en/213061575479179256>

¹⁶ Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

¹⁷ Fenta AA, Yasuda H, Shimizu K, et al. Spatial distribution and temporal trends of rainfall and erosivity in the Eastern Africa region. *Hydrological Processes*. 2017; 31: 4555–4567. <https://doi.org/10.1002/hyp.11378>

¹⁸ Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

¹⁹ <https://www.adaptation-undp.org/nap-gsp-country-brief-tanzania>

²⁰ Jury, M.R.; Funk, C. Climatic trends over Ethiopia: Regional signals and drivers. *Int. J. Climatol*. 2013, 33, 1924–1935

²¹ Luhunga, P. M. et al. Climate Change projections for Tanzania based on high-resolution Regional Climate models from the Coordinated Regional Climate Downscaling experiment (CORDEX)-Africa. *Front. Environ. Sci.* 6, 122. <https://doi.org/10.3389/fenvs.2018.00122> (2018).

mid (2041–2070), and end centuries under the RCP4.5 emission scenario²². In the future, regions with warmer nights, such as coastal areas, are expected to warm more rapidly than other regions²³.

7. **Precipitation:** In Ethiopia, annual rainfall showed a slight decrease from 1951 to 2010 compared to the 1961–1990 average²⁴. Although the overall trend indicates a decrease in average annual rainfall across the country, the trend varies from region to region and from season to season. A noticeable decrease in precipitation is observed for the February–May (Belg) season, especially in the northeast and eastern parts, compared to other seasons. Precipitation patterns exhibit high variability, and this trend is expected to continue. Under both RCP 4.5 and 8.5 scenarios, precipitation patterns are expected to increase by 4% to 12% by 2100, compared to the 1975–2005 baseline, with potential for both increased rainfall and more severe droughts²⁵. In Tanzania, future climate projections indicate that heavy rainfall events will become more dominant in regions along the coast, central regions, and the northwestern and southwestern highlands. The number of consecutive wet days is likely to increase across large areas of Tanzania, with coastal regions experiencing more rapid changes compared to other areas in all seasons. Coastal regions, in particular, are expected to face increased intensity and frequency of extreme rainfall events in the present, mid, and end centuries under the RCP4.5 emission scenario.²⁶

A1b. Climate impacts and vulnerabilities

8. Ethiopia’s economy is highly vulnerable to the impacts of climate change due to its heavy dependence on rain-fed agriculture and natural resources, as well as its relatively low adaptation as heat waves capacity²⁷. The key climate hazards in the country, as outlined in Ethiopia’s National Adaptation Plan (NAP), include frequent droughts, occasional floods, unpredictable rainfall, rising temperatures, and extreme weather events such and storms (Fig. 2).

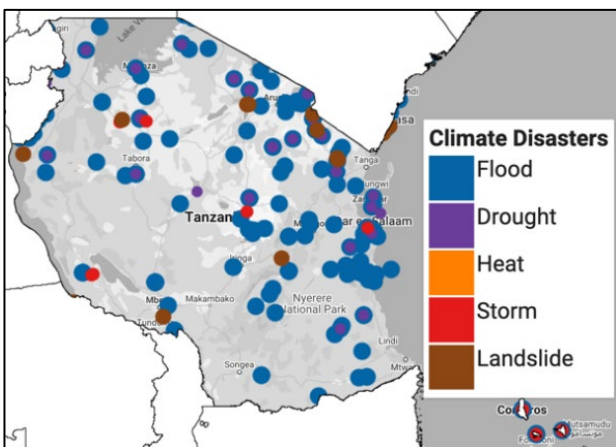


Figure 1: Major climate disasters recorded in Tanzania between 1960-2018

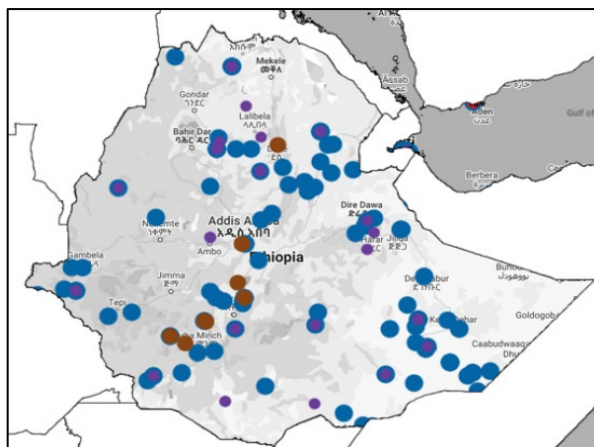


Figure 2: Major climate disasters recorded in Ethiopia between 1960-2018

9. The impacts of climate change are already being felt across almost all sectors, with varying intensity across the country and increasing impacts (Fig. 4), including human and livestock losses, biodiversity depletion, crop failures, infrastructure damage, landslides, soil erosion, crop diseases and pests, hailstorms, wildfires, displacement, and increased gender inequality, all of which significantly affect key sectors such as agriculture, water, and industry, as well as the livelihoods of many people in Ethiopia²⁸. Recent droughts include the one in 2003, which affected approximately 12.6 million people in the Tigray, Oromiya, Amhara, Somali, and Afar regions, and the 2015 drought, and impacting over 10 million people in the Somali and Afar regions. The highest mortality due to drought occurred in 1983, when approximately 300,000 people died²⁹. In contrast, floods occur more frequently but tend to affect fewer

22 Luhunga, P.M. Projected changes in climate extremes over Tanzania. *Sci Rep* 15, 292 (2025). <https://doi.org/10.1038/s41598-024-79432-w>

23 Luhunga, P.M. Projected changes in climate extremes over Tanzania. *Sci Rep* 15, 292 (2025). <https://doi.org/10.1038/s41598-024-79432-w>

24 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

25 Future assumptions obtained by the author based on the dataset of the climate knowledge portal of the worldbank.org. Available at: Ethiopia - Mean Projections Expert | Climate Change Knowledge Portal

26 Luhunga, P.M. Projected changes in climate extremes over Tanzania. *Sci Rep* 15, 292 (2025). <https://doi.org/10.1038/s41598-024-79432-w>

27 <https://unfccc.int/sites/default/files/NDC/2022-06/Ethiopia%20updated%20NDC%20JULY%202021%20submission.pdf>

28 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

29 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

people. Notable flooding events occurred in 1990, affecting 350,000 people, and in 2006, which impacted 450,000 people. The number of deaths due to flooding peaked in 2006³⁰.

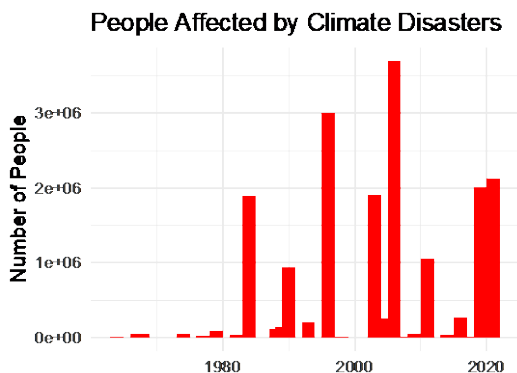


Figure 2 Number of people affected by climate disasters from 1968-2021 in Tanzania

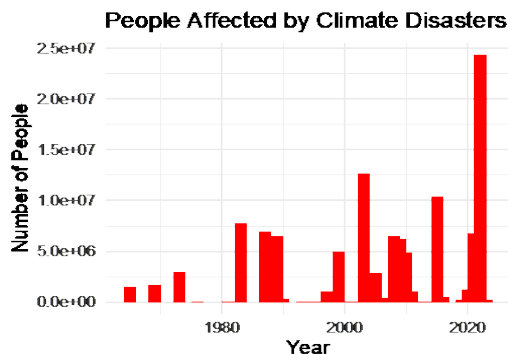


Figure 4 Number of people affected by climate disasters from 1968-2021 in Ethiopia

- In Tanzania, the National Adaptation Programme of Action (NAPA) highlights prolonged heavy rainfall, drought, strong winds, deforestation, and increased temperatures (Fig. 1), which lead to severe climate impacts, including food shortages, food insecurity, sea-level rise, loss of biodiversity, soil erosion, floods, uncertainty in cropping patterns, reduced and increased runoff in river basins, shortages of raw materials, power supply, and water, as well as soil degradation. The adverse effects of climate change include increased rainfall variability, reduced water volumes in bodies of water such as rivers and lakes³¹, increased pest and disease incidence due to rising temperatures, saltwater intrusion (especially in coastal areas and Zanzibar), and the replacement of perennial crops with annual crops due to reduced crop cycles³². The rising frequency of climate-related extreme events, coupled with a dense population and economic challenges, amplifies the vulnerability of both means of subsistence and health, particularly in rural areas³³. The effects on food and water quality, as well as disease distribution patterns, disproportionately affect rural populations and people with limited options to cope with shocks. The number of people affected by climate change is increasing (Fig. 3), with 27.7% of the population and 29.4% of the vulnerable population exposed to at least one climate risk and potentially pushing an additional 2.6 million people into poverty by 2050 if no climate actions are taken. Internal migration is likely to increase as people move away from the coast due to deteriorating water availability and crop yields, sea-level rise, and declining land availability, and towards areas in the Lake Victoria Basin³⁴.
- Agriculture sector and forestry:** In Ethiopia, the agricultural sector is extremely sensitive to even minor changes in weather patterns because it relies heavily on rainfall. This vulnerability is further exacerbated by poor farming practices and the limited adoption of agricultural inputs. Both crop and livestock production face an array of climate risks such as frequent droughts, occasional floods, shifts in seasonal rainfall and temperature patterns, and extreme events like heatwaves and storms. These hazards are projected to shorten crop maturation periods, increase the spread of crop diseases, and cause an overall decline in soil fertility and livestock productivity³⁵. The increasing frequency of crop failures, along with declining availability and quality of livestock feed, is expected to intensify food insecurity. Livestock health, growth, and reproductive capacity are also likely to deteriorate, while the prevalence and geographic spread of certain infectious diseases may expand in response to shifting climate conditions³⁶. Ethiopia's forest sector is also facing significant challenges, including declining natural regeneration, an increase in forest fires, and a growing prevalence of pests and diseases in recent decades. The country lost approximately 77% of its forest cover between 1955 and 1979, and this deforestation trend has continued to the present day³⁷. The major consequences of forest loss include increased soil erosion, more frequent flooding, deteriorating water quality,

30 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

31 URT. 2013b. Report on Forests, Rangelands and Climate Change Adaptation in Tanzania (URT).

32 URT. 2007. National Adaptation Programme of Action. United Republic of Tanzania (URT).

33 <https://www.nature.com/articles/s41599-024-02875-z>

34 World Bank Group. 2024. Tanzania Country Climate and Development Report. CCDR Series. © Washington, DC: World Bank Group. <http://hdl.handle.net/10986/42483> License: CC BY-NC-ND 3.0 IGO

35 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

36 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

37 Yikuno, Kassahun Embaye. (2000). The Indigenous Bamboo Forests of Ethiopia: An Overview. AMBIO: A Journal of the Human Environment. 29, 518-521. 10.1579/0044-7447-29.8.518.

and intensified drought conditions—along with a range of interconnected negative effects on ecosystems, agricultural productivity, and community resilience³⁸.

12. In Tanzania, heat stress is projected to lower labour productivity, accounting for 20–40% of all economic losses under certain climate futures, while the loss of crop yields due to increased precipitation variability could account for 25–50% of all economic damages from climate change. Overall, the agricultural sector is expected to see a 1–2% decrease in crop production by 2050, with livestock production experiencing shocks of 3–8% between 2041 and 2050³⁹. Warming climate conditions—combined with increased heat stress, drying, and soil erosion—are projected to reduce maize yields by 8–13%, while production of beans, sorghum, and rice may decline by 5–9%. In addition, climate change is expected to contribute to significant forest loss in Tanzania. Montane forests, including those in Kilimanjaro and Mahale Mountains National Parks, could lose between 47% and 64% of their suitable habitat by 2085, depending on the emissions scenario⁴⁰. Microhabitats and lowland forests in the Serengeti could lose more than 70% and 10% of their habitats, respectively, under a pessimistic climate future, impacting the scope and location of nature-based solutions and tourism.
13. **Water Sector:** Climate change poses significant risks to the water sector in Ethiopia, primarily through rising temperatures, declining soil moisture, and decreasing groundwater levels. These changes are expected to reduce the availability of potable water, further straining already limited water resources. As water supplies dwindle, competition for this critical resource is expected to increase, making access to clean water even more challenging for many communities. Additionally, rising temperatures and shifting precipitation patterns may worsen water pollution, affecting both water quality and public health. The damage to aquatic habitats will also intensify, threatening the biodiversity of water-dependent ecosystems and the life forms that rely on them. These climate-induced stressors will undermine the resilience of the water sector, impacting both human populations and ecosystems that depend on stable, clean water supplies⁴¹. Water shortages have been an ongoing issue in Tanzania and are likely to persist in the future. Several studies indicate that climatic changes in Tanzania have led to decreased total precipitation, shifts in the timing of the rainy season, and an increase in the frequency and duration of droughts⁴². These changes have caused severe declines in the water levels of Lake Victoria and Lake Tanganyika, and the recession of Lake Rukwa by 7 km over the past 50 years⁴³. Additional challenges related to water availability include increasing demand driven by agricultural expansion and the growing domestic needs of a larger population. By 2080, per capita water availability is expected to decrease mainly due to population growth⁴⁴.

A1c. Identified Vulnerable Regions

14. Despite some regional differences, both Ethiopia and Tanzania face severe and similar climate-related challenges, with smallholder farmers struggling to adapt to increasingly erratic and extreme weather patterns. These impacts are significantly disrupting agricultural practices, reducing productivity, and undermining livelihoods—particularly in rural communities where climate resilience is urgently needed. The section below provides an overview of the most vulnerable regions in both countries, including the ones that were selected as target locations for this project based on their high exposure to climate risks and other relevant criteria. A detailed justification for site selection is provided in the section titled “Site Selection Justification.” The information presented draws on desk-based research and the results of a survey conducted by the project team to assess climate impacts experienced by local communities in selected districts. A comprehensive analysis of the survey findings is available in the section “Survey Distribution for Community Engagement”. Among the 46 farmers interviewed, only one farmer was unsure about the climate changes they were experiencing, while the remaining 45 acknowledged noticeable shifts in the climate.

Ethiopia

15. **Highlands:** The highlands of Ethiopia are particularly vulnerable to climate change, significantly affecting the country's food and water security. For example, soil erosion has become a major issue due to increased intense rainfall and flooding, with the most severe effects observed in the Ethiopian highlands⁴⁵. Soil erosion introduces sediments and pollutants into freshwater bodies, reducing drinking water quality and degrading freshwater

38 <https://www.ebi.gov.et/wp-content/uploads/2021/10/The-Indigenous-Bamboo-Forests-of-Ethiopia-An-Overview.pdf>

39 World Bank Group. 2024. Tanzania Country Climate and Development Report. CCDR Series. © Washington, DC: World Bank Group. <http://hdl.handle.net/10986/42483> License: CC BY-NC-ND 3.0 IGO

40 World Bank Group. 2024. Tanzania Country Climate and Development Report. CCDR Series. © Washington, DC: World Bank Group. <http://hdl.handle.net/10986/42483> License: CC BY-NC-ND 3.0 IGO

41 Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: Ethiopia National Adaptation Plan

42 U. Adhikari, A. P. Nejadhashemi, M. R. Herman, and J. P. Messina, “Multiscale Assessment of the Impacts of Climate Change on Water Resources in Tanzania,” *J. Hydrol. Eng.*, vol. 22, no. 2, pp. 1–13, 2017

43 Vice President's Office Division of Environment, “National Adaptation Programme of Action (NAPA),” Dodoma, Tanzania, 2007.

44 <https://www.preventionweb.net/publication/disaster-risk-profile-tanzania>

45 <https://www.iied.org/sites/default/files/pdfs/2023-11/22071g.pdf>

resources, further compromising the country’s water security⁴⁶. Additionally, soil erosion disrupts the water cycle, depletes soil quality, and creates barren land devoid of vegetation in highland areas, initiating a self-reinforcing cycle of reduced land fertility, diminished water resources, and lower crop and livestock productivity⁴⁷. The highlands are also experiencing more intense and irregular rainfall, which further negatively impacts agricultural production and livelihoods⁴⁸. For example, cereal crop production has become nearly impossible in certain southern regions in recent years due to unfavorable weather conditions⁴⁹. Moreover, rising temperatures, especially in highland areas, are exacerbating soil erosion and agricultural degradation, compounding the challenges of food and water insecurity⁵⁰.

16. **Lowlands and Oromia:** The Ethiopian lowland ecosystem is highly and increasingly vulnerable to climate change. Rising temperatures, reduced rainfall, and other extreme weather events are severely affecting livestock health and productivity across different regions, leading to food insecurity and greater dependence on food aid⁵¹. In Oromia, where climate change hazards occur in the form of droughts, late/early onset of rain, floods, animal and crop pest and disease outbreaks, invasive plant species, and water stress⁵², livestock are experiencing lower milk production, reduced fertility, and higher disease incidence due to poor feed quality and water shortages⁵³. Additionally, pastoral communities in this region face persistent threats from climate change, as their rangelands are extensively degraded—primarily due to drought, overgrazing, and bush encroachment—resulting in reduced productivity and heightened vulnerability to the effects of climate variability and unpredictability⁵⁴. Moreover, farming communities in Oromia are highly vulnerable to climate change due to their reliance on agriculture, a climate-sensitive sector, and the increasing variability of rainfall during crop-growing seasons, along with rising temperatures driven by broader environmental and land use changes, which together threaten livelihoods and heighten exposure to food insecurity and poverty⁵⁵.

17. **South Ethiopia and Sidama:** The survey analysis (Fig. 5) conducted by the project team reveals that farmers in South Ethiopia and Sidama have similarly observed shifts in climate, with notable impacts on agriculture. These farmers have experienced dry seasons and reduced rainfall, but they also report frequent flooding and more intense heat waves, highlighting an additional level of climate variability. The challenges faced by farmers in these two regions include difficulty in growing crops, crops drying out, reduced soil fertility, lower harvests, and increased disease outbreaks. However, the farmers also face an additional significant challenge with the rise in plant diseases, which is exacerbating the impacts of other climate-related stressors. South Ethiopia is also severely impacted by floods, with a recent flood occurring at the end of September 2024. These events have displaced thousands, damaged critical infrastructure, and increased the need for urgent humanitarian assistance. Additionally,

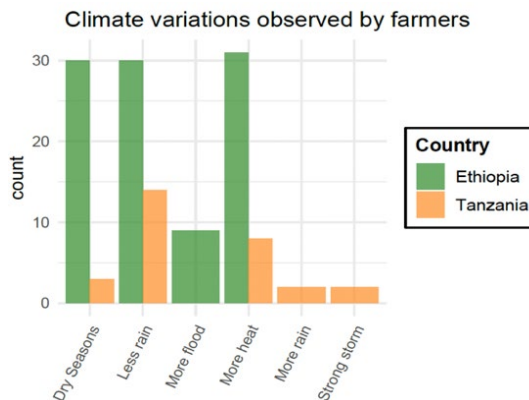


Figure 3 Climate variations observed by farmers in Ethiopia and Tanzania based on the farmers surveys conducted by UNIDO

both regions have been severely affected by drought, particularly during the October–December 2024 rainy season, resulting in water and pasture shortages, heightened food insecurity, disease outbreaks, and aggravated health and protection concerns for women and girls in the affected areas. New conflicts in these regions have further exacerbated vulnerability⁵¹. The population in South Ethiopia, in particular, has been displaced due to resource-based conflicts and natural disasters, including floods and landslides. Flood-induced displacement accounts for 41.5% of the total displacement, followed by conflict at 33.5% and landslides at 25%, as endorsed in September 2024⁵². In Sidama, the region is highly exposed to increasing temperatures and declining precipitation, significantly affecting water availability and ecosystem health. Climate change has also led to land fragmentation and degradation, reducing the resilience of local communities. Additionally, climate-induced hunger has occurred in 2000,

46 <https://www.iied.org/sites/default/files/pdfs/2023-11/22071g.pdf>

47 <https://www.adaptation-undp.org/projects/cca-growth-implementing-climate-resilient-and-green-economy-plans-highland-areas-ethiopia>

48 <https://www.thegef.org/projects-operations/projects/6967>

49 <https://www.thegef.org/projects-operations/projects/6967>

50 Ministry of Environment and Forest (2015). Ethiopia’s Second National Communication to the United Nations Framework Convention on Climate Change (UNFCCC). The Federal Democratic Republic of Ethiopia. URL:

<https://unfccc.int/resource/docs/natc/ethnc2.pdf>

51 <https://crisisresponse.iom.int/response/ethiopia-crisis-response-plan-2025>

52 <https://ethiopia.iom.int/south-ethiopia-region>

2004, 2009, and 2016, resulting from delayed rains during the rainy seasons or droughts, impacting crop and livestock productivity and food security⁵³.

18. **Addis Ababa:** Addis Ababa faces rising climate risks linked to rapid urbanization, including more frequent flash floods caused by intense rainfall, inadequate drainage, and expanding impermeable surfaces. These floods particularly impact informal settlements in low-lying areas. The city is also experiencing higher temperatures and heat waves, adding pressure on water and energy systems. Growing water scarcity—driven by declining rainfall, watershed degradation, and increasing demand—further heightens vulnerability. These combined stresses underscore the need for targeted urban resilience measures and nature-based solutions.

Tanzania

19. **Highlands (Iringa, Mbeya):** The highlands of Tanzania are experiencing the most severe climate change impacts. For example, mean seasonal rainfall is expected to decrease across most of the country, with the most significant reductions occurring in the northeastern highlands⁵⁴. Additionally, southern Tanzania, including the Southern and the Southern Highland Zone is among the most affected regions by climate change. Highlands are also more susceptible to land degradation, as the clearing of steep, unstable slopes has increased surface runoff, soil erosion, and land degradation. Land pressure from a growing human and livestock population has exacerbated land degradation, particularly in the Mbeya Highlands⁵⁵. Furthermore, water resources in the southern highlands have shown a deteriorating trend, with decreasing water flows in rivers and streams. The reliability of these water sources has progressively declined, with climate change being the primary driver. This is largely due to declining rainfall and increasingly unpredictable rainfall patterns⁵⁶. Studies have also found that villages in the highland zone are highly vulnerable to the impacts of climate change, with seasonal rainfall variability and rising temperatures contributing to the spread of pests, diseases, and other unfavorable conditions that negatively affect crop production and livestock keeping⁵⁷. In Tanzania, farmers in Mbeya have reported experiencing several notable shifts in climate, including prolonged dry seasons, less rainfall, higher temperatures, and more intense storms. These observations suggest a pattern of increasingly unpredictable weather in the region, with extended periods of drought followed by stronger, more violent storms. The climate change impacts in Mbeya have led to a range of agricultural challenges, including difficulty in growing crops, crops drying out more quickly, reduced soil fertility, lower crop yields, increased occurrence of plant diseases, and soil erosion.
20. **Coastal Region and Dar es Salaam:** Tanzania's coastal region has been significantly impacted by climate change, including rising sea levels, increasing temperatures, and decreasing rainfall. These changes have disrupted livelihoods, leading to coastal erosion, agricultural decline, and reduced fishing activities⁵⁸. Coastal communities, particularly in Zanzibar, have been hit hardest, with those lacking adaptive capacity facing heightened unemployment and economic instability⁵⁹. In particular, Dar es Salaam, rising sea levels and increased frequency of heavy rainfall expose the city to severe flooding, coastal erosion, and saltwater intrusion, which threaten homes, businesses, and critical services. Additionally, the peri-urban areas of Dar es Salaam are highly exposed to recurrent flooding and coastal erosion, which disrupt informal livelihoods and housing. Key observed indicators of climate change include reduced and unpredictable rainfall patterns, decreasing water availability in water sources, rising temperatures, increased frequency of droughts, loss of wetlands, heavy storms, intensified flooding, increased sedimentation in rivers, and the disappearance of plant and animal species. These environmental changes have direct implications for livelihoods, including reduced food crop production, heightened food insecurity, and a consequent decline in the propensity to save⁶⁰.

53 <https://ethiopia.iom.int/south-ethiopia-region>

54 <https://www.jstor.org/stable/resrep29563.6>

55 <https://www.jstor.org/stable/3673549>

56 <https://www.tandfonline.com/doi/abs/10.1080/17565529.2016.1139487>

57 <https://www.sciencedirect.com/science/article/abs/pii/S2211464523001392>

58 <https://tjpsd.udsm.ac.tz/index.php/tjpsd/article/view/173/57>

59 <https://tjpsd.udsm.ac.tz/index.php/tjpsd/article/view/173/57>

60 <https://link.springer.com/article/10.1007/s10708-019-10071-9#Sec7>

21. In Tanzania, farmers have reported experiencing dry seasons, less rainfall, more heat, and stronger storms. These observations indicate a pattern of increasingly unpredictable weather, including prolonged dry spells and intense storms. In Ethiopia, farmers have noticed dry seasons and reduced rainfall as well, but they have also reported more frequent flooding, alongside the rising occurrence of heat waves. This suggests that Ethiopian farmers are facing more erratic weather, characterized by both droughts and floods, as prominent climate challenges.

22. In Tanzania, the most frequent climate change impacts on crops are related to difficulty in growing, drying crops, infertile soil, lower harvests, more disease, and soil erosion. These challenges reflect the environmental stress affecting crop productivity in the region. In contrast, Ethiopia faces similar challenges, with widespread reports of difficulty in growing crops, drying crops, infertile soil, and lower harvests. However, Ethiopia also experiences significant issues with more disease, highlighting an additional stress factor on agricultural health (Fig. 6). Both countries face similar patterns of crop difficulties due to climate change, though the specific impacts may vary slightly in their severity and frequency.

