

A photograph of a traditional African hut with a conical thatched roof, situated in a savanna landscape. A large, leafy tree is on the left, and mountains are visible in the background under a blue sky with light clouds. The scene is bathed in warm, golden light, suggesting late afternoon or early morning.

**FORESTS, TREES AND
POVERTY ALLEVIATION IN AFRICA**
AN EXPANDED POLICY BRIEF

Editors

Daniel C. Miller
Doris N. Mutta
Stephanie Mansourian
Dikshya Devkota
Christoph Wildburger

Authors

Markus Ihalainen
Pamela A. Jagger
Gillian Kabwe
Judith Kamoto
Daniel C. Miller
Doris N. Mutta
Laura Vang Rasmussen
Joleen Timko

Contributing Authors

Alemayehu N. Ayana
Ebby Chagala
Mercy Afua Adutwumwaa Derkyi
Felix Kanungwe Kalaba
Jonathan Kamwi
Charles Joseph Kilawe
Tonjock Rosemary Kinge
Stephy David Makungwa
Etotépé A. Sogbohossou

Layout

Eugénie Hadinoto

Cover picture

Omo valley, Ethiopia: Traditional Hamar tribe house made from straw and acacia tree sticks
Photo © Einat Klein Photography, Shutterstock

Published by

Global Forest Expert Panels (GFEP) Programme
International Union of Forest Research Organizations (IUFRO)

ISBN 978-3-903345-10-2

Printed by

Eigner Druck
3040 Neulengbach
Austria

CONTENTS

Foreword.....	4
Acknowledgements.....	5
Executive Summary	6
1. Introduction	13
2. Forests, Trees and Poverty Dynamics.....	21
3. Contextual Factors Shaping Forest-Poverty Dynamics in Africa	43
4. Key Messages and Implications for Policymakers	51
5. References	64
Appendix: Authors and Stakeholders	72

FOREWORD

Poverty is one of the greatest challenges facing humanity today. “No Poverty” is the first goal of the United Nations 2030 Agenda for Sustainable Development. Globally, one out of every 10 people lives in extreme poverty, 70 percent of them in Africa. Poverty eradication on the continent is, therefore, a major priority of the African Union’s vision, Agenda 2063, as well as a global concern.

The COVID-19 global pandemic has further exacerbated poverty in many African countries and set back living standards and economic growth. A significant means of alleviating poverty is to recognize and further enhance the critical role of forests and trees as allies, especially in Africa where diverse forest and tree-based systems support livelihoods and economies across the continent.

The findings of this Policy Brief on Forests, Trees and Poverty Alleviation in Africa are now more important than ever as they demonstrate how conservation, the sustainable management and restoration of forests and tree-based systems are central to achieving a more prosperous, sustainable future for the people of Africa.

This publication, prepared by the Global Forest Expert Panels (GFEP) Programme of the International Union of Forest Research Organizations (IUFRO), synthesizes key scientific evidence on how forests and tree-based systems affect poverty in Africa. It presents specific policy implications and identifies “win-win” scenarios as well as potential trade-offs. The key messages emphasize the crucial role of forests and trees in poverty alleviation and human well-being in Africa and provide possible paths forward.

Forests and trees are often overlooked in the context of poverty alleviation. The evidence presented in this publication confirms that these natural capital assets need to take on a more central role in advancing global poverty reduction and sustainability goals. Policy tools such as this Policy Brief, based on scientific literature and extensive stakeholder consultations, can help scale up proven solutions and foster innovative strategies. I am confident that readers will find this Policy Brief valuable in the development of effective poverty alleviation strategies in Africa and in catalyzing national, regional and international action.



Mette Løyche Wilkie

Director, Forestry Division, FAO

Chair of the Collaborative Partnership on Forests (CPF)

ACKNOWLEDGEMENTS

This policy brief is the result of collaborative work between many scientists and experts who served as authors in different capacities. We express our sincere gratitude to all of them.

The information contained in this policy brief derives from the detailed analysis of relevant information contained in the global assessment report, “Forests, Trees and Eradication of Poverty: Potential and Limitation” (IUFRO World Series Volume 39), which was developed in the framework of the Global Forest Expert Panels (GFEP) joint initiative of the Collaborative Partnership on Forests (CPF). Additional research focused on Africa was carried out to complement the findings of the global assessment. We gratefully thank all authors of the global assessment.

We acknowledge and sincerely thank the 207 stakeholders in Africa, whose inputs have greatly improved the quality of this publication. We furthermore thank Katia Nakamura for creating the maps in the policy brief .

We are grateful to the institutions and organisations to which the authors and stakeholders are affiliated for enabling them to contribute their expertise to this policy brief. At the same time, we wish to note that the views expressed within this publication do not necessarily reflect the official policy of these institutions and organisations.

We also gratefully acknowledge the generous financial support provided by the German Federal Ministry for Economic Cooperation and Development. Our special thanks go to the IUFRO Secretariat for providing indispensable administrative and technical support.

Daniel C. Miller

Doris N. Mutta

Stephanie Mansourian

Dikshya Devkota

Christoph Wildburger



EXECUTIVE SUMMARY

Africa is home to the world's second largest tropical rainforest, the Congo Basin, and a wide array of other forest ecosystems, from mangroves, coastal to dry forests, from savannah woodlands to Afromontane forests. Trees outside forests also nourish land and life on farms, and are key components of urban areas across the continent. Despite this natural wealth, Africa is also home to 435 million of the world's poor. The share of Africans south of the Sahara living in extreme poverty has dropped from 55% in 1990 to 40% in 2018, but 70% of the world's extreme poor now live in Africa. Poverty eradication is therefore a critical priority of governments across the continent.

Forests and tree-based systems are vital, although often overlooked resources in efforts to address poverty. Poor and vulnerable populations in Africa often rely heavily on forests, trees and the ecosystem services they provide to support their livelihoods, both for subsistence and income generation. The contribution that forests make to national accounts is also important, although frequently underestimated because of a large informal sector. However, investment in forests and tree-based systems has not matched their importance, with governments spending relatively little of their own funds (e.g. less than 1%) in the forestry sector and international financing being insufficient to fill the gap.

Purpose, methods and audience

The goal of this policy brief is to assist government and other decision-makers to better understand the potential role of forests and trees in poverty alleviation and sustainable development in Africa. It synthesises current scientific evidence and stakeholder input to draw out policy implications and enable identification of “win-win” scenarios as well as potential trade-offs. This policy brief stems from an in-depth

review of the scientific literature globally, followed by a review focusing on Africa and broad stakeholder consultation held in diverse country contexts across the continent.

This assessment of forests and poverty in Africa comes at a critical time. The implementation period for both the African Union's Agenda 2063 and the UN Sustainable Development Goals is well underway. The COVID-19 pandemic has led to illness and death and economic slowdown that has impoverished millions. At the same time, deforestation and degradation of forest and tree resources are accelerating in many parts of Africa even as some areas are seeing an increase in tree cover.



Wildlife tourism can help provide a route out of poverty
Photo © Jennifer Zavaleta Cheek

Key messages and implications for policymakers

KEY MESSAGE 1

Forests and trees are critical to poverty alleviation in Africa

Forests and tree-based systems are essential to efforts to alleviate, and ultimately eradicate, poverty in Africa. They are particularly relevant for the more than 245 million people who live within 5 km of a forest across the continent. For these forest-proximate people, they contribute a substantial proportion of income and provide a valuable asset for managing risk, coping with shocks and, in some cases, moving out of poverty.

In virtually every country of Africa, forests and tree-based systems provide both tangible and intangible inputs to household well-being. These inputs include the material aspects of people's lives such as energy, health, housing, income and nutrition, and non-material aspects such as community relations and trust, and those relating to culture and spirituality.

The manifold contributions of forests and tree-based systems often occur outside formal markets, however, and so are excluded from national income accounts. Furthermore, decision-making is often hampered by incomplete information. As a result, contributions of forests and tree-based systems are frequently overlooked in development policy discussions. The evidence compiled in this brief strongly shows that these valuable assets should be more widely recognized, carefully stewarded, and mainstreamed in the struggle to tackle poverty in Africa. Formalising the contributions of forests can begin to ensure that their true value is reflected in national decision-making processes. Suitable mechanisms need to be in place that enable the poor to access benefits from forests in a sustainable, equitable and fair manner.

KEY MESSAGE 2

Forests and trees can contribute to the well-being of the poor in Africa as they face profound global changes

Our world is in the throes of profound global challenges, which are affecting the most vulnerable and poorest members of society in the harshest ways. In Africa, more extreme and frequent weather events associated with climate change, global economic shocks, widening inequality, concentration of political power in fewer hands and the spread of infectious diseases, among others, exacerbate an already tenuous situation for the poor. Given these threats, forests and trees can be a lifeline. While forests and trees do not offer a 'silver bullet' for securing or stabilising well-being, the poor have been able to harness forest goods and services to manage and mitigate risk, particularly where market access and public service provision is limited.

Several avenues exist for decision-makers to enhance use of forests and trees for risk management. Two of particular relevance to Africa are financing reforms in the commodity supply chain, and strengthening land rights – particularly of women, youth and marginalised groups to enhance their access to opportunities and resources critical for building their resilience to adverse impacts of global change.

KEY MESSAGE 3

The distribution of benefits from forests and trees for human well-being in Africa is inequitable

The distribution of benefits from forests and trees is shaped by many factors, including age, gender, ethnicity and economic class. These factors may constrain or enable the ability of forests and trees to alleviate poverty in a way that is effective, just and sustainable. More generally, forests and trees matter differently in different places and scales, within and across the countries of Africa. Understanding such differences is necessary to tailor policies such that forests and trees effectively address poverty and wider development goals while avoiding poverty traps.

In general, the evidence suggests that the poor are rarely able to capture the bulk of benefits from forests even as forests and trees are vital to them in terms of subsistence and food security. Elite capture is an ongoing problem and income flows tend to favour owners of land and capital, including large corporations, without reaching the poor – or, worse, coming at the expense of their livelihoods through dispossession. This inequality extends to relations between wealthy, mostly northern, countries and those in Africa. Strengthening property rights, promoting gender equality, and supporting community groups to access improved technology and to integrate relevant commodity chains can help redress inequitable benefit flows from forest and tree resources.

KEY MESSAGE 4

Cross-sectoral coordination in land use policies can avoid excessive costs being borne by the poor

The forest-proximate poor bear the brunt of conflicting policies occurring across the energy, mining, tourism, agriculture and forestry sectors. Forest and land use policies and programmes can impose particular costs on the rural poor who rely on forests and trees. Exploitation of these natural assets can have direct repercussions on the livelihoods of the poor. Where private and corporate forest or mining concessions are dominant – as in Central and West Africa - there is a risk of corruption, exclusion and conflict at all stages of development and implementation. Furthermore, poor enforcement and price variations mean that many African countries lose vast sums in revenues and as value addition to their national income.

More transparent, participatory approaches to land use planning that integrate forest management with other sectors promise better coordination and improved outcomes for the poor, but also generally. Such approaches will need institutional support and the development of mechanisms to address conflict and trade-offs. They may provide an opportunity for wide engagement, including with young people, and innovation to better conserve, manage and restore Africa's considerable forest and natural resource heritage.

KEY MESSAGE 5

Policy measures exist to enable forests and trees to effectively address poverty goals in Africa, but there is no ‘one size fits all’ solution

Forests and trees are not a panacea for poverty alleviation in Africa. Instead, a range of natural resource and forest sector policies, programmes, technologies and strategies contribute to addressing poverty. Rights-based measures, such as interventions supporting stronger tenure and property rights over forest and tree resources, are especially important for addressing different dimensions of poverty and support the effectiveness of other measures, such as agroforestry. The positive contribution of market and supply-chain measures across Africa – including forest producer organisations, payments for ecosystem services and market access – is supported by good evidence. A number of regulatory measures, including decriminalisation and formalisation of informal operations, can also help to maximise benefits while minimising costs to the poor and other segments of society. Simplified regulatory frameworks are a good first step. Until the forest sector is itself recognised as a sector that plays a positive role in poverty alleviation, other measures will remain under-utilised.

Paths Forward

Given the diversity of forests and tree-based systems in Africa, from north to south, east to west, decision-makers will need to carefully consider their particular context when designing, funding and implementing policies and programmes related to forests, trees, and poverty. Lessons learned from prior interventions in contexts of interest may be especially instructive. Special attention is needed to consider those who bear the cost or may be left behind in certain policy choices.

Strategies exist to improve conditions that would allow poorer households to move out of poverty and reduce their vulnerability to global shocks, including infectious diseases and climate change. Cross-sectoral strategies, such as OneHealth, that transcend the silos of health, biodiversity conservation and poverty alleviation, for instance, may mitigate risks and lead to alternative models of development for forest landscapes. Specific measures may include:

- strengthened land and resource rights, particularly of women and marginalised groups;
- financing of commodity supply chain reforms (strengthening transparency, training, skills and resources for smallholders to access global value chains);
- OneHealth actions (buffer areas between agriculture and livestock production and forests, wildstock and human disease surveillance, such as alternatives to wildlife trade); and
- investments in climate adaptation that reduce exposure to natural disasters and stabilise ecosystem services.

Many of these strategies can work in concert with and build the enabling environment for promising levers of change, such as community forest management, ecotourism, agroforestry, and small and medium forest enterprises. Key to the pathway towards a more prosperous future for the people of Africa as envisaged in the African Union Agenda 2063 is the conservation, sustainable management, and restoration of forests and tree-based systems.



1. INTRODUCTION

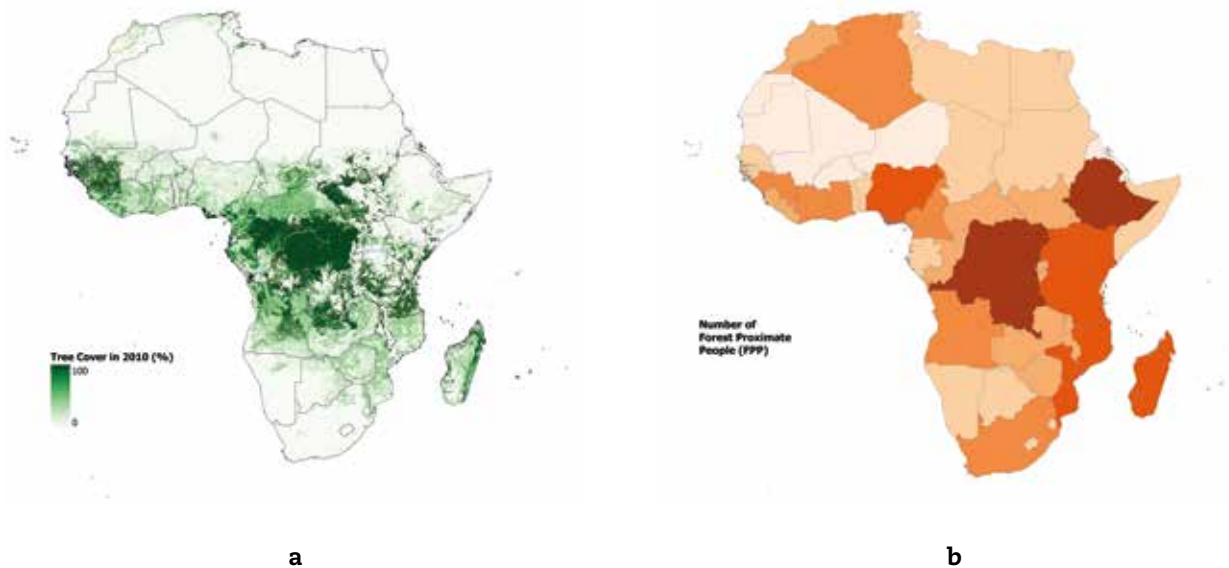
Africa is home to the world's second largest tropical rainforest, the Congo Basin, and a wide array of other forest ecosystems, from mangroves to coastal and dry forests, from savannah woodlands to Afromontane forests. Trees outside forests also nourish land and life on farms and are key components of urban areas in many corners of Africa. These diverse forest and tree-based systems comprise a cornucopia supporting livelihoods and economies across the continent.

Nearly a quarter billion people live within 5 km of a forest in Africa, with a marked majority in the Democratic Republic of Congo (DRC) and Ethiopia, followed by Kenya, Madagascar, Mozambique, Nigeria, Tanzania and Uganda (Figure 1). This number rep-

resents one-fifth of Africa's population and includes many of the continent's poor who often rely directly on the goods and services that forests and trees provide. For forest-adjacent communities in many African countries, forests contribute more than 20% of household income – as much as agriculture in many cases. Forests and tree-based systems also perform a buffer function in maintaining livelihoods and represent natural insurance for many households. More generally, these natural assets are a major foreign exchange earner and provide vital ecosystem services such as water regulation, soil protection and climate change mitigation that also support other economic activities like agriculture and nature-based tourism.

Figure 1

a) Tree cover and b) number of forest-proximate people across Africa



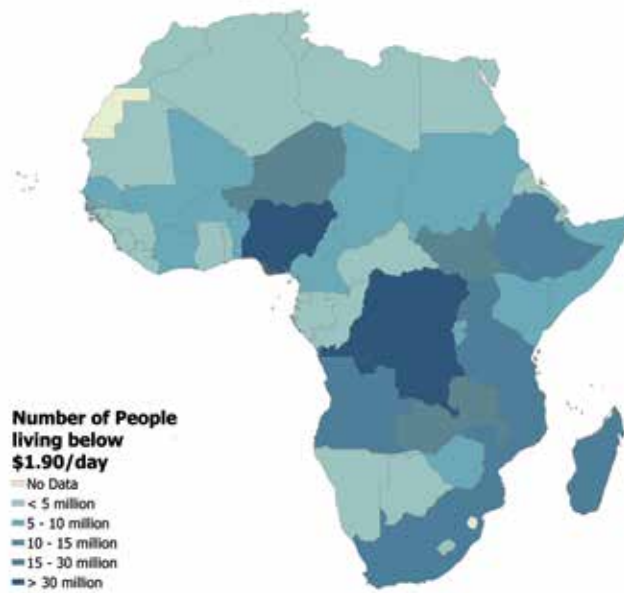
Note: Tree cover based on 2010 data from FAO, 2014. Forest proximate people are those living within 5 km of a forest based on 2012 data from Newton et al., 2020.

