



CIFOR-ICRAF COUNTRY PROFILE

Zambia

2024

About Zambia

Stretching across the northern edge of Southern Africa, Zambia borders eight countries and, with a population density of just 21 people per square kilometer, has a wealth of land. However, soils are poor, and farm productivity is low, and an estimated 60% of Zambians live below the poverty line. The causes of poverty are many. But degradation of the natural resources upon which the populace depends is one of them.

Eighty percent of Zambia is – or was – covered by Miombo, the largest savanna biome in the world, spanning 10 countries in Eastern, Central and Southern Africa. With 650 woody species overall, Miombo canopy is dominated by just three tree genera: *Brachystegia*, *Julbernardia* and *Isoberlina*. Most of the biodiversity resides in the grass and herb layer with 4000 species. Miombo provides essential resources to the people who reside within it.

However, Miombo wood is highly sought-after for fuel and the production of charcoal. Forest degradation for the domestic use of charcoal has been a concern since the 1980s. Today, however, Zambia exports charcoal to most of its neighbours – especially the Democratic Republic of Congo, Malawi, and Tanzania – where it is often sold on to Persian Gulf states. It is a slow-moving catastrophe that is affecting water levels in the Zambezi and other rivers, compromising hydro-electric production and causing long periods of load shedding.

Miombo is also being cleared for agriculture – including the expansion of commercial farming - and to accommodate a growing rural population, or when soil health and fertility decline in existing fields.

As elsewhere, proximity to forest is correlated with better nutrition. In a country where 31% of children under the age of five experienced stunting in 2022, deforestation is ringing alarm bells with the government.



Miombo woodlands are fundamental to human well-being in Zambia. Photo by Cathy Watson/CIFOR-ICRAF

“We can’t tackle non-communicable diseases and stunting without talking about nutrition from indigenous trees,” says Belinda Tshiula-Tembo, a senior nutritionist at Zambia’s National Food and Nutrition Commission. “Protecting forests and growing indigenous trees is a win-win as food and to combat climate change”

Zambia’s national nutrition framework is one of the very few to recognize the value of indigenous tree foods and tree-dependent wild foods, such as caterpillars. Zambia’s Food-based Dietary Guidelines feature these “locally available foods, making it adaptable to every local community,” according to the Food and Agriculture Organization of the United Nations (FAO).

“ CIFOR-ICRAF is honoured to be working in this frontline state ”

– Malesu Maimbo

CIFOR-ICRAF Country coordinator

CIFOR-ICRAF in Zambia

CIFOR-ICRAF is an international organisation focused on improving lives and landscapes with trees in the Global South. In Zambia it has over 40 years’ experience and is the key institution providing nature-based solutions to the climate and biodiversity crises and other global challenges.

ICRAF arrived in Zambia in the early 1980s “to assess farmers’ problems” and found that declining soil fertility was the most urgent one. Traditional fallow systems were being shortened, and 1- to 3-year natural fallows could not sustain crop yields. ICRAF immediately set about researching fast-growing nitrogen-fixing fertilizer trees.

“ICRAF laid the foundation for fertilizer trees in the country,” concluded researchers from Pennsylvania State University, University of Zambia, FAO, and the International Fund for Agricultural Development (IFAD) in 2023.

CIFOR landed in Zambia in 1993 as part of a review of Southern Africa’s Miombo woodlands, noting “rapid transformation and heavy modification by intensive use.” Miombo, along with West Africa’s humid forests, were CIFOR’s major focus in Africa for the next decade. In 2003, CIFOR launched its first project in Zambia, part of the multi-country Dry Forest Project that remains a key resource today. https://www2.cifor.org/dryforest/_ref/publications/index.html

“ We are the ‘go to’ people for issues relating to food systems as well as forest and tree conservation ”

– Malesu Maimbo
CIFOR-ICRAF Country coordinator



Malesu Maimbo CIFOR-ICRAF Country Coordinator. Photo by CIFOR-ICRAF

CIFOR-ICRAF’s current areas of work in Zambia include sustainable agricultural intensification, agroecology, forest ecology and conservation, community forest management, integrated landscape approaches, sustainable charcoal, and the regeneration capacities of indigenous trees.