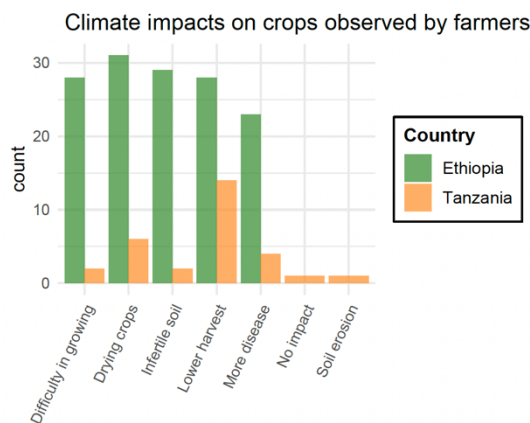


Figure 4 Climate change impacts on crops in Ethiopia and Tanzania based on the farmers surveys conducted by UNIDO

A1d. Identified Vulnerable Segments of the Population

- Smallholder Farmers:** Smallholder farmers in Ethiopia are highly vulnerable to climate change due to their exposure to climate extremes such as droughts and floods, which severely affect agricultural productivity and food security⁶¹. Their limited adaptive capacity, constrained by scarce resources and access to technology, further exacerbates their vulnerability⁶². The heavy reliance on rain-fed agriculture makes these farmers particularly susceptible to variability in rainfall patterns⁶³. Additionally, socio-economic factors such as low levels of education, limited access to credit, and inadequate infrastructure compound the challenges faced by smallholder farmers in adapting to climate change⁶⁴. These factors collectively threaten the livelihoods of smallholder farmers by reducing crop yields and increasing the frequency of crop failures. Similarly, in Tanzania, smallholder farmers face high vulnerability to climate change due to their reliance on rain-fed agriculture and exposure to extreme weather events. Limited access to modern agricultural technologies, credit, and infrastructure further restricts their ability to adapt, compounding the challenges posed by climate variability⁶⁵.
- Youth and Women:** In both rural and urban areas of Ethiopia, many young people, especially young women, are unemployed or work in the informal sector. Women and girls in rural areas are disproportionately affected by climate change due to their roles in water collection, food production, and caregiving⁶⁶. They often have limited access to resources, education, and decision-making power, making it harder for them to adapt to climate impacts. For example, women and girls spend more time than men and boys collecting firewood, with the proportion of women collecting water and firewood being twice that of men, according to a study in Ethiopia⁶⁷. Moreover, most young people live in rural areas, where livelihood opportunities are becoming increasingly scarce⁶⁸. Similarly, in Tanzania, youth and women are highly vulnerable to climate change due to socio-economic and environmental challenges. Limited access to education and employment, combined with climate-related disruptions, hampers young people's ability to secure stable livelihoods⁶⁹. Women, who are heavily involved in agriculture, water collection, and household management, face increased workloads due to droughts and floods, limiting their opportunities for education and income generation⁷⁰.
- Small Early-Stage Businesses (MSMEs):** Across both countries, micro- and small enterprises—many of which are informal or recently formalized—are highly vulnerable to climate shocks. Floods, droughts, and other climate-

61 <https://link.springer.com/article/10.1007/s10584-024-03852-w>

62 <https://www.emerald.com/insight/content/doi/10.1108/ijccsm-02-2022-0019/full/html>

63 <https://www.mdpi.com/2225-1154/7/5/70>

64 <https://www.emerald.com/insight/content/doi/10.1108/ijccsm-02-2022-0019/full/html>

65 https://esrf.or.tz/wp-content/uploads/2020/06/climate_change.pdf

66 <https://academic.oup.com/sf/article/91/1/55/2235879?login=true>

67 <https://link.springer.com/article/10.1007/s43621-024-00202-9#ref-CR6>

68 <https://www.ifad.org/en/w/countries/ethiopia>

69 <https://ewekijana.com/problems-facing-youth-in-tanzania/>

70 https://www.allmultidisciplinaryjournal.com/uploads/archives/20250110175222_MGE-2025-1-054.1.pdf

related disruptions cause market shocks, supply chain breakdowns, raw material shortages, and transportation delays. Yet these businesses are often excluded from formal financial services, recovery programs, and climate finance mechanisms due to their informality. They typically lack insurance, contingency planning, and access to climate information, limiting their preparedness and ability to build resilience. Moreover, most adaptation strategies in both countries do not adequately address the needs of micro-enterprises or provide tailored support for green and climate-resilient entrepreneurship.

- **Displaced Populations (IDPs):** In parts of Ethiopia, particularly in the south and central regions, climate change interacts with conflict dynamics, contributing to displacement and creating additional layers of vulnerability. IDPs face restricted access to land, limited livelihood options, disrupted social networks, and heightened exposure to health risks during extreme weather events. They also lack representation in local planning processes, reducing their ability to participate in or benefit from adaptation interventions.
- **Coastal Communities (Tanzania):** In Tanzania’s coastal regions, including Dar es Salaam, coastal households and fishers face rising sea levels, coastal erosion, declining fish stocks, and increased storm surges. These communities often lack diversified income sources, rely heavily on natural resources, and have limited access to social safety nets. Weak institutional capacity, fragmented coastal governance, inadequate disaster preparedness, and the absence of localized coastal risk information significantly heighten vulnerability.

A2. Problem Statement

23. Communities across Ethiopia and Tanzania are increasingly exposed to severe and unpredictable climate impacts, including prolonged droughts, erratic and declining rainfall, flooding, heatwaves, and sea-level rise^{71 72 73}. These changes are undermining agricultural productivity, degrading ecosystems, and intensifying water scarcity—posing acute risks to food security, health, and livelihoods, particularly in rural and climate-sensitive regions. The most affected areas as described above are characterized by high levels of climate exposure and low adaptive capacity. Within these regions, smallholder farmers, women, youth, and internally displaced persons face heightened vulnerability. These groups are disproportionately reliant on rain-fed agriculture and natural resources, yet they are systematically constrained by poverty, limited access to financial and technical resources, insecure land tenure, weak infrastructure, and socio-political marginalization. Socio-economic stressors—such as gender inequality, youth unemployment, and displacement due to both conflict and climate disasters—are compounding the impacts of climate change and pushing vulnerable households closer to the brink of chronic insecurity.
24. Without targeted and sustained intervention, these intersecting climate and structural challenges will continue to escalate. Affected communities will face mounting losses and damages, diminished opportunities to adapt, and a growing inability to cope with current and future climate risks. The absence of accessible, inclusive, and context-appropriate adaptation support will leave them increasingly vulnerable and unable to break the cycle of exposure and fragility. Against this baseline scenario of intersecting climate risks, socio-economic marginalization, and constrained adaptive capacity, the project considers nature-based solutions and alternative livelihoods as key pathways for communities to overcome structural barriers to adaptation and resilience. These approaches are designed to address both environmental degradation and livelihood insecurity, enabling vulnerable groups to build long-term adaptive capacity through locally appropriate, inclusive, and sustainable interventions.

Nature-based solutions

25. Nature-based solutions (NbS) are defined by the United Nations Environment Assembly as “actions to protect, conserve, restore, sustainably use and manage natural or modified terrestrial, freshwater, coastal and marine ecosystems that address social, economic and environmental challenges effectively and adaptively, while simultaneously providing human well-being, ecosystem services, resilience and biodiversity benefits” (UNEA 2022). In the context of Ethiopia and Tanzania, where communities are increasingly exposed to climate-related threats such as droughts, floods, soil erosion, and water stress, NbS offer an integrated and locally appropriate response to reduce vulnerability and build resilience. By working with ecosystems rather than replacing them, NbS can reduce the severity and frequency of climate impacts while restoring critical ecosystem services. NbS are especially suited to the needs and capacities of vulnerable populations—including smallholder farmers, women, youth, and displaced people—because they often require low-cost inputs, build on traditional knowledge, and promote community stewardship. Their inclusive nature allows for local participation in design and implementation, fostering ownership and social cohesion. Moreover, they generate co-benefits such as improved food security, diversified income sources, enhanced biodiversity, and healthier ecosystems, all of which reduce long-term vulnerability to climate shocks.

Alternative livelihoods

⁷¹ Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: [Ethiopia National Adaptation Plan](#)

⁷² Federal Democratic Republic of Ethiopia, 2019. National Adaptation Plan. Available at: [Ethiopia National Adaptation Plan](#)

⁷³ URT. 2013b. Report on Forests, Rangelands and Climate Change Adaptation in Tanzania (URT).

26. Alternative livelihoods refer to the promotion of sustainable income-generating activities that diversify or replace traditional means of earning a living—particularly those that are highly sensitive to climate change. In many rural areas of Ethiopia and Tanzania, where communities depend primarily on rain-fed agriculture, pastoralism, or natural resource extraction, climate impacts such as prolonged droughts, erratic rainfall, floods, and land degradation have severely disrupted traditional livelihoods. These changes have led to reduced agricultural productivity, loss of livestock, declining fisheries, and increased food insecurity, leaving many households trapped in cycles of vulnerability and poverty. By enabling communities to engage in diversified, climate-resilient economic activities, alternative livelihoods reduce dependence on stressed ecosystems and buffer households against climate-induced income shocks.
27. In the project's target areas, examples of alternative livelihoods include climate-smart agriculture (e.g., cultivation of drought-tolerant crops like sorghum and cassava), small-scale agro-processing (such as oil extraction from groundnuts or sunflower), sustainable forestry and bamboo production for timber, fibre, and handicrafts, eco-tourism linked to restored forests and biodiversity conservation, handicrafts using local materials like sisal and baobab, renewable energy services such as solar panel maintenance and biogas systems, small-scale aquaculture in inland areas, and seaweed farming in coastal regions of Tanzania. Nursery enterprises for indigenous tree species and land rehabilitation services also provide emerging income opportunities tied to ecosystem restoration. These livelihood options are more resilient to climate variability, less dependent on rainfall patterns, and aligned with sustainable natural resource management.
28. Alternative livelihood approaches are particularly well-suited to the needs of vulnerable groups—such as smallholder farmers, women, youth, and displaced populations—who often have limited access to land, financial capital, or formal employment. They create opportunities for economic empowerment by building transferable skills, improving access to markets, and enhancing financial inclusion through microcredit, cooperatives, or value chain integration. When supported by capacity building, vocational training, and institutional partnerships, alternative livelihoods not only contribute to individual household resilience but also to broader community stability and adaptive capacity. Importantly, alternative livelihoods complement ecosystem-based adaptation by reducing unsustainable pressure on natural resources and encouraging practices that restore and sustain ecosystem services.
29. Building on the regional analysis and survey findings outlined above, the project further responds to the Adaptation Fund's outcomes, 3, 6, 7 and 8 as per the results framework alignment table presented in Part III. *Table 1* offers a concise synthesis of the climate-related vulnerabilities and barriers to adaptation and resilience faced by specific population groups in Ethiopia and Tanzania, obtained from preliminary desk-based research. During PFG, the project team will conduct more in-depth assessments of the adaptation barriers experienced by communities in the selected districts. It highlights the key regions affected by climate change, identifies the most vulnerable segments of the population—such as smallholder farmers, women, youth, and internally displaced persons—and provides insight into their exposure to climatic impacts including droughts, floods, extreme heat, and soil degradation.

Country and region	Vulnerable group	Vulnerability	Climate impact	Barriers to climate adaptation and resilience ⁷⁴	Suggested approaches (NbS and Alternative Livelihoods)
Ethiopia - Highlands	Smallholder Farmers	Exposed to rainfall variability and temperature rise; rain-fed agriculture; economically dependent on agriculture; limited political voice	Soil erosion, floods, droughts, rising temperatures	Low adaptive capacity, limited access to technology, education, and infrastructure; lack of support from extension services; weak policy implementation; absence of localized data on climate impacts and vulnerability; no early warning systems or formal emergency response protocols; MSMEs lack insurance, contingency planning, or post-disaster recovery mechanisms	<ul style="list-style-type: none"> - Bamboo - Restoration of native tree species - Watershed restoration - Wetland rehabilitation - Upland reforestation - Contour planting - Agroforestry - Community rangeland management
Ethiopia – South, Central Oromia and Sidama	Smallholder Farmers, Women, IDPs	Drought and flood-affected; displaced by climate and conflict; socio-political marginalization; women face gender-based barriers	Dry seasons, reduced rainfall, floods, heat waves, disease outbreaks	Conflict, displacement, inadequate access to land and services, health vulnerabilities, and limited political representation, absence of localized data on climate impacts and vulnerability; absence of localized data on climate impacts and vulnerability; no early warning systems or formal emergency response protocols; MSMEs lack insurance, contingency planning, or post-disaster recovery mechanisms	<ul style="list-style-type: none"> - Bamboo - Indigenous tree planting - Wetland protection - Drought-tolerant species restoration - Agroecological farming - Forest landscape restoration - Community rangeland management

74 World Bank (2023): *Building Resilience in Sub-Saharan Africa's Rural Economies*; IPCC AR6 (2022): *Climate Change Impacts and Adaptation in Africa*; UN Women (2021): *Gender and Climate Change in Africa*; FAO (2020): *Agroecology in Ethiopia and Tanzania*; UNEP (2022): *Adaptation Gap Report*.

Tanzania - Highlands (Iringa, Mbeya)	Smallholder Farmers	Heavily dependent on rain-fed agriculture; poor access to inputs and markets; limited economic diversification	Dry seasons, less rainfall, storms, pests, disease	Land degradation, lack of investment in rural infrastructure, limited access to financial services, weak governance; local governments lack technical staff and funding to implement adaptation strategies	<ul style="list-style-type: none"> - Bamboo - Mangrove - Native vegetation reforestation - Soil erosion control - Agroforestry - Upland watershed management - Contour planting - Wetland rehabilitation
Tanzania and Ethiopia	Small early-stage businesses (informal or recently formalized MSMEs)	Limited financial resilience, low productivity, informality, lack of access to services and markets; often excluded from public support and climate finance mechanisms	Flooding, droughts leading to market shocks and disruption of value chains (e.g. raw material shortages, transportation delays, demand drops); supply chain breakdowns; infrastructure damage	Informal status excludes them from formal training, financial services, and recovery programs; limited adaptive capacity, weak disaster preparedness, no insurance or contingency planning; unable to access climate finance; lack of tailored support for green entrepreneurship; climate adaptation strategies rarely address micro-enterprise needs	<ul style="list-style-type: none"> - Product development through NbS - Partnerships between MSMEs and farmers to strengthen value chains - Access to adaptation finance and markets - Sustainable crafts or construction from local materials
Tanzania - Coastal Region (Dar es Salaam)	Coastal Communities, Fishers	Dependent on fishing and agriculture; few alternative livelihoods; vulnerable to economic shocks; limited social safety nets	Sea level rise, coastal erosion, reduced fishing	Unemployment, weak institutional capacity, poor disaster preparedness, limited community engagement in planning; no subnational coastal adaptation strategy; fragmented governance across coastal and marine institutions; no localized coastal risk maps or integrated early warning systems	<ul style="list-style-type: none"> - Mangrove - Coastal vegetation restoration - Seaweed farming - Riverbank stabilization - Wetland protection - Alternative income through eco-tourism and aquaculture - Bamboo
Ethiopia and Tanzania - General	Rural and peri-urban Youth and Women with limited land rights, lower income, and heightened exposure to climate shocks	Limited access to education, land rights, and employment; women earn significantly less than men; underrepresented in governance; heavy caregiving responsibilities; limited access to credit, insurance, and adaptation training	Floods, droughts, displacement	Gender inequality, social norms, limited political inclusion, scarce livelihood opportunities; no formal support for youth- or women-led MSMEs; limited cross-sector leadership or integration of gender- or displacement-sensitive adaptation; women disproportionately excluded from community planning and response roles; underrepresentation in adaptation committees, cooperatives, and producer groups	<ul style="list-style-type: none"> - Agroecological practices - Cover cropping - Mulching - Drought-tolerant crop integration - Bamboo and seaweed cultivation - Forest landscape restoration - Tree nurseries

Table 1: Analysis of barriers hindering climate adaptation and resilience among vulnerable groups in high-risk regions of Ethiopia and Tanzania

B. Project Objectives

30. The project's beneficiaries are vulnerable communities in the target areas of Ethiopia and Tanzania, as identified in Table 1, including smallholder farmers, women, youth, internally displaced persons (IDPs), early-stage businesses and coastal communities. These groups are increasingly exposed to climate-related hazards such as droughts, floods, erratic rainfall, soil erosion, sea-level rise, and water scarcity. Climate impacts have severely undermined livelihoods dependent on rain-fed agriculture, pastoralism, and fishing, leading to poverty, food insecurity, and environmental degradation. However, local adaptation efforts are constrained by a range of barriers: low adaptive capacity, limited access to technology, education, financial services, and rural infrastructure; weak policy implementation and governance; displacement and socio-political marginalization; gender inequality; poor disaster preparedness; and limited community participation in decision-making processes.
31. In response, **the project's objective is to strengthen the climate resilience and adaptive capacity of these vulnerable communities by promoting community-driven planning processes that scale nature-based solutions (NbS), and support sustainable alternative livelihoods that address the underlying barriers to adaptation and reduce vulnerability to climate shocks.**

C. Project Components and Financing:

Project Components	Expected Outcomes	Expected Outputs	Countries	Amount (US\$)
Component 1: Community-Based Planning for Locally Led Adaptation	Outcome 1.1: Communities prioritize adaptation needs through inclusive, locally led processes	Output 1.1.1: Foundations for inclusive community engagement established through formation of representative groups and adaptation of participatory tools	Ethiopia, Tanzania	3,235,811
		Output 1.1.2: Community dialogues conducted to validate climate impacts, vulnerabilities, resilience aspirations, and local understandings of adaptation		
	Outcome 1.2: Communities select and plan for the implementation of context-appropriate NbS and alternative livelihood options through structured and inclusive adaptation planning processes	Output 1.2.1: NbS and alternative livelihoods co-identified and assessed through participatory planning aligned with community adaptation need3		
		Output 1.2.2: Community-based NbS and alternative livelihoods selection drafted and validated based on co-identified priorities and technical feasibility		
	Outcome 1.3: Locally relevant data collection systems established to monitor, measure and report adaptation impact	Output 1.3.1: Indicators and metrics co-designed and validated to measure adaptation and resilience outcomes		
		Output 1.3.2: Communities and stakeholders trained on adaptation methodologies and resilience metrics through targeted workshops and training programs		
Component 2: Bamboo-Based Climate-Resilient Livelihoods and Nature-Based Solutions	Outcome 2.1: Communities strengthen their climate resilience by piloting bamboo as a NbS in alignment with community-identified rollout plans	Output 2.1.1: AI-enabled Bamboo Digital Twin Tool developed and deployed for NbS optimization	Ethiopia, Tanzania	14,000,000
		Output 2.1.2: Existing bamboo farmers supported to expand operations and achieve greater adaptation benefits		
		Output 2.1.3: New farmers to integrate bamboo into their production systems as a NbS and pathway to resilient alternative livelihoods		
	Outcome 2.2: Communities adopt bamboo as a resilient alternative livelihood strategy through increased demand generated by more resilient bamboo processing	Output 2.2.1: Comprehensive bamboo value chain assessments conducted to increase the resilience of bamboo processing communities		
		Output 2.2.2: Solutions identified and deployed to strengthen the resilience and off-take potential of bamboo processors		
		Output 2.2.3 Sustained partnerships established between growers and processors		
Component 3: Knowledge, Learning, and Policy Influence for Scalable Bamboo-Based Adaptation	Outcome 3.1: A collaborative bamboo ecosystem strengthens regional learning, peer exchange, and leadership for bamboo-based climate adaptation	Output 3.1.1: Bamboo Hubs (BAMBOOST) established as an inclusive learning and solutions deployment platform	Ethiopia, Tanzania	8,000,000
		Output 3.1.2: Education and training programs conducted to build a pipeline of local bamboo adaptation leaders		
		Output 3.1.3: Investment linkages strengthened through targeted outreach to financial institutions		
	Outcome 3.2: Project stakeholders access, apply, and contribute to an adaptive learning system that improves decision-making, replication, and scale	Output 3.2.1: Project learning and communication agenda developed and implemented to capture insights and guide adaptive management		
		Output 3.2.2: Feedback loops integrated into M&E to support real-time learning and course correction		
	Outcome 3.3: Policies and institutions are informed by project evidence and strengthened to scale bamboo-based adaptation through national systems	Output 3.3.1: Project results translated and synthesized into actionable policy recommendations and knowledge products for policy engagement		
Output 3.3.2: Structured policy dialogues and consultations convened to support institutional uptake				
		Output 3.3.3: Trainings conducted to strengthen institutional capacity of policymakers and planners		
Project/Programme Execution Cost			2,036,917	
Total Project/Programme Cost			27,272,728	

Project/Programme Cycle Management Fee charged by the Implementing Entity (if applicable, 10%)	2,727,272
Amount of financing requested	30,000,000

D. Projected Calendar:

Milestones	Expected Dates
Start of Project/Programme Implementation	January 2028
Mid-term Review (if planned)	December 2031
Project/Programme Closing	December 2034
Terminal Evaluation	October 2034

Project duration: 7 years (84 months)

PART II: PROJECT JUSTIFICATION

A. Project interventions

A1. Proposed intervention

- 32. The project will adopt a community-based adaptation planning approach, enabling communities to identify their specific climate risks and select appropriate NbS and livelihood strategies. In areas where communities show strong interest and where potential for adaptation benefits is greatest, bamboo-based interventions will be piloted as one example of an integrated ecosystem and livelihood solution.
- 33. In identifying nature-based solutions to address climate vulnerabilities in the target areas, the project assessed a range of ecosystem restoration and livelihood options. Several alternatives were considered based on their potential to reduce climate risks and generate sustainable economic opportunities. Mangrove restoration and seaweed cultivation, for example, offer important protection against coastal erosion and storm surges but are geographically limited to coastal zones, making them unsuitable for the inland drought- and erosion-prone regions that represent a large part of the project areas. Indigenous hardwood reforestation contributes to long-term carbon sequestration and biodiversity, but these species often require decades to mature, offer limited short- to medium-term income potential, and are vulnerable to fire and grazing pressures without intensive management. Similarly, some agroforestry systems involving fruit or cash crops require higher inputs of water, fertilizer, and maintenance—posing challenges in areas already suffering from water scarcity, degraded soils, and limited financial resources among smallholder farmers and displaced populations.
- 34. In contrast, bamboo was identified as a particularly suitable nature-based solution for the project areas. Its fast growth rate, deep root systems, low input requirements, and ability to thrive on degraded land make it well-suited to addressing key adaptation barriers such as soil erosion, water stress, and declining rural livelihoods. Bamboo can deliver rapid ecological benefits—such as land stabilization and moisture retention—while also providing communities with diversified income opportunities through products like timber, fiber, and energy. Its adaptability to both humid and dry conditions, combined with its compatibility with community-based management systems, positions bamboo as a highly effective and sustainable option for piloting under this project.

B. Opportunities offered by bamboo for climate resilient livelihoods through climate adaptation

- 35. Bamboo is a rapidly emerging nature-based solution in the fight against climate change, offering a unique combination of fast growth, high carbon sequestration potential, and resilience to extreme climate events. Its versatility enables both climate adaptation and mitigation while creating sustainable and climate resilient economic opportunities for vulnerable communities⁷⁵. As a fast-growing, self-replenishing, and versatile plant, bamboo thrives locally and requires minimal processing and investment, making it accessible to communities with limited resources. Unlike slow-growing trees that take decades to mature, bamboo reaches full maturity in just 3-5 years, thereafter allowing annual harvesting without land degradation or deforestation and without depleting the land.

⁷⁵ <https://www.weforum.org/stories/2023/02/bamboo-construction-housing-climate/>

36. The project leverages bamboo as a solution in two main ways to strengthen the climate resilience and adaptation of vulnerable communities: a) its role as a nature-based solution, and b) its potential for alternative and climate resilient livelihoods. Although mitigation is not the project's main focus, co-benefits will be achieved through bamboo's high carbon sequestration potential that strengthens the long-term sustainability of adaptation actions. The project also recognizes that homestead or compound farming systems are prevalent in the target regions, where multi-layered stands of annual and perennial plants are integrated near living spaces, sometimes alongside small livestock. This agroforestry model combines the ecological functions of forests with socio-economic benefits, making homestead bamboo farming a sustainable and practical solution for smallholder farmers⁷⁶.
37. The potential of bamboo to foster climate-resilient and diversified livelihoods responds to the adaptation strategies outlined in the two countries' climate plans. In Ethiopia's updated NDC, it is stated that efforts will be made to "diversify adaptive livelihood alternatives that enhance households' resilience to climate shocks in a manner that the livelihood options are friendly co-exist with the natural ecosystem". Ethiopia's National Adaptation Plan outlines several adaptation options that contribute to climate resilient and diversified livelihoods, including developing efficient value chain and marketing systems, improving ecosystem resilience through conserving biodiversity, and enhancing sustainable forest management. Similarly, Tanzania's NDC explicitly mentions promoting sustainable livelihood diversification for coastal communities as an adaptation measure in the Coastal, Marine Environment and Fisheries sector, and establishing alternative income generating activities around degraded forest ecosystems.

B1a. Bamboo as a Nature-based Solution for climate change

38. Nature-based solutions are increasingly recognized as essential strategies for addressing climate hazards while supporting biodiversity, ecosystem services, and sustainable livelihoods⁷⁷. These solutions leverage natural processes to enhance resilience against climate impacts such as droughts, floods, and land degradation. Bamboo, due to its rapid growth, regenerative properties, and ecological benefits, is classified as a highly effective nature-based solution (NbS), particularly for developing countries where affordable and scalable adaptation measures are critical. An overview of the uses of bamboo as a NbS is provided in *Table 2*. Bamboo has been recognized as a nature-based solution to combat climate change and enhance resilience, particularly in developing countries where affordable, scalable adaptation measures are critical⁷⁸. Due to its environmental benefits, bamboo has been identified as a core component of large-scale restoration efforts such as the African Forest Landscape Restoration Initiative (AFR100), where 32 countries have pledged to restore over 100 million hectares of land by 2030⁷⁹. Its role in Ethiopia's Green Legacy Initiative highlights its potential to create green jobs, enhance climate resilience, and support long-term ecosystem restoration⁸⁰.

Climate impact	Nature based solution	Description
Soil erosion	Improved soil infiltration	Bamboo's extensive fibrous root system bind the soil, preventing erosion. Its dense canopy and litter cover provided by dead leaves reduce splash erosion and improve water infiltration.
Flood	Flood management	Bamboo plantations along riverbanks can slow down surface runoff and reduce the risk of flash flooding. Bamboo helps absorb excess rainwater and release it gradually, regulating water flow.
Wind erosion	Windbreaks and shelterbelts	Bamboo's bending and evergreen culms form windbreaks, sheltering natural vegetation and crops, protecting the soil from wind damage, especially in coastal areas frequently buffeted by winds.
Land degradation	Land rehabilitation	Due to its high tolerance of a range of soil conditions, including low pH values, bamboo grow on lands that would otherwise be unsuitable for productive ecosystems
Destruction of Infrastructures	Climate-resilient infrastructures	1) Disaster Resilient Permanent Housing: Bamboo can be transformed into a flood-resistant elevated stilt housing through with its innovative and sustainable disaster-resilience, enhancing the resilience of rural and urban dwellers in climate impact-vulnerable communities. 2) Post-Disaster Shelter: Bamboo serves as a cost-effective, strong, fast-to-construct and readily available material for short-term shelters, enabling a quick recovery from damages.
Drought	Alternative greenery in arid areas	Few bamboo can survive in semi-arid conditions, making bamboo cultivation a viable option in drought-prone areas to maintain greenery and vegetation cover.
Extreme heat waves	Cooling	Bamboo is a light building material with a high level of thermal resistance making it a bio-climatic building materials. At the same time, planting bamboo has a cooling effect on hot air.
Deforestation	Bamboo plantation	A fast growth rate of bamboo makes it a sustainable resource to prevent deforestation by substituting traditional wood, particularly hardwoods, which can take decades or even centuries to mature.
Loss of biodiversity	Habitat creation	Bamboo forests provide shelter and food for various species while reducing human pressure on the remaining natural forests and woodland ⁸¹ .