Despite this natural wealth in forests and trees, poverty remains a major challenge in countries across Africa. The poorest often go hungry, lack adequate shelter, suffer from poor health, live with the threat of violence, and worry about their immediate future and that of their families. Significant progress has been made to reduce poverty over the past three decades, with the share of Africans south of the Sahara living in extreme poverty (defined as less than 1.90 international dollars (Int\$)¹ per day) declining from 55% in 1990 to 40% in 2018. However, a growing

population has meant the number of poor people actually increased over the same period, from 280 million to 435 million². Some 70% of the world's extreme poor now live in Africa (Figure 2), with more than 80% making a living primarily from agriculture in rural areas. The COVID-19 global pandemic has further exacerbated poverty. In many African countries, living standards have been set back by a decade, with economic activity estimated to have shrunk by 3.7% in 2020 and growth trends expected to be much more moderate than previously assumed³.

Figure 2

Number of people living in extreme poverty (below USD 1.90/day) in Africa



Data source: World Bank, 2021a; World Data Lab, 2021

1 An 'international dollar' is a hypothetical currency used to enable comparisons across country contexts. It has the same purchasing power parity (PPP) that the US dollars has at a given point in time.

2 World Bank, 2021a

3 World Bank, 2021b

Poverty is not only economic. Rather, it is multi-dimensional, touching on all dimensions of human well-being, including health, safety, food and education, amongst others. Broadly, poverty can be understood as a state of deprivation or disadvantage that prevents an individual or group from attaining

a certain level of well-being, realising their capabilities, and participating fully in society. Key terms and concepts related to poverty and human well-being as used in this Policy Brief are defined in Box 1.

Box 1

Key terms and concepts on poverty and human well-being⁴

Human well-being (also ‘well-being’)

A multidimensional concept capturing diverse ideas about what constitutes a ‘good life’. It can be defined simply as a positive physical, social and mental state. Human well-being comprises the objective material circumstances of people’s lives such as health, housing and income, social aspects such as community relations and trust, and a subjective dimension relating to how individuals view their own circumstances.

Poverty

Deprivation or disadvantage that prevents an individual or group from attaining a certain level of well-being and participating fully in society. This definition encompasses not only commonly used income or consumption measures of poverty but also a range of non-monetary attributes that directly affect people’s overall well-being and ability to realise their capabilities.

Poverty alleviation

A lessening of deprivation or disadvantage such that well-being is improved. This lessening may include movement above a certain income or consumption threshold, such as international or country-specific poverty lines (termed ‘**poverty reduction**’ or ‘**poverty elimination**’). It may also include a lessening in the degree of poverty experienced or avoiding falling into poverty (termed ‘**poverty mitigation**’).

Poverty eradication (also ‘elimination’)

The complete or near absence of people or households in poverty, indicated by the international poverty line or other measures. Implies permanent movement out of poverty by addressing the root causes of why people are impoverished.

Poverty trap

Any self-reinforcing mechanism that causes poverty to persist.

⁴ Miller et al., 2020a

Given the persistence of poverty in Africa, its eradication is a major priority of governments across the continent. The primary African Union aspiration is “a prosperous Africa based on inclusive growth and sustainable development” within the next 50 years⁵. The first priority under this broad goal is “to eradicate poverty in one generation and build shared prosperity through social and economic transformation of the continent.”

The first of the 17 Sustainable Development Goals (SDGs) agreed upon by all 193 Member States of the United Nations is “End poverty in all its forms everywhere”⁶. Given that such a large share of the world’s extreme poor live in Africa, poverty alleviation on the continent is also a global concern. A wide range of international organisations are therefore working with government, civil society, and private sector actors in Africa to tackle extreme poverty. In so doing, they seek to address the five main targets of SDG 1, covering many aspects of poverty, from a focus on extreme poverty measured in monetary terms to nationally-determined definitions of multi-dimensional poverty. The natural environment is embedded explicitly in two of these targets, which concern the rights to land and natural resources (target 4) and the resilience of the poor in the face of different kinds of shocks and disasters (target 5).

A large body of literature has now developed on the role that forests and tree-based systems can play in addressing poverty and sustainable development in Africa.

1.1 Purpose and Audience for this Brief

This policy brief synthesises scientific evidence on how forests and tree-based systems affect poverty alleviation in Africa. It also highlights current knowledge gaps. The scope is the whole of Africa, including countries both north and south of the Sahel and island nations like Cape Verde, Madagascar and the Seychelles. The evidence presented here largely derives from a global assessment report⁷ as well as extensive consultation with stakeholder groups across Africa (Box 2).

The **goal of this policy brief** is to help decision-makers to better understand the potential role of forests and trees in poverty alleviation and sustainable development in Africa. It aims to draw out specific policy implications from the evidence base and enable identification of “win-win” scenarios as well as potential trade-offs. The main **target audience** is **decision-makers** across Africa and beyond. This brief should be directly relevant to **government** officials at different levels, including elected government representatives and ministries and bureaucracies concerned with agriculture, environment and land-use policy, and those working within continent-wide political bodies such as the African Union and regional ones such as ECOWAS⁸, EAC⁹, SADC¹⁰ and COMIFAC¹¹. It should also be of interest to:

5 African Union Commission, 2015

6 UN, 2015

7 Miller D.C., Mansourian S. and Wildburger C. (Eds.) (2020). *Forests, Trees and the Eradication of Poverty: Potential and Limitations*. International Union of Forest Research Organizations (IUFRO): Vienna. ISBN 9783903345065.

8 Economic Community of West African States

9 East African Community

10 Southern African Development Community

11 Commission des Forêts d’Afrique Centrale

- **civil society** actors, including those in NGOs and community associations;
- **private sector** actors, including those in the agricultural and forestry sector;
- **international donors**, such as bi- and multi-lateral aid agencies or private foundation staff; and
- **researchers** based in Africa and abroad.

Box 2

Input from stakeholders in Africa

In April and May 2021, stakeholder consultations were carried out in Africa to receive feedback on the accuracy and relevance of this policy brief. Nine experts from diverse countries across Western, Eastern and Southern Africa consulted 207 stakeholders (listed in the Appendix). All experts

are scientists working in the sector and selected through IUFRO’s network. Although attempts were made, in the time available, it was not possible to carry out a similar exercise in Northern Africa and the small island states.

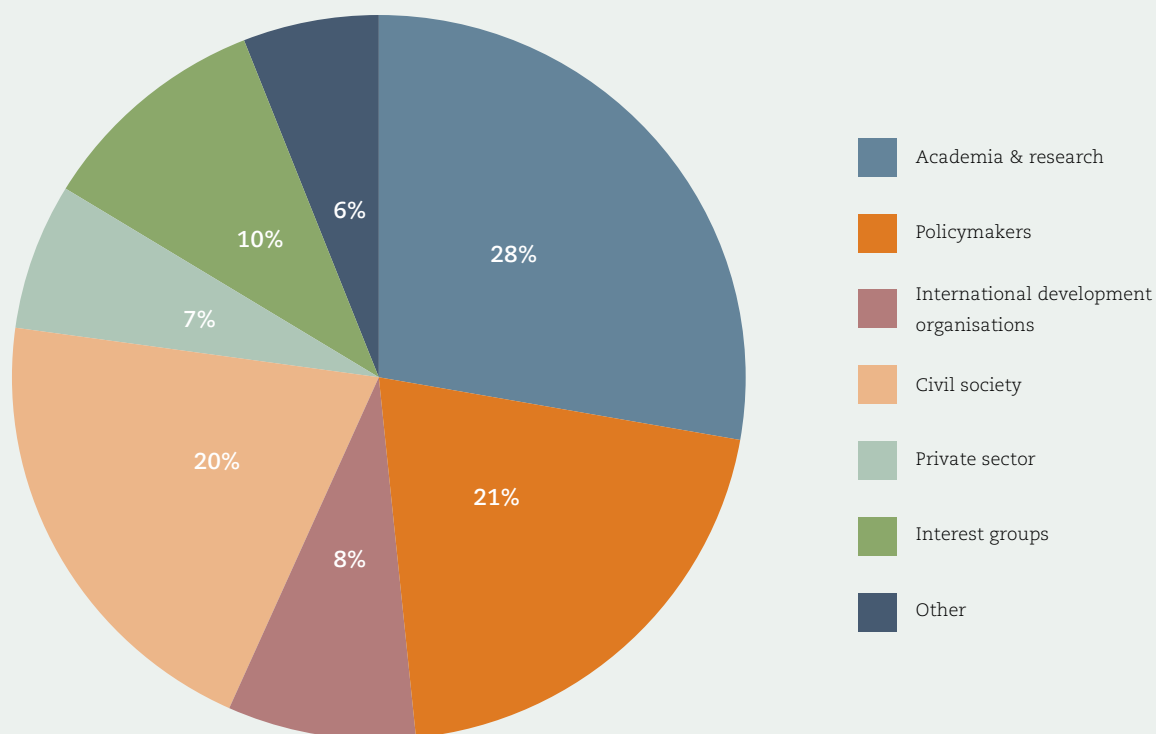


Figure 3: Types of stakeholders consulted across Africa

The experts conducted consultations (virtually and in-person) on the first draft of the policy brief. The stakeholders were selected to represent different relevant groups, including national policymakers, civil society, academia and research, the private sector, international development organisations, and other interest groups (Figure 3). A draft of the policy brief was shared with the stakeholders prior to the consultations, and a set of guiding questions provided by IUFRO's Global Forest Experts Panels (GFEP) Programme served as the basis of the consultation. The questions were tailored by the experts to suit different stakehold-

er groups. Finally, the experts summarised the stakeholder comments, removed all identifiers, and shared them with the authors and editors.

Stakeholder comments were then addressed within each section of the policy brief. Specifically, the stakeholder comments focused on new topics and sub-topics as well as additional data, case studies on specific regions or issues, and references missing or inadequately covered in the initial draft of the policy brief. Additional changes on information presentation were also made as suggested by the stakeholders.

1.2 A Critical Time for Forests, Trees and Poverty

This assessment of forests and poverty in Africa comes at a critical time. The implementation period for the SDGs is well underway, with less than a decade remaining to reach the goals and targets set. The COVID-19 pandemic has led to illness and death and economic slowdown that has impoverished millions. While the world looks to recover from COVID-19, the possibility that other infectious diseases may emerge in the future to pose a major threat to progress towards the SDGs must also be taken seriously.

At the same time, deforestation and degradation of forest and tree resources is accelerating in many parts of Africa even as some areas are seeing an increase in tree cover¹². Deforestation is rampant in many parts of Africa, with intact, old-growth forests

especially imperilled in Madagascar and many West African countries.

Climate change is further exacerbating challenges to poverty and forests. It jeopardises gains made in addressing poverty, but also threatens some of the world's poorest and most vulnerable people whose basic necessities and livelihoods often derive directly from forests and tree-based systems. Human-induced changes to the earth's climate, including increases in frequency and intensity of extreme events, such as floods and fires, have already adversely affected food security and terrestrial ecosystems in many regions¹³. Climate change threatens both the total area covered by forests and forest integrity, which, in turn, imperils the livelihoods of forest-dependent people.

Given that forests are also key to mitigating climate change through avoided deforestation and carbon sequestration, policies that promote sustainable

¹² FAO and UNEP, 2020

¹³ IPCC, 2019

forest management, conservation and restoration while recognising the rights and stewardship of forest-dependent people, promise to help advance multiple sustainable development objectives. However, such policies will have to navigate potential trade-offs between climate mitigation and forest-based livelihoods. In this context, forests take on particular importance for not only expanding human well-being to reduce poverty and bring more widespread prosperity, but to do so in a way that is sustained over time.

The African Union has articulated a vision of Africa as “a prosperous continent, with the means

and resources to drive its own development, with sustainable and long-term stewardship of its resources” by 2063. Member states have also adopted the Sustainable Forest Management Framework to guide the countries on forest-related priorities.¹⁴ This brief shows the synergies between these two priorities and demonstrates how the conservation, sustainable management, and restoration of forests and tree-based systems will be central to realising a more prosperous future that can be sustained over time for the people of Africa.



Forested landscape in Malawi
Photo © Jennifer Zavaleta Cheek

14 African Union Commission, 2015

2. FORESTS, TREES AND POVERTY DYNAMICS

Forests and tree-based systems play an important role in relation to poverty across Africa. Poverty – and its converse – well-being can change over time (Figure 4).

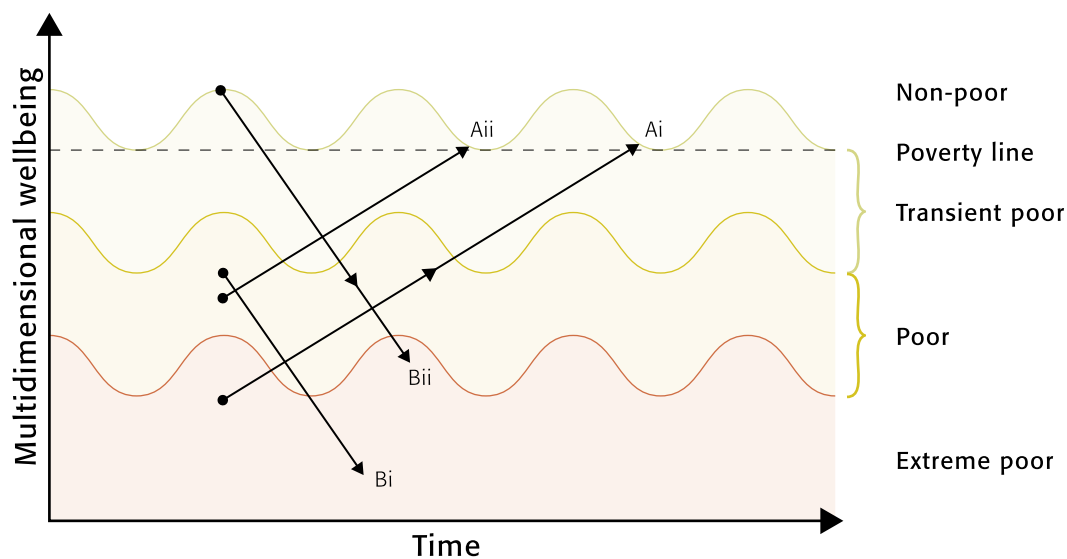
2.1 Conceptualising Poverty Dynamics

The starting point for conceptualising poverty dynamics is that people may be considered non-poor, poor, transient poor or extremely poor at any point in time, but this status may change. For example, individuals or households may find themselves within different groups at different times based on the season, the household 'life cycle' or after experiencing a shock. Forests and tree-based systems may influence poverty and well-being trajectories as follows:

1. Movement out of poverty: Poverty alleviation or durable improvements in well-being (shifts out of poor or extreme poor status) (A_i , A_{ii} ; Figure 4)
2. Supporting current consumption: Maintenance of the status quo or support for current consumption (any horizontal trajectory; Figure 4)
3. Risk mitigation: Managing risk to avoid transience around poor or extreme poor status (oscillation within yellow or red bands; Figure 4)
4. Negative externalities: Negative effects on well-being (shifts into poor or extremely poor status) (B_i , B_{ii} ; Figure 4)

Figure 4

Conceptualising poverty dynamics



A_i A_{ii} = Moving out of poverty
 B_i B_{ii} = Moving into poverty

2.1.1 Movement out of poverty

Forests and trees outside forests can help people move out of poverty by providing a broad range of goods and services that directly or indirectly enable households to earn income. Additionally, income and other benefits from forests and trees can lead to asset accumulation for households such that they are able to move out of poverty. Studies that use longitudinal data, specifically household level panel data that examine the role of forests in lifting people out of poverty over time are few; most of our knowledge is from studies that measure the contribution of forests and trees to household income or patterns of consumption and expenditures¹⁵. National statistical offices in most countries in Africa conduct population representative household surveys to inform national decision-making on poverty and livelihood issues, but they typically collect little to no information on the use and benefits of forests and trees^{16,17}. This gap in data collection means that policymakers do not have complete information when they are making decisions about the potential role for forests and tree-based systems in poverty alleviation and broader development strategies.

2.1.2 Supporting current consumption

Over the past three decades a significant evidence base has emerged that quantifies the important role that forests play in supporting current consumption. Supporting current consumption is fundamental to maintaining the status quo and keeping households from sliding into poverty¹⁸. Forests provide a

wide range of goods in support of subsistence such as food, fuel, farm implements, fodder and building materials¹⁹. Resources collected from forests can support consumption to meet basic needs, which can reduce pressure on stretched incomes and make households less vulnerable to price changes of fuel and other critical consumption goods in the market. Subsistence income (e.g. the estimated value of goods collected without payment) is not typically captured in standard measures of poverty, but typically plays a critical role in smoothing incomes and mitigating risk, and addressing other poverty dimensions.

The Poverty Environment Network (PEN) study analysed data from sites in 11 countries in West, Central, Southern and East Africa and found that forests accounted for 21.4% of the relative income share (compared with 32.2% for crops)¹⁹. Products from trees on farms also contribute to livelihoods across Africa. Fruit trees in particular provide a significant source of income as well as a direct source of nutrition for many families. For example, evidence from Uganda using data from a national survey of nearly 1,400 households over a 10-year period showed that households that increased the area they allocated to trees on farms – particularly fruit trees – saw a significant increase in their total consumption²⁰.

15 Miller et al., 2017

16 FAO et al., 2016

17 Miller et al., 2017

18 Angelsen and Wunder, 2003

19 Angelsen et al., 2014

20 Miller et al., 2020c



Women collect firewood for cooking and subsistence
Photo © Jennifer Zavaleta Cheek

2.1.3 Risk mitigation

Forests play a critical role in managing risk and coping with shocks by providing a ‘natural insurance’ function and helping to smooth consumption across seasons. In the face of shocks, households can turn to forests to increase their income or improve subsistence by collecting forest goods. Households may harvest timber and non-timber forest products (NTFPs) when they have lost other income earning opportunities. Given the barriers to entry for timber production and limited potential to scale up NTFP collection, the poor frequently rely on forests to make up shortfalls and support basic survival²¹. Often income- and as-

set-poor, and female-headed households rely more on forests to cope with shocks as compared to more asset-rich households that have other response options. Households with greater access to forests or that are remote and lack market-based coping options are more likely to use the forest as a safety net. The availability of other coping strategies beyond the use of forest resources may mean households choose non-forest-based responses to respond to shocks. Nevertheless, forests can be particularly important when households face multiple, interacting shocks such as economic collapse and drought²².