Results on the ground

- More than 300,000 smallholders use multipurpose leguminous shrubs *Sesbania sesban*, *Cajanus cajan*, *Gliricidia sepium*.
- In wildlife corridor, 50 families receive 250 beehives in 2024.
- 16 radio shows on nutrition and indigenous trees reach 1 million plus listeners 2023-2024.

Major achievements

- Showed that nitrogen-fixing trees in fallows and alleys between crops could provide fuelwood by Year 2, increase maize yields in Years 3–5, and counter dry season shortages of livestock fodder.
- Domesticated and promoted the use and commercialization of Miombo fruit trees, conducting trials to see which grew best, selecting superior phenotypes, and developing propagation protocols. One trial reduced time to fruiting for *Uapaca kirkiana* from 8–10 years to 3–4 years.
- Built evidence around “fertilizer trees,” such as *Faidherbia albida*.
- Determined that wild fruits

contributed about 80 percent of fruit intake for rural Zambians.

- Provided solutions to threats to Miombo, particularly using woody species to improve livelihoods.
- Pioneered agroecological Integrated Pest Management (IPM) strategies for smallholders. Helped formulate a regional IPM strategy for fall armyworm.
- Contributed to the draft National Agroforestry Strategy and informed national forest policies on illegal logging.
- Conducted research on the fast-disappearing rosewood tree, *Pterocarpus tinctorius* (*Mukula*), contributing to its inclusion in Appendix II of the Convention on International Trade in Endangered Species (CITES) of Wild Fauna and Flora.
- Developed analysis and tools to reduce carbon emissions and adapt to climate change.
- Provided substantial input to REDD+ and Zambia’s Nationally Determined Contributions.
- Promoted the sustainable use and trade of forest products; improved woodfuel governance; and advocated for more sustainable value chains and technical options, such as community plantations and efficient kilns.
- Supports Zambia’s AFR100 commitment to bring degraded land into restoration.
- Disseminates research findings and solutions.

L-R: Challenges include depleted soil on farms, removal of trees to create land to cultivate, and charcoal making as a livelihood. Loss of tree cover results in low water in major rivers like the Luangwa, causing reduced electricity from hydropower. Photos by Cathy Watson/CIFOR-ICRAF





L-R: Solutions include growing crops with trees like the nitrogen-fixer *Faidherbia albida*; sustainable management of wildlife; and protection of endangered trees species, like Rosewood (*Pterocarpus genus*). Photos by Charlie Pye-Smith/CIFOR-ICRAF

Select projects

- Funded by NORAD, **Developing smallholder strategies for fall armyworm (FAW) management in Southern Africa: Examining the effectiveness of ecological control options** showed that the moth, which invaded Africa in 2016, could be managed by interventions that allow natural predators to flourish, such as more native vegetation around fields, greater tree diversity on farms, and field interventions, such as minimum tillage and intercropping cereal crops with legumes. The critical step, however, is “to avoid using broad spectrum chemical pesticides, as these often have far great impact on natural enemies than on the pest,” says Rhet Harrison, the CIFOR-ICRAF ecologist leading the project. “Pesticides should only be used as a last resort,” he added. The project, which partnered with the ZARI Agriculture Research Institute, gave rise to a major conference on agroecological management of FAW in 2021. Watch the recordings of the sessions here. <https://www.cifor-icraf.org/event/developing-smallholder-oriented-integrated-pest-management-strategies-for-fall-armyworm-spodoptera-frugiperda-smith-management/>
- Funded by Germany’s Federal Ministry for the Environment, Nature Conservation, Building and Nuclear Safety (BMUB) under its International Climate Initiative (IKI), **Collaborating to operationalize landscape approaches for nature, development and sustainability (COLANDS) (2018-2025)** works to reconcile competing claims on land and natural resources in southern Zambia. 2023 activities included sharing the results of assessments of vegetation and birds with communities, and co-writing articles on carbon stocks, plant assemblages, and local perceptions of land cover changes with the assistance of colleagues from the Copperbelt University, district departments of