76 <https://www.inbar.int/wp-content/uploads/2020/05/1543378642.pdf>

77 IUCN, 2023. <https://www.iucn.org/our-work/nature-based-solutions>

78 INBAR, 2024. Why Bamboo and Rattan. Available at: Why Bamboo and Rattan | International Bamboo and Rattan Organization (inbar.int)

79 Bhoke Masisi, Astrid Zabel, Jürgen Blaser, Suzana Augustino, Fighting climate change with bamboo in Africa: The case of Kyela, Rungwe and Mufindi districts – Tanzania, <https://www.sciencedirect.com/science/article/pii/S277313912200009X>

80 <https://www.inbar.int/bamboo-making-its-mark-on-ethiopia-green-legacy-initiative/>

81 <https://www.bamboogrove.com/blog/bamboo-uses/the-benefits-of-using-bamboo-for-biodiversity-conservation/#:~:text=Bamboo's%20role%20in%20habitat%20preservation,contributing%20significantly%20to%20biodiversity%20conservation.>

Coastal erosion	Coastal protection	Bamboo pole help stabilize soil, preventing erosion and providing a natural barrier against storm surges and rising sea levels.
Carbon emissions	Carbon sequestration	Bamboo sequesters high levels of carbon, acting as a natural carbon sink and contributing to climate change mitigation.

Table 2: Bamboo's uses as a nature-based solution

39. Its rapid growth—maturing in just 3 to 5 years—and ability to regenerate after harvesting without replanting make it a resilient and resource-efficient alternative to traditional tree species⁸². These characteristics make bamboo an effective adaptation solution through soil erosion control, water conservation and land rehabilitation. Bamboo plays a crucial role in mitigating the effects of climate hazards such as droughts, floods, and land degradation. The rhizomes and roots grow in all directions forming a complex network especially in topsoil, which effectively holds soil particles together, thereby, preventing soil erosion and promoting water percolation⁸³. Bamboo with its extensive root biomass, macro-pore characteristics, lower soil bulk density improve soil hydro-physical properties improves water recharges, reduces run-off, control soil erosion and improve groundwater recharge⁸⁴. By reducing runoff and improving groundwater recharge, bamboo contributes to water security and soil conservation, making it an effective solution for areas prone to drought and land degradation⁸⁵. The aboveground structure of bamboo also helps mitigate erosion caused by heavy rainfall and strong winds by providing canopy cover and reducing surface runoff. Bamboo litterfall enhances soil fertility, further improving land productivity⁸⁶.
40. Beyond adaptation, bamboo serves as an effective nature-based solution for climate mitigation. Its high carbon sequestration capacity enables it to absorb and store large amounts of CO₂, making it a crucial tool in reducing greenhouse gas emissions. Studies suggest that bamboo forests can sequester carbon at rates comparable to or even greater than fast-growing tree species^{87,88}, while also producing durable products that continue to store carbon over time. Additionally, bamboo-based biochar and biomass energy provide sustainable alternatives to fossil fuels, further reducing carbon footprints.

B1b. Bamboo cultivation for alternative livelihoods

41. As climate change intensifies, traditional agricultural systems are becoming increasingly vulnerable to erratic weather patterns, prolonged droughts, and extreme climate events. Many smallholder farmers, who rely on staple crops for their livelihoods, are facing declining yields and economic uncertainty due to shifting growing seasons and soil degradation. In this context, diversifying income sources through alternative livelihoods has emerged as a crucial adaptation and resilience strategy. By reducing dependence on climate-sensitive crops and integrating sustainable, climate-resilient practices, communities can enhance their ability to withstand environmental shocks and secure long-term economic stability. Alternative livelihoods, such as bamboo cultivation, provide communities with stable, lower-risk income sources that are less affected by climate variability. These livelihoods promote economic diversification while leveraging natural resources that are more resilient to environmental changes. By adopting sustainable practices and tapping into climate-adaptive industries, communities can mitigate the adverse impacts of climate change, reduce vulnerability, and foster long-term resilience. Strengthening these alternative livelihood pathways is essential for ensuring that rural economies remain viable in the face of ongoing climate challenges.
42. Bamboo offers an alternative livelihood strategy for communities facing increasing climate-related challenges. Its rapid growth, adaptability, and ability to thrive in degraded or marginal lands make it an ideal resource for farmers seeking stable income sources amid shifting climate conditions. Unlike many traditional crops, bamboo is a perennial grass that regenerates naturally, requiring minimal inputs while providing continuous yields, making it a highly sustainable livelihood option. Unlike traditional crops, which are vulnerable to erratic rainfall, prolonged droughts, and extreme weather events, bamboo is highly resilient to climate variability. Many staple crops struggle with shifting growing seasons, leading to unstable yields and economic insecurity for farmers. In contrast, bamboo's root system helps retain soil moisture, prevents erosion, and rehabilitates degraded land, ensuring long-term land productivity. Furthermore, bamboo's ability to regenerate after harvesting eliminates the need for replanting, significantly reducing production costs and providing farmers with a reliable and consistent income stream.

82 WEF 2023, How bamboo can help solve the world housing and climate crises, <https://www.weforum.org/stories/2023/02/bamboo-construction-housing-climate/>

83 <https://www.ebi.gov.et/wp-content/uploads/2021/10/The-Indigenous-Bamboo-Forests-of-Ethiopia-An-Overview.pdf>

84 <https://www.sciencedirect.com/science/article/abs/pii/S1642359321000689?via%3DIihub>

85 Walta Information Centre News. 1999. Panel recommends short and long-term plan to resist drought. <http://www.telecom.net.et/~walta/html/news.html>. 21 August 1999.

86 Christanty, L., Mally, D. and Kimmins, J.P. 1996. Without bamboo the land dies: biomass, litterfall and soil organic matter dynamics of a Javanese bamboo talum-kebun system. *Forest Ecol. Mgmt* 87, 75–88.

87 https://www.inbar.int/resources/inbar_publications/integration-of-bamboo-forestry-into-carbon-markets/

88 https://www.inbar.int/resources/inbar_publications/bamboo-and-climate-change-mitigation/

43. Bamboo provides a wide range of livelihood opportunities that contribute to climate adaptation. Its fast-growing nature ensures a steady supply of raw materials for sale to multiple processing industries, including construction, furniture-making, crafts and fibre production, reducing dependence on climate-sensitive crops. By cultivating bamboo for sale to processing industries, farmers can benefit from growing market demand for bamboo-based products such as construction materials, furniture, paper, and textiles. An overview of the uses of bamboo for sustainable and climate resilient products and livelihoods provided in *Table 3*.

Category	Use	Product examples & opportunities for value addition and innovation for strengthened bamboo value chain
Construction, Housing & Infrastructures	Climate-resilient and low-carbon housing and building materials	Flooring, roofing, agricultural fencing, windbreaks, shade structures, flood prevention structures, disaster resilient structures, bridges and scaffolding.
Textile & Apparel	Sustainable fashion	Bamboo fibre textiles, clothing and functional wear.
Packaging & Paper	Biodegradable packaging	Bioplastics and sustainable paper for eco-packaging.
Furniture & Household items	Sustainable and low carbon furniture & kitchenware	Furniture, handicrafts, decorative objects, biodegradable and reusable cutlery (utensils, plates, bowls).
Energy	Sustainable fuels, carbon sequestration	Alternatives to firewood and charcoal such as bamboo charcoal, briquettes and carbon-neutral soil amendment.
Health & Wellness	Skincare & hygiene products	Bamboo charcoal face masks, bamboo toothbrushes, bamboo based sanitary pads and cotton pads.
Food & Nutrition	Food products	Bamboo shoot products, high-protein, fibre-rich food supplement, bamboo leaves and byproducts as nutrient-rich livestock feed.

Table 3: Uses of bamboo for sustainable and climate resilient products and livelihoods

44. By cultivating bamboo for sale to processing industries, farmers benefit from increasing market demand for bamboo-based products. Supporting bamboo processors to create diverse, sustainable bamboo products is instrumental in achieving the goal of generating alternative livelihoods. Enhancing the commercial value of bamboo enables farmers to integrate into broader economic networks, providing financial security and reducing reliance on unstable agricultural yields. Therefore, the efficiency and sustainability of bamboo product manufacturing empower vulnerable communities to cultivate and sell bamboo, creating robust livelihood opportunities that directly strengthen climate resilience.
45. Using bamboo as an alternative livelihood also brings significant co-benefits for climate mitigation and the circular economy. Bamboo-based products are widely recognized as sustainable alternatives to plastics, paper, textiles, and packaging, all of which have substantial carbon footprints. Bamboo-based products are widely used as sustainable alternatives to plastics, paper, textiles, and packaging, all of which have significant carbon footprints⁸⁹. By promoting bamboo as a NbS and as a source of alternative, climate-resilient livelihoods, the project directly contributes to the Adaptation Fund's strategic results by strengthening local capacities to respond to extreme weather events (Output 2.1), strengthening livelihood strategies (Output 6), integrating adaptation strategies into national and subnational development plans (Output 7), accelerating the rollout of viable innovations for climate adaptation and resilience (Output 8), and building national capacity for knowledge capture, learning and dissemination (Output 3.2).

C1. Project structure

46. The project is structured in three interrelated components, addressing the climate adaptation barriers faced by vulnerable communities in the selected regions as described above under "barrier analysis".
- **Component 1** empowers communities in Ethiopia and Tanzania to lead the identification and planning of locally relevant, socially inclusive nature-based adaptation solutions. Using Human-Centered Design (HCD) approaches, it combines scientific climate data with traditional and local knowledge to co-develop adaptation action plans tailored to specific climate vulnerabilities and socio-economic needs. The component also establishes the metrics and indicators that will guide monitoring and evaluation across the project, particularly to measure the adaptation and resilience outcomes associated with bamboo-based interventions. These community roll-out plans serve as the foundation for targeted support and implementation under Component 2.
 - **Component 2** implements the community adaptation roll-out plans developed under Component 1 in areas where bamboo was selected as a preferred nature-based solution and alternative livelihood pathway. It supports both existing and new bamboo farmers: providing technical assistance to improve sustainable cultivation, climate resilience, and productivity for current producers, and enabling new farmers to adopt bamboo cultivation for soil restoration, income diversification, and adaptation benefits. In parallel, the component strengthens the resilience and operational capacity of bamboo processors—most of which are early-stage or informal enterprises—with

⁸⁹ <https://www.fao.org/redd/news/detail/en/c/1197076/>

tailored technical and financial support. By increasing the resilience and production capabilities of these processors, demand for raw bamboo will grow, creating stronger offtake opportunities and more reliable income streams for bamboo farmers who supply the raw bamboo.

- **Component 3** strengthens systems for knowledge generation, peer learning, and policy engagement to scale bamboo-based adaptation. It establishes national Bamboo Hubs (BAMBOOST) in Ethiopia and Tanzania as inclusive platforms for co-creation, stakeholder collaboration, and learning. The Hubs facilitate solution development, education programs, and exchanges while capturing evidence from implementation. A project-wide learning and communication agenda ensures insights are translated into accessible knowledge products and used for adaptive management. Policy engagement is supported through structured dialogues, capacity-building for decision-makers, and the integration of project results into national adaptation frameworks.

C1a. Unidentified Sub-Projects (USP)

47. The project includes a number of interventions under Outcomes 1.2 and 2.2 that follow the Adaptation Fund’s definition of “Unidentified Sub-Projects (USP). These include the final selection of context-appropriate NbS and alternative livelihood options as well as the selection and deployment of adaptation solutions to strengthen the resilience and off-take potential of bamboo processors. These elements are not fully defined at the current concept note stage to preserve the core principle of community ownership and enable demand-responsive adaptation planning. They will be co-identified and selected during implementation through participatory processes, rigorous matching methodologies, and transparent co-design mechanisms. The table below provides a detailed justification, developed according to the AF’s Guidance document for project/programme with USPs, which states that the project (i) needs to provide the reasons why an activity cannot be formulated at the design stage and (ii) must describe the specific benefits of not formulating an activity at that stage. It should further (iii) explain how these benefits outweigh the increased risk on non-compliance with the ESP and GP.

USPs	Justification for non-identification at this stage (criterion i.)	Benefits for non-identification (criterion ii.)	Benefit/risk trade-off (criterion iii.)
Output 1.2.2: Community-based NbS and alternative livelihoods selection drafted and validated based on co-identified priorities and technical feasibility	The NbS and alternative livelihoods selected under this output are to be co-designed with communities through a structured participatory process (Output 1.2.1), which includes climate risk awareness, mapping of vulnerabilities and assets, participatory selection of options, and feasibility scoring. Formulating the solutions in advance would bypass this critical process and risk delivering pre-conceived, top-down interventions that do not reflect local priorities or realities. Additionally, site-specific climate vulnerabilities and social dynamics vary significantly across target districts, making it technically unfeasible to pre-identify uniform solutions.	Current design of co-identification of solutions during implementation allows for deep community engagement, supporting the LLA principles, inclusive governance, and long-term ownership. It strengthens social acceptability, appropriateness, and sustainability of the final solutions by anchoring them in the lived experiences and priorities of diverse community members (especially women, youth, and marginalized groups). This flexibility also ensures that interventions are responsive to dynamic local contexts, especially where vulnerabilities shift with evolving climate patterns.	The selection and implementation process of solutions will be fully integrated into the project’s ESMP. All solutions will be screened against the AF’s ESP and Gender Policy (GP). Safeguards instruments will incorporate adaptive risk management, stakeholder consultations, and accessible grievance redress mechanisms. The ability to align interventions with real needs through participatory methods reduces the risk of maladaptation, increases the project’s compliance, and enhances safeguards outcomes overall.
Output 2.2.2: Solutions identified and deployed to strengthen the resilience and off-take potential of bamboo processors	At the design stage, it is not prudent to pre-define the specific technologies, services, or innovations that will be deployed to support bamboo processors, because they will be selected through a competitive call for solutions. This process will be informed by: (i) the results of a participatory planning process where communities articulate specific needs (Output 1.2.1), and (ii) a value chain assessment identifying processor-level constraints and resilience gaps (Output 2.2.1). Pre-identifying these solutions would risk investing in interventions misaligned with actual resilience needs, business constraints, or climate risks faced by processors.	This approach enables the deployment of tailored, demand-driven solutions that are relevant to local market structures, processing capacity, and climate exposure. It fosters private sector engagement and innovation, by encouraging diverse solution providers to compete based on technical merit and alignment with locally defined needs. Moreover, it enhances cost-effectiveness by ensuring grant funds are allocated based on evidence, not assumptions.	The project will enforce rigorous screening, monitoring, and safeguard compliance at every stage of the solution selection and deployment process. The call for solutions will include clear eligibility and exclusion criteria aligned with the ESP and GP. Each selected solution will undergo site-specific risk assessments and compliance reviews. Milestone-based disbursements will further ensure that funds are only released when safeguard criteria are met. This flexible, evidence-based approach minimizes environmental and social risk by aligning interventions with real conditions—a more robust safeguard than imposing pre-set solutions without adequate local grounding.

Table 4: Justification for USPs

C2. Theory of change

48. The Theory of Change (Fig. 7) addresses identified critical climate hazards—including droughts, floods, and soil erosion—that severely impact vulnerable communities in Ethiopia and Tanzania, as illustrated above under “Climate impacts and vulnerabilities” and “Identified vulnerable regions”. The project responds through three interconnected components, directly linking these climate risks to nature-based and alternative livelihood, community-driven adaptation solutions centered on bamboo:

Component 1: Community-Based Planning for Locally Led Adaptation

- **IF** climate risk assessments are validated and communities are engaged through participatory methods and Human-Centered Design (HCD) to identify vulnerabilities, aspirations, and solutions;
- **IF** communities map, prioritize, and formalize NbS and alternative livelihood options through inclusive adaptation planning processes;
- **ASSUMING** community adaptation groups are representative, local facilitators are trained, and participatory tools are adapted for accessibility;
- **THEN** community adaptation plans will reflect locally endorsed, evidence-informed priorities for climate adaptation, laying the groundwork for implementation;
- **BECAUSE** participatory planning ensures ownership, social inclusion, and sustainability of adaptation actions by aligning them with specific local risks, capacities, and community visions.

Component 2: Bamboo-Based Climate-Resilient Livelihoods and Nature-Based Solutions

Farmers:

- **IF** farmers who selected bamboo as a priority adaptation measure receive tailored support to grow bamboo and manage it more sustainably along with real-time decision-making tools such as the AI-enabled Bamboo Digital Twin;
- **ASSUMING** partnerships are established between farmers and processors, to sell the bamboo;
- **THEN** farmers will make their vulnerable crops more resilient while creating a secure alternative livelihood option from selling bamboo to processors.
- **BECAUSE** bamboo is a fast-growing, climate-resilient species that can reinforce degraded agricultural systems as a nature-based solution, while also offering farmers an annual, climate-resilient income stream.

Processors:

- **IF** bamboo processors—many of whom are early-stage and informal—receive targeted technical assistance and milestone-based grants to enhance their resilience, processing capacity, and market integration;
- **ASSUMING** partnerships are established between farmers and processors, to buy additional raw bamboo;
- **THEN** bamboo demand will grow, local value addition will increase, thereby allowing processors to become more resilient and farmers to gain more reliable income;
- **BECAUSE** enhancing the capacity and resilience of bamboo processors allows them to operate at larger scales, requiring greater volumes of raw bamboo and stimulating upstream demand—thus creating stronger and more secure livelihood opportunities for bamboo farmers.

Component 3: Knowledge, Learning, and Policy Influence for Scalable Bamboo-Based Adaptation

- **IF** inclusive Bamboo Hubs (BAMBOOST) are established as platforms for learning, co-creation, and innovation, and facilitate peer exchange, education, and solution deployment;
- **IF** project learning is captured through adaptive M&E systems and translated into knowledge products and policy recommendations;
- **IF** financial institutions and policymakers are actively engaged through training, dialogues, and structured outreach;
- **ASSUMING** multi-stakeholder governance, feedback loops, and national platforms are operationalized to bridge local insights with national systems;
- **THEN** bamboo-based adaptation solutions will be adopted, replicated, and scaled through national and subnational climate policies and systems;
- **BECAUSE** systemic collaboration, institutional capacity-building, and evidence-based policymaking are essential for embedding bamboo as a strategic solution for climate resilience.

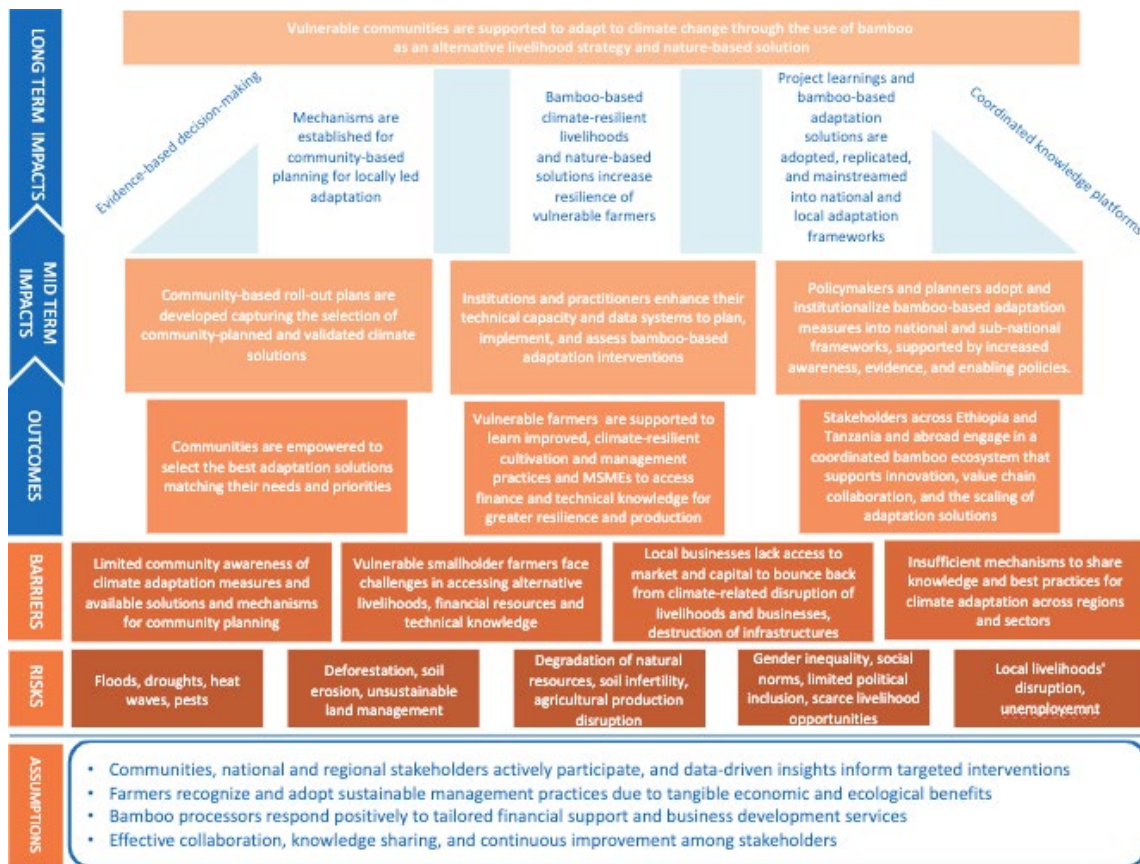


Figure 7: ToC Diagram

C3. Sites selection justification

49. The project focuses on lowlands (Oromia), South Ethiopia, Sidama, Addis Ababa City, and Tanzania's Southern Highland Zone (Iringa and Mbeya) and Dar es Salaam due to their acute and growing climate vulnerabilities (Fig.8 and Fig.9). Across both countries, smallholder farmers, women, youth, and marginalized groups face mounting challenges linked to erratic rainfall, prolonged droughts, increasing temperatures, soil degradation, flooding, and ecosystem decline. In Ethiopia's highlands, rising temperatures, intense rainfall, and soil erosion are severely affecting food and water security, while regions like Sidama and South Ethiopia have experienced worsening droughts, floods, displacement, and disease outbreaks. In Tanzania, the highlands are suffering from declining rainfall, prolonged dry seasons, land degradation, and reduced water flows, while Dar es Salaam faces intensifying coastal erosion, flooding, and saltwater intrusion. Surveys conducted by the project team confirm that farmers overwhelmingly recognize worsening climate impacts, with reported difficulties in crop cultivation, declining soil fertility, disease outbreaks, and an urgent need for adaptation support.
50. Prioritizing these highly exposed and vulnerable regions enables the project to focus efforts where resilience-building is most critically needed, directly addressing the risks faced by smallholder farmers, displaced populations, women, and youth. While climate vulnerability is the primary driver of site selection, these areas also offer opportunities for nature-based solutions (NbS) that can restore degraded ecosystems and support livelihoods. In particular, where communities prioritize bamboo-based interventions, conditions are favorable for indigenous and drought-tolerant species such as *Oldeania alpina*, *Oxytenanthera abyssinica*, and *Bambusa vulgaris*, which contribute to soil stabilization, ecosystem restoration, and alternative income generation. Survey findings further revealed strong community interest in growing bamboo, provided that adequate technical, material, and market support is made available. The proximity to major markets such as Addis Ababa and Dar es Salaam further enhances the feasibility of sustainable value chains where appropriate, complementing locally led, vulnerability-driven adaptation strategies. The project team received a request from the government of Ethiopia to also consider regions of Oromia, Southwestern Ethiopia and Benishangul-Gumze as target communities, and further analysis will be conducted during PFG phase for these regions.

C4. Bamboo mapping and species selection

51. The global bamboo market size was estimated at USD 67.13 billion in 2024 and is expected to reach USD 70.14 billion in 2025⁹⁰. The most globally traded bamboo commodities are as follows: (a) preserved bamboo shoots (17.48%), (b) bamboo and rattan furniture (14.19%), (c) bamboo basketry work (13.04%), (d) bamboo and rattan seats (12.91%), (e) bamboo plyboard (12.24%) and (f) bamboo poles (10.16%)⁹¹. Emerging markets focus on bamboo-based flooring, panels, and engineered furniture as sustainable wood substitutes, while bamboo textiles, bioplastics, and packaging solutions are gaining popularity as alternatives to high-emission synthetic materials. Africa's participation in the bamboo trade remains modest, with Common Market for Eastern and Southern Africa (COMESA) countries importing bamboo products worth USD 9.26 million and exporting USD 2.12 million annually. Strengthening bamboo value chains in Ethiopia and Tanzania presents an opportunity to not only create jobs, increase incomes, and improve market access for climate-resilient products, but also diversify economic sectors of the two countries⁹².



Figure 8: Selected regions in Ethiopia (Sidama in red, Addis Ababa in blue and South Ethiopia in green)

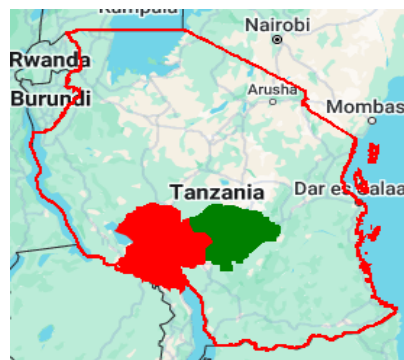


Figure 9: Selected regions in Tanzania (Iringa in green and Mbeya in red)

chains in Ethiopia and Tanzania presents an opportunity to not only create jobs, increase incomes, and improve market access for climate-resilient products, but also diversify economic sectors of the two countries⁹².