²¹ Neumann and Hirsch, 2000

²² Pritchard et al., 2020

2.1.4 Negative externalities associated with forests

In some circumstances, forests may be associated with pushing people into poverty or keeping people in poverty. Events associated with living proximate to trees and forests can negatively impact well-being, sometimes in very extreme ways²³. Examples include forest fires, crop-raiding by wildlife²⁴ and prevalence of zoonotic diseases²⁵. These events are largely a function of living at the forest frontier, or where forest and agricultural systems are co-located. Crop and livestock raiding in buffer zones around protected areas is a challenge in many parts of Africa. Wildlife, such as elephants, primates and buffalo, may also cause human injuries and even death. Studies on Crop raids by wildlife around the Bia Conservation Area in Ghana and the Budongo Forest Reserve in Uganda affected 84% and 73% of farmers respectively,^{26,27} while in Tanzania, 27.4% of livestock owners experienced loss to wild predators (e.g. hyenas, leopard, baboons) at an average of 4.5% or 5.3 heads of stock in a year²⁸.

The overlap between the extreme poor and those living in marginal or remote areas characterised by forests and woodlands is substantial in many parts of Africa²⁹, leading to what has been called a “poverty trap” (see Box 1). The causal mechanisms for how forests keep people in poverty may be related to remoteness, specific policies surrounding forest protection that restrict forest access for local communities, and low levels of awareness about forest conservation. Populations in such remote forest landscapes,

far from markets, may find themselves in a poverty trap by virtue of the lack of income and asset accumulation opportunities. Overall, there is significant evidence that poverty is higher in forested areas, but no evidence that this association is caused by forest reliance. Policies affecting actions in forest landscapes where human populations reside, particularly those that create incentives to change access to forests and contribute to land use change, have the potential to impact well-being.

2.2 Forest-Derived Goods and Services Contributing Directly to Well-Being in Africa

There exists a robust knowledge base on key products that support livelihoods in fundamental ways. These products include household energy, food, timber and a wide range of non-timber forest products, some of which are sold in national and international markets.

2.2.1 Energy

In sub-Saharan Africa, where the majority of cultures consume staple foods with long cooking times, over 80% of households rely on biomass (e.g. primarily fuelwood and charcoal, but also dung, briquettes and pellets) for cooking energy. In rural Malawi, over 97% of households rely on firewood for cooking³⁰. In detailed studies of forest income, woodfuels are the largest contributor to forest income in rural commu-

23 Lyytimäki, 2015

24 Naughton-Treves et al., 1998

25 Paige et al., 2014

26 Harich et al., 2013

27 Tweheyo et al., 2005

28 Holmern et al., 2007

29 Barbier, 2019

30 Makungwa et al., 2013

nities^{31,32}. Woodfuels harvested for subsistence use are by far the highest value commodity rural households extract from forests. While rural households generally rely on freely accessed fuelwood³³ to meet their energy needs, households in peri-urban and urban centres have high demand for both charcoal and fuelwood, even in cities where transitions to clean cooking fuels are starting to occur (e.g. Nairobi, Lusaka, Accra). Charcoal production has become a very common activity throughout rural Africa to meet both domestic and sometimes international market demand. Although it was previously perceived as an activity of last resort for poor households with few

income generating alternatives, but recent evidence confirms that charcoal production can be quite lucrative and is undertaken by people across the income spectrum. Informal sector activity for charcoal and fuelwood production has been estimated to be three times greater than all recorded formal forest sector activity³⁴. Trade in charcoal accounts for a large share of incomes within the informal sector³⁵ and provides jobs for millions of people in different countries³⁶. However, charcoal production is known to be a driver of deforestation and forest degradation in a few locations in the densely populated parts of East Africa, and select locations in West Africa³⁷.



Forest products are critical resources used on a daily basis by forest-proximate communities

Photo © Nelson Grima

31 Angelsen et al., 2014

32 Jagger and Shively, 2014

33 Makungwa et al., 2013

34 FAO, 2014

35 Chiteculo et al., 2018

36 Gumbo et al., 2013

37 Bailis et al., 2015

An important consequence of reliance on biomass for cooking is exposure to household air pollution. Exposure to smoke from the combustion of biofuels is a major cause of morbidity and mortality accounting for approximately 739,000 deaths in Africa annually³⁸, which is more than the deaths from malaria and tuberculosis. This health burden creates a potential negative feedback loop to poverty as use of biomass for cooking contributes to morbidity and mortality, reducing productive work days, thereby exacerbating household poverty.

2.2.2 Food and nutrition

People who live near areas with more forest and tree cover have more diverse and nutritious diets. A statistically significant correlation between tree cover and dietary diversity among children was found in more than 20 African countries^{39,40}. The micronutrients provided by forest foods improve health outcomes and prevent stunting and impairment of cognitive development⁴¹. Tree cover⁴², proximity to forests⁴³ and composition of forests⁴⁴ are associated with higher quality diets, including higher dietary diversity of fruits, vegetables and meats. In many contexts, the contribution of forests to dietary diversity is not easily replaced by higher incomes. In places where forests were converted to commodity crops leading to in-

creased household incomes, there have been negative consequences for nutrition and dietary diversity⁴⁵.

A study exploring the contribution of natural resources to the nutrition of the local population in a protected area in Gabon found that the consumption by children aged 5 to 9 of products stemming directly from their environment, was the best predictor for nutritional status⁴⁶. Similarly, although natural foods were found to contribute only 12% of the energy requirements of villagers in the Gamba Complex of Gabon, they contributed an estimated 82% of protein, 36% of vitamin A and 20% of iron requirements⁴⁷. In this context, the role of wild foods collected from the forest is all the more important to help to combat micronutrient deficiencies. Fruit trees, both wild and cultivated, and caterpillars are an important source of dietary diversity for many rural households. Bushmeat also plays a critical role in dietary diversity throughout Africa. Wild animals are important as both high-value market products and critical sources of protein in many countries even though the legality of hunting such animals varies depending on species and country context. For many rural households, bushmeat harvesting contributes to improved nutrition and food security⁴⁸. While bushmeat is often consumed directly by hunters and members of their households⁴⁹, it is sometimes also sold to other

38 WHO, 2018

39 Ickowitz et al., 2014

40 Rasolofoson et al., 2018

41 Vinceti et al., 2013

42 Ickowitz et al., 2014

43 Tata et al., 2019

44 Rasmussen et al., 2020

45 Ickowitz et al., 2016

46 Blaney et al., 2009

47 Blaney et al., 2009

48 Nielsen et al., 2018

49 Wilkie et al., 2005

community members or traders, with the latter often re-selling the meat in cities⁵⁰. The harvesting of bushmeat may have ancillary benefits for agriculture, by reducing predation on crops, livestock and people working in remote fields. On the other hand, poor regulation in the sector leads to illegality, over-harvesting and biodiversity loss⁵¹.

2.2.3 Timber extraction

Commercial timber extraction is the most valuable and lucrative forest undertaking⁵² often requiring economies of scale and high initial investments and technology⁵³. FAO estimates that 79 million m³ of wood was harvested as industrial timber in Africa in 2018⁵⁴, but this is widely recognised as a substantial underestimate due to large-scale illegal felling and trade of logs in many countries. Further, due to the illegal nature of much activity in the sector, it is very challenging to collect information on the role of timber extraction in well-being. A survey carried out among migrant loggers in Uganda found that their total annual income was not significantly different than a comparison group of non-loggers⁵⁵. In addition, elite capture, corruption, and unsustainable practices and other political economy challenges often combine and hinder the potential for rural households to engage in timber harvesting in a significant way⁵⁶. Nev-

ertheless, locally-controlled forestry businesses and cooperatives exist in various contexts around Africa that can contribute to poverty reduction and broader notions of prosperity⁵⁷.

2.2.4 Non-timber forest products

Non-timber forest products (NTFPs) include products from forests or tree-based systems such as mushrooms, fruit and nuts, honey, herbs for medicine, and specialised products such as shea butter, vanilla and shade-grown coffee. Wildlife can also be considered a kind of NTFP. NTFPs often play a safety net role during times of need such as natural disasters, crop failure, or family illnesses and periods of financial struggle. Frequently, NTFPs are used for seasonal gap filling, when they are collected and sold based on their availability relative to crop harvesting and planting seasons⁵⁸. They are generally accessible to poor households but often offer low returns to labour⁵⁹. NTFPs are also often open access, suggesting resources can be harvested easily⁶⁰, but also that high levels of market interest will quickly lead to unsustainable management. Due to the remote nature of many communities harvesting NTFPs, transport, capital, technology and market access are significant challenges⁶¹. For rural households with little financial or physical capital, low barriers of entry for many

50 Nielsen et al., 2017

51 Lindsey et al., 2013

52 FAO, 2014

53 Angelsen and Wunder, 2003

54 FAO, 2019

55 Jagger et al., 2020

56 Sundström, 2016

57 Macqueen et al., 2020

58 Leßmeister et al., 2018

59 López-Feldman and Wilen, 2008

60 Belcher, 2005

61 Shackleton et al., 2008



Timber extraction generates economic revenues

Photo © Jennifer Zavaleta Cheek

NTFPs make them a viable livelihood strategy. In both Cameroon and DRC about one third of NTFPs are traded and they represent the main income source for 39% of NTFP harvesters⁶². In Central Africa, the NTFP value chain was found to be highly gendered, with men involved in the most valuable products, generating on average 11% more profits from NTFPs than women⁶³. One particularly important role of forests is as a 'natural pharmacy' or source of medicinal plants that play important health care roles for people living in remote rural areas where modern medicine is not accessible. Domestic trade in medicinal plants products is widespread in a number of countries in Africa such as Ghana, Kenya, Ethiopia

and South Africa. An estimated 70-80% of Africans consult traditional medical practitioners for health care⁶⁴ and a large body of literature on the wide use of medicinal plants in traditional health care systems has been documented⁶⁵.

Beekeeping is a long-established economic activity in many parts of Africa. In Tanzania, for example, beekeeping generates some USD 19 million per annum and employs more than two million people. Besides generating income, beekeeping produces food and medicines, makes a significant contribution to biodiversity conservation and supports agricultural production through pollination⁶⁶. These benefits are increasingly threatened by the use of chemicals in

62 Ingram et al., 2014

63 Ingram et al., 2014

64 Cunningham, 1993

65 Colfer et al., 2006

66 Tutuba and Vanhaverbeke, 2018

agriculture and excessive exploitation of forests and trees upon which bees rely to produce honey.

The stunning array of wildlife found in Africa's forests and broader tree-based landscapes bring jobs and income from safaris and other wildlife-based tourism supported by large forest reserves and woodlands that are host to charismatic animal species. Prior to the 2020 global pandemic, wildlife-based tourism in Africa generated over USD 29 billion annually and provided direct employment for 3.6 million people and another 24 million related jobs⁶⁷. Such tourism employs proportionately more women than men, includes substantial community benefits, and has greater job creation power than many other sectors^{68,69}.

Shea nut butter and vanilla are two other NTFPs that have been well integrated into domestic and international markets. The nuts of the shea tree (*Vitellaria paradoxa*), found in the dry savannah and grassy woodlands of Africa, are both consumed at home and sold in markets for end uses including food, oils and cosmetics. Shea nut prices increased five-fold from the 1990s to 2013⁷⁰. In particular, shea collection, processing and subsequent sale of shea-based products generate income and offer employment to rural women and children⁷¹. Women involved in shea production are more likely to increase their family income if they have access to microcredit, as shown by the Community Life Improvement Programme (CLIP) in

northern Ghana⁷². At the country level, FAO estimated that Ghana exported 42,424 metric tonnes (MT) of shea worth USD 14.8 million in 2008⁷³. This same quantity of shea nuts could have yielded 21,212 MT of shea butter at a total value of USD 21.2 million⁷⁴. Value addition through the processing of shea nuts into butter presents an opportunity for increasing income, improving livelihood outcomes and alleviating poverty.

Another example of a lucrative NTFP is vanilla, grown in the SAVA region of Madagascar. Vanilla orchids (*Vanilla planifolia*) have become the main source of income for many farmers⁷⁵. Cultivation of vanilla has improved the socio-economic status of smallholders, including gains in income, educational attainment, access to electricity and ownership of assets. These benefits generally arise from contracts with vanilla exporters and are concentrated among smallholders able to obtain those contracts. Exemplifying persistent gender inequality, female-headed households are less likely to get contracts because of their significant social disadvantages (e.g. lower labour availability and smaller fields). Tight integration with the export market can result due to unstable prices⁷⁶ and perceived exploitation as noted in the disparity between the prices offered to smallholders and the export value.

67 WTTC, 2019

68 Backman and Munanura, 2015

69 Lindsey et al., 2020

70 Rousseau et al., 2015

71 Sarkodie et al., 2016

72 Bawa et al., 2017

73 FAOSTAT, 2008

74 Omane, 2014

75 Hänke et al., 2018

76 Zhu, 2018

Generally, NTFPs have been found to be crucial to enhancing livelihood security for millions of poor households in rural Africa. In exceptional cases (e.g. ecotourism, shea butter, etc.), these products have helped provide a route out of poverty. Creating such exceptions requires more equitable forest policy⁷⁷, awareness of potentially relevant forest and agriculture programmes, and greater access to capital, technology and markets⁷⁸.

2.2.5 Production gains in agriculture, livestock and fisheries

Many households derive benefits from the contributions of forests and trees to production in other sectors, most notably agriculture, livestock and fisheries. These indirect benefits are particularly important to poor households who cannot afford to purchase inputs. For example, hundreds of thousands of smallholders, half of them women, plant fodder trees in East Africa, where they reduce the cost of producing milk and increase agricultural productivity⁷⁹. Services derived from planting and managing trees include reduced sedimentation downstream, pollination, water conservation and nitrogen fixation. They also include inputs gathered from forests and produced in tree-based agricultural systems, such as fodder, parts of farm implements and poles. A review of 438 studies spanning over 20 countries across sub-Saharan Africa showed that crop yields increased under tree-based systems such as fallowing, tree-crop intercrop and alley cropping compared to treeless systems in

68% of the studies due to improved microclimate, nutrient cycling and soil fertility⁸⁰. ‘Fertiliser trees’ (that are grown in agricultural fields or pastures to increase nitrogen availability) can offer an alternative or supplement to fertiliser application, which can reduce expenditure on fertiliser and increase income through higher yields. A review of 90 studies suggests that maize yields increased, and crop production stabilised during drought after the integration of nitrogen-fixing trees on farms in Eastern and Southern Africa⁸¹. Similar results have been seen in Sahelian West Africa.

In livestock systems, trees provide both the key service of shade and the key input of fodder. These systems include grazing livestock on pastures with trees and allowing livestock to graze on the trees or shrubs, as well as supplying tree cuttings as fodder for livestock. Fodder trees, when used as a protein supplement, improve milk and meat production, livestock growth, and livestock health and reproduction. This increase in productivity leads to improved incomes and food security. In East Africa, for example, fodder trees and shrubs contributed about USD 3.8 million annually to farmers’ incomes by 2006⁸². At the household level, this translated to an increase in net returns of between USD 13-334 per year in Zimbabwe, and USD 30-114 per year in Kenya and Uganda due to increased production and income from cattle⁸³.

While not as well recognised as contributions to crop and livestock productivity, forests and trees also support fisheries. Fish and other products (e.g.

77 Larson and Ribot, 2007

78 Scherr et al., 2003

79 Franzel et al., 2014

80 Kuyah et al., 2016

81 Sileshi et al., 2007

82 Franzel et al., 2008

83 Franzel et al., 2014



Forests and trees provide goods and services that allow rural households to diversify their income

Photo © Nelson Grima

freshwater prawn, crayfish and crabs) have long been recognised as an important source of protein for the poor, who consume less, but are more dependent on and have fewer substitutes for these products in their diets, as compared to wealthier populations⁸⁴. Fish have been estimated to represent the main animal protein for 19% of Africans and the fisheries sector has been estimated to support the livelihoods of 12.3 million people across the continent, including about 3 million women⁸⁵. A growing body of literature highlights the contribution that ‘blue forests’, no-

tably mangroves, make in supporting local community well-being, livelihoods and food security⁸⁶. This contribution is often differentiated by gender as in the case of Kenya, where women use mangroves for fuelwood, and men for collecting crustaceans⁸⁷.

2.2.6 Non-material benefits of forests

Non-material benefits from forests contribute to broader multi-dimensional understandings of well-being and may contribute to fulfilment of SDG 1 targets focused on rights (1.4) and resilience (1.5),

84 HLPE, 2014

85 Chan et al., 2019

86 Himes-Cornell et al., 2018

87 Huxham et al., 2015

even as these benefits are unlikely to affect economic measures of well-being or income and asset poverty. Forests provide non-material benefits that contribute to culture and spirituality, feelings of empowerment, individual happiness and social relations. They are central to the identity of many forest-dependent communities and forest knowledge embedded in indigenous knowledge systems. Many intact forest patches are close to human settlements and form an integral part of traditional closely-knit rural communities. They provide the venue for social, cultural and religious ceremonies and a range of products for traditional ceremonies from food and beverages to costumes and musical instruments. For example, sacred forests in south-eastern Nigeria and coastal Kenya are important sites for the coronation of paramount rulers, exclusive meetings for spiritual leaders, traditional rites and celebrations⁸⁸. Across Africa, forests are considered sacred places, traditionally managed by indigenous communities and governed by a set of traditional norms and rules⁸⁹. For instance, important remnants of native old-growth forests can be found in Ethiopia's Orthodox churches⁹⁰. Forests are also sites of seclusion for initiates, meeting places for secret societies and areas where community rituals and celebrations are held⁹¹. Products from forests and trees play a role in customary and religious rituals. In a study of the uses of fallow tree species in Ghana, half of the identified species were valued in customary rites⁹². Most musical instruments are made from

forest products in Africa. Among many examples, the seed shells of *Chrysophyllum albidum* and *Mammea africana* are worn by dancers as rattles and the wooden strips of *Ricinodendron heudelottii* are used to make xylophones in Igboland, Nigeria⁹³.