forestry, livestock and agriculture, and the National Heritage Conservation Commission. For more information: *Evolution, resilience and loss of local knowledge and natural resource management practices, 2023*, <https://www.cifor.org/knowledge/slide/34903> and *Learning from community-based natural resource management in Ghana and Zambia: Lessons for integrated landscape approaches, 2023*, <https://www.cifor.org/knowledge/publication/8202>

- Funded by Germany’s Federal Ministry for Economic Cooperation and Development (BMZ), **Piloting incentive-based agricultural portfolios for nutrition and resilience in Zambia (2021–2024)** co-developed portfolios of species with communities. Together, these portfolios can supply a household with fruit all year round, minimizing seasonal hunger and nutrient gaps. “By growing portfolios of diverse fruit (“food”) trees, both exotic and wild, smallholders can improve their health, livelihoods, and environment,” says CIFOR-ICRAF’s Stepha McMullin. The portfolios provide an example of how agriculture may be used to promote nutritionally rich diets. The project has trained smallholders to collect indigenous fruit tree seed and raise seedlings to sell or plant on their own land. Partners are the Zambia Agricultural Research Institute, Community Markets for Conservation (COMACO), and the National Food and Nutrition Commission, Zambia. See <https://worldagroforestry.org/output/tree-seed-important-indigenous-fruit-and-food-trees-zambia-guide-tree-seed-collectors>
- Funded by the EU through the 11th European Development Fund in Zambia, **The sustainable wildlife management programme (2018–2024)** is a 13-country initiative to tackle the wildmeat challenge by addressing wildlife conservation and food security

together. Led by CIFOR-ICRAF, in Zambia, it focuses on the Kavango-Zambezi Transfrontier Conservation Area. “We are encouraging community-managed game reserves to create corridors between national parks,” says Maimbo Malusu, CIFOR-ICRAF’s country coordinator. The project works with traditional chiefs as well as provincial, national, and international partners, including FAO, the Wildlife Conservation Society, and the French Agricultural Research Centre for International Development (CIRAD).

- Funded by the EU’s DeSIRA initiative, the **Zambia for Agroforestry Biodiversity and Climate (Z4ABC) project (2022–2026)** is promoting a climate-relevant, productive, and sustainable transformation of agriculture, forestry, and food systems to support Zambia’s Nationally Determined Contributions. The project covers four pilot sites across the Lower Zambezi – Luangwa – Nyika (ZLN) corridor. Partners include the Government of Zambia, the University of Zambia, Mulungushi University, Natural Resources Institute Finland, Håme University of Applied Sciences, and Viikki Tropical Resources Institute at the University of Helsinki.

“ We are looking at forestry, agroforestry, and wildlife-based value chains, including legumes used as rotation crops, savanna bamboo (*Oxytenanthera abyssinica*), wild mushrooms, edible caterpillars, and community-based eco-tourism ”

– Nicholas Hogarth
Multidisciplinary researcher, CIFOR-ICRAF



L-R: Commonly seen in Zambian markets are caterpillars, a rich source of protein and fats, and micronutrient-dense fruits from indigenous trees such as Baobab and Ziziphus species. CIFOR-ICRAF is promoting this natural endowment through seed training, food fairs, and radio shows. Photos by Cathy Watson/CIFOR-ICRAF

Resources

Agroforestry extension manual for Eastern Zambia, 1998, remains highly recommended on nitrogen-fixing shrubs in crops and other agroforestry systems. <https://apps.worldagroforestry.org/downloads/Publications/PDFS/B11227.pdf>