Ethiopia

52. Ethiopia is estimated to produce approximately 3 million tons of bamboo annually, predominantly growing two species: *Oldeania alpina* (highland bamboo) and *Oxytenanthera abyssinica* (lowland bamboo). Highland bamboo is widely preferred for higher value-added products and industrial applications due to its superior structural and physical properties compared to lowland bamboo. Bamboo's annual economic contribution to Ethiopia's gross domestic product (GDP) is estimated at Ethiopian Birr (ETB) 56,250,000, with approximately 750,000 households deriving income and sustenance from bamboo harvesting and production⁹³. Ethiopia hosts 1.47 million hectares of bamboo, one of the largest bamboo resources in Africa⁹⁴, corresponding to approximately 4.2% of the global bamboo resource and 8.3% of the country's total forest area comprising two indigenous species under two genera⁹⁵. About 92% of the natural bamboo resource of the country is covered by *Oxytenanthera abyssinica* (commonly known as lowland bamboo), which grows in the savannah lowlands of western and northwestern Ethiopia⁹⁶. The area of this lowland bamboo is estimated to be 1,332,243 ha in total, mainly located in Benishangul-Gumuz, western Amhara, and the western Oromia regional states (Fig. 10). The remaining 8% is covered by *Oldeania alpina* (commonly known as highland bamboo), which grows in the south, southwestern, southeastern, central, and northwestern highlands of Ethiopia⁹⁷. *Oldeania alpina* covers an estimated area of 115,220 ha, mainly in Amhara, Oromia and in the states of the Sidama, South Ethiopia Regional state, and Southwest Ethiopia Regional State as a natural and planted bamboo forest⁹⁸. Highland bamboo is also grown on farms in small patches or as farm

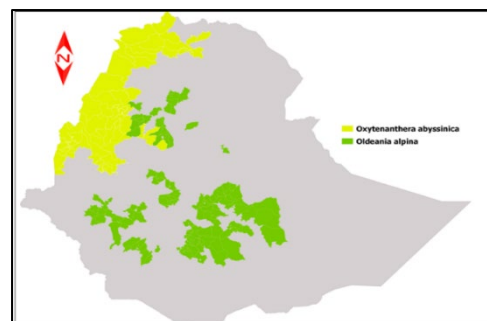


Figure 10: Bamboo atlas in Ethiopia

90 <https://www.grandviewresearch.com/industry-analysis/bamboos-market>

91 <https://epa.gov.et/images/PDF/Bambo/Ethiopian%20Bamboo%20Strategy%20&%20Action.pdf>

92 <https://www.inbar.int/wp-content/uploads/2020/05/1579229333.pdf>

93 https://www.epa.gov.et/images/PDF/Bambo/Ethiopia_Bamboo_Development_Strategy_Action_Plan.pdf

94 INBAR (2018b) Remote-sensing based regional bamboo resource assessment report of Ethiopia, Kenya and Uganda. Beijing, China: INBAR. <https://www.cabidigitallibrary.org/doi/full/10.5555/20183289409>

95 INBAR Working Paper Technical Paper The Potential of Bamboo for Climate Change Mitigation in Ethiopia, https://www.researchgate.net/publication/365771726_INBAR_Working_Paper_Technical_Paper_The_Potential_of_Bamboo_for_Climate_Change_Mitigation_in_Ethiopia

96 Zhao, Y., Feng, D., Jayaraman, D., Belay, D., Sebrala, H., Ngugi, J., Maina, E., Akombo, R., Otuoma, J., Mutyaba, J., Kissa, S., Qi, S., Assefa, F., Oduor, N.M., Ndawula, A.K., Li, Y. and Gong, P. (2018) 'Bamboo mapping of Ethiopia, Kenya and Uganda for the year 2016 using multi-temporal Landsat imagery', International Journal of Applied Earth Observations Geoinformation 66, 116–125 [online]. Available at: <https://doi.org/10.1016/j.jag.2017.11.008>

97 Zhao, Y., Feng, D., Jayaraman, D., Belay, D., Sebrala, H., Ngugi, J., Maina, E., Akombo, R., Otuoma, J., Mutyaba, J., Kissa, S., Qi, S., Assefa, F., Oduor, N.M., Ndawula, A.K., Li, Y. and Gong, P. (2018) 'Bamboo mapping of Ethiopia, Kenya and Uganda for the year 2016 using multi-temporal Landsat imagery', International Journal of Applied Earth Observations Geoinformation 66, 116–125 [online]. Available at: <https://doi.org/10.1016/j.jag.2017.11.008>

98 Zhao, Y., Feng, D., Jayaraman, D., Belay, D., Sebrala, H., Ngugi, J., Maina, E., Akombo, R., Otuoma, J., Mutyaba, J., Kissa, S., Qi, S., Assefa, F., Oduor, N.M., Ndawula, A.K., Li, Y. and Gong, P. (2018) 'Bamboo mapping of Ethiopia, Kenya and Uganda for the year 2016 using multi-temporal Landsat imagery', International Journal of Applied Earth Observations Geoinformation 66, 116–125 [online]. Available at: <https://doi.org/10.1016/j.jag.2017.11.008>

boundaries under cultivation in Oromia, Amhara, Sidama, South Ethiopia Regional state, and Southwest Ethiopia Regional State. However, this was not captured due to small and fragmented patches. In Ethiopia, highland bamboo is an ecologically and economically important indigenous species with a narrow ecological range. Highland bamboo grows in 2200 - 4000 masl, 1500 - 2000 mm rainfall, 10 – 20 °C temperature, and hollow culm⁹⁹, while lowland bamboo grows in 500 - 1600 masl, 1150 mm rainfall, 20 – 27 °C temperature, and solid culm.

Tanzania

53. In Tanzania, the bamboo industry remains at an early stage, characterized primarily by small-scale production and limited commercialization. While commercial large-scale bamboo farming has not yet been widely established, the Tanzania Forest Service (TFS) has initiated bamboo plantations in areas such as North Ruvu, Sao Hill, Korogwe, Rondo, Ukaguru, Mtibwa, and Wino. These plantations have significant potential to benefit the government, private sector, and individual farmers, particularly in carbon trading initiatives aimed at mitigating climate change¹⁰⁰. Market penetration is minimal, with Tanzania annually importing approximately USD 1.5 million worth of bamboo commodities, while exports remain relatively low at approximately USD 0.17 million¹⁰¹.

54. Tanzania has favourable climatic conditions for growing bamboo, resulting in high productivity and growth rates of bamboo plantations. Tanzania has the highest diversity of bamboo species in Africa, as four of the five Africa endemic species (five are endemic to Africa: *Oxytenanthera abyssinica*, *Oldeania alpina*, *Hickelia africana*, *Thamnocalamus tessellatus*, and *Oreobambos buchwaldii*) are native to Tanzania, and all the Africa bamboo species exhibit a sympodial (clumping) root growth pattern¹⁰². Seven more exotic bamboo species exist in Tanzania, including *Bambusa vulgaris* and *Bambusa bambos* being the most common¹⁰³. The country hosts 1 million hectares of bamboo, representing significant potential for Tanzania's bamboo industry (Fig. 11). Bamboo forests are mainly found in two ecological zones that are the high rainfall forests of the Eastern Arc Mountains and Lowland areas¹⁰⁴, dominated by *Oldeania alpina*, *Bambusa vulgaris*, *Bambusa bambos* and *Oxytenanthera abyssinica*

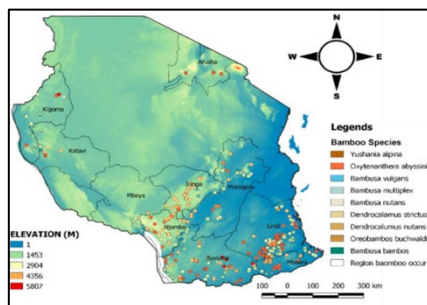


Figure 11: Bamboo species distribution map along elevation in Tanzania

105, altogether accounting for 73.2% of the total bamboo abundance in the country. In addition, bamboo species promoted by the Ruvu North Forest Plantation are *Bambusa bambos*, *Dendrocalamus asper*, *Dendrocalamus membranaceus* and naturalised species (*Bambusa vulgaris*)¹⁰⁶. About 62% (636,545 Ha) of bamboos are found in the Southern zone (Lindi, Mtwara and Ruvuma) of Tanzania. Bamboo resources are distributed in eleven administrative regions of Arusha, Tanga, Morogoro, Lindi, Mtwara, Ruvuma, Njombe, Iringa, Mbeya, Katavi and Kigoma (Fig. 11). Bamboo is most abundant in Lindi, Ruvuma, Mtwara, Iringa and Njombe with 75.2% of total bamboo. Less abundance of bamboos is observed in Arusha, Mbeya, Katavi and Tanga¹⁰⁷. Most bamboo species are distributed in low altitudes compared to high altitude, and about 85.2% of bamboos distributed below 1500 m.a.s.l. (Fig. 11). The highest proportion of occurrence is in woodland (66%), cultivated land (12%) and forest (10%)¹⁰⁸.

55. Bamboo species display notable variations in physical, mechanical, and strength properties, which are further influenced by factors such as age and moisture content. For example, lowland bamboo typically has a solid culm and higher bulk density, offering greater overall stability. In contrast, highland bamboo features a hollow, softer culm and advantageous physical traits—such as optimal culm height, diameter, and internode length—with comparatively lower moisture content during the dry season. These attributes make highland bamboo easier to process and more suited for products like laminated lumber, plywood, and fiber-based materials. While lowland bamboo may be less ideal for applications such as bamboo panels and laminate products, highland bamboo excels in these uses, and its shoots

99Yalew Dessalegn, Balkeshwar Singh, Aart W. Vanuure, Assessment of the National Bamboo Resources and its Properties in Ethiopia , https://www.researchgate.net/publication/360737847_Assessment_of_the_national_bamboo_resources_and_its_properties_in_Ethiopia

100 <https://www.inbar.int/country/tanzania/>

101 INBAR (2021), The Tanzania Bamboo Strategy and Action Plan (2021–2031), International Bamboo and Rattan Organisation (INBAR), Addis Ababa, Ethiopia.

102 <https://www.sciencedirect.com/science/article/pii/S277313912200009X>

103 <http://repository.cotech.or.tz:8080/handle/123456789/91658>

104 <https://tatedo.or.tz/en/latest/bamboo-farming-in-tanzania-a-new-source-of-construction-materials-and-energy-for-domestic-uses>

105 <https://tatedo.or.tz/en/latest/bamboo-farming-in-tanzania-a-new-source-of-construction-materials-and-energy-for-domestic-uses>

106 <https://tatedo.or.tz/en/latest/bamboo-farming-in-tanzania-a-new-source-of-construction-materials-and-energy-for-domestic-uses>

107 Paulo J. Lyimo^{1*}, Rogers Malimbwi¹, et al, 2019, Bamboo: A potential resource for contribution to industrial development of Tanzania,

https://www.researchgate.net/publication/341945737_Bamboo_A_potential_resource_for_contribution_to_industrial_development_of_Tanzania

108 Paulo J. Lyimo^{1*}, Rogers Malimbwi¹, et al, 2019, Bamboo: A potential resource for contribution to industrial development of Tanzania,

https://www.researchgate.net/publication/341945737_Bamboo_A_potential_resource_for_contribution_to_industrial_development_of_Tanzania

can also be utilized for food and feed, adding further value to its cultivation and processing¹⁰⁹. The project will select indigenous species growing in these regions. *Oldeania alpina* will be promoted in Ethiopia as this species possess properties suitable for structural applications (building materials) because of its high density, good mechanical properties and dimension stability as well as high lignin content¹¹⁰. In addition, *Oldeania alpina* is widely used by industries in Ethiopia for production of parquet floor, laminated lumber, stick based products, as well as showing great utilization potential for production of timber substitute products¹¹¹.

D. Project structure

Component 1: Community-Based Planning for Locally Led Adaptation

56. Component 1 lays the essential groundwork for the project by empowering communities in selected districts of Ethiopia and Tanzania to lead the design of their own climate adaptation pathways and will be executed by INBAR and the Ethiopian Forestry Development (EFD) in Ethiopia and the Tanzania Ministry of Natural Resources and Tourism in Tanzania. This component ensures that climate solutions are locally relevant, socially inclusive, and technically sound—anchoring the entire project in the principles of Locally Led Adaptation (LLA). The process begins with the validation of climate risk assessments conducted during the PFG phase, integrating scientific data with community knowledge. Through structured participatory methods and Human-Centered Design (HCD), communities—particularly women, youth, displaced persons, and marginalized groups—identify key vulnerabilities, articulate resilience aspirations, and define what adaptation means in their local context. Building on this foundation, communities engage in solution mapping and participatory decision-making to identify and prioritize NbS and alternative livelihood options that align with their local needs and capacities. These are formalized into community adaptation plans, which form the strategic basis for implementation in Components 2, where communities that selected bamboo as a priority solution, pilot their chosen intervention. This ensures that adaptation efforts not only respond to climate risks but also support resilient income generation and landscape restoration. This component also establishes robust, locally relevant systems to monitor, measure, and report the adaptation impact of bamboo-based interventions. Indicators and metrics are co-designed with stakeholders and aligned with international adaptation and resilience frameworks, then pilot tested, refined, and integrated into project monitoring systems. Complementary capacity-building activities ensure that these tools are accessible and actionable: targeted workshops, inclusive training curricula, and practical demonstrations are delivered to equip stakeholders with the skills to apply bamboo-based adaptation methodologies and resilience metrics. This component has been specifically designed to address the structural barriers faced by women, youth, and other marginalized groups—such as exclusion from planning processes, limited access to information, and lack of decision-making power—as outlined in Table 1 above.

Outcome 1.1: Communities prioritize adaptation needs through inclusive, locally led processes

Output 1.1.1: Foundations for inclusive community engagement established through formation of representative groups and adaptation of participatory tools

Activity 1.1.1.1: Establish inclusive community adaptation planning groups with representation of women, youth, displaced persons, and marginalized groups

Activity 1.1.1.2: Train local facilitators and community representatives on the principles of locally led adaptation and the use of participatory tools

Activity 1.1.1.3: Adapt Human-Centered Design (HCD) and other participatory planning tools to fit the local context and translate them into local languages

Activity 1.1.1.4: Develop facilitation materials and visual aids to support inclusive and accessible engagement sessions

Output 1.1.2: Community dialogues conducted to validate climate impacts, vulnerabilities, resilience aspirations, and local understandings of adaptation

Activity 1.1.2.1: Hold structured community dialogues to explore lived experiences with climate risks and environmental change

Activity 1.1.2.2: Facilitate interactive exercises to identify priority vulnerabilities and their effects on different community groups

Activity 1.1.2.3: Conduct visioning sessions to identify aspirations and define what resilience means locally

Activity 1.1.2.4: Synthesize findings into community adaptation profiles to inform planning

¹⁰⁹Yalew Dessaegn, Balkeshwar Singh, Aart W. Vanuure, Assessment of the National Bamboo Resources and its Properties in Ethiopia , https://www.researchgate.net/publication/360737847_Assessment_of_the_national_bamboo_resources_and_its_properties_in_Ethiopia

¹¹⁰ <https://www.inbar.int/wp-content/uploads/2020/05/1566466810.pdf>

¹¹¹ <https://www.inbar.int/wp-content/uploads/2020/05/1566466810.pdf>

Outcome 1.2: Communities select and plan for the implementation of context-appropriate NbS and alternative livelihood options through structured and inclusive adaptation planning processes

Output 1.2.1: NbS and alternative livelihoods co-identified and assessed through participatory planning aligned with community adaptation needs

Activity 1.2.1.1: Raise awareness on NbS and alternative livelihood options and their potential benefits for climate adaptation

Activity 1.2.1.2: Hold solution mapping sessions with communities and local experts to consider feasible NbS under different climate scenarios

Activity 1.2.1.3: Facilitate group decision-making exercises to evaluate the suitability, trade-offs, and synergies of proposed solutions

Activity 1.2.1.4: Prioritize a shortlist of community-preferred solutions for inclusion in rollout plans

Output 1.2.2: Community-based NbS and alternative livelihoods selection drafted and validated based on co-identified priorities and technical feasibility

Activity 1.2.2.1: Collaborate with local experts and community facilitators to draft rollout plans, detailing implementation steps and sustainability measures

Activity 1.2.3.1: Hold inclusive validation meetings with community members to review and revise proposed solutions

Activity 1.2.3.3: Finalize and formally endorse selected NbS and alternative livelihoods options

Outcome 1.3: Locally relevant data collection systems established to monitor measure and report adaptation impact

Output 1.3.1: Indicators and metrics designed and validated to measure bamboo adaptation and resilience outcomes.

Activity 1.3.1.1: Collect data for bamboo mapping

Activity 1.3.1.2: Design measurable indicators aligned with international adaptation and resilience frameworks

Activity 1.3.1.3: Pilot test indicators in selected districts and refine based on feedback

Output 1.3.2: Stakeholders trained on bamboo-based adaptation methodologies and resilience metrics through targeted workshops and capacity-building programs

Activity 1.3.2.1: Review and adapt methodologies and indicators into training content tailored for different stakeholder groups

Activity 1.3.2.2: Deliver multi-day technical workshops and practical field demonstrations at the hubs

Activity 1.3.2.3: Provide training materials in accessible formats and local languages for wider uptake

Activity 1.3.2.4: Conduct follow-up mentoring and coaching sessions to reinforce knowledge uptake and ensure on-the-ground application of training content

Component 2: Bamboo-Based Climate-Resilient Livelihoods and Nature-Based Solutions

57. Component 2 strengthens the climate resilience of vulnerable communities by supporting both farmers and bamboo processors as key beneficiaries and will be executed by INBAR and the Ethiopian Forestry Development (EFD) in Ethiopia and the Tanzania Ministry of Natural Resources and Tourism in Tanzania. It operationalizes the roll-out plans developed through participatory planning under Component 1, for those communities that selected bamboo as a viable adaptation measure. The component begins with the development and deployment of an AI-enabled Bamboo Digital Twin Tool, which combines sensor-based field data and geospatial modelling to simulate growth and climate scenarios. The tool provides real-time insights to guide adaptive rollout planning and optimize interventions for farmers across project sites. Then, support is directed to two groups of farmers: (1) Existing bamboo farmers are assisted in scaling up sustainable production through tailored training, upgraded nurseries, and continuous technical support for greater adaptation benefits; (2) New farmers are supported to adopt bamboo as a NbS and alternative livelihood options, with land suitability assessments, quality seedlings, hands-on training, and guided establishment of bamboo plots.
58. At the same time, the component targets bamboo processors as direct beneficiaries. These are typically early-stage, often informal small businesses with limited resilience and weak market integration. Many face structural challenges including inadequate processing capacity, lack of equipment, and vulnerability to climate and market shocks. A comprehensive value chain assessment maps constraints and opportunities across the processing segment and informs the selection of solution providers to deliver innovations that enhance the climate resilience and operational capacity of processors. Selected providers receive milestone-based grants and technical assistance to develop and adapt solutions in collaboration with local enterprises, supported by Component 3's BAMBOOST Hubs. Given the informal status of many processors, the project will assess during the PFG stage whether and how informal businesses can be supported in a context-appropriate and effective manner. The component also ensures that training, inputs, and enterprise support reach women, youth, and other marginalized groups who face systemic barriers to land, finance, and market participation—thus fostering inclusive access to climate-resilient livelihoods. By improving both

the production and processing ends of the value chain, the component facilitates structured partnerships between growers and processors, strengthening offtake arrangements and ensuring stable, climate-resilient livelihoods.

59. The following section provides an overview of the current bamboo value chain in Ethiopia and Tanzania, organized by stakeholder group. It presents both country-level and district-level analyses of the current status and key barriers. Country-level insights are based on desk research, while district-level findings are drawn from responses to a survey conducted by the project team in March 2025. For more information on the survey methodology and outreach, see section I on “stakeholder engagement”.

Overview of the bamboo value chain in Ethiopia and Tanzania

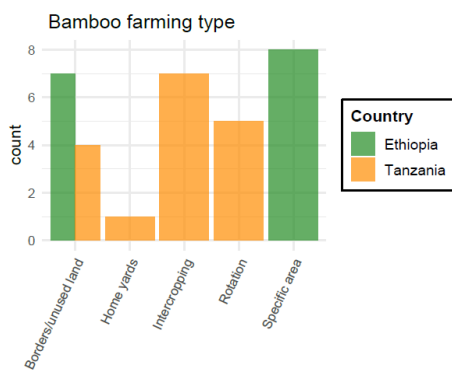


Figure 12: Bamboo farming types demonstrating how bamboo farmers grow bamboo in existing crops in Ethiopia and Tanzania, based on the farmers surveys

60. **Bamboo growers/harvesters:** Overall, the survey analysis shows that bamboo cultivation practices in Tanzania and Ethiopia are notably different. In Tanzania, farmers tend to integrate bamboo into their existing agricultural systems, using methods such as intercropping and rotation, or cultivating it in borders and unused land. In contrast, Ethiopian farmers typically dedicate specific areas to bamboo cultivation, indicating a more specialized and focused method of growing bamboo (Fig. 12). In Tanzania, many people in the southern highlands use bamboo juice and bamboo beer (ulanzi) tapped from *Oxytenanthera abyssinica* bamboo specie as their favorite drink. In Ethiopia, rural communities, particularly in areas abundant in highland bamboo, heavily rely on bamboo resources as construction material for building new houses, repairing existing structures, and creating furniture, fences, and basketry. Notably, in Sidama Regional State, almost the entirety of traditional housing structures, recognized as climate-smart housing solutions, is built from highland bamboo. In Tanzania, the most commonly cited support required to expanding bamboo cultivation includes training on bamboo cultivation, harvesting, and management, access to quality seedlings, market linkages, and financial support, particularly in the form of subsidies. In Ethiopia, while training and financial support remain important, a notable distinction is the greater demand for connections to bamboo processing facilities (Fig. 12).

61. **Farmers growing other crops:** The most significant barrier preventing farmers growing other crops from cultivating bamboo is the lack of available land, limited knowledge about bamboo farming, lack of market access, and concerns about pests and diseases. Despite the challenges farmers face in growing bamboo, all investigated farmers expressed interest in cultivating it on their land. They are willing to do so if provided with initial support, including seeds or seedlings, training, market access for products/poles, and connections with facilities that process bamboo

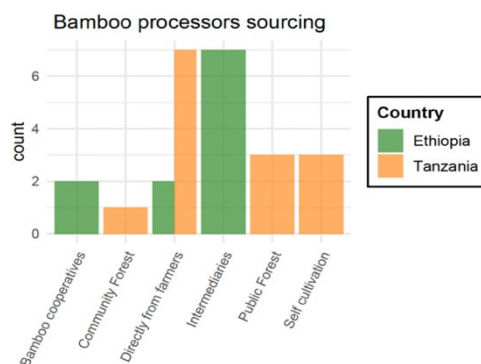


Figure 13: Bamboo processing sourcing in Ethiopia and Tanzania, based on survey analysis conducted by UNIDO

62. **Bamboo processors:** Both countries engage in sales and distribution, but Tanzania has a more diversified involvement in bamboo gardening and cultivation, while Ethiopia places greater emphasis on construction (Fig. 13). In Tanzania, processors primarily source raw bamboo materials directly from smallholder farmers. In contrast, Ethiopian processors tend to rely more on bamboo cooperatives and intermediaries, although they also source directly from farmers (Fig. 13). In both countries most bamboo processors face significant barriers such as limited market access, inadequate infrastructure, lack of tools and equipment, scarce financing opportunities, and insufficient knowledge or capacity for product innovation. As a result, these enterprises mainly produce traditional, low-value bamboo products for daily subsistence. Trade is largely restricted to local and national markets, dominated by small household processors, traders, and intermediaries who often prioritize short-term profits over product quality¹¹². Tanzania faces additional challenges related to skilled labor and product innovation, while Ethiopia places greater emphasis on market access and policy barriers, reflecting a more advanced bamboo value chain in Ethiopia.

112 <https://www.inbar.int/wp-content/uploads/2020/05/1579229333.pdf>

63. **Recent growing interest and potential:** Despite these challenges, Ethiopia's bamboo sector is witnessing increased private-sector investment driven by acute shortages of conventional forest products and growing demand for timber and wood-based alternatives¹¹³. The emergence of bamboo processors has raised demand and market prices for bamboo poles, incentivizing smallholder farmers to expand bamboo cultivation as a source of alternative livelihoods. Over recent decades, development interventions have facilitated a gradual shift from subsistence-level bamboo usage to commercialized production through processors, resulting in an expanding range of value-added products reaching domestic markets. Nonetheless bamboo's role in climate adaptation and resilience is constrained by four barriers: (1) Weak enabling environment: Bamboo's value as a nature-based solution is underrecognized in policies. Data gaps, limited adaptation strategies, and lack of standardized metrics hinder decision-making, (2) Low adoption of sustainable practices: Smallholders have limited access to quality planting materials, knowledge, and technical support, leading to poor cultivation and reduced adaptation benefits, (3) Weak processing and market access: Bamboo enterprises struggle with inadequate tools, financing, product diversification, and market linkages, limiting value chain growth, (4) Fragmented ecosystem: Poor coordination among growers, processors, policymakers, and financiers, alongside few platforms for learning and collaboration, stifles sector development.

Outcome 2.1: Communities strengthen their climate resilience by piloting bamboo as a NbS in alignment with community-identified rollout plans¹¹⁴

Output 2.1.1: AI-enabled Bamboo Digital Twin Tool developed and deployed to optimize interventions and adaptation planning

Activity 2.1.1.1: Design the Bamboo Digital Twin Tool in collaboration with AI and geospatial experts

Activity 2.1.1.2: Collect baseline and growth data from project sites using sensors and local enumerators

Activity 2.1.1.3: Use the tool to simulate climate and growth scenarios and guide strategic rollout decisions

Activity 2.1.1.4: Share real-time insights for adaptive management

Activity 2.1.1.5: Integrate bamboo data and maps into national knowledge platforms

Output 2.1.2: Existing bamboo farmers supported to expand operations and achieve greater adaptation benefits

Activity 2.1.2.1: Identify and assess existing bamboo farmers in communities that selected bamboo as an NbS and alternative livelihood option

Activity 2.1.2.2: Develop localized rollout plans for bamboo cultivation combining community-based plans and target assessments

Activity 2.1.2.3: Develop and deliver tailored training programs on climate-resilient bamboo cultivation, agroforestry integration, and post-harvest handling

Activity 2.1.2.4: Upgrade nursery infrastructure and build capacity for sustainable propagation and quality control

Activity 2.1.2.5: Provide ongoing technical assistance and extension support to farmers through field visits and community-based advisors

Output 2.1.3: New farmers supported to integrate bamboo into their production systems as a NbS and pathway to resilient alternative livelihoods

Activity 2.1.3.1: Identify and assess suitability of land and readiness of new pilot farmers for bamboo adoption

Activity 2.1.3.2: Develop localized rollout plans for bamboo cultivation combining community-based plans and target assessments

Activity 2.1.3.3: Establish nursery partnerships and distribute high-quality bamboo seedlings and inputs

Activity 2.1.3.4: Deliver hands-on training on bamboo intercropping, site preparation, and adaptation benefits

Activity 2.1.3.5: Provide on-farm technical assistance during establishment phase and monitor pilot plots

Activity 2.1.3.6: Implement a continuous learning and monitoring process to assess results and adjust practices based on community feedback and field observations

Outcome 2.2: Communities adopt bamboo as a resilient alternative livelihood strategy through increased demand generated by more resilient bamboo processing¹¹⁵

Output 2.2.1: Comprehensive bamboo value chain assessments conducted to increase the resilience of bamboo processing communities

Activity 2.2.1.1: Map key actors, infrastructure, and material flows across local and regional bamboo value chains

Activity 2.2.1.2: Identify constraints and upgrading opportunities in processing, logistics, and market access

Activity 2.2.1.3: Analyze demand trends, product gaps, and potential for new market linkages

Output 2.2.2: Solutions identified and deployed to strengthen the resilience and off-take potential of bamboo processors

¹¹³ https://www.cifor-icraf.org/publications/pdf_files/articles/AKassa1404.pdf

¹¹⁴ The pilot intervention using bamboo as a NbS and alternative livelihood option will be implemented in those communities that have identified bamboo as a NbS option under PC1

¹¹⁵ The target communities are those that identified bamboo as a priority pathway for alternative livelihoods under Outcome 1.1 and Outcome 1.2

Activity 2.2.2.1: Design and launch a call for solutions with inclusive eligibility criteria and transparent selection process
Activity 2.2.2.2: Conduct awareness campaign to promote the call for solutions
Activity 2.2.2.3: Form review panel including university consortium experts and community representatives and select proposals
Activity 2.2.2.4: Disburse grants to selected solution providers based on contractual milestones
Activity 2.2.2.5: Deliver capacity building on climate adaptation and resilience for bamboo processors
Activity 2.2.2.5: Provide tailored support to monitor, and adapt solutions for deployment in community contexts
Activity 2.2.2.6: Solution providers deploy tested solutions to bamboo processors to enhance climate resilience and value addition

Output 2.2.3: Sustained partnerships established between growers and processors

Activity 2.2.3.1: Analyse compatibility in terms of location, harvesting and processing timelines, quality standards, and processing capacity to match bamboo growers with processors
Activity 2.2.3.2: Facilitate partnership agreements between bamboo growers and processors to strengthen offtake arrangements and ensure sustainable livelihoods

Component 3: Knowledge, Learning, and Policy Influence for Scalable Bamboo-Based Adaptation

64. This component strengthens the systems and institutions needed to enhance the climate resilience of vulnerable communities by positioning bamboo as a strategic means for locally led adaptation and will be executed by UNIDO in collaboration with the Ethiopian Forestry Development (EFD) in Ethiopia and the Tanzania Ministry of Natural Resources and Tourism in Tanzania. It fosters inclusive knowledge generation, peer learning, and evidence-based policy engagement to support the development, deployment, and scaling of bamboo-based solutions. Central to this component is the establishment of national Bamboo Hubs (BAMBOOST) in Ethiopia and Tanzania as collaborative platforms for learning, innovation, and solution deployment. These hubs convene diverse value chain actors through structured forums, governance frameworks, and international exchanges. They support co-creation of context-specific solutions and promote long-term collaboration through institutional partnerships. Education and training programs—including internships, academic exchanges, and curriculum development—help build a pipeline of local adaptation leaders. Targeted outreach to financial institutions enhances investment linkages through tailored knowledge products and matchmaking events. A project-wide learning and communication agenda ensures continuous reflection, adaptation, and improvement. Field-based insights are translated into accessible knowledge products and widely disseminated to enable replication and scale. Finally, the component strengthens enabling environments by translating project evidence into actionable policy recommendations, facilitating structured dialogues, and building institutional capacity at national and subnational levels.