2.2.7 Benefits of forest-related traditional knowledge

The body of traditional knowledge held by indigenous peoples in Africa provides valuable insights into natural resource use and ecosystem management and contributes to human development in various ways. Through the careful selection of crops domesticated from forests and managed over many generations and seasons, traditional farmers have developed crop varieties with favourable characteristics such as drought tolerance, disease and pest resistance, and special culinary and nutritional characteristics, thus contributing to food security. Examples include *Coffea arabica*, *C. canephora* and *C. liberica* cultivated for production of coffee that were first domesticated by 'Ethiopian farmers'^{94,95} and now represent an important agricultural commodity in many African countries. In health care, some of the medicinal plants based on traditional knowledge have offered important pharmaceutical products to the world. An example includes the rose periwinkle (*Catharanthus roseus*) traditionally used in Madagascar for stopping bleeding, wound healing, headache and fatigue, from which the alkaloids vinblastine and vincristine have been extracted as powerful anti-cancer natural prod-

88 Daniel et al., 2016

89 Ngoufo et al., 2014

90 Ruelle et al., 2015

91 Kamoto et al., 2013

92 Asamoah, 1985

93 Okigbo, 1980

94 Bridson and Verdcourt, 1988

95 Lokker, 2013

ucts used in the treatment of acute leukaemia and Hodgkin's disease⁹⁶.

Equitable sharing of benefits accrued from such products, coupled with institutional arrangements that provide indigenous peoples with equal opportunities and intellectual property protection – in line with the principle of free, prior and informed consent – would be an important contribution to poverty alleviation strategies in Africa.

2.3 Which Forest Management Policies, Programmes, Technologies, and Strategies Have Been Effective at Alleviating Poverty in Africa?

An extensive set of policies, programmes, technologies and strategies have been implemented in the forest sector. Collectively, these 'levers' cover a diverse range of approaches, at a variety of scales and are governed by many different stakeholders. It is important for decision-makers to understand which forest policy levers might be most useful in achieving poverty alleviation. Twenty-one different rights-based, regulatory, market and supply chain, and forest and tree management levers were studied to assess how implementation of that lever might alleviate (reduce or mitigate) poverty. The evidence presented in section 2.2 above illustrates how some levers have been instrumental in generating positive livelihood outcomes.

2.3.1 Rights-based levers

Rights-based levers are developed and implemented by local, sub-national or national governments, with their implementation often supported by civil society actors. They include different types of tenure reform, community forest management, concessions and protected areas. Tenure insecurity or lack of clarity on formal rights of access and use for communities living in or near forests has constrained the contribution of forests to rural livelihoods and limited the potential of forests for livelihood improvement and wealth creation⁹⁷. In general, rights-based levers may contribute to poverty alleviation through recognising and strengthening local resource users' rights to directly or indirectly benefit from forest resources. Recognition of rights to adequate compensation during human-wildlife conflicts may reduce negative externalities attributed to forests. Indeed, secure access to land and forest resources is often seen as a first step for forest-reliant poor to be able to reliably benefit, monetarily and non-monetarily, from forests. In Africa, only 2% of forested land is formally held privately or jointly owned by local communities⁹⁸. Informal tenure among rural smallholders, however, is considerably greater in large parts of Africa.

Tenure insecurity has profound implications on livelihoods in the framework of carbon-related schemes such as REDD+ or some afforestation/reforestation initiatives⁹⁹. It also exacerbates inequalities and unequal access to forest resources. In Zambia's Eastern Province, for example, forest benefits were found to flow primarily to elites in the context

96 Das and Sharangi, 2017

97 Barrow et al., 2016

98 Sunderlin et al., 2008

99 Unruh, 2008



A canopy walk in the Kakum National Park (Ghana) attracts international tourism, helping to increase the revenues of the park
Photo © Nelson Grima

of customary tenure systems¹⁰⁰. In Central Africa, lack of ownership rights to trees has impeded women from accessing forest products with higher values¹⁰¹. While some countries have taken steps towards recognising community-based tenure, progress in Africa lags behind Asia and Latin America. As of 2017, forests designated for and owned by communities comprised 7.4% across the 11 African countries included in the assessment, while the corresponding figures in Latin America and Asia were 33.5% and 45.3%, respectively¹⁰². A systematic review of forest property reforms

suggests generally positive to neutral impacts on income consumption and capital. Land tenure reforms designed to increase transparency and accountability and, in some cases, grant formal title to land has been slow in Africa; only 10% of Africa's rural land is registered, and where rural land remains undocumented and informally administered it becomes susceptible to land grabbing, and expropriation without fair compensation¹⁰³. It is important to distinguish between land and tree tenure. In certain African countries, such as Ghana and Tanzania, trees remain

100 Stickler et al., 2017

101 Ingram et al., 2014

102 RRI, 2018

103 Byamugisha, 2013

under the purview of the government regardless of land ownership^{104,105,106}. In Madagascar, as in many other countries, native tree species fall under government ownership, acting as a perverse incentive to protect or restore such species¹⁰⁷. While studies have noted some progress in implementation of tree registration programmes^{108,109} poverty impacts of reform of tree tenure outside forests are yet to be adequately measured.

Similarly, while community-based forest management (CBFM) is being operationalised in many African countries, the extent of such schemes is often quite limited¹¹⁰. In Cameroon, for instance, community forests comprise only 2% of the total forest estate¹¹¹. A rigorous national-level analysis showed that CBFM in Madagascar has had a small but positive impact on household living standards, particularly for those closer to forests and with more education. Similarly, a review in Cameroon, Ethiopia and Tanzania found reports of increased incomes among households¹¹². Importantly, significant social differentiation in poverty and well-being outcomes is noted in relation to both tenure reforms and CBFM, resulting from, among others, inadequate protection for women's rights or inequitable benefit sharing schemes. The Ethiopian Participatory Forest Management (PFM) scheme gen-

erates various subsistence and economic benefits to forest-dependent populations¹¹³, although women, older, and less educated people are less likely to perceive positive benefits from PFM¹¹⁴. Limitations on plot size under PFM have rendered particularly poorer households more dependent on forest products for their livelihoods¹¹⁵.

Forest concessions and protected areas can support livelihoods either directly, through providing communities with extraction and management rights, or indirectly, through increased employment opportunities or improved infrastructure and services. In Central and West Africa, for instance, private and corporate forest concessions are the dominant form of forest governance, covering almost 56 million ha¹¹⁶. Meanwhile, terrestrial protected areas (including other effective conservation measures or OECMs) account for 17.85% of Africa's terrestrial surface and inland waters. Evidence on both these levers points at some positive contributions to poverty alleviation in Africa. In Cameroon and Liberia, households living near a concession had greater wealth. Using data from 190,000 households across 34 countries, including a number of African countries, it appears that households near protected areas with tourism had higher wealth levels and a lower like-

104 Acheampong and Marfo, 2011

105 Marfo et al., 2012

106 Hajjar, 2015

107 Mansourian et al., 2016

108 Fisher et al., 2012

109 O'Sullivan et al., 2018

110 Duguma et al., 2018

111 Movuh, 2013

112 Duguma et al., 2018

113 Yemiru et al., 2010

114 Gashu and Aminu, 2019

115 Yemiru et al., 2010

116 Karsenty, 2016

likelihood of poverty than similar households living far from protected areas¹¹⁷. However, studies also note that benefits from concessions tend to be skewed in favour of large logging companies, while much documentation exists of displacements of rural poor in the context of protected areas.

2.3.2 Regulatory levers

Regulatory levers are oriented around laws, policies and regulations that determine how forests and trees are managed, used, conserved and/or restored. These levers include decriminalisation and formalisation of informal operations, modification or simplification of regulatory frameworks, log export bans, and procurement policies.

The first two levers present a particularly compelling case for their relevance to poverty alleviation. For instance, the informal forestry sector is estimated to employ 45-50 million people worldwide¹¹⁸ and in Africa, an estimated 13 million people are involved in the mainly informal wood-based biomass energy sector¹¹⁹. The formalisation of informal livelihoods can allow the poor to convert their possessions and labour into capital, fetch higher prices for products and enhance the protection of their rights. Tackling overly burdensome regulations through simplified management plans makes it easier for the poor to benefit from formal activities. However, few studies in the tropics have explicitly focused on the relationship between these levers and poverty alleviation. One study in Central and West Africa¹²⁰ suggested that taxes generated through formalised and decen-

tralised value chains, such as that of woodfuel, had been reinvested in local social projects. Woodcutters in Mali benefitted from formalisation through harvesting quotas, formally allocated selling points and improved oversight. However, fully formalised, small-scale forest product value chains are not yet mainstream in national or regional economies. Poor, small-scale value chain actors often struggle to comply with costly and complex formal regulations and as such, some formalisation efforts have further marginalised poor, small-scale workers through criminalising their livelihoods, reducing access to key resources and increasing elite capture.

While in Cameroon one study found that simplified management plans brought financial benefits to some communities¹²¹, another study in Senegal¹²² predicted that simplified management plans would only have a small impact on local development. However, despite the mixed and patchy evidence on poverty alleviation, many studies continue to point to the difficulties associated with overly bureaucratic and technical processes to participate in the formal sector. Such dynamics have for instance been cautioned against in the context of Voluntary Partnership Agreements (VPAs) of the EU's Forest Law Enforcement, Governance and Trade Programme, currently signed or negotiated with eight African countries. While some argue that the VPA processes present an opportunity for pro-poor policy reforms, we did not find evidence suggesting that this pathway has resulted in poverty reduction or enhanced economic opportunities for the forest-reliant poor. Instead, some authors have

117 Naidoo et al., 2019

118 FAO, 2014

119 Openshaw, 2010

120 Schure et al., 2013

121 Bruggeman et al., 2015

122 Sanogo et al., 2014

pointed to potential negative effects of these policies on small-scale timber producers, particularly if they are required to bear the cost of implementation or if self-employed people in the informal sector are squeezed out, exacerbating poverty in forest-reliant communities^{123,124}. Associated costs and bureaucratic hurdles may constitute additional disincentives to updating forest management plans¹²⁵.

2.3.3 Market-based levers

Levers that are based on market mechanisms and whose success depends, at least in part, on the commodification or commercialisation of trees, forest products, or forest ecosystem services, include payments for ecosystem services (PES), REDD+, ecotourism, small and medium forest enterprises, market access, forest producer organisations, company-community partnerships, contract production, certification, zero deforestation commitments and boycotts. While all of the reviewed levers may be expected to influence poverty outcomes, studies on the reviewed market-based levers generally report effects on poverty mitigation (i.e., increasing income, assets and other aspects of well-being). For instance, while some studies suggest small, but statistically significant decreases in poverty in some PES schemes, studies in Africa point at small positive increases in household income and consumption in Burkina Faso, Mozambique and Uganda. Studies on REDD+ tend to be more cautious in associating poverty and well-being outcomes. Indeed, while many African countries

have demonstrated willingness in implementing REDD+, studies on well-being outcomes tend to highlight small or insignificant results. For instance, one study¹²⁶ found that although a REDD+/PFM project led to forest governance improvements, there was no conclusive evidence that it contributed to local livelihoods. Moreover, gender-differentiated outcomes are reported in both PES and REDD+ schemes.

Studies on ecotourism also note positive outcomes in relation to livelihoods and socio-economic development, though cautioning against inequitable distribution of associated opportunities and benefits. In Zimbabwe, ecotourism was found to offer higher salaries than other formal employment¹²⁷. Similarly, a study in Botswana, Malawi and Namibia associated increased household investments with ecotourism employment¹²⁸. Despite its potential for contributing towards national and local economies, ecotourism remains relatively underdeveloped in many African countries.

Substantial contributions towards poverty mitigation were also identified in relation to small- and medium-scale forest enterprises (SMFEs) and forest producer organisations (FPOs). SMFEs provide employment and income in most, if not all, countries with significant forest cover in Africa¹²⁹. In Ethiopia, for example, income from frankincense cooperatives resulted in a 3.6% reduction in poverty rates among member households. In Côte d'Ivoire and Ghana, a study of 453 cacao producers across six sites found forest cooperative members generated relatively

123 Eba' a Atyi et al., 2013

124 Hajjar, 2015

125 Meshack et al., 2006

126 Corbera et al., 2017

127 Chirenje, 2017

128 Snyman, 2012

129 Mayers et al., 2016

higher incomes from cacao than non-members¹³⁰. FPOs in Cameroon were instrumental in strengthening the bargaining power of NTFP producers vis-a-vis traders¹³¹. In Burkina Faso's largely female-dominated shea nut value chain, 76% of surveyed women noted improvements in their financial situation as a result of their participation in shea producer groups¹³². However, studies also point out that fees and membership rules may serve to exclude the poorest and marginalised community members, especially women¹³³.

Community-company partnerships (CCPs), including contract production schemes, also demonstrate some potential for poverty mitigation, though the coverage and robustness of the evidence is somewhat limited. Case studies on CCPs from a number of countries, including Ghana and South Africa, suggest improved financial, human and physical capital of smallholder producers, while several empirical studies on contract production, particularly of agricultural tree crops, find associated gains in household incomes. However, in the case of CCPs, impacts on poverty reduction remain unproven or neutral¹³⁴, while contract production models can exacerbate social differentiation, as participants tend to be more affluent and well-educated.

There was less evidence for the influence on poverty of other reviewed market-based levers, including market access, certification, zero-deforestation commitments and boycotts. In the case of market access, a study from Ghana suggests that improved roads

may lead to better market integration and higher yields, although evidence from other countries show low economic returns even after infrastructure improvements. In the Congo Basin, timber certification is found to have potential in strengthening land tenure and community empowerment while remaining financially unattractive to many smallholders.

2.3.4 Forest and tree management levers

Two levers that do not directly fall under the above categories, but are of importance nonetheless, are agroforestry and forest landscape restoration. Agroforestry refers to the intentional integration of trees and other woody perennials in crop and livestock systems. An analysis of satellite imagery and geodatasets found that nearly 30% of agricultural land in sub-Saharan Africa had at least 10% tree cover¹³⁵. As these lands accommodate nearly 40% of the population, agroforestry can certainly be considered a major land use in sub-Saharan Africa. Agroforestry practices can improve farmer livelihoods and resilience through diversifying agricultural production and income sources. For example, a large-scale study of five countries in sub-Saharan Africa found that a third of rural smallholder households grow trees, which contribute an estimated 17% of total annual gross income for these households¹³⁶. In Malawi, agroforestry adoption contributed to a 20-35% increase in yields, which provided increased income opportunities as well as better food security¹³⁷. However, evidence on

130 Calkins and Ngo, 2010

131 Mala et al., 2012

132 Chen, 2017

133 Stoian et al., 2018

134 Mayers and Vermeulen, 2002

135 Zomer et al., 2014

136 Miller et al., 2017

137 Coulibaly et al., 2017

such linkages acquired through rigorous impact evaluation methods is extremely limited¹³⁸. In addition, a number of studies pointed to gender-inequitable distribution of labour and benefits in some agroforestry systems resulting notably, in lower adoption rates among women.

Another management-lever with increasing prominence in Africa is forest restoration. While there are numerous terms referring to the expansion of forest cover, most common terms refer to afforestation, reforestation, ecological restoration, ecosystem restoration and forest landscape restoration (FLR). FLR was defined in 2000 as an approach with the twin goals of enhancing ecological integrity and human well-being. Political commitments to FLR have been articulated under various global, regional and national initiatives, including the African Forest Landscape Restoration Initiative (AFR100), aiming to bring 100 million ha to restoration by 2030. As of January 2021, 31 African countries had signed onto AFR100, committing a combined 129,912,800 ha of land to restoration (AFR100 website). Forest restoration, reforestation and afforestation – as well as agroforestry and plantations – all feature to varying degrees in African countries' strategies to meeting these commitments. Each of them can produce livelihood impacts through direct and indirect benefits. For instance, farmer-managed natural regeneration in Niger has been associated with increased asset ownership and income diversity^{139,140}. In Ethiopia's Amhara region, households participating in smallholder tree

planting earned 142% the income of non-participating households¹⁴¹. Meanwhile, the Kenyan Plantations Establishment and Livelihood Improvement Scheme (PELIS) was found to have a significant and positive impact on participating households' welfare as well as forest cover, although welfare impacts were mainly experienced by better-off households¹⁴². A review of an FLR project in Madagascar found that 1,400 households were able to benefit from alternative income generating activities, including a 2-4 fold increase in rice production¹⁴³. However, alongside direct benefits, restoration activities can also disadvantage communities by reducing available agricultural land for example. While some evidence suggests that restored forests can contribute to livelihood diversification, few studies to date have conclusively substantiated that livelihood benefits from services provided by restored forests meaningfully alleviated poverty among households living in or near them.

2.4 Inadequate financing of the forestry sector in Africa

Successful implementation of forestry programmes in Africa to deliver socio-economic development benefits, including poverty alleviation, is constrained by inadequate financing. Across the continent, governments have invested relatively little of their own funds (e.g., less than 1%) in the forestry sector and international financing has been unable to fill the gap¹⁴⁴. Insufficient domestic public funding is attributed to low economic growth, lower priority of the

138 Miller et al., 2020b

139 Haglund et al., 2011

140 Weston et al., 2015

141 Addis et al., 2016

142 Okumu and Muchapondwa, 2020

143 Mansourian et al., 2018

144 Gondo, 2010

forest sector in national policy, smaller budget allocations, and failure to capture the full contribution of forests in national accounts. The highly informal nature of the sector also leads to undervaluation of forests. Although nearly all African countries receive donor support, the funds are much smaller than other world regions. Some USD 7 billion in internation-

al and bilateral aid was allocated to forest projects in Africa during 2014-2017, but this was just a third of similar aid to Asia, for example. Capacity development in the sector could enable mobilisation and more effective use of both domestic and international funds for sustainable management of forests and tree-based systems.