Small-scale woodland-based enterprises with outstanding economic potential: The case of honey in Zambia, 2006, is the definitive study on this non-timber forest product as well as beeswax. Nowhere, it says, is honey's importance to livelihoods "more apparent than in Miombo woodlands." <https://www.cifor-icraf.org/knowledge/publication/2143/>

Indigenous fruit trees in the tropics: Domestication, utilization and commercialization, 2008, covers from Oceania to Amazonia but focuses mostly on Miombo. The landmark book observes that 65%–80% rural households in one triangle of Zambia, Malawi, and Mozambique lacked food for 3–4 months of the year, 60% of whom rely on fruit from *Uapaca*

kirkiana. https://researchonline.jcu.edu.au/27776/1/27776_Leakey_et_al_2008.pdf

From laissez-faire to organized groups: A short history of sustainable charcoal producers in Kenya and Zambia, 2021, details how 600 charcoal producers increased recognition of producers in sustainable production, and boosted the payment of licensing fees by 150%. Organized producers are becoming involved in forest regeneration and community forest management. <https://cgspace.cgiar.org/items/7ffd75c3-67d3-4827-a1d1-bbafab7db4a3> This report and others – such as *Sustainable wood fuel management through community action planning and assisted natural regeneration in Zambia*, 2023, <https://www.cifor-icraf.org/knowledge/publication/8932/> – were the result of the EU-funded Governing Multifunctional Landscapes (GML) project.

Including soil organic carbon into nationally determined contributions: Insights from Zambia, 2022, uses farmer and key informant interviews to understand why

soil organic carbon is absent from Zambia's latest NDC and discusses opportunities for its inclusion. <https://worldagroforestry.org/publication/including-soil-organic-carbon-nationally-determined-contributions-insights-zambia>

Wild foods from forests: Quantities collected across Zambia, 2022, documents the sheer volume of nutritious products emerging from wooded landscapes: about 12 million large (20 L) collecting buckets, 125% of the volume of sawn wood produced. <https://www.cifor.org/knowledge/publication/8644>

How to manage fall armyworm (Spodoptera frugiperda) on smallholder farms, 2023, shows how the pest can be controlled by "enhancing the biodiversity of the agricultural environment." <https://www.cifor-icraf.org/knowledge/video/VVPxVfKHCYk/>. See also: *Fall armyworm management in Southern Africa*, 2021. <https://apps.worldagroforestry.org/downloads/Publications/PDFS/PB21020.pdf> and this guide. <https://www.cifor-icraf.org/publications/pdf/guide/Fall-Armyworm-guide.pdf>

Ambition of CIFOR-ICRAF In Zambia

CIFOR-ICRAF's ambition in Zambia is to promote sustainable and resilient livelihoods, while conserving biodiversity and mitigating climate change through improved forest and natural resource management; sustainable agricultural intensification; and poverty reduction. It produces actionable evidence and local

solutions, working through entry points such as gender equity, value chains, agroecology, agroforestry, and forest governance.

Over the next five years, the Zambia team aims to support livelihood improvements for more than 500,000 people living in poverty; conserve or restore at least 1 million ha of Miombo; publish and disseminate more than 100 peer-reviewed articles, publicly available datasets, and

tools; contribute to policies, strategies, and regulations; mobilize over USD 20 million; and establish or strengthen more than 50 new or existing partnerships.

“ We work at the nexus of development, climate change, and biodiversity. ”

– Malesu Maimbo
CIFOR-ICRAF Country coordinator

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CIFOR-ICRAF

The Center for International Forestry Research and World Agroforestry (CIFOR-ICRAF) harnesses the power of trees, forests and agroforestry landscapes to address the most pressing global challenges of our time – biodiversity loss, climate change, food security, livelihoods and inequity. CIFOR and ICRAF are CGIAR Research Centers.

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