Outcome 3.1: A collaborative bamboo ecosystem strengthens regional learning, peer exchange, and leadership for bamboo-based climate adaptation

Output 3.1.1: Bamboo Hubs (BAMBOOST) established as an inclusive learning and solutions deployment platform

Activity 3.1.1.1: Design and launch a call for proposals to select host universities or other national institutions in Ethiopia and Tanzania and institutionalize partnership agreements to sustain collaboration beyond the project life
Activity 3.1.1.2: Procure, deliver, and install specialized bamboo-processing and testing machinery at both hubs
Activity 3.1.1.3: Map and convene bamboo value chain actors in both countries through stakeholder forums
Activity 3.1.1.4: Establish formal multi-stakeholder working groups at each hub with defined membership structures and governance rules
Activity 3.1.1.5: Facilitate collaboration and cross-country exposure visits with international bamboo leaders (e.g., China, India, Ecuador)
Activity 3.1.1.6: Convene regular innovation forums and thematic working groups connecting farmers, processors, researchers, local government, and financial actors
Activity 3.1.1.7: Facilitate joint problem-solving and co-design sessions among bamboo communities to collaboratively identify and develop bamboo value chain solutions

Output 3.1.2: Education and training programs launched to build a pipeline of local bamboo adaptation leaders

Activity 3.1.2.1: Launch internship and research placement programs for university students
Activity 3.1.2.2: Facilitate international study tours and academic exchanges
Activity 3.1.2.3: Establish academic partnerships with bamboo centers of excellence
Activity 3.1.2.4: Integrate bamboo adaptation into national academic curricula through partner institutions

Output 3.1.3: Investment linkages strengthened through targeted outreach to financial institutions.

Activity 3.1.3.1: Develop knowledge products and training for banks and FIs on financing bamboo adaptation
Activity 3.1.3.2: Organize investor roundtables and business–finance matchmaking events

Outcome 3.2: Project stakeholders access, apply, and contribute to an adaptive learning system that improves decision-making, replication, and scale

Output 3.2.1: Project learning and communication agenda developed and implemented to capture insights and guide adaptive management

Activity 3.2.1.1: Define project learning questions and learning-by-doing protocols with partners

Activity 3.2.1.2: Conduct regular reflection and sense-making workshops with project teams and community actors

Activity 3.2.1.3: Capture learning from field visits, pilots, and innovation testing at the hubs

Activity 3.2.1.4: Develop case studies, policy notes, technical manuals, and guidance documents

Activity 3.2.1.5: Translate knowledge products into local languages and accessible formats

Activity 3.2.1.6: Disseminate materials through national platforms, project websites, and knowledge events

Output 3.2.2: Feedback loops integrated into M&E to support real-time learning and course correction

Activity 3.2.2.1: Establish participatory monitoring systems in communities

Activity 3.2.2.2: Integrate real-time learning from the Bamboo Twin Tool into adaptation planning

Activity 3.2.2.3: Adapt interventions and support based on community and system feedback

Outcome 3.3: Policies and institutions are informed by project evidence and strengthened to scale bamboo-based adaptation through national systems

Output 3.3.1: Project results translated into actionable policy recommendations

Activity 3.3.1.1: Synthesize findings from Components 1–2 into policy-relevant insights

Activity 3.3.1.2: Develop policy briefs and adaptation guidance notes

Activity 3.3.1.3: Validate recommendations through expert panels and stakeholder review

Output 3.3.2: Structured policy dialogue and consultation convened to support institutional uptake

Activity 3.3.2.1: Organize national and subnational dialogues on bamboo-based adaptation

Activity 3.3.2.2: Facilitate consultations with policymakers, regulators, and value chain actors

Activity 3.3.2.3: Engage ministries to integrate recommendations into climate strategies and incentive schemes

Output 3.3.3: Institutional capacity of policymakers and planners strengthened through training and technical assistance

Activity 3.3.3.1: Develop training modules for policymakers based on project tools and methodologies

Activity 3.3.3.2: Deliver capacity-building sessions at national and district levels

Activity 3.3.3.3: Organize study tours and technical exchanges for policy actors

Activity 3.3.3.4: Provide follow-up advisory support for integrating bamboo into NDCs, NAPs, and sectoral plans

A3. Regional perspectives

65. By uniting two of Africa's leading bamboo resource countries—Ethiopia and Tanzania—this project adopts a regional approach that maximizes synergies, accelerates learning, and enhances cost-effectiveness in addressing shared climate challenges. Both countries face increasing climate risks such as prolonged droughts, erratic rainfall, land degradation, and loss of agricultural productivity, making climate adaptation and alternative livelihoods an urgent priority. Bamboo offers a nature-based, locally available solution that is particularly well-suited to these challenges. Ethiopia and Tanzania are among the few African nations where bamboo grows naturally and abundantly, with Ethiopia hosting approximately two-thirds of the continent's bamboo resources. Tanzania, meanwhile, has the highest diversity of indigenous bamboo species in Africa. Both countries have demonstrated strong political will by developing national bamboo strategies and frameworks, positioning bamboo as a strategic resource for sustainable development, ecosystem restoration, and climate resilience. However, the two countries are at different stages of bamboo sector development. Ethiopia has made more significant advances, with growing private sector engagement, emerging processing industries, and stronger institutional frameworks for bamboo promotion. Tanzania's bamboo sector remains nascent, with lower levels of commercialization and limited technical capacity. This disparity creates a powerful opportunity for South-South knowledge exchange, allowing Tanzania to benefit directly from Ethiopia's experience in policy integration, cultivation techniques, value addition, and enterprise development. A regional implementation model not only fosters peer learning but also enables shared activities such as joint training programs, cross-border study tours, regional market linkage forums, and collaborative research. These joint efforts avoid duplication, reduce implementation costs, and promote the harmonization of approaches across contexts. The project will leverage existing institutional and business networks in both countries to facilitate stakeholder coordination, streamline procurement and logistics, and accelerate implementation timelines.

B. Promotion of innovative solutions to climate change adaptation

66. The project promotes innovation in climate change adaptation and resilience in several different ways:
- **Multiple uses of bamboo to address multiple climate hazards:** The diverse applications of bamboo against climate impacts include stabilizing soils against erosion, reducing flood risks through natural barriers, and mitigating

wind damage. By developing bamboo-based climate-resilient construction materials, biochar, crafts, furniture, energy, food and fodder products, the project offers communities multiple alternative livelihood pathways. These diverse economic opportunities enhance resilience by reducing dependence on climate-sensitive practices and fostering economic diversification.

- **Bamboo for climate adaptation with complementary mitigation benefits:** Unlike conventional approaches that prioritize bamboo mainly for carbon sequestration, this project strategically positions bamboo to proactively address climate adaptation challenges. With its rapid growth cycle (3–5 years), bamboo provides a renewable resource capable of annual harvesting without land degradation, effectively offering significant adaptation solutions for communities vulnerable to climate impacts.
- **Innovative agroforestry techniques:** The project introduces and scales innovative agroforestry techniques integrating bamboo with complementary crops, enhancing ecological resilience and productivity. This approach promotes soil health, water retention, biodiversity conservation, and resilience to climate variability. Farmers adopting bamboo-based agroforestry systems benefit from improved yields, food security, and long-term environmental sustainability.
- **Ecosystem-wide approach to bamboo value chain development:** The project's holistic, ecosystem-wide approach systematically strengthens the entire bamboo value chain, creating robust connections among bamboo growers, processors, policymakers, and financial institutions. This comprehensive model ensures alignment between supply and demand, effective policy integration, and increased investment opportunities, addressing key gaps in the bamboo ecosystem.
- **South–south cooperation and exchange:** Recognizing Ethiopia's advanced bamboo industry, the project facilitates intensive knowledge exchange, technological transfers, and capacity-building efforts to accelerate Tanzania's bamboo value chain development. Joint workshops, study tours, and resource-sharing mechanisms foster collaborative learning, rapidly scaling bamboo-based adaptation solutions across both nations. In parallel, collaboration with major bamboo economies such as China, India, Ecuador, Vietnam will be promoted for greater learning benefits.
- **Creation of methodologies for innovative use of bamboo in adaptation and resilience:** The project actively develops innovative methodologies specifically designed to maximize bamboo's effectiveness in climate adaptation applications. These methodologies include solutions for soil stabilization, flood mitigation, wind protection, climate-resilient building materials, and biochar production. Each methodology addresses distinct climate vulnerabilities, enabling communities to adopt proven, replicable adaptation techniques widely.
- **Innovative support framework and performance-based grants:** The project implements an innovative support framework combining performance-based grants, capacity-building, and ecosystem-wide coordination. Bamboo processors receive financial incentives linked to clear adaptation outcomes, such as adopting advanced processing technologies or land restoration practices. Farmers engaged in bamboo cultivation benefit from tailored technical assistance, training, and access to local processing and market opportunities. Coupled with ongoing support, this targeted assistance empowers both local enterprises and farmers to continuously innovate, access new markets, and significantly enhance their climate resilience.
- **Integration of AI for effective climate adaptation:** The project will cautiously explore the use of Artificial Intelligence (AI) tools to enhance effectiveness and efficiency, particularly in data-intensive or monitoring-heavy activities. In rural adaptation settings, AI can improve climate data processing, enable predictive environmental analysis, optimize bamboo resource mapping, and support real-time field monitoring and feedback. AI will not be a prerequisite for project success; instead, tools will be piloted and evaluated for usability, affordability, and scalability in low-connectivity, low-IT capacity contexts. Use of AI will follow strict sustainability and ethical standards—ensuring tools are maintainable by local institutions post-project and all data use adheres to privacy and consent protocols. Successful pilots may be scaled based on relevance and demonstrated value.

C. Economic, social and environmental benefits

67. The project will fully comply with the Adaptation Fund's ESP requirements. As per UNIDO's ESSPP, the project has been screened against environmental and social risks and classified as a Category B project. Consequently, an Environmental and Social Management Framework (ESMF) will be developed at full proposal stage.

C1. Economic Benefits

68. The project generates sustainable livelihood opportunities for vulnerable farmers by promoting bamboo as a viable alternative to climate-sensitive agriculture. An estimate of 10,000 farmers in target districts (7,000 in Ethiopia and 3,000 in Tanzania) will be supported to either improve existing bamboo cultivation practices or integrate bamboo into their agroforestry systems. This allows for income diversification and stabilization of household earnings in areas prone

to droughts, floods, or soil degradation. The estimated average of bamboo growing area for each is about 0.1 ha, potentially supplying 200-300 bamboo poles, for a total production of 2,500,000 poles. Simultaneously, the project enables an estimate of 100-150 bamboo processors to scale up their operating capacity by 50-70% to enable reliable offtake opportunities for bamboo harvested by farmers, ensuring that smallholders can earn predictable income from their bamboo plots. By upgrading processing capacity and expanding product offerings—such as bamboo-based construction materials, packaging, furniture, crafts, or clean energy products—the project creates a robust economic ecosystem that reduces dependency on extractive or subsistence activities. At the full project proposal development stage, the economic benefits of the project intervention will be assessed and the above estimates validated through an in-depth data collection exercise, for which a list of potential questions is provided in Annex 1.

C2. Social Benefits

69. On the social front, the project aims to enhance the climate resilience of local communities leading to a wide range of social co-benefits. By promoting bamboo-based solutions that directly address climate risks—such as flooding, soil erosion, and declining agricultural yields—the project strengthens the resilience of vulnerable communities and reduces their exposure to climate hazards. Bamboo’s rapid growth and multi-functional use position it as a localized, nature-based adaptation strategy. Vulnerable households, especially those in degraded or disaster-prone areas, benefit from enhanced safety, adaptive infrastructure, and reduced displacement risks. This enhances community stability and fosters self-sufficiency in the face of climate shocks, particularly among women, youth, and marginalized social groups often excluded from climate planning processes. Project Component 1 ensures that bamboo interventions are grounded in participatory planning, using vulnerability assessments and community consultations to identify the most at-risk households and tailor solutions accordingly. This bottom-up approach promotes equity and empowerment, ensuring that women, youth, and marginalized groups are not only beneficiaries but co-designers of the resilience strategies. Through the inclusive community adaptation planning groups the project will reach an estimate of 40,000 people, that will acquire increased knowledge of climate risks, mitigation strategies as well as improved access to decision-making.
70. In addition, the collaborative ecosystem established under Component 3 will reinforce social cohesion both within and across countries. By bringing together government representatives with farmers, processors, youth, and community adaptation groups, the project fosters mutual understanding and collective ownership of climate resilience strategies. Through the establishment of the Bamboo Hubs, the project will convene universities, policymakers, processors, and community leaders in structured stakeholder forums, multi-stakeholder working groups, and cross-country exchanges. Youth engagement is a central pillar of this component, with dedicated activities such as academic partnerships, training programs, and international study visits aimed at building a new generation of climate adaptation leaders. National and subnational dialogues, as well as targeted consultations, will ensure that the voices of vulnerable communities are meaningfully reflected in policy development. Field visits and technical exchanges will connect decision-makers directly with community-based initiatives, showcasing on-the-ground realities and locally led solutions. These engagements are designed to bridge the gap between institutions and society, strengthening trust, accountability, and alignment between policy and practice. Overall, the project targets overall 40% women participation and 20% youth participation. At the full project proposal development stage, the social benefits of the project intervention will be assessed and the above estimates validated through an in-depth data collection exercise, for which a list of potential questions is provided in Annex 2.

C2a. Gender assessment

71. The project recognizes that climate vulnerability in Ethiopia and Tanzania is deeply gendered, particularly in the context of rural and forest-adjacent communities where livelihoods are closely tied to rain-fed agriculture and ecosystem services. Women and youth constitute a significant portion of the agricultural labor force and are extensively involved in bamboo planting, harvesting, and land restoration activities. However, their access to productive assets, credit, markets, technology, and decision-making spaces remains highly constrained. In both countries, structural inequalities rooted in socio-cultural norms, legal barriers, and institutional limitations exacerbate women’s and girls’ exposure to climate-related risks, and impede their ability to benefit from emerging green economy opportunities. The project therefore positions gender equality and women’s empowerment as central to its theory of change and implementation strategy, aiming to ensure that bamboo-based NbS and alternative livelihoods generate equitable benefits.
72. The project is fully aligned with the Adaptation Fund’s Gender Policy, which mandates the integration of gender considerations across the project cycle and the proactive identification of gender-differentiated climate impacts and capacities. It commits to promoting equal participation, equitable access to services, and the transformation of gender power relations within the bamboo sector. By supporting the active engagement of women, youth, and marginalized groups in decision-making, training, and enterprise development, the project will help reduce existing vulnerabilities

while enhancing the adaptive capacity of local communities. Specific attention will be given to ensuring that benefits derived from NbS, such as income from bamboo processing, improved ecosystem services, and land restoration, are equitably distributed and not disproportionately captured by male-dominated actors or institutions. The project will apply the UNIDO Gender Equality Strategy 2020–2023, which promotes the integration of gender equality principles into all stages of program development and implementation. UNIDO's strategy emphasizes structural transformation and inclusive industrial development, with a focus on reducing gender-based constraints in access to productive resources, finance, markets, and institutions. The project will use this strategic framework to embed gender analysis into planning, capacity development, policy influence, and enterprise support interventions. Through this approach, it will not only address existing gender disparities, but also generate lasting institutional changes in how the bamboo sector is governed, financed, and developed in both countries.

73. Methodologically, the project will use participatory, community-based planning to ensure that gender-differentiated needs and capacities are explicitly identified and addressed. Vulnerability assessments and local adaptation action plans will incorporate the perspectives of women and youth, while project activities will be designed to ensure that these groups have direct and sustained access to project resources. A Gender Action Plan will guide implementation, including the use of sex-disaggregated baseline data, gender-sensitive indicators, and gender-responsive budgeting. These mechanisms will allow the project to go beyond participation metrics and monitor changes in women's decision-making power, access to productive assets, and income from climate-resilient bamboo enterprises. Knowledge products, learning exchanges, and policy engagement will also be designed to promote the visibility of women's roles in bamboo ecosystems and ensure that institutional reforms are gender-responsive.
74. The gender baseline context in Ethiopia is informed by the 2019–2030 National Bamboo Development Strategy and Action Plan, which calls for the integration of gender across all areas of bamboo development. The strategy includes a target of 40 % women participation in bamboo-related training and business activities and identifies key barriers such as land tenure insecurity, exclusion from enterprise ownership, and limited mobility and access to credit. These challenges are compounded by low female literacy levels, with only 40.4 % of adult women literate compared to 59.2 % of men¹¹⁶, which constrains their access to training and formal enterprise development opportunities in bamboo processing and value addition. At the same time, women constitute nearly 57.3% of the labor force¹¹⁷, underscoring their critical role in natural resource-based sectors such as bamboo. An assessment of the effectiveness of Ethiopia's Second Level Land Certification programme¹¹⁸ shows that out of the 7.1 million certified land parcels examined, women were recorded as either joint holders in 55% of cases or sole holders in 22%, totaling 77% of parcels with female ownership. In terms of land area, based on the total certified area of 3.4 million hectares, 62% was jointly held, while 16% was solely registered to men and 21% to women. The project will build on these foundations by actively promoting women's engagement in bamboo farming, nursery operations, processing, and market development, while working to improve their access to land and business services.
75. In Tanzania, although a sector-specific gender framework for bamboo is not yet established, the country has adopted the Gender Mainstreaming Guidelines for the Public Service, developed in collaboration with UNDP and national institutions. These guidelines demonstrate clear political will to promote gender equality, though implementation gaps persist. As of 2020, women held 36.9% of Tanzania's national parliament seats, rising to 37.4% by 2020 and reaching 37.8% in 2025¹¹⁹, demonstrating institutional commitment to gender parity across public sector leadership and governance structures, and signaling growing participation in decision-making bodies relevant to bamboo ecosystem governance. Additionally, although overall financial inclusion has improved nationally, gender disparities persist: as of 2023, 80.6% of women had access to financial services¹²⁰, yet they continue to face lower access to credit products and investment capital — key constraints to enterprise development in sectors like bamboo. To address these challenges, the project will build on recent progress by working with local institutions to ensure women's participation in bamboo ecosystem governance structures and value chain development, while also promoting peer learning and policy dialogue to close gender gaps in knowledge, access, and representation.

The estimate figure considers that the whole community e.g. an entire village will participate in the exercise, although only a few participants will select bamboo as a priority adaptation solution and will therefore be included in the activities of PC2. Therefore, this number is higher than the estimate figure provided in the economic benefits section (10,000 farmers).

¹¹⁶ World Bank (2019), Ethiopia Gender Landscape: <https://genderdata.worldbank.org/en/economies/ethiopia>

¹¹⁷ World Bank (2024), Ethiopia Gender Landscape Brief: <https://genderdata.worldbank.org/en/economies/ethiopia>

¹¹⁸ Hailu, Z., Mekonen, W., Savolainen, G., Leckie, J. (2019). Protecting land tenure security of women in Ethiopia: Evidence from the Land Investment for Transformation programme. https://archive.uneca.org/sites/default/files/uploaded-documents/CLPA/2019/Papers/Womens-access-to-land-and-security-tenure/final_submission_259.pdf

¹¹⁹ Sustainable Development Report (2025), Tanzania: <https://dashboards.sdgindex.org/profiles/tanzania/indicators>

¹²⁰ Were, M., Odongo, M., Israel, C. (2024), Gender disparities in financial inclusion in Tanzania: <https://doi.org/10.1093/oso/9780192885746.003.0009>

76. There are several gender-related risks associated with the project. These include the possibility that women's participation may be limited to lower-value segments of the bamboo value chain, reinforcing existing labor hierarchies; that benefits from bamboo processing and market access may disproportionately favour male-led enterprises; and that governance platforms could marginalize women and youth if participation mechanisms are not carefully designed in gender- and youth-responsive ways. There is also a risk that time poverty and unpaid care burdens will prevent women from fully engaging in training and decision-making activities, particularly in areas affected by displacement or seasonal labor demands. To mitigate these risks, the project will apply a number of targeted measures. Gender participation targets will be embedded in community-level planning and enterprise support activities, using the 40% benchmark as a minimum standard. Sex-disaggregated data monitoring will be used to detect disparities in access and benefits, and course-correction mechanisms will be included in the Gender Action Plan. Project partners will work with women's organizations and local governments to ensure that institutional reforms, capacity development, and financial services are gender-responsive. Where appropriate, the project will support gender-sensitive service delivery models, such as mobile training, childcare support, and flexible scheduling, to reduce time and mobility barriers for women and girls. Through these approaches, the project will ensure that gender equality is embedded as a fundamental component, rather than a peripheral consideration, thereby promoting effective, inclusive, and sustainable climate resilience. At the full project proposal development stage, a full gender analysis will be conducted through an in-depth data collection exercise, for which a list of potential questions is provided in Annex 1.

C3. Environmental Benefits

77. Bamboo is deployed as a NbS to deliver multiple environmental benefits alongside adaptation impacts. Bamboo's extensive fibrous root system binds soil and improves infiltration, expecting to reduce soil erosion by up to 75% on sloped lands¹²¹. The dense canopy and persistent leaf litter also minimize splash erosion and increase soil organic matter, enhancing fertility and infiltration capacity. When planted along riverbanks and flood-prone areas, bamboo slows surface runoff and helps absorb excess rainwater, thus regulating water flow and mitigating flash floods. Bamboo-based flood buffers have been shown to reduce runoff by 20–30% and stabilize embankments more effectively than many conventional species¹²². Its role as a natural water sponge is complemented by its high drought tolerance in semi-arid zones, where selected species such as *Oxytenanthera abyssinica* present in Ethiopia and Tanzania, maintain vegetation cover and soil moisture even under prolonged dry conditions. In coastal and arid regions, bamboo will serve as a windbreak and erosion barrier. Its flexible and evergreen culms protect croplands from wind damage, reducing topsoil loss and enhancing microclimate stability. Bamboo poles can also be used in dune stabilization and coastal reforestation, forming a first line of defense against windstorms and tidal surges. Bamboo's land rehabilitation potential is particularly valuable in degraded or marginal lands, including those with poor soils, high acidity, or previous overgrazing. Studies show bamboo can thrive on degraded land with pH values as low as 4.5, making it one of the few viable restoration options in such zones¹²³. In terms of infrastructure protection, bamboo is increasingly used in climate-resilient housing. Its tensile strength (greater than steel by weight) and flexibility allow for the construction of flood-resistant stilt houses and post-disaster shelters that are fast to deploy and low in embodied emissions. Bamboo-based housing has been piloted in several countries as a cost-effective alternative in flood- and cyclone-prone areas¹²⁴. In urban areas and extreme heat zones, bamboo's thermal resistance and shading properties reduce ambient temperatures around structures and improve microclimate comfort, offering bio-climatic benefits in both rural and peri-urban settings. Bamboo architecture reduces the urban heat island effect and lowers indoor cooling needs. With respect to biodiversity, bamboo forests provide critical habitat for insects, birds, and small mammals, while relieving pressure on natural forests by offering a fast-growing and sustainable alternative to hardwood logging. Bamboo can reach maturity in 3–5 years, compared to 30–50 years for most hardwood species, and sustainably harvested stands can provide continuous yields without replanting. As a fast-growing, high-biomass plant, bamboo can sequester 150 to 250 tons of CO₂ per hectare over a 10-year period, acting as a powerful carbon sink¹²⁵. The project promotes durable, low-emission bamboo products that substitute for cement, steel, and plastics, delivering long-term mitigation co-benefits. Bamboo charcoal and biochar production, where applicable, offer clean energy alternatives and additional carbon sequestration pathways, further reinforcing bamboo's contribution to climate action.

¹²¹ INBAR (2019), Bamboo and Climate Change Mitigation: https://www.inbar.int/resources/inbar_publications/bamboo-and-climate-change-mitigation/

¹²² FAO (2021), Bamboo for Land Restoration, FAO Forestry Working Paper.

¹²³ Midmore, D. J. (2009). Bamboo for Rural Development. INBAR Technical Report.

¹²⁴ Arup & INBAR (2021). Bamboo as a Building Material for Resilient Housing. <https://www.arup.com/perspectives/publications>

¹²⁵ INBAR (2019), Bamboo and Climate Change Mitigation: https://www.inbar.int/resources/inbar_publications/bamboo-and-climate-change-mitigation/

78. Bamboo-based NbS interventions will be implemented for their environmental protection, adaptation benefits and productive use. To preserve the NbS potential of bamboo, the project deliberately avoids monoculture practices and intensive production models. Instead, bamboo is integrated into mixed-species systems, complementing native trees, crops, and vegetation to enhance biodiversity and strengthen landscape connectivity. Indigenous and locally adapted bamboo species are prioritized to prevent ecological disruption, and cultivation practices minimize chemical inputs and emphasize selective harvesting to sustain soil health, water quality, and habitat complexity over time. Community-led planning and site-specific design principles ensure that bamboo interventions are environmentally sustainable and culturally appropriate, aligning restoration efforts with local priorities. Furthermore, the project will monitor ecological co-benefits by developing and applying indicators and metrics to track whether bamboo interventions contribute to ecosystem-based adaptation and guide adaptive management. Adaptive management, supported by ongoing monitoring of ecosystem indicators such as biodiversity, soil quality, and water resources, ensures that bamboo continues to deliver positive NbS outcomes over the long term. At the full project proposal development stage, the environmental benefits of the project intervention will be assessed and the above estimates validated through an in-depth data collection exercise, for which potential questions are provided in Annex 1. This process will include an analysis of maladaptation risks using the IPCC 6th Assessment Report framework, ensuring that adaptation interventions do not inadvertently reinforce inequalities or increase vulnerability.