Forests and trees also contribute to production in other sectors, including agriculture
Photo © Terry Sunderland

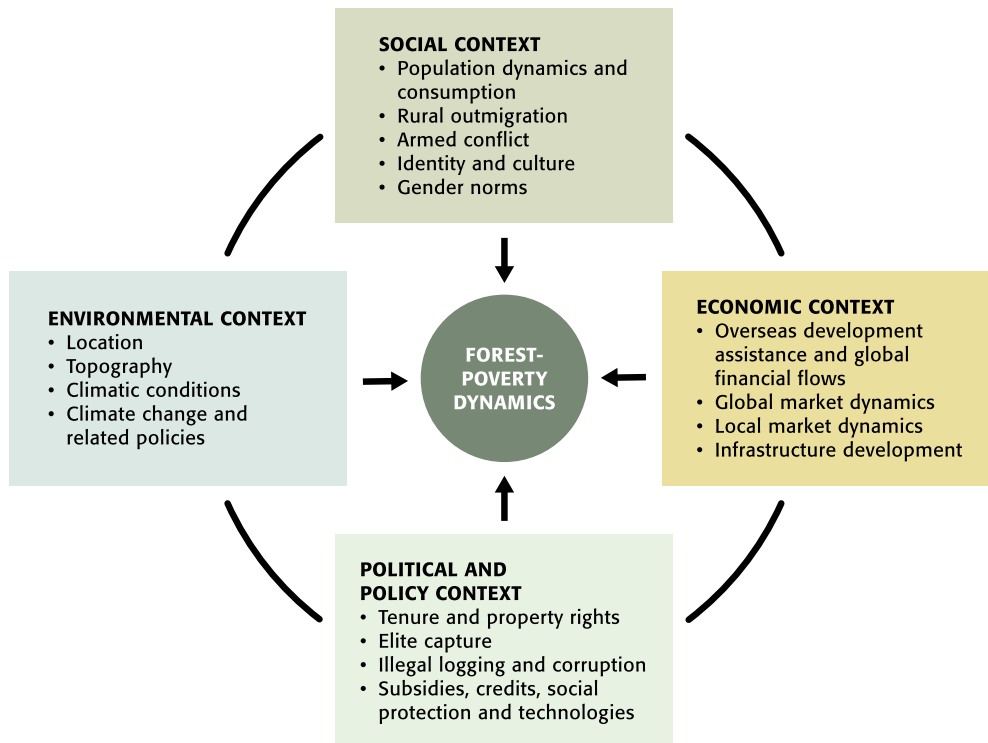
3. CONTEXTUAL FACTORS SHAPING FOREST-POVERTY DYNAMICS IN AFRICA

3.1 Social, Economic, Political and Environmental Factors Shaping Forest-Poverty Dynamics in Africa

A number of social, economic, political and environmental factors operate in forests and tree-based systems (Figure 5); these factors may constrain or enable poverty reduction¹⁴⁵. Furthermore, these factors are not independent from each other; they often co-occur in time and space, and interact in a multitude of complex ways.

Figure 5

Local and large-scale factors influencing forest-poverty dynamics



145 Gabay et al., 2020

3.1.1 Social context

Social factors that can shape local forest-poverty dynamics operate at localised scales (e.g. population dynamics and consumption), at national or international scales (e.g. rural outmigration and armed conflicts) or can have more intrinsic characteristics (e.g. identity and culture and gender norms). For example, gender patterns of work may play a crucial role in poverty reduction and food security. Although women's rights to resources are critical factors in social status, economic well-being and empowerment, in Africa women frequently lack secure access to land and natural resources across the range of property regimes. Most of the African countries lag behind the rest of the world on women's participation in development, due to deeply entrenched, discriminatory views about their role and position in society, resulting in unequal power relations between men and women¹⁴⁶. Research in African contexts has shown that women have less access than men to productive resources and opportunities such as labour, education, extension and financial services, and technology, which can serve as a barrier to poverty alleviation. For example, lack of tenure rights on land has impacted women's access to financial resources and income-generating opportunities¹⁴⁷.

Another key social factor in the context of Africa is its large youth population. Africa is the world's youngest continent, with at least 60% of the population under the age of 25¹⁴⁸. This large and rapidly growing population of young people presents opportunities and challenges. Creativity and innovation among

the younger generations means they are poised to play an important role in transforming and shaping more just, equitable and sustainable societies across Africa. However, youth are marginalised, isolated and faced with limited opportunities in many countries, a situation exacerbated by the COVID-19 pandemic. They face high unemployment and a shrinking political space for involvement and influence¹⁴⁹. A decline in interest among young people in forest management and appreciation for the role forests and trees play in livelihoods and development is reported in a number of different country contexts¹⁵⁰.



Charcoal produced from the forest in bags on the roadside for sale

Photo © Gillian Kabwe

146 Murunga, 2017

147 Kiptot, 2015

148 UN, 2021

149 Signe, 2019

150 Clendenning et al., 2019

3.1.2 Economic context

Economic factors influencing forest-poverty dynamics entail multiple market-related and financial processes that generally originate outside forests and tree-based systems. As such, these factors represent contexts shaped primarily by external actors and institutions, including international markets and agreements. Key economic factors include official development assistance and global financial flows, global and local market and production system dynamics, and infrastructure development. For example, mega-infrastructure projects, such as the Lamu Port and Lamu–Southern Sudan–Ethiopia Transport Corridor, which aim to increase national and international connectivity and secure access to energy and natural resources, are likely to have major consequences for: a) forest landscapes; b) the people living in these landscapes (as such projects can generate both positive and negative effects); and c) the forest-poverty dynamics playing out in these landscapes.

3.1.3 Political context

Political factors shape the ways, in which various stakeholders interact within forests and tree-based systems, which in turn influences poverty. Effective institutions are a requirement for well-functioning social relations and economic progress. Other key political factors include: tenure and property rights; elite capture; illegal logging and corruption; and government support programmes such as subsidies, credits, social protection mechanisms and agricultural technologies. For example, elite capture can be a lead-

ing driver of inequality in access to resources. While recent evidence suggests that community forestry can reduce poverty, studies from Ghana and Kenya found that some areas with community forestry have seen increases in inequality by restricted forest access for the most marginalised and poorest community members¹⁵¹. Also, whereas private land ownership might be advantageous for poverty alleviation, trees growing on the land can still be owned by the state as is the case, for example, in Tanzania. Various permits are thus required to extract trees even on private land and obtaining these can be a long and expensive process.

Illegal logging is a major cause of deforestation in Central, West and Southern Africa. The African countries most affected by illegal logging are Cameroon, the Democratic Republic of the Congo and the Republic of Congo¹⁵². Long-running conflicts in and around forests have had an impact on their ability to contribute to poverty alleviation, as was the case in Mozambique or South Sudan. At the same time, conflicts may be generated because of the valuable resources found in forests or indeed fuelled by the sale of these resources. In Rwanda, deforestation in two protected areas was indirectly attributed to the civil war, resulting from the displacement of people into these areas¹⁵³.

3.1.4 Environmental context

Environmental factors such as location, topography, climate conditions and climate change differ substantially from the social, economic, and political

151 Baruah, 2017

152 Gan et al., 2016

153 Ordway, 2015

factors that shape forest-poverty dynamics. They are most often time invariant and, in the case of climate change, effects on forest-poverty dynamics are characterised by long time lags. These factors are difficult to change through forest or poverty interventions and policy instruments, and they should instead be seen as constraints and boundaries to forest and livelihood strategies and activities. For example, climatic stressors might cause defoliation and tree mortality leading to declining forest productivity over large spatial scales as has been seen in the Congo Basin, where severe droughts have caused widespread forest degradation. At the same time, biophysical factors that have played a central role in shaping the evolution of diverse forest and tree-based systems across Africa, from desert oases in the Sahara to lush tropical rain forests of West and Central Africa, to the mangroves of southern Africa. In turn, these diverse ecoregions present differing opportunities to support livelihoods and alleviate poverty.

3.2 Emerging Large-Scale Factors Influencing Forest-Poverty Dynamics in Africa

The social, economic, political and environmental factors described above may exert influences at local, national and international scales. However, new research on forest-poverty dynamics demonstrates the importance of devoting specific attention to factors operating at regional, inter-continental and global scales as these large-scale processes may have disproportionate effects on sustainability, climate

change solutions and biodiversity conservation, and therefore are particularly important for policy and action^{154,155}. Five major factors that are pertinent to Africa are described below.

3.2.1 Growing commodity markets

Demand for commodities significantly modifies tropical forests, with demand for beef, soy, palm oil and wood products causing substantial forest changes worldwide. Other commodities with high expansion rates in Africa include coffee, cassava, tobacco and cocoa. In fact, cocoa was the fastest expanding export-oriented crop across sub-Saharan Africa, accounting for 57% of global expansion in 2000–2013 at a rate of 132,000 ha per year¹⁵⁶.

Four Congo Basin countries, as well as Côte d'Ivoire, Liberia and Sierra Leone, have been most at risk in terms of exposure, vulnerability and pressures from agricultural expansion. Reasons include that these countries have high forest cover (average of 58%) and therefore limited available cropland outside forest areas (average of 1%).

3.2.2 Climate change

Severe droughts and excessive precipitation are increasing forests' susceptibility to human-induced wildfires and floods. The provision of key products for human use might be reduced because such climatic changes are causing forest defoliation, tree mortality and declines in forest productivity. Also, rainfed agriculture accounts for 95% of cropped land in sub-Saharan Africa and it will likely also be affected by increased drought¹⁵⁷. Migration may be a key adap-

154 Oldekop, et al., 2020

155 Shyamsundar et al., 2020

156 Ordway et al., 2017

157 Cooper et al., 2009



Trees are of particular importance as resource and service providers in arid landscapes

Photo © Nelson Grima

tation response to climate-induced extreme events, although likely to be highly country-specific. For example, findings from Botswana, Kenya and Zambia suggest mobility declined significantly with increases in temperature, but that these declines varied across and within countries based on demand for workers locally and nationally¹⁵⁸.

3.2.3 Technological change

Improvements in available technology can lead to substantial changes in forest-poverty dynamics at scale as new information and communication allow forest stakeholders to map and monitor forest resources. For example, improvements in the information available on forest resources and provision of more accurate and scalable methods for forest monitoring can be beneficial for policymakers needing better evidence for decision-making. Other potential beneficiaries include agencies needing to monitor

158 Mueller et al., 2020

compliance, non-governmental actors monitoring sustainable production chains of commodities and local communities seeking to protect the forests in their surroundings. In Kenya, the M-PESA mobile phone-based money transfer service (now operating in several other African countries), has significantly eased and lowered financial transaction costs in rural areas and increased the use of agricultural inputs by rural households. Yet, improvements in available technologies may also be favourable to actors involved in illicit activities related to deforestation, such as mining and illegal logging.

3.2.4 Global socio-political movements

A multitude of global socio-political movements is beginning to shape contemporary politics around forests and forest-dependent people. Examples include climate change action, anti-environmental populism, protests against inequality and racism, and support of local communities' rights.

The changing political landscape has resulted in potential conflicts between priorities at national and international scales, including trade-offs between conservation and forest-based economic development. We also see movements shaped to counter national anti-environmental political shifts, just as public awareness is increasing of the potential harm environmental change might do to human well-being. For example, the Great Green Wall for the Sahara and Sahel Initiative, which is an African-led movement, has an epic ambition to re-green an 8,000km stretch across the entire width of Africa. The initiative promises to be a compelling solution to the many urgent challenges threatening Africa, such as climate change, drought, famine, conflict and migration.

3.2.5 Spread of infectious diseases

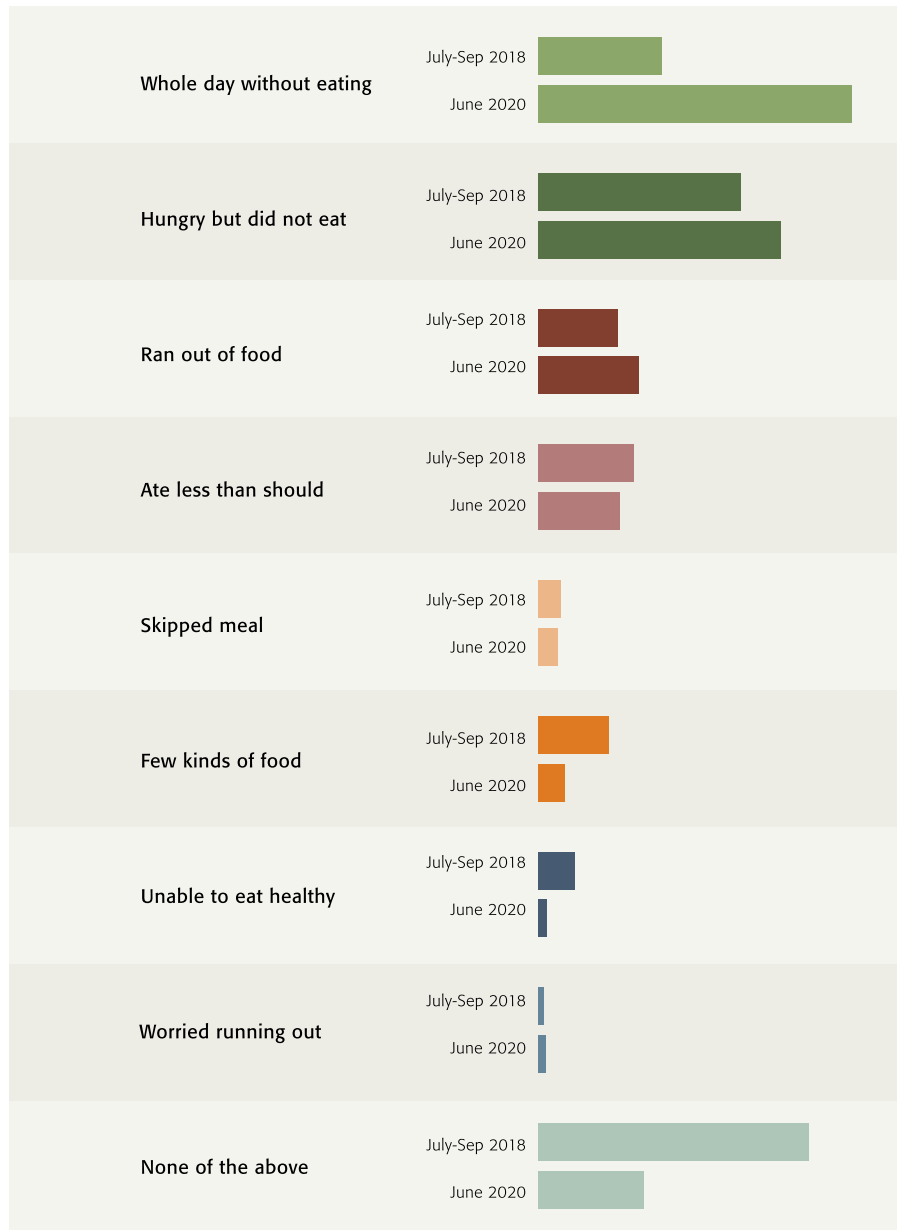
The COVID-19 pandemic has focused attention on the transmission of diseases from wildlife to people and the risk of new diseases emerging. About 75% of new emerging infectious diseases, such as severe acute respiratory syndrome (SARS), Ebola haemorrhagic fever and the original emergence of HIV, are of animal origin. Processes that contribute to zoonoses include deforestation and expansion of agricultural land (as these processes increase contact between humans and wildlife), intensification of livestock production near wildlife areas, and more hunting and trading of wildlife. The spread of infectious diseases might in turn have severe consequences for poverty levels. For example, the Ebola outbreak, which killed more than 11,000 people in West Africa by 2016, may have contributed to a 12% reduction in the combined GDP of Guinea, Liberia and Sierra Leone relative to pre-Ebola expectations¹⁵⁹. Assuming a 5% contraction of the global economy because of COVID-19, rural populations in extreme poverty are expected to increase by 15% globally¹⁶⁰. Likewise, food insecurity is expected to rise sharply as seen in Nigeria, where the share of households experiencing the most severe forms of food insecurity (households reported going a whole day without food) increased from a level of about 14% in 2018 to 35% in 2020 during COVID-19 (Figure 6). Also, the proportion of households reported not experiencing food insecurity was reduced from one third to a tenth during the same period.

159 World Bank, 2015

160 Laborde et al., 2020

Figure 6

Food insecurity in Nigeria in the period of July-September 2018 as compared to June 2020 during the COVID-19 pandemic



Data Source: National Bureau of Statistics, 2021

4. KEY MESSAGES AND IMPLICATIONS FOR POLICYMAKERS

Forests and trees can contribute to many of the priority areas of Agenda 2063, a pan-Africa strategic framework for inclusive and sustainable development, including those on income and jobs; poverty, inequality and hunger; health and nutrition; energy, biodiversity conservation; and climate resilience. Forests and tree-based systems also provide supporting services for development of other sectors such as tourism, agriculture and fisheries, that contribute to

rural livelihoods, and local and national economies. Five key messages emerged from our assessment of forests, trees and poverty in Africa. These are summarised in Table 1 along with discussion of their implications for policymakers seeking to support a more prosperous future for people in Africa, especially the poor and marginalised, through improved management of forests and tree-based systems.

Table 1

Summary table of conclusions and implications for policymakers

KEY MESSAGE	IMPLICATIONS FOR POLICYMAKERS
1. Forests and trees are critical to poverty alleviation in Africa	Build evidence on the contributions of forests to help ensure that their true value is reflected in national decision-making processes. Put in place mechanisms that enable the poor to access benefits from forests in a sustainable, equitable and fair manner. Integrate forests and tree-based systems in development policy discussions.
2. Forests and trees can contribute to the well-being of the poor in Africa as they face profound global changes	Enhance use of forests and trees for risk management through financing reforms in commodity supply chains, and strengthen land rights – particularly of women, youth, and marginalised groups – to enhance their access to opportunities and resources critical for building resilience to adverse impacts of global change.
3. The distribution of benefits from forests and trees for human well-being in Africa is inequitable	Tailor policies such that forests and trees effectively address poverty and wider development goals while avoiding poverty traps. Strengthen property rights, promote gender equality, and support community groups to access improved technology and relevant commodity chains to redress inequitable benefit flows from forest and tree resources.