D. Cost-effectiveness analysis

79. Bamboo was selected as the primary nature-based solution after assessing a range of ecosystem restoration and livelihood options based on expected adaptation benefits, scalability, local suitability, and long-term impact, a preliminary analysis is presented in *Table 5* and will be expanded at PFG stage. Alternatives such as mangrove restoration and seaweed cultivation were found unsuitable for the inland, drought- and erosion-prone areas targeted by the project. Indigenous hardwood reforestation offers biodiversity and carbon benefits but requires decades to mature, generates limited short-term income, and demands intensive management. Agroforestry systems involving fruit or cash crops often require high inputs of water and fertilizer, making them less viable in degraded landscapes with resource-poor communities.

80. In contrast, bamboo combines fast growth, deep root systems, low input needs, and the ability to thrive on degraded lands—directly addressing critical climate vulnerabilities such as soil erosion, water stress, and livelihood decline. Bamboo delivers rapid ecological benefits like land stabilization and moisture retention while simultaneously offering diversified income streams through timber, fiber, and energy products. Its adaptability to both humid and dry conditions, and its compatibility with community-based management, make bamboo an exceptionally scalable and sustainable option for piloting under this project. Preliminary cost-benefit assessments indicate that bamboo-based restoration provides among the highest returns per dollar invested for land rehabilitation in semi-arid regions. The estimated establishment cost of bamboo stands is USD 600–950 per hectare, including site preparation, seedlings, and training, compared with USD 1,200–1,500 per hectare for conventional reforestation. Within 3–5 years, bamboo cultivation begins generating household income through culm harvesting, bamboo shoot sales, and value-added processing, resulting in annual household income gains of USD 500–800¹²⁶. These figures demonstrate that the bamboo model offers both short-term livelihood improvements and long-term ecological gains at lower cost than comparable approaches. In addition, the project's cost-effectiveness will be ensured through the following points:

- **Leveraging existing institutional networks:** The project builds on the extensive operational presence and institutional relationships of UNIDO and INBAR in the target countries. By leveraging their existing platforms, partnerships, and project delivery infrastructure, the project reduces transaction and coordination costs that would otherwise be incurred during start-up and stakeholder mobilization. Through joint implementation by UNIDO and INBAR, the project capitalizes on existing nursery facilities, field demonstration sites, and community networks, avoiding the need for new infrastructure investments. This approach saves an estimated 15–20% in initial start-up and mobilization costs compared to establishing new delivery mechanisms¹²⁷.
- **Regional and South-South collaboration:** A regional, multi-country approach enhances efficiency by promoting the transfer of lessons, tools, and innovations between Ethiopia and Tanzania. Shared learning events, cross-border training, and joint methodology development eliminate duplication of efforts and allow for resource pooling, lowering per-country costs. The project further maximizes cost-efficiency by tapping into South-South cooperation with experienced bamboo-growing countries—including China, India, Vietnam, and Ecuador. These countries offer proven models, research, and technologies that can be adapted to local conditions, avoiding the high costs of developing new systems from scratch. By sharing technical materials, training modules, and monitoring tools

¹²⁶ INBAR (2019). *Bamboo for Land Restoration: A Cost-Effective Tool for Sustainable Land Management in Africa*.

¹²⁷ INBAR (2022). *Africa Bamboo Development Report 2022*.

between Ethiopia and Tanzania, the project reduces per-country design and delivery costs by an estimated USD 200,000–300,000, while accelerating capacity-building timelines¹²⁸.

- **Focus on scalable, adaptable solutions:** The project prioritizes interventions that are scalable and replicable, such as community-based bamboo cultivation, performance-based support for bamboo processors, and nature-based solutions for climate resilience. While tailored to each country’s context, these approaches rely on standardized methodologies and flexible delivery models, allowing economies of scale. For example, the training modules and impact metrics developed in Component 1 can be used across multiple communities and ecosystems, significantly lowering the unit cost of outreach and capacity building. Each community training cycle (covering approximately 1,000 beneficiaries) is estimated at USD 25,000–30,000¹²⁹, including facilitation, materials, and follow-up. This represents a 30% cost reduction compared to standalone national training models used in previous adaptation projects.
- **Long-term and multiplier impacts:** Bamboo offers a low-cost, high-impact climate solution with multiple co-benefits—economic, environmental, and social. Investments in bamboo nurseries, intercropping systems, and local processors generate recurring income for farmers and processors, reducing the need for ongoing financial support. Furthermore, bamboo-based nature-based solutions provide long-term ecosystem services with minimal maintenance costs, offering a strong return on investment. Additionally, the project supports market development and business incubation that will attract private-sector investment, creating multiplier effects and reducing dependence on donor financing. This economic self-reinforcement increases sustainability while reducing cost per impact over time. The project’s economic modeling anticipates that each dollar invested in bamboo-based livelihood activities will yield an estimated USD 3–4 in cumulative economic and ecosystem service benefits over a 10-year horizon, demonstrating a strong return on investment relative to alternative nature-based adaptation models^{130 131}.
- **Integrated knowledge and learning mechanism:** The establishment of a robust learning and knowledge-sharing ecosystem under Component 3 further supports cost-effectiveness. Tools, methodologies, and results will be systematically documented and disseminated within and beyond the two countries. This enables other regions and development partners to adopt proven approaches, spreading the benefits of the project without requiring major additional investments.

Option	Baseline presence in target areas	Relevant regions & groups	Main climate risks addressed	Indicative cost per direct beneficiary (USD)	Indicative establishment / upgrading cost (USD/ha)	Indicative timeframe for adaptation & livelihood benefits	Key strengths	Key limitations (incl. cost-effectiveness considerations)
Bamboo-based systems	Existing natural or previously established stands in both Ethiopia and Tanzania	Ethiopia Highlands; Oromia & Sidama, South Ethiopia; Tanzania Highlands – Mbeya, Iringa; smallholder farmers, women, youth, MSMEs	Drought, soil erosion, floods, livelihood diversification	Low–moderate (multiple households benefit per hectare; early livelihood gains where existing stands are upgraded)	Upgrading existing stands: USD 100–150 ¹³² New planting (limited): USD 600–950 ¹³³	Immediate–1 yrs where existing stands are upgraded ¹³⁴ ; 3–5 yrs where new planting occurs ¹³⁵	Builds on existing resources; annual returns after early period of establishment; diverse livelihood opportunities through management, processing, and markets; soil and water conservation benefits; integration as agroforestry	Benefits depend on market access and robust value chain development, technology, management capacity; new planting still requires time to mature ¹³⁶

¹²⁸ FAO (2018). *South–South Cooperation in Forestry and Land Restoration: Lessons Learned*.

¹²⁹ GEF (2022). *Guidelines for Cost-Effective Community-Based Adaptation*.

¹³⁰ UNEP (2018). *The Business Case for Investing in Natural Infrastructure*.

¹³¹ INBAR (2021). *Socioeconomic Assessment of Bamboo Value Chains in East Africa*.

¹³² FAO (2021). *Guidelines on Sustainable Bamboo Management*. Food and Agriculture Organization of the United Nations.

¹³³ FAO & INBAR (2022). *Bamboo for Land Restoration and Climate Resilience in Drylands*.

¹³⁴ UNIDO (2022). *Bamboo-based Value Chains and MSME Development for Climate Resilience*. United Nations Industrial

¹³⁵ FAO (2020). *Growth Cycles and Management Practices of Bamboo Species in Africa*.

¹³⁶ OECD (2020). *Nature-based Solutions for Adapting to Climate Change*. Organisation for Economic Co-operation and Development.

							and shelterbelts	
Wood lots	Existing new planting ¹³⁷	Ethiopia & Tanzania highlands	Soil erosion, Drought, alternative income options for grower	High (benefits accrue slowly and to a limited number of direct beneficiaries)	1,200–1,500 ¹³⁸	10–20+ yrs ¹³⁹	Provide alternative income for growers at onetime – interval of 10-20 years; source for charcoal and construction materials and carbon benefits	Monoculture and biodiversity risks; limited livelihood and product options; long gestation period ¹⁴⁰
Agroforestry (fruit/cash crops)	Partially present in some areas	Ethiopia – Oromia, South Ethiopia and Sidama & Tanzania – Mbeya, Iringa and Coastal regions; farmers, women	Drought, rainfall variability	Moderate (household-level benefits, but higher input and management costs per beneficiary)	1,000–1,400 ¹⁴¹	4–6 yrs ¹⁴²	Diversifies income sources and ensures food and nutrition security; maximize land use; soil and moisture conservation; minimizes people's migration due to food insecurity and reduces deforestation as a result of people's settlement	Requires water, fertilizer, and sustained inputs; shorter shelf life; climate sensitivity in degraded landscapes ¹⁴³
Watershed & upland reforestation	Present in Ethiopia highland areas; Limited; mostly new interventions in Tanzania	Ethiopia & Tanzania highlands	Floods, erosion; and drought	High (benefits are diffuse and largely indirect for households)	1,100–1,600 ¹⁴⁴	>10 yrs ¹⁴⁵	Effective at landscape scale; sustainable land management ; direct and indirect ecosystem services	Ownership issues; High coordination and opportunity costs; limited direct income generation ¹⁴⁶
Wetland rehabilitation (inland)	Present only in specific basins	Selected areas in Ethiopia & Tanzania	Flood buffering, drought moderation	High (primarily indirect beneficiaries ; limited household-level income effects)	900–1,300	Mostly indirect ¹⁴⁷	Strong hydrological regulation, biodiversity and carbon benefits	Site and species specific; limited livelihood benefits; governance-intensive

¹³⁷ FAO (2020). *Reforestation Practices and Costs in Eastern Africa*.

¹³⁸ World Bank (2020). *Cost Structures and Economic Performance of Reforestation and Landscape Restoration Projects*.

¹³⁹ IPCC (2022). *AR6 Working Group II – Impacts, Adaptation and Vulnerability*.

¹⁴⁰ GEF Independent Evaluation Office (2023). *Cost-effectiveness in Climate Adaptation Projects*.

¹⁴¹ FAO (2020). *Agroforestry Investment Costs and Input Requirements*.

¹⁴² IFAD (2021). *Timeframes for Returns in Smallholder Agroecological Systems*.

¹⁴³ World Bank (2019). *Climate Risks, Water Stress and Agricultural Productivity in Sub-Saharan Africa*.

¹⁴⁴ World Bank (2020). *Economics of Watershed Restoration Programs*.

¹⁴⁵ IPCC (2022). *AR6 WGII – Ecosystem-based Adaptation*.

¹⁴⁶ OECD (2021). *Economic Evaluation of Ecosystem Restoration and Nature-based Solutions*.

¹⁴⁷ OECD (2021). *Measuring Indirect Benefits of Ecosystem-based Adaptation*.

Mangrove restoration	Existing in coastal Tanzania only	Coastal communities	Sea-level rise, erosion; storm and flood management	Moderate–high (context-specific; benefits accrue over time)	900–1,300 ¹⁴⁸	5–10 yrs ¹⁴⁹	High coastal protection value; higher biodiversity and productivity	Not applicable to inland target areas
Seaweed farming	Existing in coastal Tanzania	Coastal communities	Livelihood diversification	Low–moderate (direct income for participating households)	700–1,100 ¹⁵⁰	1–2 yrs ¹⁵¹	Rapid income generation	Limited relevance to inland climate risks
Poly houses and micro-irrigation systems	Limited – private agriculture and floriculture investment	Ethiopia highlands; private industries and investment	Climate variability	High – with upfront investment costs for infrastructure – practiced by private investors (exports)	10000 - 200000	1-2 years	High land use intensity; higher turnover and profits	Limited relevance to smallholder farmers – only wage employment for youth and women;
Business-as-usual (current practices – rain-fed agriculture with limited irrigation in limited areas)	Existing practice across all target areas	Ethiopia Highlands; Oromia & Sidama, south Ethiopia; Tanzania Highlands – Mbeya and Iringa; smallholder farmers, women, youth, MSMEs	Drought, floods, soil erosion, heat and moisture stress; land slides	High (implicit, due to recurrent losses borne by households over time)	Low direct investment cost; high and recurring climate loss costs	Degradation improvement over time	No upfront public investment required	Declining productivity, increasing climate losses, continued ecosystem degradation, high recovery costs, and growing vulnerability over time

Table 5: Cost-effectiveness analysis comparison of climate solutions

E. Alignment with national/sub-national sustainable development strategies

81. By supporting the use of bamboo to increase the climate resilience and adaptive capacity of vulnerable communities, the project aligns with national strategies, plans and policies in Ethiopia and Tanzania as well as regional plans and strategies, as summarised below:

Ethiopia		
Plans/ strategies/ policies	Description	Relevant strategic points and alignment with the project
National Bamboo Development Strategy and Action Plan (2019-2030):	Focuses on sustainable bamboo development, utilization, and market creation.	The project contributes to the strategy's goals of expanding bamboo cultivation and utilization for climate adaptation and resilience.
National Forest Sector Development and Sustainable Land Management Programmes (2018-2028):	Aims to transform the forest sector to catalyze GDP growth, employment, and sustainable use of forest products.	The project supports the programmes' priority of improving land productivity and forest health by integrating bamboo into agroforestry systems and using it as nature-based solutions. The programme targets the rehabilitation of 5,815 hectares of land through Assisted Natural Regeneration. The project contributes to these indicators through pilot cultivation and intercropping demonstrations.
Green Legacy Initiative (2019):	A mass tree planting program aimed at restoring degraded lands, increasing forest cover, and reducing climate impact.	The project contributes to these goals by promoting large-scale bamboo planting, which not only supports land restoration but also provides sustainable livelihood opportunities and alternative resources for vulnerable communities.
National Adaptation Plan (NAP) (2019)	Addresses Ethiopia's adaptation needs to climate	The project aligns with the NAP by promoting climate-resilient livelihoods through bamboo cultivation, targeting vulnerable rural communities. It supports ecosystem-based

¹⁴⁸ UNEP (2020). *Mangrove Restoration Economics and Climate Adaptation Benefits*.

¹⁴⁹ IPCC (2022). *Coastal Ecosystems and Climate Adaptation*.

¹⁵⁰

¹⁵¹ World Bank (2019). *Blue Economy and Coastal Livelihoods in East Africa*

	change, focusing on vulnerable areas and ecosystems.	adaptation and forest restoration, strengthens adaptive capacity of farmers and SMEs, and contributes to integration of adaptation into local development plans.
Climate Resilient Green Economy (CRGE) Strategy (2011):	Aims to build a green economy by reducing greenhouse gas emissions and enhancing climate resilience.	The project supports the strategy goals by promoting bamboo's high carbon sequestration capacity. Due to its fast growth and short rotation period, bamboo can sequester carbon 4.5 to 6 times faster than many other tree species, making it an ideal plant for mitigating climate change.
Ethiopia's Nationally Determined Contributions (2011):	Ethiopia's NDC aims to cut GHG emissions by up to 68.8% by 2030.	The project supports the strategy's goal of achieving long-term climate resilience and low emissions by using bamboo's role as a sustainable alternative to timber and carbon-intensive materials. Ethiopia's NDC prioritises Agriculture, Forestry, and Other Land Use (AFOLU) for adaptation.
Ethiopia's 10-year development plan (2021- 2030)	Focuses on key priorities like economic diversification, green development, human resource development, infrastructure, and technological innovation.	The project supports economic diversification and green development by positioning bamboo as a sustainable value chain. It promotes climate resilience through nature-based solutions and land restoration, and strengthens human resources via capacity building for bamboo processors and farmers.
Reducing Emission from Deforestation and Forest Degradation (REDD+)	Aims to protect and restore forests, mitigate carbon emissions, and promote sustainable land use practices.	The project contributes to forest restoration and sustainable land use by promoting bamboo cultivation on degraded lands. It supports emission reduction through bamboo's carbon sequestration potential and delivers livelihood co-benefits by creating income-generating opportunities for farmers and bamboo processors.
The National Entrepreneurship Strategy (NES) of Ethiopia (2020-2025)	Aims to create an enabling environment for existing and aspiring entrepreneurs, including youth and women.	The project promotes inclusive entrepreneurship by supporting women- and youth-led bamboo enterprises with capacity building, market access, and financial support, aligned with NES objectives.
Tanzania		
National Climate Change Strategy (2021-2026):	Aims to enable Tanzania to effectively adapt to climate change and participate in global efforts to mitigate climate change, whilst achieving sustainable development.	Promotes adaptation and mitigation through bamboo-based restoration, livelihood diversification, and low-carbon processing practices.
National Adaptation Programme of Action (NAPA) (2007):	Identifies immediate and urgent climate change adaptation actions to reduce risks to sustainable development.	Provides immediate, community-based adaptation through climate-resilient bamboo cultivation and income-generating opportunities for vulnerable populations.
National Bamboo Development Strategy and Action Plan (2023-2031)	Focuses on transforming sustainable management of bamboo resources to foster green industries and promote high-value products.	The project directly supports this strategy by building a coordinated bamboo ecosystem, strengthening value chains, and supporting stakeholders to deliver climate adaptation and resilience benefits through bamboo-based livelihoods.
National Forest Policy Implementation Strategy (NFPIS) (2021-2031)	Enhances the contribution of the forest sector to sustainable development and conservation of natural resources.	The project promotes sustainable forest management through bamboo-based afforestation, restoration of degraded land, and the development of value-added bamboo products.
Tanzania's Nationally Determined Contribution (NDC)	Focuses on enhancing climate resilience and reducing emissions through sustainable land use, water management, renewable energy, and support for vulnerable communities.	Tanzania's NDC prioritises Agriculture, Livestock, and Forestry for adaptation. Bamboo's benefits are relevant to these sectors.
National Community Based Forest Management (CBFM) Action Plan (2021-2031)	Supports community-based forest management initiatives, including bamboo cultivation, to improve forest values and provide environmental and social services.	The project enhances CBFM goals by promoting bamboo cultivation and processing at the community level, linking sustainable resource use with improved incomes and forest conservation.
Regional Framework		
EAC (East African Community)		
EAC Climate Change Master Plan (2011-2031):	Guides the region's response to climate change through adaptation and mitigation strategies.	The project supports regional climate action by providing bamboo-based solutions for adaptation, promoting sustainable land use, and contributing to resilience through the development of standardized methodologies and impact metrics for bamboo interventions.
EAC Vision 2050 (2015-2050)	Aims to transform the region into an upper-middle-income economy with sustainable development.	The project supports sustainable development by promoting bamboo as a nature-based solution and alternative livelihood option for vulnerable communities, while generating jobs and market linkages through a strengthened bamboo value chain.
SADC (Southern African Development Community)		
SADC Regional Indicative Strategic	Aims to achieve sustainable development and poverty	The project contributes to regional development by promoting inclusive economic growth through bamboo-based livelihoods, strengthening value chains, and facilitating regional knowledge sharing and resource coordination.

Development Plan (RISDP) (2020-2030)	eradication through regional integration and cooperation.	
SADC Climate Change Strategy and Action Plan (2015-2030)	Addresses climate change impacts and promotes adaptation and mitigation measures across the region.	The project aligns with the strategy by offering practical bamboo-based adaptation measures, improving resilience for vulnerable communities, and contributing to climate adaptation indicators through the use of monitoring metrics and tools.
UN Sustainable Development Cooperation Framework		
UN Sustainable Development Cooperation Framework (UNSDCF) for Ethiopia (2020-2025)	Support Ethiopia's sustainable development priorities with a focus on inclusion, prosperity, sustainability, peace, and the SDGs.	The project advances the UNSDCF by co-developing inclusive bamboo adaptation strategies (Component 1), empowering vulnerable groups through climate-resilient livelihoods (Component 2), and influencing policy for sustainability and peacebuilding. It supports evidence-based decision-making, inclusive governance, and restoration of degraded land to achieve the SDGs.
UN Sustainable Development Cooperation Framework (UNSDCF) for Tanzania (2022-2027)	Guide coordinated UN support to implement the 2030 Agenda, FYDP III, ZADEP, and regional commitments like EAC Vision 2050 and Agenda 2063.	The project supports the UNSDCF by scaling the bamboo value chain as a nature-based solution, empowering local farmers and processors, and contributing to regional development and climate goals through sustainable land use, market linkages, and environmental restoration across rural Tanzania.

Table 6: Alignment with national/sub-national sustainable development strategies

F. Alignment with national technical standards

82. The project is designed to fully comply with relevant national technical standards in both Ethiopia and Tanzania, as well as with the Adaptation Fund's ESP. This commitment is integrated across all components. Alignment with national environmental regulations: i) Ethiopia's Environmental Impact Assessment Proclamation (Proclamation No. 299/2002) and associated directives, requiring screening and permitting of activities with potential environmental impacts; ii) Tanzania's Environmental Management Act (2004) and the Environmental Impact Assessment and Audit Regulations (2005), including obligations for environmental permits, community engagement, and mitigation plans. Activities such as the establishment of bamboo nurseries, land rehabilitation, and processing facility upgrades will be subject to EIA screening and, where required, formal environmental clearance processes. All cultivation activities will use non-invasive bamboo species suited to local ecological conditions, in line with national biodiversity and land use policies. National building codes in both countries when developing bamboo-based construction materials and promoting their use in housing, infrastructure, or post-disaster shelters; Standards for sustainable forest and agroforestry management, including those from relevant forestry authorities and agricultural ministries; Occupational health and safety regulations for bamboo processing, training centers, and MSME activities; Certification or quality standards for bamboo products (e.g., for energy, furniture, packaging), where applicable under national or regional trade frameworks.
83. For Ethiopia, the Institute of Ethiopian Standards (IES) in collaboration with INBAR has adopted 19 standards for bamboo products, listed below, to facilitate market access by aligning with international benchmarks, and promote sustainable practices for harvesting and processing. These standards will be integrated into training modules, capacity-building efforts and technical support activities, ensuring that all project-supported products and processes meet local compliance requirements. The Tanzania Bureau of Standards (TBS) has developed draft standards to regulate bamboo products. A draft version that is not yet published is being drafted and standards will be incorporated as soon as available: 1ES 6416:2021: Design of Bamboo Structures; ES 6417:2021: Preservation of bamboo Part 1: for construction purpose; ES 6418:2021: Preservation of bamboo part- 2: for non-construction purpose; ES 6419-2021: Preservation of Timber - Code of practice; ES 6420-2021: Specification for water soluble type wood Preservative; ES 6421-2021: Specification for water soluble type wood preservatives Copper-Chrome-Arsenal (CCA) wood preservative; ES 6422-2021: Specification of water soluble type wood preservation, Copper-Chrome-boron, CCB; ES 6925-2021: Bamboo curtain; ES 6422-2021: Specification for water soluble type wood preservatives Copper-Chrome-Boron (CCB) wood preservative; Moreover, the following national standards are under public review: ES 6971:2022 Bamboo based furniture specification; ES 6972:2022 Bamboo bicycle frame specification; ES6973:2022 Bamboo scaffolding requirement; ES 6974:2022 Bamboo incense sticks; ES 6975:2022: Edible bamboo shoot- requirements; ES ISO 19624:2022: Bamboo structure-grading of bamboo culm basic principle and procedures; ES ISO 5946:2022: Bamboo based activated carbon- general specification; ES ISO 21626-1:2022: Bamboo charcoal part 2, fuel application; ES ISO 19624:2023 Bamboo structure-grading of bamboo culm basic principle and procedures; ES ISO 21625:2023 Vocabulary related to bamboo and bamboo products; ES ISO 22157:2023 Bamboo structure - determination of physical and mechanical properties of bamboo culms, test method; ES ISO 19626:2023 Bamboo charcoal part 1: Generalities.

G. Duplication of project with other funding sources

84. During the design of this project and at the time of conducting stakeholder consultations, it was ensured that there is no duplication of project interventions in the two target countries. The below table provides ongoing and upcoming initiatives that this project will coordinate and collaborate with to create synergies.