4. Cross-sectoral coordination in land use policies can avoid excessive costs being borne by the poor

Promote more transparent, participatory approaches to land use planning that integrate forest management with other sectors to improve coordination and secure better outcomes for the poor, but also generally. Provide institutional support and develop mechanisms to address conflict and trade-offs. Create opportunities for wide engagement, including with young people, and innovation to better conserve, manage and restore forests.

5. Policy measures exist to enable forests and trees to effectively address poverty goals in Africa, but there is no 'one size fits all' solution

Rights-based measures, such as interventions supporting stronger tenure and property rights over forest and tree resources, are especially important for addressing different dimensions of poverty and support the effectiveness of other measures, such as agroforestry. Promote market and supply-chain measures across Africa – including forest producer organisations, payments for ecosystem services and market access. Important regulatory measures to apply include decriminalisation and formalisation of informal operations. Simplify regulatory frameworks. Recognise the forest sector as a sector that can play a positive role in poverty alleviation.

Key Message 1

Forests and Trees are Critical to Poverty Alleviation in Africa

Forests and tree-based systems are essential to efforts to alleviate, and ultimately eradicate, poverty in Africa. They are particularly relevant for the more than 245 million people who live within 5 km of a forest across the continent. For these forest-proximate people, they contribute a substantial proportion of

income and provide a valuable asset for managing risk, coping with shocks and, in some cases, moving out of poverty.

In virtually every country of Africa, forests and tree-based systems provide both tangible and intangible inputs to household well-being. These inputs include the material aspects of people's lives such as energy, food, health, housing, income and nutrition, and non-material aspects such as community relations and trust, and those relating to culture and spirituality. Forests contribute 21.4% of income in

most of Africa compared to agriculture which contributes 32.2% – a strong pointer to the significant value of forests to livelihoods. However, the manifold contributions of forests and tree-based systems often occur outside formal markets and so are excluded from national income accounts. As a result, they are frequently overlooked in development policy discussions. Furthermore, their distribution is often inequitable across different social groups, particularly women, youth and less powerful stakeholders.

Although there is evidence that forests support poor people to improve their well-being or mitigate risks, the role of forests to move people permanently out of poverty is much less well documented. For

example, evidence to date on NTFPs suggests that they can contribute to poverty alleviation, but the impacts have largely been at small scales and questions remain about whether they can persist over time. Forest and tree-related resources are especially important in supporting the well-being of people in rural communities and in allowing them to manage risk. However, these resources can also help people move out of poverty in some circumstances, including directly through the sale of forest and tree products, and indirectly through the enhancement of soil fertility, water regulation and the provision of other ecosystem services supporting food production and other livelihood needs.



Forests and tree-based systems provide a wide range of benefits that support poor people and improve their well-being
Photo © Nelson Grima

Forests and trees also play a crucial role in risk management such that the poor do not sink even deeper into poverty and the non-poor avoid impoverishment. Forests provide food, fodder, fuel and other products that may be consumed at home or sold. This role for forests and trees is especially relevant to the rural poor because they often do not have access to other forms of insurance and rely on livelihood activities that are subject to external shocks such as crop-raiding or variable weather.

Forests and trees also harbour the wildlife that is at the centre of many African countries' tourism industry, a leading foreign exchange earner. They also contribute to improved nutrition by providing ecosystem services that support the agriculture and fisheries sectors that are important for rural livelihoods, local and national economies. As habitats for valuable plants and animals, forests conserve biological diversity with potential for various biotechnology and medicinal applications that can generate economic benefits for local communities and countries.

These critical functions of forests and tree-based systems to the livelihoods and well-being of many rural communities in Africa form an important part of overall economic development and social welfare. The implication is that the forest natural capital that generates these benefits must be given adequate weight in decision making and resource allocation. Expanding and formalising participation of communities in management of forest and tree resources is key to unlocking the benefits they provide in a more equitable and sustainable way. Appropriate institutional mechanisms are required to support this process. Support for national statistical offices to collect information on the use and benefits of forests and trees would help yield more complete information to inform relevant policy processes that are often hampered by incomplete information.

Key Message 2

Forests and Trees Can Contribute to the Well-Being of the Poor in Africa as They Face Profound Global Changes

Our world is in the throes of profound global challenges, which are affecting the most vulnerable and poorest members of society in the harshest ways. In Africa, more extreme and frequent weather events associated with climate change, global economic shocks, widening inequality, concentration of political power in fewer hands and the spread of infectious diseases, among others, exacerbate an already tenuous situation for the poor. Given these threats, forests and trees can be a lifeline. While forests and trees do not offer a 'silver bullet' for securing or stabilising well-being, the poor have been able to harness forest goods and services to manage and mitigate risk, particularly where market access and public service provision is limited.

Forests and trees may play an important role in strategies to reduce risks and improve conditions that would allow poor households to move out of poverty. Risk management is now even more critical in the face of the growing impacts of climate change and other global shocks such as the COVID-19 pandemic. Climate change threatens the forest-reliant poor by destroying assets, impeding livelihoods and reducing ecosystem services. Pandemic-related economic shocks have been substantial in Africa, disrupting forest livelihoods such as those that derive income from ecotourism. Such shocks may lead rural communities to increase their extraction from forests, contributing to deforestation and forest degradation, with additional indirect negative effects on household well-being.



Forest products are used as traditional building materials

Photo © Daniel C. Miller

Several avenues exist for policymakers to enhance the use of forests and trees for risk management across diverse contexts in Africa. Two of particular relevance are financing reforms in the commodity supply chain and strengthening land and resource rights – particularly of women, youth and marginalised groups. Financing reforms can help to strengthen transparency and develop capacity for smallholders to access global value chains, thus redressing much of the inequality inherent in current systems. Strengthening land and resource rights can range from partial devolution of forest management

rights to local communities resulting in co-management systems (as seen in many African countries over the past two decades) to promotion of management and rights that empower local community forest users and organisations to protect, sustainably manage and restore valuable forest resources. Strengthening rights not just to land but also to specific resources, including forest-based ones, is especially important to enhance the access of women, youth and marginalised groups to opportunities and resources critical for building their resilience to adverse impacts of global change.

Key Message 3

The Distribution of Benefits from Forests and Trees for Human Well-Being in Africa Is Inequitable

The benefits generated by forests and tree-based systems are not distributed evenly in Africa. Inequitable distribution is shaped by many factors, including age, gender, ethnicity and class. These factors may constrain or enable the ability of forests and trees to alleviate poverty in a way that is effective, just and sustainable. More generally, forests and trees matter differently in different places and scales within and across the countries of Africa. Understanding such differences is necessary to tailor policies such that forests and trees effectively address poverty and wider development goals while avoiding poverty traps.

In several African countries, progress has been made to reduce gender inequality and improve women's empowerment through legal frameworks aligned with international conventions. However, gender inequality remains stubbornly persistent in many places and efforts will need to be intensified and sustained to eliminate it. For forest-based economic growth to have a positive and more inclusive impact on poverty reduction, efforts are required to tackle gender inequalities through strengthening women's legal status, property rights and recognition of their land and resource rights.

While the overall contribution of forests or trees on farms to household incomes may be relatively small when looking at national averages, it can be very significant to households in more forested regions of countries. There are also instances where the converse is true. In many forest and wildlife-rich countries in Africa, such as Kenya and Tanzania, timber and tourism are major contributors to national accounts, but the benefits may not accrue at the local

level – and, worse, local communities may bear the cost of these activities through environmental degradation, crop-raiding, livestock predation and restricted access to forest protected areas (Key Message 4).

In general, the evidence suggests that the poor are rarely able to capture the bulk of benefits from forests even as forests and trees are vital to them in terms of subsistence and food security. Elite capture is an ongoing problem and income flows tend to favour owners of land and capital, including large corporations, without reaching the poor – or, worse, coming at the expense of their livelihoods through dispossession. This inequality extends to relations between wealthy, mostly northern, countries and those in Africa.

Markets for commodities such as timber, cocoa and palm oil will continue to grow and, in principle, could offer potential for poverty alleviation at the forest agricultural frontier. However, demand for commodities produced in Africa contributes to deforestation and degradation. As such, global commodity markets are likely to continue to fuel agricultural expansion and deforestation. Policy levers that decouple market growth and forest loss are therefore critical for influencing poverty alleviation. At the same time, it is important to develop policies that promote more inclusive access to relevant commodity chains. Along with income and jobs, commodity markets bring new risks. For example, while the increasing global demand and trade in bush mango in West Africa contributes to increasing incomes, thus benefitting many households, it also incentivises over-harvesting and long-term unsustainability (Box 3). Support for sustainable production of such commodities to ensure continuous supply of the material without depleting the natural resource is necessary. Tree and crop germplasm management and improvement, as well as effective participation of community groups, will be key to sustainable resource management.

Short- and long-term implications in the bush mango supply chain

Global demand from distant markets is increasingly driving the profitability of many timber and non-timber forest products (NFTPs), with varied short- and long-term outcomes. In the case of the bush mangoes, growing in several countries in Africa, global markets contribute to increased income for many poor households, while also increasing incentives to over-harvest, undermining long-term sustainability.

The bush mango (*Irvingia spp.*) is a popular commodity that is both traded and used domestically. The ground kernels of bush mangoes are used as a condiment and sauce thickener; and the kernels are increasingly processed in Europe and the US as an important ingredient in weight-loss aids, health supplements and cosmetics (Ingram 2014). The seeds are used for cooking oil, the juice is used in cooking and wine, the pulp as a dye, and the timber is used for construction. The growth in demand for bush mangoes has contributed to improving livelihoods. In Southern Cameroon, for example, 5,200 people are directly employed in

the bush mango value chain, contributing on average to 31% of total household incomes (Ingram et al, 2017). For stakeholders located further away from the forest, the income gains are even more pronounced – contributing an average of 48% of exporters' and 57% of retailers' annual incomes.

Despite bush mangoes making substantial livelihood contributions, the value chain is increasingly becoming unsustainable because of: a) lack of consistent regulatory control and enforcement; b) continuing high demand; c) low levels of cultivation driven by alternate uses of agricultural land; d) declining wild resources evidenced by harvesters travelling longer distances; and e) clearance of the species' natural forest habitat. Customary tenure that seems to allow access to trees within common forests on a 'first-come, first-served' basis is not compatible with growing demand. Some combination of technical advice, formal and customary rule changes and improved monitoring is required to sustain this market.

The relevance of political institutions and land use policies is all the more important when forests and trees produce negative externalities, such as crop-raiding, livestock predation and zoonoses. The economic, social and political inequities evident in the uneven distribution of forest benefits and costs imply that policies in forestry must deliberately tackle inequalities in ways that ensure the contribution of forests and trees to alleviate poverty is just, effective

and sustainable. Rights-based levers, such as tenure reform or community-based forest management, will be critical to reduce such inequalities. Where market levers that better capture and share the values of forest products and services, notably through PES, are supported by an effective institutional context, the poor can derive more and stable benefits from forests. Strengthening property rights, promoting gender equality and supporting community groups to access

improved technology and to integrate relevant commodity chains can help redress inequitable benefit flows from forest and tree resources.

Key Message 4

Cross-Sectoral Coordination in Land Use Policies Can Avoid Excessive Costs Being Borne by the Poor

The forest-proximate poor bear the brunt of conflicting policies occurring across the energy, mining, tourism, agriculture and forestry sectors. Forest and land use policies and programmes can impose particular costs on the rural poor who rely on forests and trees. Exploitation of these natural assets can have direct repercussions on the livelihoods of the poor. Where private and corporate forest or mining concessions are dominant – as in Central and West Africa – there is a risk of corruption, exclusion and conflict at all stages of development and implementation, and poor enforcement and price variations mean that many African countries lose vast sums in revenues and as value addition to their national income.

For forest and land use policies to effectively support the poor, a host of other conditions need to be fostered. For example, tenure reforms to empower community investment in the forestry sector require technical and legal support, enforcement of existing laws, and access to finance and basic infrastructure (e.g., water, electricity, roads, communications, schools and healthcare). Further, some existing policies will need to be revisited to assess whether they are effective in advancing sustainable development objectives. For example, in many countries farmers are disincentivised from maintaining trees on their land given laws that accord rights to tree resources to the government. In Niger, changes to the forest code allowing farmers to make use of trees on their land

led to the widely-acclaimed “greening” of a significant area in the Sahel.

More transparent, participatory approaches to land use planning that integrate forest management with other sectors promise better coordination and improved outcomes for the poor, but also generally. Participatory planning can contribute to strengthening the resilience of forests and related ecosystems to anthropogenic impacts, including those resulting from climate change. Adoption of tools and methods that integrate economic, social and environmental considerations will be valuable in this context. These approaches would enhance sustainable management practices, help securing forest resources over time, and ensure equity. Such approaches require institutional support and mechanisms to prevent and resolve conflicts and trade-offs. They may provide an opportunity for wide engagement, including with young people, and innovation to better conserve, manage and restore Africa’s considerable forest and natural resource heritage.

Key Message 5

Policy Measures Exist to Enable Forests and Trees to Effectively Address Poverty Goals in Africa, but There is No ‘One Size Fits All’ Solution

Forests and trees are not a panacea for poverty alleviation in Africa. Instead, numerous natural resource and forest sector policies, programmes, technologies, and strategies contribute to addressing poverty. Frequently, while policies may exist, their enforcement is lacking. Furthermore, knowledge of such policies may be limited – certainly among forest-proximate communities – thus further limiting their contribution to real reform.



Forests and trees can provide intergenerational wealth for households across Africa

Photo © Daniel C. Miller

Rights-based measures, such as interventions supporting stronger tenure and property rights over forest and tree resources, are especially important for addressing different dimensions of poverty and support the effectiveness of other levers, such as agroforestry.

A number of regulatory measures can also help to maximise benefits while minimising costs to the poor and other segments of society. Simplified regulatory frameworks are a good first step. Until the forest sector is itself recognised as a sector that plays a positive role in poverty alleviation, other measures will remain under-utilised. The decriminalisation and formalisation of informal operations is critical. For-

malisation can be a way of allowing the poor to convert their possessions and labour into capital, which in turn can be used to generate added value (e.g. through accessing credit).

The positive contribution of market and supply-chain measures across Africa – including forest producer organisations, PES and market access – is supported by good evidence. For example, the impacts of forest producer organisations on poverty alleviation have been observed in a number of countries including Côte d'Ivoire, Ethiopia, Ghana and Mali. PES schemes have impacted poverty alleviation efforts on the African continent, while market access is important as improving roads may lead to better market integration, access to credit and higher yields. Several other forest and tree management measures have found success in Africa, such as, for example, Farmer Managed Natural Regeneration (FMNR).

Paths Forward

Although close to a quarter billion Africans live within 5 km of a forest, the evidence on the contribution that forests make to poverty alleviation remains incomplete and highlights the importance of contextual differences. Research across the different sub-regions of Africa is necessary to better understand the specific constraints to forests contributing to poverty alleviation and the levers that may accelerate this contribution. A number of reviewed studies highlighted the importance of social heterogeneity in the context of the measures that most strongly favour poverty alleviation. Socially differentiated outcomes, including variable opportunities, benefits and trade-offs, result from a combination of underlying material and sociocultural inequalities, and the failure of a given measure to sufficiently account for and address those inequalities.

Unintended consequences also sometimes result from policy change, such as when women face disproportionate losses of income due to forest enclosures associated with PES, or when agroforestry practices increase women's labour burden but without commensurate benefits. Decision-makers must therefore embrace complexity and carefully consider the context when designing, funding and implementing policies and programmes related to forests and tree-based systems. Learning lessons from prior interventions in contexts of interest may be especially instructive. Special attention is needed to consider those who bear the cost or may be left behind in certain policy choices.