Project title	Time- frame / Financiers	Short Description of Intervention	Synergy Opportunities
Amplifying the impact of the “Challenge Programme for Adaptation Innovation” of the GER through learning and knowledge management (CAIL)	2023 – ongoing GEF through UNIDO	The objective of this project is to accelerate innovation and private sector engagement in climate change adaptation, by identifying, sharing, and disseminating learnings and the knowledge generated in this field, including those projects supported by the GEF-managed LDCF and SCCF through the Challenge Program for Adaptation Innovation, in the areas of (i) investment funds, (ii) MSME incubation and acceleration, and (iii) CCA impacts and measures.	Strong links and coordination will be ensured between this project and CAIL through: <ul style="list-style-type: none"> Incorporating knowledge and learnings from the CAIL on the methodologies and tools that will be developed by this project, particularly concerning Project Component 3. Having bamboo processors and other interested stakeholders becoming part of the CAIL CoPs and contributing to knowledge generation and dissemination.
19 Challenge Programme on Adaptation Innovation projects	2021 – ongoing GEF through several GEF Agencies including UNIDO	All 19 Challenge Programme projects aim at catalysing innovation to harness the power of private sector actors for achieving adaptation results, through testing and validation of scalable, bankable or otherwise fundable investment approaches, business models and partnerships, and technologies.	Strong links with these projects will be created through CAIL on innovative models and examples to mobilize private investment in the adaptation space.
Adaptation Fund Climate Innovation Accelerator (AFCIA)	Ongoing Adaptation Fund (AF) in partnership with UNDP, UNEP/CTCN, UNIDO, WFP	AFCIA, aims to foster innovation in climate change adaptation in developing countries. The programme targets a broad range of potential finance recipients, including governments, non- governmental organizations, community groups, entrepreneurs, young innovators and other groups. It will award competitive grants of up to US\$ 250,000 each.	Strong collaborative linkages with the AFCIA will be established to enhance the development, adaptation, and dissemination of methodologies and toolkits for climate adaptation and resilience-building.
Inclusive GEF Assembly Challenge Program 76	2024 – ongoing GEF through UNIDO	The objective of the GEF Assembly Challenge Program is to catalyze inclusive and innovative on-the-ground action, to be implemented by a wide range of partners, that addresses global environmental priorities and climate change challenges.	Lessons learned from implementation of the Inclusive GEF Assembly Challenge Program will be made available in the peer learning and knowledge exchange activities with a special focus on inclusivity as part of PC3.
Promoting adaptation and resilience through innovation and entrepreneurship for green jobs and livelihood improvement in Ethiopia	2024 – ongoing GEF through UNIDO	Builds resilience and adaptive capacities of vulnerable communities in southeastern and southern Ethiopia through the promotion of climate-resilient agro-pastoral productive practices, emergency preparedness and innovative business models for value addition and employment along the agro-pastoral and non-wood forestry products value chains.	The project strengthens institutional capacity and will create an enabling environment for climate-resilient value chains, which can support bamboo sector development. Its focus on climate-resilient primary processing and value addition aligns with sustainable bamboo processing and eco-friendly business models.
China-Africa-UNIDO CoE Agriculture modernization Pillar	2025 - ongoing	Implements the Global Development Initiative and the Ethiopian Ten-Year Perspective Development Plan, and to facilitate Africa’s industrialization, agriculture modernization, and talent development, to contribute to the implementation of the United Nations 2030 Agenda for Sustainable Development	The project supports agriculture modernization, industrialization, and technology-driven value chain development. The CoE’s focus on agro-processing capacity and value chain upgrading can directly benefit bamboo-based industries by providing technical expertise, infrastructure, and market access opportunities.
SMARTFARM - A data and digital technology driven and farm management solution for climate resilience	2025-2027 GEF through UNIDO	Makes real-time weather and climate data along with data-driven farm advisory available to smallholder farmers, hence increasing adoption of climate resilient agriculture practices and enhancing rural communities’ resilience to climate change	The project will leverage data-driven farm management and climate adaptation strategies to improve productivity and resilience. Its focus on climate-smart agriculture, resource efficiency, and access to markets and finance can directly support bamboo cultivation and processing by integrating precision farming techniques, efficient water use, and optimized crop cycles for bamboo agroforestry.
Support to mechanized agriculture systems in Ethiopia (Amhara Regional State)	2024-2026 China through UNIDO	The overall objective of the project is to reduce rural poverty through the adoption of best agriculture mechanization systems and practices.	The project will be aligned with these strategies by creating synergies through shared knowledge, learning exchanges, and coordination mechanisms that strengthen the impact and scalability of bamboo-based climate resilience solutions.
Dutch Sino East Africa Bamboo Development Programme Phase II	2020 – 2024 (completed) INBAR	The overall program goal is to enhance climate change mitigation and adaptation benefits by developing inclusive and sustainable industrial and SME bamboo value chains resulting in enhanced	The project will be aligned with these strategies by creating synergies through shared knowledge, learning exchanges, and coordination mechanisms that strengthen the impact and scalability of bamboo-based climate resilience solutions.

		livelihood opportunities, food security and environment management in East Africa.	
Building Circular Economy and Climate Change Resilience through Bamboo Supply Chain Development in Ethiopia	2022 –2025 INBAR	The overall project goal is contributed to building circular economy and resilience to climate change through the development of bamboo based reliable supply chain development in Ethiopia.	The project will be aligned with these strategies by creating synergies through shared knowledge, learning exchanges, and coordination mechanisms that strengthen the impact and scalability of bamboo-based climate resilience solutions.
Promoting a Bamboo-Based Circular Economy for Job Creation, Economic Development, and Climate Change Mitigation and Adaptation in Ethiopia and Mozambique.	2025 – 2028 INBAR	The overall objective of the programme is to promote bamboo as a nature-based solution for enhancing climate change mitigation and adaptation benefits through diversified bamboo production systems in Ethiopia and Mozambique.	Strong linkages will be developed between both the projects with INBAR will be implementing this project and will be associated with UNIDO in implementing the Adaptation Fund project. Components such as developing governance mechanisms, bamboo resource development and south-south cooperation will have strong convergence will compliment each other project for scaling up.
Building climate resilience in the landscape of Kigoma region of Tanzania.	2024-2029 GCF	The project focuses on ecosystem-based adaptation to build climate resilience and enhance peaceful coexistence in communities.	The best practices on community engagement and livelihoods promotion will be scaled-up and adopted. The project sites are different to the proposed project and avoid the duplicity.
Scaling Up Nature-Based Solutions for Climate Resilience in Tanzania: IUCN and NORAD Launch RESOLVE-NbS. in rural communities.	2025-2026 NORAD	The project will develop a GIS-based knowledge management system on adaptation interventions that will support the inter-sectoral coordination mechanisms for adaptation planning.	The adaptation technologies to support vulnerable communities could be replicated where applicable.
CCA Growth: Implementing Climate Resilient and Green Economy plans in highland areas in Ethiopia	GEF	This project focuses on mainstreaming climate risks into national and sub-national planning processes to increase the resilience of local communities in the Ethiopian highlands.	The project will be aligned with these strategies by creating synergies through shared knowledge, learning exchanges, and coordination mechanisms that strengthen the impact and scalability of bamboo-based climate resilience solutions.
Resilient Landscapes and Livelihoods Project	GCF	This project aims to improve climate resilience, land productivity, and carbon storage in vulnerable rural watersheds, while also increasing access to diversified livelihood activities.	The project will be aligned with these strategies by creating synergies through shared knowledge, learning exchanges, and coordination mechanisms that strengthen the impact and scalability of bamboo-based climate resilience solutions.
Strengthening Climate Information and Early Warning Systems in Ethiopia	UNDP	This project aims to enhance the capacity of the national early warning network to forewarn and rapidly respond to extreme climate event.	The project will be aligned with these strategies by creating synergies through shared knowledge, learning exchanges, and coordination mechanisms that strengthen the impact and scalability of bamboo-based climate resilience solutions.

Table 7: Synergies with other projects

H. Learning and knowledge management mechanism

85. The learning and knowledge management component of Project Component 3 serves as an integral connector, synthesizing and amplifying insights across all dimensions of the project intervention. By systematically capturing, documenting, and disseminating lessons learned, this component enhances the coherence, effectiveness, and replicability of bamboo-based climate adaptation solutions. It aligns closely with other project components, ensuring that insights from adaptive cultivation practices, bamboo processors growth initiatives, policy integration processes, and stakeholder collaborations are continuously gathered and shared. A structured learning agenda identifies core themes and utilizes robust data collection methods including regular progress reviews, field visits, and stakeholder interviews. Collected insights are then compiled into practical knowledge products such as case studies, toolkits, and manuals that vividly illustrate the technical, financial, and social aspects of the project interventions. Strategic communication and outreach further unify the project, targeting diverse audiences (farmers, bamboo processors, investors, policymakers) with tailored messages and impactful materials including visuals, videos, brochures, and success stories. These knowledge products are strategically disseminated at local, regional, and international platforms such as specialized fora, trade fairs, and community gatherings, using comprehensive media campaigns and leveraging local influencers and strategic partnerships. Active participation in prominent global events—including COP, UNIDO Climate Adaptation Week, and UNFCCC climate weeks—extends the project's visibility and impact, promoting the broader adoption and scaling of successful bamboo-based climate adaptation approaches.

86. For maximum visibility, the project will be included in the GEF-funded UNIDO [Climate Adaptation Innovation and Learning \(CAIL\)](#) project's platform and learning mechanism, including knowledge exchange with other innovative projects promoting climate adaptation and resilience for vulnerable communities. This integration includes knowledge-sharing opportunities with other innovative projects focused on climate adaptation and resilience for vulnerable communities. A dedicated project webpage within the CAIL platform will serve as a central hub for disseminating project events, recordings, knowledge materials, outcomes, and success stories. Synergies will be created with below knowledge management platforms: Global Landscapes Forum (GLF); Climate Knowledge Hub (WeADAPT); Africa Adaptation Knowledge Network (AAKNet); Ethiopia's Climate Resilient Green Economy (CRGE); Tanzania's National Climate Change Knowledge Management System (NCCKMS); Community Radio.

I. Stakeholder consultations

87. As part of the concept proposal development, the project team engaged in consultations with key project stakeholders, with the purpose of informing the project design by better understanding the gaps, needs, vulnerabilities, interest in the project, and potential roles. A multi-level consultation process will continue during the full proposal development phase, building on initial engagements and deepening collaboration with a wide range of actors, including farmers, processors, financial institutions and local governments. Particular attention is being given to gender- and youth-focused farmers and processors. Consultations are designed to ensure inclusive participation, especially of vulnerable groups such as women, youth, marginalized populations, and indigenous peoples, whose insights will be essential to shaping context-responsive and equitable project interventions. During the consultation process, the project grievance mechanism will also be introduced and promoted to ensure transparency and accountability from the outset. Comprehensive consultation reports will be made available as annexes to the final project proposal, documenting stakeholders consulted, dates, discussion topics, and how stakeholder inputs have been reflected in project planning and design. Stakeholder engagement carried out so far is summarized in the sections below. The project team engaged closely with the Adaptation Fund's National Designated Authorities (NDAs) in Ethiopia and Tanzania throughout the project design process. In each country, two formal meetings were held: one at the beginning of the concept development phase to assess alignment with national priorities, and another shortly before submission to gather final feedback and validate the proposed design. Meeting minutes are available in Annex 3.

11. Consultations with Ethiopian and Tanzanian governments

88. In September 2024, an initial consultation call was held with the Ethiopian NDA, represented by the Ethiopian Forestry Development. During this meeting, the project concept was presented and preliminary feedback was gathered to ensure the idea aligned with Ethiopia's climate adaptation priorities. The NDA confirmed strong interest in the project, emphasized the importance of engaging local communities, and expressed a preference for integrating mitigation co-benefits into the design. The restoration of degraded land was highlighted as a top national priority. In the same month, a meeting was held with the Tanzanian NDA, represented by the Ministry of Natural Resources and Tourism. The NDA welcomed the project idea and expressed interest in further exploring the potential of bamboo as an adaptation solution, noting that the bamboo value chain is currently underdeveloped in Tanzania. The project was seen as an opportunity to strengthen this area while contributing to broader resilience goals. A second round of consultations with both NDAs was held in April 2025, during which the project team presented the final concept draft to validate the project activities and alignment with national priorities for submission to the Adaptation Fund. During the meeting, both NDAs expressed the willingness to expand the project's geographical scope to Central Ethiopia and Dar es Salaam and requested to engage in further consultations in these regions as well as consider the possibility to widen the geographical scope at PFG stage.

12. Survey distribution for community engagement

89. The project team developed three surveys for in-person distribution, which took place from March 10th to March 21st, 2025, in the project's target districts in Ethiopia (Sidama, Central Ethiopia, South Ethiopia, and Addis Abeba) and Tanzania (Iringa, Mbeya and Dar es Salaam). The primary purpose was to inform the project design and validate assumptions based on desk-based research. The survey results contributed to the development of project outputs and activities, which were incorporated into the concept document—including the background section on climate change impacts, the barrier analysis, and the project structure—to provide key rationales for the proposed project activities. A stakeholder mapping exercise was conducted to identify key stakeholders for engagement and define the purpose of the consultations. Based on this, targeted surveys were developed—one for each stakeholder group, as outlined below:
- **Bamboo famers/harvesters** in Sidama and South Ethiopia (Ethiopia) and Iringa and Mbeya (Tanzania): This group was identified as one of the project's primary beneficiary groups. The survey aimed to understand how and why they grow bamboo, whether they integrate it with other crops or grow it exclusively, whether they process it themselves and for what purpose, or if they sell it and to whom. It also explored the barriers they face in bamboo

cultivation, the climate impacts they have experienced, their interest in participating in the project to manage bamboo more sustainably, and the types of support they would need.

- **Famers growing other crops than bamboo** in Sidama and South Ethiopia (Ethiopia) and Iringa and Mbeya (Tanzania): This group was also identified as a key beneficiary of the project. The survey focused on understanding the types of crops grown, the climate impacts experienced, and reasons for not cultivating bamboo. It also examined barriers to bamboo integration, their interest in adopting bamboo cultivation, and the support they would require to do so.
- **Bamboo processors** in Sidama, South Ethiopia, Oromia and Addis Abeba (Ethiopia) and Iringa and Mbeya (Tanzania): processors were targeted as key enablers of value addition and facilitators of benefits for vulnerable communities. Although the main project areas are Sidama, South Ethiopia, and Iringa and Mbeya, processors in Oromia and Addis Abeba were included due to their relevance and proximity to the target regions. The questionnaire investigated what bamboo products they process, where they source bamboo from, the challenges they face, their interest in participating in the project, and the type of support they would need.
- **Local governments** in Sidama, South Ethiopia, and Addis Abeba (Ethiopia) and Iringa and Mbeya (Tanzania): This group was consulted to better understand existing strategies and policies and to identify gaps in integrating bamboo for climate adaptation and resilience. The survey targeted local authorities and regulatory agencies to assess policy effectiveness and implementation challenges related to bamboo development. It gathered insights on existing regulatory frameworks, support for bamboo processors, challenges in attracting investment, and available support for bamboo businesses, including financial incentives, market access, and business development services.

90. A total of 46 smallholder farmers, 15 bamboo processors, and 4 local authorities responded to the surveys, a full breakdown is available in Table 7. Ethiopia covered a larger area and recorded a higher number of responses, particularly in regions such as Sidama and South Ethiopia, while Tanzania—represented primarily by Mbeya—had fewer responses. The gender balance among smallholder farmer respondents was strong across both countries, with 15 male and 15 female farmers participating. The consultative process adhered to the guidelines of the Adaptation Fund’s Environmental and Social Policy, with particular emphasis on the inclusion of vulnerable groups, gender considerations, and the engagement of all relevant stakeholders. Vulnerable groups, especially women farmers, were specifically targeted to ensure their voices were heard and their needs integrated into the project design. The survey analysis results are integrated into relevant sections of the concept document, including the climate impacts analysis, barrier analysis, and project structure.

Country	Location (Region)	Stakeholder Type and Number			
		Smallholder farmers		Bamboo processors	Local authorities
		Male	Female		
Tanzania	Mbeya	3	6	8	1
	Iringa	5	2	-	-
Ethiopia	South Ethiopia	5	5	1	1
	Sidama	18	2	3	1
	Oromia	-	-	2	
	Addis Ababa City	-	-	1	1
TOTAL		31	15	15	4

Table8: Overview of responses to the survey distribution

J. Justification for funding requested

91. This project was designed from the outset based on the resources requested from the Adaptation Fund. All interventions—including their scale, delivery modalities, and institutional arrangements—have been carefully calibrated to operate within the proposed AF grant. The project does not foresee co-financing, all planned outcomes can be fully achieved through Adaptation Fund resources alone, without dependence on uncertain external contributions. The project targets selected districts in Ethiopia and Tanzania (rather than national coverage) to ensure depth and quality of support within a manageable area and cost envelope. The number of farmers, processors, and communities targeted will be carefully calculated to match budgeted resources. The global imbalance between mitigation and adaptation financing continues to leave local communities highly exposed to climate risks. While annual adaptation costs in developing countries are projected by the UN to reach between USD 155 and 330 billion by 2030,

only USD 63 billion was mobilized in recent years—compared to over USD 430 billion for mitigation¹⁵². Adaptation remains critically underfunded, particularly for locally-led, nature-based and MSME-driven approaches that are essential for responding to the lived realities of vulnerable populations. There is an urgent need to channel adaptation finance directly to the local level, where climate impacts are felt most acutely, and where solutions must be context-specific and community-owned. The project structure is explicitly designed to fill this gap. The project applies the Adaptation Fund’s full cost of adaptation principle by investing in community-led climate planning and piloting of bamboo-based solutions that would not otherwise be possible. Without AF support, these activities would remain financially and institutionally out of reach due to limited local capacity, lack of enabling environments, and inadequate access to early-stage financing. This project directly supports groups that are typically excluded from adaptation finance mechanisms. The milestone-based funding approach ensures cost-effective delivery within budgetary limits, including technical assistance, seedling provision, localized training, and AI-enabled decision tools that improve climate responsiveness and scalability. As outlined in detail in section C1.a, several project interventions fall under the category of USPs, including the community-led selection of nature-based solutions and livelihood options, as well as the deployment of tailored solutions for bamboo processors. These components are intentionally left undefined at the proposal stage to uphold the principle of community ownership and ensure responsiveness to local needs. This approach does not require additional funding: rather, it ensures that Adaptation Fund resources are flexibly and efficiently allocated during implementation to respond directly to specific climate risks and vulnerabilities identified by communities themselves—needs that would otherwise remain unaddressed. To measure the benefits of the funding provided, the project also co-designs locally relevant indicators for bamboo-based resilience (Output 1.3.1), embedding participatory monitoring into rollout processes, and linking learning loops across community systems, digital tools, and institutional platforms.

K. Project sustainability

92. The project’s sustainability is anchored in strong community ownership, local institutional capacity, dynamic learning systems, resilient market linkages, embedded policy influence, diversified financing mechanisms as well as environmental stewardship. Communities are not passive recipients but active co-creators of climate adaptation plans, ensuring solutions are locally relevant, inclusive, and enduring. Adaptation groups are formalized and integrated into local governance structures to maintain leadership and decision-making capacity beyond the project’s duration. Long-term institutional sustainability is secured through the establishment of Bamboo Hubs embedded within national universities or other key national institutions which will be identified following a call for proposals. These hubs, integrated into academic curricula and research programs, will serve as permanent centers for innovation, training, and collaboration. The project creates a dynamic knowledge ecosystem by implementing a structured learning agenda, deploying the AI-powered Bamboo Twin Tool, and integrating project lessons into national knowledge platforms. This ensures continuous learning, adaptation, and replication. Bamboo value chains are strengthened through processor upgrading, innovation deployment, and market linkage facilitation, creating sustainable livelihoods and economic incentives that will outlast project support. Evidence generated across the project is systematically translated into policy recommendations and integrated into national adaptation plans, ensuring broader systemic change. Financial sustainability is supported through investment partnerships, enterprise development, and revenue-generating models at the hubs. The project also positions its approach for future climate finance mobilization to ensure expansion and scale. Finally, the project ensures environmental sustainability by deploying bamboo as a nature-based solution that restores degraded landscapes, enhances ecosystem services, and reduces communities’ exposure to climate hazards. As a fast-growing plant that matures in 3–5 years, bamboo offers rapid climate and livelihood benefits. It regenerates naturally without replanting, allowing for continuous harvesting while relieving pressure on natural forests. Its capacity to thrive in degraded or marginal soils makes it ideal for land rehabilitation in areas unsuitable for conventional crops.

L. Environmental and social impacts and risks

93. The project will fully comply with the Adaptation Fund’s ESP requirements. As per UNIDO’s ESSPP, the project has been screened against environmental and social risks and classified as a Category B project. Consequently, an ESMF will be developed and implemented. The ESMF will act as an early-stage risk assessment and mitigation tool for all community-level interventions, ensuring that supported solutions are environmentally responsible, socially appropriate, and legally compliant. It will facilitate systematic evaluation and management of potential environmental and social risks—including land tenure conflicts, labour conditions, resource overuse, and other site-specific concerns—in

¹⁵² <https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2023/>

alignment with both ESP Principles and applicable national laws and regulations. The ESMF will integrate specific management measures and monitoring activities identified during the impact assessment process. Interventions will be categorized by risk level (low, moderate, high), with high-risk activities subject to rigorous scrutiny, potential redesign, or exclusion. Furthermore, the ESMF will guide the E&S risk screenings and assessments for any unidentified subprojects (USPs) that will be supported through this project and will incorporate additional site-specific mitigation measures in the overall ESMP, if needed. Where applicable, the process will require Free, Prior, and Informed Consent (FPIC), promote transparency, and ensure inclusive community engagement. Environmental and social impacts identified at this stage are summarized in the table below:

Checklist of environmental and social principles	No further assessment required for compliance	Potential impacts and risks – further assessment and management required for compliance
<i>Compliance with the Law</i>		MEDIUM RISK - While the project is fully aligned with Ethiopian, Tanzanian and international regulations and benefits from strong government endorsement, some uncertainty remains regarding the legal compliance capacity of implementing partners such as INBAR, local subcontractors, and the SMEs that will be selected later. To mitigate this risk, the project will conduct thorough compliance screening prior to contracting or supporting any partner or SME, verifying registration status, permits and adherence to national regulations. Where gaps are identified, partners will receive clear guidance and time-bound corrective actions before engaging in project activities. A more detailed assessment and corresponding mitigation measures will be further elaborated during the full proposal development stage.
<i>Access and Equity</i>		LOW RISK - The project focuses on strengthening the climate resilience and adaptive capacity of vulnerable communities through bamboo, prioritizing equitable access to resources, finance, and market opportunities. However, there is a risk that marginalized groups, including rural smallholder farmers and women-led businesses, may face barriers to accessing project benefits. Measures will be implemented to ensure inclusive participation and equitable distribution of project resources, ensuring that communities in Ethiopia and Tanzania benefit equitably. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Marginalized and Vulnerable Groups</i>		MEDIUM RISK - Smallholder farmers, women, and youth in Ethiopia and Tanzania are disproportionately vulnerable to climate change. The project aims to provide adaptation and resilience benefits through bamboo-based livelihoods and nature-based solutions, yet there is a risk that certain marginalized groups may not fully benefit due to existing socio-economic barriers. Targeted interventions will ensure inclusivity in skill development, financial access, and decision-making processes while addressing structural barriers that limit participation. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Human Rights</i>		LOW RISK - The project's planned activities do not pose any risk of infringing international human rights standards, and its design is aligned with national and international frameworks. However, the risk cannot be considered fully low because the USPs—such as SMEs and local subcontractors—are not yet known, and their human-rights practices, labour conditions and adherence to safeguards may vary. To mitigate this risk, all USPs will undergo a dedicated human-rights screening as part of the ESMF before any support is approved, ensuring compliance with labour rights, non-discrimination, occupational safety and the protection of vulnerable groups. Any shortcomings will require corrective actions prior to engagement. A more detailed assessment and corresponding mitigation measures will be further elaborated during the full proposal development stage.
<i>Gender Equity and Women's Empowerment</i>		MEDIUM RISK - While the project promotes women's participation in the bamboo sector, there is a risk of unequal benefit distribution due to structural barriers—particularly the predominance of male land ownership in many target areas. Capacity-building initiatives will be tailored to address gender-specific constraints, and safeguards will be in place to ensure gender equity in decision-making and resource allocation. In parallel, the project will deliver tailored training, mentorship, and entrepreneurship support to empower women as agents of change in climate resilience and green value chains. Special attention will be given to ensuring that women are not disproportionately burdened by unpaid labor or excluded from emerging opportunities. A gender action plan will be developed to fully mainstream gender considerations into project design and implementation. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Core Labour Rights</i>		LOW RISK - Many smallholder farmers and bamboo processors operate in the informal sector with limited labour rights protections. Risks include informal employment conditions, lack of occupational health and safety standards, and potential child labour concerns. The project will promote labour rights awareness and support compliance with international labour standards through training and policy integration, ensuring that all labour practices align with core labour rights. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Indigenous Peoples</i>		LOW RISK - Indigenous communities in Ethiopia and Tanzania may depend on natural resources for their livelihoods. While the project promotes sustainable bamboo cultivation, there is a risk that some groups may be inadvertently excluded from project benefits. Efforts will be made to ensure their inclusion through participatory planning and culturally appropriate engagement strategies, recognizing traditional knowledge and practices where relevant. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Involuntary Resettlement</i>	X	Activities in the proposed project will not cause involuntary settlement of local communities. Unidentified subproject (SMEs) will be screened to avoid supporting any projects leading to resettlement as a part of the ESMF.
<i>Protection of Natural Habitats</i>		MEDIUM RISK - Bamboo cultivation can support ecosystem restoration, but poor land-use planning or improper management may lead to unintended habitat disturbance and maladaptation. The project will apply best practices in agroforestry to minimize environmental risks and protect biodiversity, particularly in vulnerable ecosystems in Ethiopia and Tanzania. Species are selected based on ecological appropriateness and non-invasiveness, guided by bamboo resource mapping, stakeholder consultations, and alignment with national forestry regulations.
<i>Conservation of Biological Diversity</i>		LOW RISK - Bamboo is a nature-based solution for climate resilience, but unsustainable harvesting or monoculture practices could pose risks to biodiversity. Large-scale bamboo cultivation may replace native vegetation, reduce biodiversity, and degrade local ecosystems. The project will ensure biodiversity-friendly

		management practices, promote indigenous bamboo species, and avoid the introduction of invasive species to prevent ecological imbalances. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Climate Change</i>		LOW RISK - The project directly contributes to climate adaptation and mitigation. However, there is a risk that certain bamboo processing activities may have unintended carbon footprints. Efforts will be made to implement energy-efficient processing methods, promote sustainable value chains, and reduce greenhouse gas emissions from production activities. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Pollution Prevention and Resource Efficiency</i>		LOW RISK - Bamboo processing industries may generate waste and pollution if not properly managed. The project will incorporate waste management strategies and promote resource efficiency to minimize environmental impact. Sustainable resource use and circular economy principles will be integrated into value chain development. Further assessment and management will be required during implementation to ensure full compliance with this principle.
<i>Public Health</i>	X	The project does not involve hazardous materials or health-impacting activities; this is avoided by adhering to safety standards and excluding harmful substances.
<i>Physical and Cultural Heritage</i>	X	No activities occur near cultural or historical sites; this is avoided by confirming project locations do not intersect with protected areas.
<i>Lands and Soil Conservation</i>		MEDIUM RISK - While bamboo planting improves soil stability and fertility in the long term, initial land preparation (clearing, tilling, or slope modification) may temporarily disturb soil structure and increase erosion risk if not properly managed. This will be further assessed and mitigated during the PFG stage through the ESMF by applying measures such as minimal tillage, maintaining ground cover, contour planting, and mulching.

Table 9: Environmental and social impacts and risks

PART III: IMPLEMENTATION ARRANGEMENTS

94. The project will be implemented by the United Nations Industrial Organization (UNIDO) and co-executed by the International Network for Bamboo and Rattan (INBAR), UNIDO, the Ethiopian Forestry Development and the Ministry of Natural Resources and Tourism of the United Republic of Tanzania. Additional national project partners may be identified during PFG stage to ensure full scope of expertise for the proposals can be delivered by the optimal configuration of partners. UNIDO entails oversight of overall project implementation to ensure that the project carried out in accordance with agreed standards and requirements. The project maintains full alignment with the Adaptation Fund Results Framework (AFRF), as indicated in Table 9. UNIDO will be accountable to the Adaptation Fund for all financed activities and will be responsible for project cycle management services and corporate activities, including all enquiries regarding the project implementation progress, and project-level reporting, and the achievement of the project's impacts on the global environment. UNIDO will be responsible for the project mid-term and terminal evaluation, under oversight of UNIDO It is envisaged that the project will set up two Project Management Units (PMUs) at the national levels, which will be responsible for day-to-day management of project activities. A Project Steering Committee (PSC), co-chaired by the Ethiopian and Tanzanian NDAs, will be established to provide overall strategic guidance and direction of the project. Members of the PSC include UNIDO, government representatives and regional authorities from Ethiopia and Tanzania, and representatives from the affected communities. The final composition will be confirmed at full proposal stage.