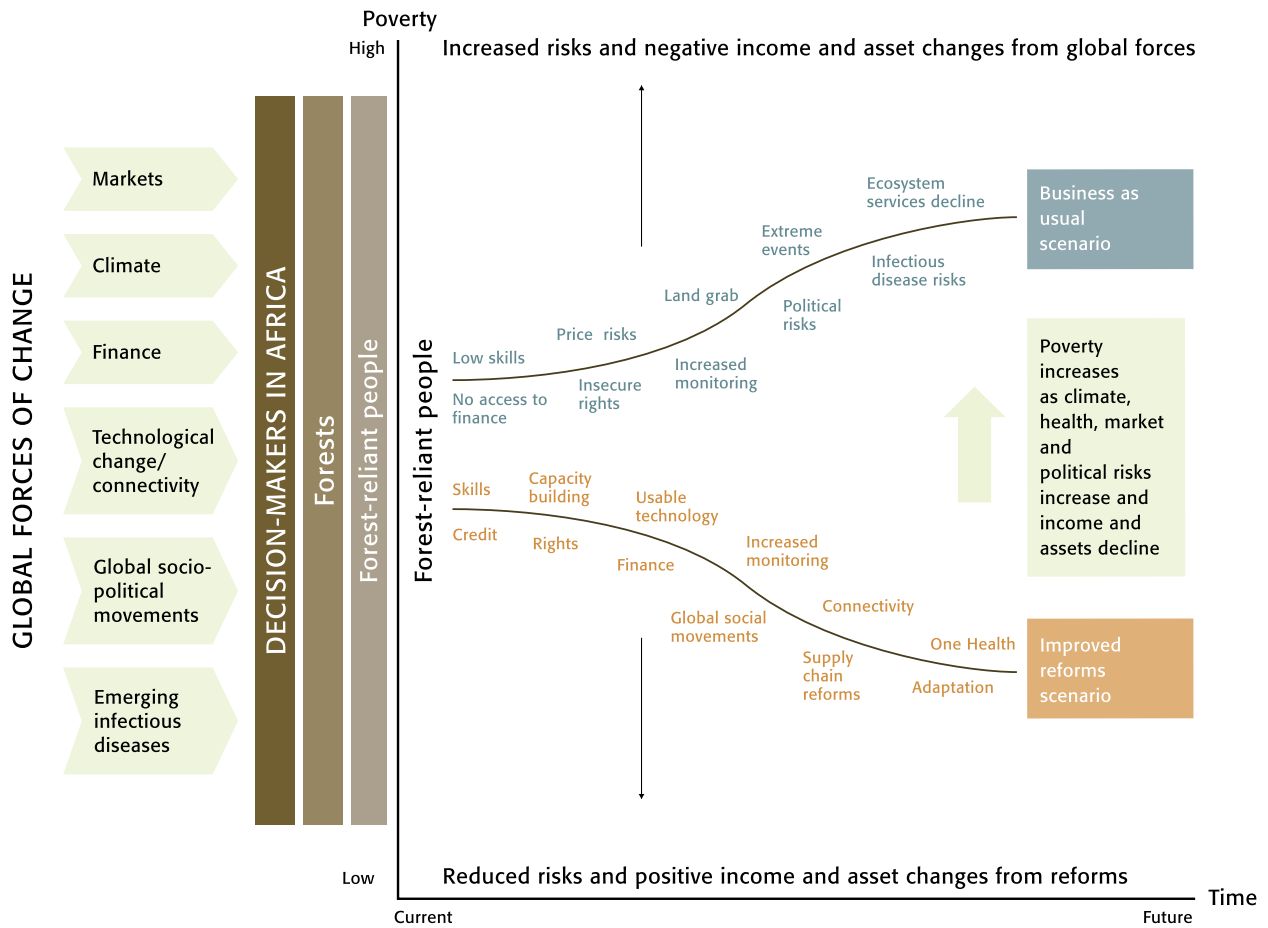
Strategies exist to improve conditions that would allow poorer households to be brought out of poverty and reduce their vulnerability to global shocks, including infectious diseases and climate change. Cross-sectoral strategies, such as OneHealth, that transcend the silos of health, biodiversity conservation and poverty alleviation, for instance, may mitigate risks and lead to alternative models of development for forest landscapes. Figure 7 identifies a potential 'improved' future scenario for the forest-reliant poor with measures undertaken to reduce global risks and strengthen capacity to manage risks and opportunities. Specific measures may include:

- financing of commodity supply chain reforms (strengthening transparency, training, skills and resources for smallholders to access global value chains);
- strengthened land and resource rights, particularly of women and marginalised groups;
- OneHealth actions (e.g. buffer areas between agriculture and livestock production and forests, wildstock and human disease surveillance, such as alternatives to wildlife trade); and
- investments in climate adaptation that reduce exposure to natural disasters and stabilise ecosystem services.

Many of these strategies can work in concert with, and build the enabling environment for, promising levers of change, such as community forest management, ecotourism, agroforestry, and small and medium forest enterprises. Attention must be paid to holistic approaches and systems thinking, however, rather than relying on standalone actions.

Figure 7

Business as usual versus improved scenarios



Conclusion

The importance of forests and tree-based systems to rural livelihoods and poverty alleviation in the diverse country contexts of Africa means that their conservation, sustainable management and restoration are paramount. Eliminating extreme poverty while preventing people from slipping into poverty will require nurturing the resources and services that forests and tree-based systems provide. Development policies in-

tended to alleviate poverty must therefore consider how they might affect forests and tree-based systems as well as vulnerable groups. Such policies should seek to mitigate damage to forests, trees and people while taking advantage of the opportunities that forests and tree-based systems present for advancing poverty alleviation goals. Enhanced focus on forests and tree-based systems will go a long way in advancing their contribution to poverty alleviation and prosperity across Africa.

5. REFERENCES

- Acheampong E. and Marfo E. (2011). *The impact of tree tenure and access on chainsaw milling in Ghana*. Ghana Journal of Forestry, 27, 68–86.
- Addis F., Melak S., Tefera B. and Kassa H. (2016). *Impacts of smallholder tree plantation in Amhara Region of Ethiopia: the case of Lay Gayint and Fagta Locuma Districts*. Ethiopian Journal of Economics, 25, 1, 35–58.
- African Union Commission (2015). *Africa 2063: The Africa We Want*. African Union Commission: Addis Ababa, Ethiopia.
- Angelsen A. and Wunder S. (2003). *Exploring the forest-poverty link: key concepts, issues and research implications*. Center for International Forestry Research (CIFOR): Bogor. DOI: 10.17528/cifor/001211.
- Angelsen A., Jagger P., Babigumira R., Belcher B., Hogarth N.J., Bauch S., Rner J.B. and Wunder S. (2014). *Environmental income and rural livelihoods: A Global-Comparative Analysis*. World Development, 64, S12-S28. DOI: 10.1016/j.worlddev.2014.03.006.
- Asamoah R.K.F. (1985). *Uses of fallow trees and farm practices in Ho forest districts (Ghana)*. Institute of Renewable Natural Resources, University of Science and Technology. Kumasi, Ghana.
- Backman K.F. and Munanura I. (2015). *Introduction to the special issues on ecotourism in Africa over the past 30 years*. Journal of Ecotourism, 14, 2-3, 95-98, DOI: 10.1080/14724049.2015.1128058.
- Bailis R., Drigo R., Ghilardi A. and Masera O. (2015). *The carbon footprint of traditional woodfuels*. Nature Climate Change, 5, 3, 266-272, DOI: 10.1038/nclimate2491.
- Barbier E. B. (2019). *Institutional constraints and the forest transition in tropical developing countries*. International Advances in Economic Research, 25, 1, 1-18, DOI: 10.1007/s11294-019-09725-8.
- Barrow E., Kamugisha-Ruhombe J., Nhantumbo I., Oyono R. and Savadogo M. (2016). *Who owns Africa's forests? Exploring the impacts of forest tenure reform on forest ecosystems and livelihoods*. Forests, trees and livelihoods, 25, 2, 132-156, DOI: 10.1080/14728028.2016.1159999.
- Baruah M. (2017). *Facipulation and elite formation: Community resource management in Southwestern Ghana*. Conservation and Society, 15, 4, 371-383, DOI: 10.4103/cs.cs_16_108.
- Bawa A., Atengdem P.B. and Abukari S.C. (2017). *Assessing the impact of Community Life Improvement Program (CLIP) on the livelihood assets of women in the shea butter processing business in Karaga district of Northern Ghana*. Journal of Social Sciences, 13, 2, 108-117, DOI: 10.3844/jssp.2017.108.117.
- Belcher, B.M. (2005). *Forest product markets, forests and poverty reduction*. International Forestry Review, 7, 2, 82-89, DOI: 10.1505/ifer.2005.7.2.82.
- Blaney S., Beaudry M. and Latham M. (2009). *Contribution of natural resources to nutritional status in a protected area of Gabon*. Food and nutrition bulletin, 30, 1, 49-62. DOI: 10.1177/156482650903000105.
- Bridson D. and Verdcourt B. (1988). *Coffea*. In: Flora of Tropical East Africa: Rubiaceae, Part 2. (Eds.) R. M. Polhill. Balkema, Rotterdam. pp. 703-723. ISBN 9789061913375.
- Bruggeman D., Meyfroidt P. and Lambin E.F. (2015). *Production forests as a conservation tool: Effectiveness of Cameroon's land use zoning policy*. Land Use Policy, 42, 151–164. DOI: 10.1016/j.landusepol.2014.07.012.
- Byamugisha F.F.K. (2013). *Securing Africa's land for shared prosperity: A program to scale up reforms and investments*. Africa Development Forum Series, World Bank: Washington, D.C.
- Calkins P. and Ngo A.T. (2010). *The impacts of farmer cooperatives on the well-being of cocoa producing villages in Cote d'Ivoire and Ghana*. Canadian Journal of Development Studies/Revue canadienne d'études du développement, 30, 3-4, 535-563. DOI: 10.1080/02255189.2010.9669315.
- Chan C.Y., Tran N., Pethiyagoda S., Crissman C.C., Sulser T.B. and Phillips M.J. (2019). *Prospects and challenges of fish for food security in Africa*. Global food security, 20, 17-25, DOI: 10.1016/j.gfs.2018.12.002.
- Chen T. (2017). *Impact of the shea nut industry on women's empowerment in Burkina Faso: a multi-dimensional study focusing on the Central, Central-West and Hauts-Bassins regions*. Food and Agriculture Organization of the United Nations (FAO): Rome. ISBN 978-92-5-130005-3.
- Chirenje L.I. (2017). *Contribution of ecotourism to poverty alleviation in Nyanga, Zimbabwe*. Chinese Journal of Population Resources and Environment, 15, 2, 1-6. DOI: 10.1080/10042857.2017.1319172.

- Chiteculo V., Lojka B., Surový P., Verner V., Panagiotidis D. and Woitsch J. (2018). *Value chain of charcoal production and implications for forest degradation: Case study of Bié province, Angola*. *Environments*, 5, 11, 113, DOI: 10.3390/environments5110113.
- Clendenning J., Elias M. and Sijapati Basnett B. (2019). *At the intersection of gender and generation: Engaging with 'youth' in the CGIAR Research Program on Forests, Trees and Agroforestry*. Center for International Forestry Research (CIFOR): Bogor, DOI: 10.17528/cifor/007346.
- Colfer C.J.P., Sheil D. and Kishi M. (2006). *Forests and human health: assessing the evidence*. CIFOR: Bogor. DOI: 10.17528/cifor/002037.
- Cooper P., Rao K.P.C., Singh P., Dimes J., Traore P.C.S., Rao K., Dixit P. and Twomlow S.J. (2009). *Farming with current and future climate risk: Advancing 'Hypothesis of Hope' for rainfed agriculture in the semi-arid tropics*. *Journal of SAT Agricultural Research*, 7, 1-19.
- Corbera E., Martin A., Springate-Baginski O. and Villaseñor A. (2017). *Sowing the seeds of sustainable rural livelihoods? An assessment of Participatory Forest Management through REDD+ in Tanzania*. *Land Use Policy*, 97, 102962, DOI: 10.1016/j.landusepol.2017.09.037.
- Coulibaly J.Y., Chiputwa B., Nakelse T. and Kundhlande G. (2017). *Adoption of agroforestry and the impact on household food security among farmers in Malawi*. *Agricultural Systems*, 155, 52-69, DOI: 10.1016/j.agsy.2017.03.017.
- Cunningham A.B. (1993). *African medicinal plants: setting priorities at the interface between conservation and primary health care*. People and Plants working paper 1. UNESCO: Paris.
- Daniel K.S., Udeagha A.U. and Jacob D.E. (2016). *Sociocultural importance of sacred forests conservation in south Southern Nigeria*. *African Journal of Sustainable Development*, 6, 2, 251-268.
- Das S. and Sharangi A.B. (2017). *Madagascar periwinkle (Catharanthus roseus L.): Diverse medicinal and therapeutic benefits to humankind*. *Journal of Pharmacognosy and Phytochemistry* 6, 5, 1695-701.
- Duguma L.A., Atela J., Ayana A.N., Alemagi D., Mpanda M., Nyago M., Minang P.A., Nzyoka J.M., Foundjem-Tita D. and Ntamag-Ndjebet C.N. (2018). *Community forestry frameworks in sub-Saharan Africa and the impact on sustainable development*. *Ecology and Society*, 23, 4, DOI: 10.5751/ES-10514-230421.
- Eba'a Atyi R., Assembe-Mvondo S., Lescuyer G. and Cerutti P. (2013). *Impacts of international timber procurement policies on Central Africa's forestry sector: The case of Cameroon*. *Forest Policy and Economics*, 32, 40-48, DOI: 10.1016/j.forpol.2012.12.006.
- FAO (2014). *State of the World's Forests 2014: Enhancing the socioeconomic benefits from forests*. Food and Agricultural Organization: Rome. ISBN 9789251082690.
- FAO (2019). *Global forest products facts and figures 2018*. Food and Agricultural Organization: Rome.
- FAO and UNEP (2020). *The state of the world's forests 2020. Forests, biodiversity and people*. Food and Agricultural Organization: Rome. ISBN 978-92-5-132419-6.
- FAO, CIFOR, IFRI and World Bank. (2016). *National socioeconomic surveys in forestry: guidance and survey modules for measuring the multiple roles of forests in household welfare and livelihoods*. FAO Forestry Paper No. 179. Food and Agriculture Organization, Center for International Forestry Research, International Forestry Resources and Institutions Research Network and World Bank: Rome, Bogor, India, and Washington DC.
- FAOSTAT (2008). *The Food and Agricultural Organisation of the United Nation Production Databases*. Food and Agricultural Organization. Available at: <http://www.fao.org> [Accessed on 1 September 2020].
- Fisher R.J., Barrow E., de Silva J., Ingles A. and Shepherd G. (2012). *Improving access to forest resources: Experiences in informal tenure reform from IUCN's Livelihoods and Landscapes Strategy*. *Livelihoods and Landscape Strategy, Working Paper 3*, International Union for Conservation of Nature (IUCN): Gland.
- Franzel S., Carsan S., Lukuyu B., Sinja J. and Wambugu C. (2014). *Fodder trees for improving livestock productivity and smallholder livelihoods in Africa*. *Current Opinion in Environmental Sustainability*, 6, 1, 98-103, DOI: 10.1016/j.cosust.2013.11.008.

- Franzel S., Wambugu C., Arimi H. and Stewart J. (2008). *Fodder shrubs for improving livestock productivity and sustainable land management in East Africa*. In: The World Bank, Sustainable Land Management Sourcebook. World Bank: Washington D.C. ISBN: 978-0-8213-7432-0.
- Gabay M., Oldekop J.A., Humphreys D., Kamoto J., Mutta D.N., Rai N., Song C., Timko J., Rasmussen L.V., Cheek J.Z., Devkota D. and Stoian D. (2020). *Contextual factors in shaping forest-poverty dynamics*. In: Forests, Trees and the Eradication of Poverty: Potential and Limitations. A Global Assessment Report. IUFRO World Series Volume 39. (Eds.) Miller D.C., Mansourian S. and Wildburger C., International Union of Forest Research Organizations (IUFRO): Vienna. ISBN 978-3-903345-06-5.
- Gan J., Cerutti P.O., Maslero M., Pettenella D., Andrighetto N. and Dawson T. (2016). *Quantifying illegal logging and related timber trade*. In: Illegal Logging and Related Timber Trade – Dimensions, Drivers, Impacts and Responses. A Global Scientific Rapid Response Assessment Report. IUFRO World Series Volume 35. (Eds.) Kleinschmit D., Mansourian S., Wildburger W. and Purret A., International Union of Forest Research Organizations (IUFRO): Vienna. ISBN 978-3-902762-70-2.
- Gashu K. and Aminu O. (2019). *Participatory forest management and smallholder farmers' livelihoods improvement nexus in Northwest Ethiopia*. Journal of Sustainable Forestry, 38, 5, 413-426, DOI: 10.1080/10549811.2019.1569535.
- Gondo P. (2010) *Financing of sustainable forest management in Africa: An overview of the current situation and experiences*. United Nations Forum on Forests Secretariat: New York.
- Gumbo D. J., Moombe K. B., Kandulu M. M., Kabwe G., Ojanen M., Ndhlovu E. and Sunderland T.C. (2013). *Dynamics of the charcoal and indigenous timber trade in Zambia: A scoping study in Eastern, Northern and Northwestern provinces*. Occasional Paper, 86, CIFOR: Bogor, Indonesia. ISBN 978-602-1504-02-4.
- Haglund E., Ndjunga J., Snook L. and Pasternak D. (2011). *Dry land tree management for improved household livelihoods: Farmer managed natural regeneration in Niger*. Journal of Environmental Management 92, 7, 1696-1705. DOI: /10.1016/j.jenvman.2011.01.027.
- Hajjar R. (2015). *Advancing small-scale forestry under FLEGT and REDD in Ghana*. Forest Policy and Economics, 58, 12–20, DOI: 10.1016/j.forpol.2014.09.014.
- Hänke H., Barkmann J., Blum L., Franke Y., Martin D.A., Niens J., Osen K., Uruena V., Witherspoon S.A. and Wurz A. (2018). *Socio-economic, land use and value chain perspectives on vanilla farming in the SAVA Region (north-eastern Madagascar): The Diversity Turn Baseline Study (DTBS)*. Diskussionsbeitrag, 108. Georg-August-Universität Göttingen, Department für Agrarökonomie und Rurale Entwicklung (DARE), Göttingen.
- Harich F.K., Treydte A.C., Sauerborn J. and Owusu E.H. (2013). *People and wildlife: Conflicts arising around the Bia Conservation Area in Ghana*. Journal for Nature Conservation, 21, 5, 342-349, DOI: 10.1016/j.jnc.2013.05.003.
- Himes-Cornell A., Pendleton L. and Atiyah P. (2018). *Valuing ecosystem services from blue forests: A systematic review of the valuation of salt marshes, sea grass beds and mangrove forests*. Ecosystem Services, 30, 36-48, DOI: 10.1016/j.ecoser.2018.01.006.
- HLPE (2014). *Sustainable fisheries and aquaculture for food security and nutrition. A report by the high-level panel of experts on food security and nutrition of the committee on World Food Security*. FAO: Rome.
- Holmern T., Nyahongo J. and E. Roskafa E. (2007). *Livestock loss caused by predators outside the Serengeti National Park, Tanzania*. Biological Conservation, 135, 518-526, DOI: 10.1016/j.biocon.2006.10.049.
- Huxham M., Emerton L., Kairo J., Munyi F., Abdirizak H., Muriuki T., Nunan F. and Briers R.A. (2015). *Applying climate compatible development and economic valuation to coastal management: a case study of Kenya's mangrove forests*. Journal of environmental management, 157, 168-181, DOI: 10.1016/j.jenvman.2015.04.018.
- Ickowitz A., Powell B., Salim M.A. and Sunderland T.C.H. (2014). *Dietary quality and tree cover in Africa*. Global Environmental Change, 24, 287–294, DOI: 10.1016/j.gloenvcha.2013.12.001.
- Ickowitz A., Rowland D., Powell B. and Salim M.A. (2016). *Forests, trees, and micronutrient-rich food consumption in Indonesia*. PLOS One, 11, 5, 1-15. DOI: e0154139.