Project Objective(s) ¹⁵³	Project Objective Indicator(s)	Adaptation Fund Outcome	Adaptation Fund Outcome Indicator	Grant Amount (USD)
Objective 1: To strengthen the climate resilience and adaptive capacity of vulnerable communities in Tanzania and Ethiopia by promoting community-driven planning processes	1. Number of vulnerable communities in Ethiopia and Tanzania equipped with inclusive, nationally integrated, community planned and led climate resilience and adaptation measures	Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2. Percentage of targeted population applying appropriate adaptation responses	1,200,000
		Outcome 7: Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy	1,017,906
		Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2. Percentage of targeted population applying appropriate adaptation responses	1,017,905
Objective 2: To strengthen the climate resilience and adaptive capacity of vulnerable communities in	2. Number of vulnerable communities with improved Bamboo-Based Climate Resilient	Outcome 6: Diversified and strengthened	6.2. Percentage of targeted population with sustained climate-resilient alternative livelihoods	4,000,000

¹⁵³ The AF utilized OECD/DAC terminology for its results framework. Project proponents may use different terminology but the overall principle should still apply

Tanzania and Ethiopia by promoting Bamboo-Based Climate-Resilient Livelihoods and scaling Nature-based Solutions (NbS),	Livelihoods and scaled Nature-based Solutions in place	livelihoods and sources of income for vulnerable people in targeted areas		
		Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level	10,000,000
Objective 3: To strengthen the climate resilience and adaptive capacity of vulnerable communities in Tanzania and Ethiopia by supporting sustainable alternative livelihoods that enhance knowledge and learning	3. Number of climate risk-exposed communities protected through adaptation measures	Outcome 8: Support the development and diffusion of innovative adaptation practices, tools and technologies	8. Innovative adaptation practices are rolled out, scaled up, encouraged and/or accelerated at regional, national and/or subnational level	5,000,000
		Outcome 3: Strengthened awareness and ownership of adaptation and climate risk reduction processes at local level	3.2. Percentage of targeted population applying appropriate adaptation responses	2,200,000
		Outcome 7: Improved policies and regulations that promote and enforce resilience measures	7. Climate change priorities are integrated into national development strategy	800,000
Total outcome level grant amount				25,235,811
Project Outcome(s)	Project Outcome Indicator(s)	Adaptation Fund Output	Adaptation Fund Output Indicator	Grant Amount (USD)
Outcome 1: Community-Based Planning for Locally Led Adaptation				
Outcome 1.1: Communities prioritize adaptation needs through inclusive, locally led processes	1.1.1 Number of women and youth, actively engaged in decision-making processes	Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge 3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	1,200,000
Outcome 1.2: Communities select and plan for the implementation of context-appropriate NbS and alternative livelihood options through structured and inclusive adaptation planning processes	1.2.1 Number of community roll-out plans identifying NbS and livelihood solutions	Output 7: Improved integration of climate-resilient strategies into country development plans	7.2 No. of targeted development strategies with incorporated climate change priorities enforced	1,017,906
Outcome 1.3: Locally relevant data collection systems established to monitor, measure and report adaptation impact	1.3.1 Number of climate risk, vulnerability, and impact data systems established or strengthened	Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.2 No. of tools and guidelines developed (thematic, sectoral, institutional) and shared with relevant stakeholders	1,017,905
Outcome 2: Bamboo-Based Climate-Resilient Livelihoods and Nature-Based Solutions				
Outcome 2.1: Communities strengthen their climate resilience by piloting bamboo as a NbS in alignment with community-identified rollout plans	2.1.1 Number of farmers with increased climate resilience	Output 6: Targeted individual and community livelihood strategies strengthened in relation to climate change impacts, including variability	6.2.1 Type of income sources for households generated under climate change scenario	4,000,000
Outcome 2.2: Communities adopt bamboo as a resilient alternative livelihood strategy through increased demand generated by	2.2.1 Number of bamboo-processors supported 2.2.2 Percentage increase in bamboo-based product volume or income	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated	8.1 No. of innovative adaptation practices, tools and technologies accelerated, scaled-up and/or replicated	10,000,000

more resilient bamboo processing				
Outcome 3: Knowledge, Learning, and Policy Influence for Scalable Bamboo-Based Adaptation				
Outcome 3.1: A collaborative bamboo ecosystem strengthens regional learning, peer exchange, and leadership for bamboo-based climate adaptation	3.1.1 Number of stakeholders with increased capacity	Output 8: Viable innovations are rolled out, scaled up, encouraged and/or accelerated	8.2 No. of key findings on effective, efficient adaptation practices, products and technologies generated	5,000,000
Outcome 3.2: Project stakeholders access, apply, and contribute to an adaptive learning system that improves decision-making, replication, and scale	3.2.1 Number of Bamboo hubs established	Output 3.2: Strengthened capacity of national and subnational stakeholders and entities to capture and disseminate knowledge and learning	3.2.1 No. of technical committees/associations formed to ensure transfer of knowledge	2,200,000
Outcome 3.3: Policies and institutions are informed by project evidence and strengthened to scale bamboo-based adaptation through national systems	3.3.1 Number of institutional frameworks strengthened to enable scale-up	Output 7: Improved integration of climate-resilience strategies into country development plans	7.2 No. of targeted development strategies with incorporated climate change priorities enforced	800,000
Total output level grant amount				25,235,811


Table 10: Project alignment with the Results Framework of the Adaptation Fund

PART IV: ENDORSEMENT BY GOVERNMENTS AND CERTIFICATION BY THE IMPLEMENTING ENTITY

A. Record of endorsement on behalf of the government¹⁵⁴

Mr. Mohammed Andoshe Faynet Director of Climate Change Planning, implementation & Coordination Directorate, Lead Negotiator of Climate Change Ministry of Planning and Development /Environmental Protection Authority Ethiopia	Date: 9 October 2024
Prof. Peter Lawrance Makenga Msoffe Permanent Secretary Vice President's Office Tanzania	Date: 15 December 2025

B. Implementing Entity certification

I certify that this proposal has been prepared in accordance with guidelines provided by the Adaptation Fund Board, and prevailing National Development and Adaptation Plans and subject to the approval by the Adaptation Fund Board, <u>commit to implementing the project/programme in compliance with the Environmental and Social Policy of the Adaptation Fund</u> and on the understanding that the Implementing Entity will be fully (legally and financially) responsible for the implementation of this project/programme.
<i>Name & Signature</i> Implementing Entity Coordinator 
Ms. Ganna Onysko Senior GEF, GCF, AF Coordinator Division of Funding Partner Relations Directorate of Global Partnerships and External Relations

6. Each Party shall designate and communicate to the secretariat the authority that will endorse on behalf of the national government the projects and programmes proposed by the implementing entities.

United Nations Industrial Development Organization - UNIDO Implementing Entity Coordinator	
Date: <i>(Month, Day, Year)</i> 6 January 2026	Tel. and email: +43 1 26026 3647; G.ONYSKO@unido.org
Project Contact Person: Caterina BIANCO Email: C.Bianco@unido.org	
(cc: Ms. Eleonora Gatti, Head of Climate Technology Innovation E.Gatti@unido.org ; Mr. Alois Mhlanga, Director of Climate Innovation and Montreal Protocol a.mhlanga@unido.org)	



በኢትዮጵያ ፌዴራላዊ ዲሞክራሲያዊ ሪፐብሊክ
የፕላንና ልማት ሚኒስቴር
 FEDERAL DEMOCRATIC REPUBLIC OF ETHIOPIA
 MINISTRY OF PLANNING AND DEVELOPMENT

ቁጥር./NO : 119/PPD/3/ሩ-3/219
 ቀን/DATE : 02 FEB 2026

To: The Adaptation Fund Board
 c/o Adaptation Fund Board Secretariat
 Email: Secretariat@Adaptation-Fund.org
 Fax: 202 522 3240/5

Subject: Endorsement for the Project “Enhancing the Bamboo Value Chain in Ethiopia and the United Republic of Tanzania to Leverage Bamboo as a Nature Based Solution for Climate Resilience as a Nature Based Solution for Climate Resilience”

In my capacity as designated authority for the Adaptation Fund in Ethiopia, I confirm that the above regional project proposal is in accordance with the government’s national priorities in implementing adaptation activities to reduce adverse impacts of, and risks, posed by climate change in the country.

Accordingly, I am pleased to endorse the above project proposal with support from the Adaptation Fund. If approved, the project will be implemented by the United Nations Industrial Development Organization (UNIDO) and executed by the Ethiopian Forestry Development, the International Network for Bamboo and Rattan (INBAR) and UNIDO in collaboration with the Ministry of Natural Resources and Tourism of the United Republic of Tanzania.

Sincerely,


Seyoum Mekonen Hailu
 State Minister



THE UNITED REPUBLIC OF TANZANIA
VICE PRESIDENT'S OFFICE

Telegram: "MAKAMU", HQ
Telephone No: +255 026 2329006
Fax No: +255 026 2329007
Barua Pepe:ps@vpo.go.tz



Government City,
Mtumba Area,
Vice President's Street,
P.O. Box 2502,
40406 DODOMA.

In reply please quote:

Our Ref: BA.90/201/01A/

15th December, 2025

To: The Adaptation Fund Board
c/o Adaptation Fund Board Secretariat
Email: Secretariat@Adaptation-Fund.org
Fax: 202 522 3240/5

SUBJECT: ENDORSEMENT FOR "ENHANCING THE BAMBOO VALUE CHAIN IN ETHIOPIA AND THE UNITED REPUBLIC OF TANZANIA TO LEVERAGE BAMBOO AS A NATURE-BASED SOLUTION FOR CLIMATE RESILIENCE AND ADAPTATION"

Refer to the subject captioned above.

2. The United Republic of Tanzania is collaborating with partners to develop a project proposal on "Enhancing the Bamboo Value Chain in Leverage Bamboo as a Nature-Based Solution for Climate Resilience and Adaptation."
3. The proposed regional project will be implemented in Ethiopia and the United Republic of Tanzania with the support of the Adaptation Fund.
4. Therefore, in my capacity as the Designated National Authority (DNA) for the Adaptation Fund in the United Republic of Tanzania, I confirm that the above regional project proposal is in accordance with the Government's national priorities in implementing adaptation activities to reduce adverse impacts of, and risks posed by climate change in the United Republic of Tanzania.
5. In view of this, I am pleased to endorse the above project proposal with the support of the Adaptation Fund.
6. If approved, the project will be implemented by the United Nations Industrial Development Organization (UNIDO) and executed by UNIDO and the International Bamboo and Rattan Organization (INBAR) in collaboration with the Ethiopian Forestry Development and the Ministry of Natural Resources and Tourism of the United Republic of Tanzania.
7. Thank you for your continued support.

A handwritten signature in blue ink, appearing to read 'P. Msoffe'.

Prof. Peter L.M. Msoffe

**NATIONAL DESIGNATED AUTHORITY
DEPUTY PERMANENT SECRETARY-ENVIRONMENT**

Copy:

Dr. Kanizio Fredrick Manyika,
National Focal Point for the Adaptation Fund Projects in Tanzania,
Vice- President's Office,
Mtumba Government City,
Mtumba Area, Vice President's Street,
P.O.Box 2502,
40406 DODOMA,
Mob: +255 713 426060,
Email: kanizio.manyika@vpo.go.tz.



Revised PFG Submission Form¹ (additions in red)

Project Formulation Grant (PFG)

Submission Date: 6 January 2026

Adaptation Fund Project ID: N/A

Country/ies: Ethiopia and the United Republic of Tanzania

Title of Project/Programme: Enhancing the bamboo value chain in Ethiopia and the United Republic of Tanzania to leverage bamboo as a nature-based solution for climate resilience and adaptation

Type of IE (NIE/RIE/MIE): MIE

Implementing Entity: United Nations International Development Organization (UNIDO)

Executing Entity/ies: UNIDO

C. A. Project Preparation Timeframe

Start date of PFG	June 2026
Completion date of PFG	March 2027


CI. B. Proposed Project Preparation Activities (\$)

List of Proposed Project Preparation Activities	Output of the PFG Activities	US\$ Amount	Budget note²
1. Subcontract service provider to develop the full project proposal and annexes and including baseline analysis, stakeholder engagement and consultations and community engagement; project indicators and project monitoring and evaluation plan and exist strategy; organization of the validation workshop.	Project full proposal is developed, including Gender and Environmental and Social risk analyses and formulation of Environmental and Social Management Plan and Gender Action Plan and other required annexes. Baseline data is collected through desk-based research and in-country data collection, analysed and incorporated in the project document.	105,000	A service provider will be hired to develop the project full proposal including assessment of environmental and social risks, gender analysis and action plan and alignment with the AF's results framework and indicators. In-country climate risk assessment at the district level is conducted to collect and analyse project baseline data on climate hazards, and

	<p>Consultations are carried out with project stakeholders to inform project design and assess interest of beneficiaries to participate in the project.</p> <p>Project logframe is developed against baseline indicators.</p> <p>Project monitoring and evaluation plan and exit strategy are developed.</p>		<p>climate vulnerability in Ethiopia and Tanzania, and to map and analyse the presence of bamboo, and assess its potential and opportunities for adaptation and resilience against the local needs and climate risks identified.</p> <p>Consultations are carried out with project stakeholders including vulnerable groups to ensure project relevance to local needs, inclusivity and ownership.</p> <p>Implementing arrangements will be further elaborated.</p>
2. Travel for project validation workshops in 2 countries	2 project validation workshops are organized with project stakeholders.	15,000	Requested budget will cover the cost of travel for the 2 project validation workshops
3. Hire a service provider to conduct HACT assessment of Project Executing Entity	PEEs' HACT assessments are conducted.	15,000	Requested budget will cover the costs of hiring a company to conduct HACT assessment of the PEEs to ensure execution is possible.
4. IE fee (10%)	IE admin and technical support for project development, monitoring and supervision, compliance assurance	15,000	Technical and admin support services
Total Project Formulation Grant		150,000	

CII. Implementing Entity

This request has been prepared in accordance with the Adaptation Fund Board's procedures and meets the Adaptation Fund's criteria for project identification and formulation

Implementing Entity Coordinator, IE Name	Ms. Ganna Onysko Senior GEF, GCF, AF Coordinator Division of Funding Partner Relations Directorate of Global Partnerships and External Relations United Nations Industrial Development Organization - UNIDO Implementing Entity Coordinator	
Signature		Date: 6 January 2026
Project Contact Person	Ms. Caterina Bianco +43 1 26026 3481 c.bianco@unido.org	
Telephone	+43 1 26026 3708	
E-mail	TO: g.onysko@unido.org CC: gef@unido.org / glo@unido.org / f.haidara@unido.org	

Annex 1: Potential questions to assess economic, environmental and social benefits at PFG stage

Economics benefits	Social benefits	Environmental benefits
<ul style="list-style-type: none"> - What is the average yield of bamboo per hectare and its market value, and how does this compare with existing income from rain-fed agriculture? - What is the total volume of raw bamboo expected to be sold annually by farmers to processors under improved market linkages? - How many people (disaggregated by sex and age) will be trained in bamboo cultivation, processing, and business development through project activities? - What is the projected increase in market price of bamboo poles due to improved product quality and market access? - What is the potential of bamboo to generate stable and diversified income for smallholder farmers compared to traditional agriculture? - How much income can smallholder farmers realistically expect to earn from bamboo cultivation/harvesting? - How can reliable and inclusive linkages between farmers and processors be established to ensure predictable offtake and income? - Which bamboo-based value-added products have the strongest market demand and climate resilience potential (e.g., construction, panel-based products, packaging, furniture, crafts, energy)? - What types of financing mechanisms or incentives would most effectively support bamboo processors in upgrading and diversifying their product lines? - How resilient is the local bamboo value chain to future climate shocks or market fluctuations? 	<ul style="list-style-type: none"> - How many individuals (disaggregated by sex, age, and vulnerability status) are expected to participate in community adaptation planning processes? - How many community members are expected to report increased knowledge of local climate risks and adaptation options after project activities? - How many stakeholders from different sectors (academia, government, private sector, civil society) are expected to collaborate through multi-stakeholder platforms? - How many community–government interactions (dialogues, field visits) will be organized? - How do cultural norms, land tenure systems, and access to resources influence women’s and youth’s ability to participate in and benefit from bamboo-based interventions? - How can the project ensure meaningful participation of women, youth, and marginalized groups in participatory planning, decision-making, and monitoring processes? - How can the project ensure that new income streams, such as bamboo processing or bamboo agroforestry, are equitably shared within households and communities? - What gender- and youth-sensitive indicators should be used to track social outcomes (e.g., increased resilience, decision-making power, access to services)? - Are there any potential unintended negative social impacts that should be monitored and mitigated? 	<ul style="list-style-type: none"> - How many hectares are expected to show improved soil health, water retention, or biodiversity levels through bamboo deployment? - Which degraded or high-risk landscapes (in hectares) in target areas are ecologically and economically suitable for bamboo as a nature-based solution? - How much CO₂ is expected to be sequestered (in tons/year and tons/ha/year) by bamboo plantations over the project duration as a co-benefit? - What area (in ha) can be planted with drought-tolerant bamboo species in semi-arid zones? - How many hectares of degraded land in the target areas are ecologically suitable for bamboo restoration (based on slope, soil type, pH)? - What length of coastline or wind-exposed area is suitable for bamboo windbreak or stabilization interventions? - How effective is bamboo in mitigating specific local climate hazards such as droughts, floods, and soil erosion, based on ecological conditions and past experience? - What are the expected co-benefits of bamboo on ecosystem services in the selected areas? - How can bamboo products (e.g., construction materials, charcoal, packaging, furniture, crafts) replace high-emission alternatives and contribute to long-term carbon mitigation co-benefits?

Table 11: Potential questions to assess economic, environmental and social benefits at PFG stage.

Annex 2: Potential questions to guide the project gender analysis at PFG stage

Gender analysis questions	
<ul style="list-style-type: none"> - What are the prevailing gender norms, roles, and values in Ethiopia and Tanzania? - What beliefs, perceptions, and stereotypes about gender are commonly held in these countries? - Are there national or local policy documents, assessments, or statistics that identify gender gaps and priorities related to climate adaptation? - Do specific laws or regulations in the target communities address gender issues? - Is sex-disaggregated data readily available to support gender analysis? - Do women and men have equitable access to climate adaptation solutions? - Are resources, such as finance (e.g. money for clean water, fertilizer, pesticides), technology (e.g. harvesting equipment), information, and services, equally accessible to both women and men? - How do the levels of knowledge, education, and training compare between women and men? - How is labor divided between women and men in Ethiopia and Tanzania, particularly in relation to climate adaptation? - What are the gender-specific roles in climate adaptation, and how do traditional activities shape the distinct needs and priorities of women and men? - What professional and entrepreneurial opportunities exist for women and men in the climate adaptation sector? - Are there any associations, organizations, or networks actively promoting gender equality in climate adaptation in Ethiopia and Tanzania? - Who are the key stakeholders or actors in promoting gender equality and women’s empowerment in climate adaptation, and how might they be engaged in the project? - At the household level, who is responsible for decisions regarding resources and activities? 	<ul style="list-style-type: none"> - Do women and men participate equally in political and investment-related decision-making processes? - Are there policymakers (e.g. in Government or Parliament) who can champion gender equality and women’s empowerment in the context of climate adaptation? - Are government institutions responsible for gender issues engaged in national-level decision-making and planning processes? - Will the project’s services be equally accessible and beneficial to both women and men? - Is the design of proposed climate adaptation solutions inclusive and gender-responsive? - In what ways might the project help women and men carry out their traditional responsibilities? - Which project outputs or activities are likely to have the greatest impact on women? - How can activities be tailored to promote gender equality and empower women? Should any services be specifically targeted at women? - Are there any gender-specific risks or unintended negative impacts, and how can these be avoided or mitigated? - What gender-sensitive targets or sex-disaggregated indicators could be developed to measure the project’s performance and impact? - What data (e.g. disaggregated surveys, feedback mechanisms, direct observation) can be collected to monitor outcomes for women and men? - How gender-aware are project stakeholders, and is there a need to build awareness of gender dimensions among staff in relevant government agencies?

Annex 3: Evidence of stakeholder consultations at concept development stage

Title	Participants	Key discussion points
Introductory Meeting with Ethiopia NDA (10 September 2024; 10:00–11:00 CET; Virtual)	<ul style="list-style-type: none"> • Mohammed Andoshe Faint – Director, Climate Change Planning, Ministry of Planning and Development / Adaptation Fund NDA; • Addis Negash – Team Leader, ECCCT, Ministry of Agriculture; • Caterina Bianco – Project Administrator, UNIDO; • Loide Matias da Silva – Assistant Industrial Development Officer, UNIDO; • Asegid Mebrat – Ethiopia National Programme Officer, UNIDO; 	<ul style="list-style-type: none"> • Expressed strong interest in the project and affirmed that bamboo aligns with national priorities, including the Green Legacy Initiative and the restoration of degraded lands. • Emphasis was placed on creating bamboo-based value chains and promoting sustainable bamboo industrialisation in Ethiopia. • Bamboo’s role in carbon sequestration was raised as a crucial environmental co-benefit. • Highlighted the importance of ensuring inclusive communication and participatory approaches with local communities during planning and implementation.

	<ul style="list-style-type: none"> Jiwon Song – Intern, UNIDO; Borja De La Peña Escardó – Head of Global Policies, INBAR; Durai Jayaraman – Global Programme Director, INBAR; Biruk Kebede – Acting Director, INBAR East Africa Regional Office; Selim Reza – National Project Manager, Ethiopia, INBAR 	<ul style="list-style-type: none"> Suggested exploring synergies with previous UNIDO initiatives, including the Common Fund for Commodities project implemented over a decade ago, which also focused on bamboo in Ethiopia.
Introductory Meeting with Tanzania NDA (1 October 2024; 09:30–10:00 CET; Virtual)	<ul style="list-style-type: none"> Kanizio Manyika – Assistant Director, Climate Change and Environmental Assessment, Vice President's Office / NDA Contact; Lorence Ansermet – UNIDO Country Representative, Tanzania; Sungcho Kang – Senior Climate Finance Innovation Expert, UNIDO; Caterina Bianco – Project Administrator, UNIDO; Loide Matias da Silva – Assistant Industrial Development Officer, UNIDO; Jiwon Song – Intern, UNIDO; Borja De La Peña Escardó – Head of Global Policies, INBAR; Durai Jayaraman – Global Programme Director, INBAR 	<ul style="list-style-type: none"> Confirmed growing national interest in bamboo and highlighted the recent approval of the National Bamboo Development Strategy and Action Plan 2023–2031 as a policy milestone. It was noted that although demand for bamboo products is growing across rural and urban areas, there has been limited investment in cultivating bamboo to match this demand. The project was seen as an opportunity to bridge this gap. Requested that the project explore how bamboo could offer sustainable alternatives or synergies with charcoal production and wood-based value chains, particularly for energy and construction. Requested further clarification on how grants would be delivered and the mechanism of budget allocation between Ethiopia and Tanzania.
Project Validation Meeting with Tanzania Government (22 April 2025; 9:00-10:00 CET; Virtual)	<ul style="list-style-type: none"> Deusdedith K. Bwoyo – Director, Department of Forestry and Beekeeping, Ministry of Natural Resources and Tourism (MNRT); Siima Bakengesa – Director of Forest Production Research, Tanzania Forestry Research Institute (TAFORI); Caterina Bianco – Project Administrator, UNIDO; Sunyoung Suh – Industrial Development Officer, UNIDO; Biruk Kebede – Acting Director, INBAR East Africa Regional Office; Jayaraman Durai – Global Programme Director, INBAR; Selim Reza – Programme Officer, INBAR; Donald Kibhuti – Programme Officer, INBAR. 	<ul style="list-style-type: none"> Confirmed support for the project and welcomed the expanded scope of interventions. It was recommended to include additional beneficiary regions, particularly along the southern coastal belt. Emphasized the importance of aligning the project with the National Bamboo Development Strategy and Action Plan 2023–2031. Offered to coordinate the distribution of surveys to government stakeholders. Suggested mapping of existing national initiatives and stakeholders, including those led by TAFORI. Requested increased communication and coordination between INBAR (Donald) and TAFORI (Dr. Siima). Suggested exploring the feasibility of conducting physical meetings to complete surveys.
Stakeholder Consultation Meeting with Ethiopia Government (23 April 2025; 9:00-10:00; Virtual)	<ul style="list-style-type: none"> Mohammed Andoshe – Senior Expert, Ministry of Planning and Development (MoPD); Teshome Tamirat – Director, Environment, Forest and Climate Change Commission (EFCCC); Caterina Bianco – Project Administrator, UNIDO; Sunyoung Suh – Industrial Development Officer, UNIDO; Biruk Kebede – Country Project Coordinator, INBAR; Jayaraman Durai – Global Programme Director, INBAR; Biruk Kebede – Acting Director, INBAR East Africa Regional Office; Donald Kibhuti – Programme Officer, INBAR 	<ul style="list-style-type: none"> Strong support was expressed for the initiative, noting that bamboo is a government priority commodity under the Green Legacy Initiative, which aims to restore 22 million hectares by 2030. The government requested that <u>Central Ethiopia</u>—a new administrative region with known bamboo potential—be added as a beneficiary. Proposed focusing on Applied research and testing of exotic bamboo species; Bamboo planting material development and nursery scale-up; Introduction of bamboo planting technologies; Supporting the policy framework for bamboo-based adaptation. Emphasized the importance of coordination with the Ministries of Agriculture and Forestry. Endorsed the current regional selection, with the additional inclusion of Central Ethiopia. Requested clarification on how climate vulnerability was identified; UNIDO explained that initial vulnerability mapping was based on background research and stakeholder consultations, to be validated at the full proposal stage.
Meeting with Ethiopian Institute of Architecture (11 September 2025, 14:00-15:00; in person)	<ul style="list-style-type: none"> Eleonora Gatti, Head of the Climate Technology Innovation Unit, UNIDO; Caterina Bianco, Project Administrator, UNIDO; Biruk Kebede – Acting Director, INBAR East Africa Regional Office; Betel Biruk, Ethiopian Institute of Architecture 	<ul style="list-style-type: none"> Exchange on ongoing research and training initiatives on bamboo construction and material innovation led by the University. Discuss potential joint research areas, such as bamboo-based housing solutions, structural testing, and development of standards for climate-resilient construction.
Meeting with Ethiopia Forestry Department (12 September, 9:00-10:00; in person)	<ul style="list-style-type: none"> Eleonora Gatti, Head of the Climate Technology Innovation Unit, UNIDO; Sungcho Kang, Senior Climate Finance Innovation Expert, UNIDO Caterina Bianco, Project Administrator, UNIDO; Biruk Kebede – Acting Director, INBAR East Africa Regional Office; 	<ul style="list-style-type: none"> At this preliminary stage, stakeholder engagement has been limited due to time and capacity constraints. Only a few key actors from INBAR's network were involved. During the Project Formulation Grant (PFG) phase, in-depth consultations will be conducted in collaboration with the Ministry, ensuring the inclusion of all relevant stakeholders as previously advised. The Ministry emphasized the importance of running the concept through their office during the PFG to co-design the activities and co-organize the national consultations
Meetings with two bamboo MSMEs (12	<ul style="list-style-type: none"> Eleonora Gatti, Head of the Climate Technology Innovation Unit, UNIDO; Sungcho Kang, Senior Climate Finance Innovation Expert, UNIDO 	<ul style="list-style-type: none"> Visited the premises of two bamboo factories to observe their production processes and the variety of products manufactured (e.g., furniture, household items, and construction materials).

<p>September, 10:00-13:00; in person)</p>	<ul style="list-style-type: none"> • Caterina Bianco, Project Administrator, UNIDO; • Biruk Kebede – Acting Director, INBAR East Africa Regional Office. 	<ul style="list-style-type: none"> • Discussed key operational challenges, including limited access to finance, difficulties securing loans from local banks due to lack of collateral and high interest rate, lack of a space to run operations, lack of machinery. • Expressed strong interest in the project and to expand operations for greater adaptation benefits.
--	--	---

Table 12: Evidence of stakeholder consultations

Annex 4: Pictures from survey distribution and consultations in Tanzania and Ethiopia