- Ingram V., Schure J., Tieguhong J.C., Ndoye O., Awono A. and Iponga D.M. (2014). *Gender implications of forest product value chains in the Congo basin*. *Forests, Trees and Livelihoods*, 23, 1-2, 67-86, DOI: 10.1080/14728028.2014.887610.
- Ingram V., Ewane M., Ndumbe L.N. and Awono A. (2017). *Challenges to governing sustainable forest food: Irvingia spp. from southern Cameroon*. *Forest Policy and Economics*, 84, 29-37, DOI: 10.1016/j.forpol.2016.12.014.
- IPCC (2019). *Climate Change and Land. An IPCC Special Report on Climate Change, Desertification, Land Degradation, Sustainable Land Management, Food Security, and Greenhouse Gas Fluxes in Terrestrial Ecosystems. Summary for Policymakers*. Intergovernmental Panel on Climate Change (IPCC): Geneva. ISBN 978-92-9169-154-8.
- Jagger P. and Shively G. (2014). *Land use change, fuel use and respiratory health in Uganda*. *Energy Policy*, Elsevier, 67, C, 713-726, DOI: 10.1016/j.enpol.2013.11.068.
- Jagger P.A., Cheek J.Z., Miller D.C., Ryan C., Razafindratsima O.H., Shyamsundar P. and Sills E.O. (2020). *Key concepts for understanding forest-poverty dynamics*. In: *Forests, Trees and the Eradication of Poverty: Potential and Limitations. A Global Assessment Report*. IUFRO World Series Volume 39. (Eds.) Miller D.C., Mansourian S. and Wildburger C. (Eds.), International Union of Forest Research Organizations (IUFRO): Vienna. 31-52.
- Kamoto J., Clarkson G., Dorward P. and Shepherd D. (2013). *Doing more harm than good? Community based natural resource management and the neglect of local institutions in policy development*. *Land Use Policy*, 35, 293-301, DOI: 10.1016/j.landusepol.2013.06.002.
- Karsenty A. (2016). *The contemporary forest concessions in West and Central Africa: chronicle of a foretold decline?* FAO Forestry Policy and Institutions Working Paper No. 34. FAO: Rome.
- Kiptot E. (2015). *Gender roles, responsibilities, and spaces: implications for agroforestry research and development in Africa*. *International Forestry Review*, 17, 4, 11-21, DOI: 0.1505/146554815816086426.
- Kuyah S., Öborn I., Jonsson M., Dahlin A.S., Barrios E., Muthuri C., Malmer A., Malmer A., Nyaga J., Magaju C., Namirembe S., Nyberg Y. and Sinclair L.F. (2016). *Trees in agricultural landscapes enhance provision of ecosystem services in Sub-Saharan Africa*. *International Journal of Biodiversity Science, Ecosystem Services & Management*, 12, 4, 255-273, DOI: 10.1080/21513732.2016.1214178.
- Laborde D., Martin W. and Vos R. (2020). *Poverty and food insecurity could grow dramatically as COVID-19 spreads*. In: *COVID-19 and Global Food Security*. (Eds.) Swinnen J. and McDermott J. International Food Policy Research Institute (IFPRI): Washington, DC. ISBN 9780896293878.
- Larson A.M. and Ribot J.C. (2007). *The poverty of forestry policy: double standards on an uneven playing field*. *Sustainability Science*, 2, 189-204, DOI: 10.1007/s11625-007-0030-0.
- Leßmeister A., Heubach K., Lykke A.M., Thiombiano A., Wittig R. and Hahn K. (2018). *The contribution of non-timber forest products (NTFPs) to rural household revenues in two villages in south-eastern Burkina Faso*. *Agroforestry systems*, 92, 1, 139-155, DOI: 10.1007/s10457-016-0021-1.
- Lindsey P., Allan J., Brehony P., Dickman A., Robson A., Begg C., Bhammar H., Blanken L., Breuer T., Fitzgerald K. and Flyman M. (2020). *Conserving Africa's wildlife and wildlands through the COVID-19 crisis and beyond*. *Nature ecology & evolution*, 4, 10, 1300-1310, DOI: 10.1038/s41559-020-1275-6.
- Lindsey P.A., Balme G., Becker M., Begg C., Bento C., Bocchino C., Dickman A., Diggle R.W., Eves H., Henschel P. and Lewis D. (2013). *The bushmeat trade in African savannas: Impacts, drivers, and possible solutions*. *Biological conservation*, 160, 80-96, DOI: 10.1016/j.biocon.2012.12.020.
- Lokker B. (2013). *The origin of Coffee: Kaldi and the Dancing Goats*. Available at: <http://www.coffeecrossroads.com/coffee-history/origin-of-coffee-kaldi-and-dancing-goats> [Assessed on 10 June 2021].
- López-Feldman A. and Wilen J.E. (2008). *Poverty and spatial dimensions of non-timber forest extraction*. *Environment and Development Economics*, 13, 5, 621-642, DOI: 10.1017/S1355770X08004518.
- Lyymtimäki J. (2015). *Ecosystem disservices: Embrace the catchword*. *Ecosystem Services*, 12, 136, DOI: 10.1016/j.ecoser.2014.11.008.

- Macqueen D, Bolin A., Greijmans M., Grouwels S. and Humphries S. (2020). *Innovations towards prosperity emerging in locally controlled forest business models and prospects for scaling up*. World Development, 125, 104382, DOI: 10.1016/j.worlddev.2018.08.004.
- Makungwa S.D., Epulani F. and Woodhouse I.H. (2013). *Fuelwood supply: A missed essential component in a food security equation*. Journal of Food Security, 1, 2, 49-51. DOI: 10.12691/jfs-1-2-6.
- Mala W.A., Tieguhong J.C., Ndoye O., Grouwels S. and Betti J.L. (2012). *Collective action and promotion of forest based associations on non-wood forest products in Cameroon*. Development in Practice, 22, 8, 1122-1134, DOI: 10.2307/41723173.
- Mansourian S., Razafimahatratra A. and Vallauri D. (2018). *Lessons Learnt from 13 Years of Restoration in a Moist Tropical Forest: The Fandriana-Marolambo Landscape in Madagascar*. WWF France: Paris.
- Mansourian S., Razafimahatratra A., Ranjatson P. and Rambeloarisao G. (2016). *Novel governance for forest landscape restoration in Fandriana Marolambo, Madagascar*. World Development Perspectives, 3, 28-31, DOI: 10.1016/j.wdp.2016.11.009.
- Marfo E., Acheampong E. and Opuni-Frimpong E. (2012). *Fractured tenure, unaccountable authority, and benefit capture: constraints to improving community benefits under climate change mitigation schemes in Ghana*. Conservation and Society, 10, 2, 161-172, DOI: 10.4103/0972-4923.97488.
- Mayers J. and Vermeulen S. (2002). *Company-community forestry partnerships: From raw deals to mutual gains*. International Institute for Environment and Development: London.
- Mayers J., Buckley L. and Macqueen D.J. (2016). *Small, but many, is big: Challenges in assessing the collective scale of locally controlled forest-linked production and investment*. International Institute for Environment and Development: London. ISBN 978-1-78431-321-0.
- Meshack C.K., Adhikari B., Doggart N. and Lovett J.C. (2006). *Transaction costs of community-based forest management: empirical evidence from Tanzania*. African Journal of Ecology, 44, 4, 468-477, DOI: 10.1111/j.1365-2028.2006.00659.x.
- Miller D.C., Mansourian S. and Wildburger C. (Eds.) (2020a). *Forests, Trees and the Eradication of Poverty: Potential and Limitations*. International Union of Forest Research Organizations (IUFRO): Vienna. ISBN 9783903345065.
- Miller D.C., Muñoz-Mora J.C. and Christiaensen L. (2017). *Prevalence, economic contribution, and determinants of trees on farms across Sub-Saharan Africa*. Forest Policy and Economics, 84, 47-61. DOI: 10.13140/RG.2.2.14253.69600.
- Miller D.C., Muñoz-Mora J.C., Rasmussen L.V. and Zezza A. (2020b). *Do Trees on Farms Improve Household Well-Being? Evidence from National Panel Data in Uganda*. Frontiers in Forests and Global Change, 3, 101, DOI: 10.3389/ffgc.2020.00101.
- Miller D.C., Ordoñez P.J., Brown S.E., Forrest S., Nava N.J., Hughes K. and Baylis K. (2020c). *The impacts of agroforestry on agricultural productivity, ecosystem services, and human well-being in low- and middle-income countries: An evidence and gap map*. Campbell Systematic Reviews, 16, 1, 1066. DOI: 10.1002/cl2.1066.
- Movuh M.C.Y. (2013). *Power: A Driving Factor of Forest Policy in Cameroon: Example of Community Forestry*. Cuvillier Verlag: Goettingen, Germany. ISBN 9783954045150.
- Mueller V., Gray C. and Hopping D. (2020). *Climate-Induced migration and unemployment in middle-income Africa*. Global Environmental Change, 65, 1, DOI: 10.1016/j.gloenvcha.2020.102183.
- Murunga V. (2017). *Africa's progress on gender equality and women's empowerment is notable but gender inequality persists*. African Institute for Development Policy (AFIDEP). Available at: <https://www.afidep.org/african-progress-gender-equality-womens-empowerment-notable-gender-inequality-persists/> [Accessed on 22 June 2021]
- Naidoo R., Gerkey D., Hole D., Pfaff A., Ellis A. M., Golden C.D. and Herrera D. (2019). *Evaluating impacts of protected areas on human well-being across the developing world*. Science Advances 5, 4, 3006, DOI: 10.1126/sciadv.aav3006.
- National Bureau of Statistics (2021). *Nigeria - COVID 19 National Longitudinal Phone Survey 2020*. World Bank. Available at: <https://microdata.worldbank.org/index.php/catalog/3712> [Accessed on 29 June 2021].

- Naughton-Treves L., Treves A., Chapman C. and Wrangham R. (1998). *Temporal patterns of crop raiding by primates: linking food availability in croplands and adjacent forests*. *Journal of Applied Ecology*, 35, 596-606, DOI: 10.1046/j.1365-2664.1998.3540596.x.
- Neumann R.P. and Hirsch E. (2000). *Commercialization of non-timber forest products: review an analysis of research*. CIFOR and FAO: Bogor and Rome. ISBN 979-8764-51-X.
- Newton P., Kinzer A.T., Miller D.C., Oldekop J.A. and Agrawal A. (2020). *The number and spatial distribution of forest-proximate people globally*. *One Earth*, 3, 3, 363-370.
- Ngoufo R., Yongyeh N.K., Obioha E.E., Bobo K.S., Jimoh S.O. and Waltert M. (2014). *Social norms and cultural services-community belief system and use of wildlife products in the Northern periphery of the Korup National Park, South-West Cameroon*. *Change and Adaptation in Socio-Ecological Systems* 1, 1, 26-34, DOI: 10.2478/cass-2014-0003.
- Nielsen M.R., Meilby H., Smith-Hall C., Pouliot M. and Treue T. (2018). *The importance of wild meat in the global south*. *Ecological Economics*, 146, 696-705, DOI: 10.1016/j.ecolecon.2017.12.018.
- Nielsen M.R., Pouliot M., Meilby H., Smith-Hall C. and Angelsen A. (2017). *Global patterns and determinants of the economic importance of bushmeat*. *Biological Conservation*, 215, 277-287, DOI: 10.1016/j.biocon.2017.08.036.
- O'Sullivan R., Roth M., Antwi Y.A., Ramirez P. and Sommerville M. (2018). *Land and tree tenure innovations for financing smallholder cocoa rehabilitation in Ghana*. 2018 World Bank Conference on Land and Poverty: Washington DC.
- Okigbo B. (1980). *Plants and food in Igbo culture*. Ahiajoku Lecture series. Igbo Language Culture Centre: Owerri.
- Okumu B. and Muchapondwa E. (2020). *Welfare and forest cover impacts of incentive based conservation: Evidence from Kenyan community forest associations*. *World Development*, 129, 104890, DOI: 10.1016/j.worlddev.2020.104890.
- Oldekop J.A., Rasmussen L.V., Agrawal A., Bebbington A.J., Meyfroidt P., Bengston D.N., Blackman A., Brooks A., Davidson-Hunt I., Davis P., Dinsi S.C., Fontana L.B., Gumucio T., Kumar C., Kumar K., Moran D., Mwampamba T.H., Nasi R., Nilsson M., Pindo-Vasquez M.A., Rhemtulla J.M., Sutherland W.J., Watkins C. and Wilson S.J. (2020). *Forest-linked livelihoods in a globalized world*. *Nature Plants*, 6, 1-8, DOI: 10.1038/s41477-020-00814-9.
- Omane B.M. (2014). *The effect of the adoption of improved Sheanut processing technology on women's income in the Savelugu-Nanton Municipality*. University of Ghana. Accra, Ghana.
- Openshaw K. (2010). *Biomass energy: employment generation and its contribution to poverty alleviation*. *Biomass and bioenergy*, 34, 3, 365-378, DOI: 10.1016/j.biombioe.2009.11.008.
- Ordway E.M. (2015). *Political shifts and changing forests: Effects of armed conflict on forest conservation in Rwanda*. *Global Ecology and Conservation*, 3, 448-460, DOI: 10.1016/j.GECCO.2015.01.013.
- Ordway E.M., Asner G.P. and Lambin E.F. (2017). *Deforestation risk due to commodity crop expansion in sub-Saharan Africa*. *Environmental Research Letters*, 12, 4, DOI: 10.1088/1748-9326/aa6509.
- Paige S.B., Frost S.D.W., Gibson M.A., Jones J.H., Shankar A., Switzer W.M., Ting N. and Goldberg T. L. (2014). *Beyond bushmeat: Animal conflict, injury, and zoonotic disease risk in western Uganda*. *EcoHealth*, 11, 4, 534-54, DOI: 10.1007/s10393-014-0942-y.
- Pritchard R., Grundy I.M., van der Horst D., Dzobo N. and Ryan C.M. (2020). *Environmental resources as 'last resort' coping strategies following harvest failures in Zimbabwe*. *World Development*, 127, 104741. DOI: 10.1016/j.worlddev.2019.10474.
- Rasmussen L.V., Fagan M.E., Ickowitz A., Wood S.L., Kennedy G., Powell B., Baudron F., Gergel S., Jung S., Smithwick A.H.E., Sunderland T., Wood S. and Rhemtulla J.M. (2019). *Forest pattern, not just amount, influences dietary quality in five African countries*. *Global Food Security*, 25, 100331, DOI: 10.1016/j.gfs.2019.100331.

- Rasolofoson R.A., Hanauer M.M., Pappinen A., Fisher B. and Ricketts T.H. (2018). *Impacts of forests on children's diet in rural areas across 27 developing countries*. *Science Advances*, 4, 8, DOI: 10.1126/sciadv.aat2853.
- Rousseau K., Gautier D. and Wardell D.A. (2015). *Coping with the upheavals of globalization in the shea value chain: The maintenance and relevance of upstream shea nut supply chain organization in western Burkina Faso*. *World Development*, 66, 413-427, DOI: 10.1016/j.worlddev.2014.09.004.
- RRI (2015). *Who Owns the World's Land? A global baseline of formally recognized indigenous and community land rights*. Rights and Resource Initiative (RRI): Washington, D.C.
- RRI (2018). *At a Crossroads: Consequential trends in recognition of community-based forest tenure*. Rights and Resource Initiative (RRI): Washington, D.C.
- Ruelle M.L., Kassam K.A. and Asfaw Z. (2018). *Human ecology of sacred space: Church forests in the highlands of northwestern Ethiopia*. *Environmental Conservation*, 45, 3, 291-300, DOI: 10.1017/S0376892917000534.
- Sanogo D., N'Diaye M., Badji M. and Beye S.A. (2014). *Optimisation de l'utilisation des ressources communes dans le bassin arachidier du Sénégal: évaluation ex ante de plans et d'alternatives de gestion durable*. *Biotechnology, Agronomy, Society and Environment*, 18, 3, 339-352.
- Sarkodie P.A., Agyapong D., Mumuni S. and Amponsah F.Y. (2016). *Assessing the impact of indigenous shea butter processing activities in Northern Ghana*. *International Research Journal of Environment Sciences*, 5, 3, 18-26.
- Scherr S.J., White A. and Kaimowitz D. (2003). *Making markets work for forest communities*. *The International Forestry Review*, 5, 1, 67-73, DOI: 10.1505/IFOR.5.1.67.17423.
- Schure J., Ingram V., Sakho-Jimbira M.S., Levang P. and Wiersum K.F. (2013). *Formalisation of charcoal value chains and livelihood outcomes in Central and West Africa*. *Energy for Sustainable Development*, 17, 2, 95-105, DOI: 10.1016/j.esd.2012.07.002.
- Shackleton S., Campbell B., Lotz-Sisitka H. and Shackleton C. (2008). *Links between the local trade in natural products, livelihoods and poverty alleviation in a semi-arid region of South Africa*. *World Development*, 36, 3, 505-526, DOI: 10.1016/j.worlddev.2007.03.003.
- Shyamsundar P., Cheek J.Z., Rasmussen L.V., Miller C.D., Oldekop A.J., Sauls A.L., Sullivan-Wiley A.K., Erbaugh T.J., and Krishnapriya P.P. (2020). *Global Forces of Change: Implications for Alleviating Poverty and Sustaining Forests*. In: *Forests, Trees and the Eradication of Poverty: Potential and Limitations*. A Global Assessment Report. IUFRO World Series Volume 39. (Eds.) Miller D.C., Mansourian S. and Wildburger C. International Union of Forest Research Organizations (IUFRO): Vienna. ISBN 978-3-903345-06-5.
- Signé L. (2019). *Africa youth leadership: Building local leaders to solve global challenges*. Brookings Institute. Available at: <https://www.brookings.edu/blog/africa-in-focus/2019/03/27/africa-youth-leadership-building-local-leaders-to-solve-global-challenges/> [Accessed on 21 June 2020].
- Sileshi G., Akinnifesi F.K., Ajayi O.C., Chakeredza S., Kaonga M. and Matakala P.W. (2007). *Contributions of agroforestry to ecosystem services in the Miombo eco-region of eastern and southern Africa*. *African Journal of Environmental Science and Technology*, 1, 4, 68-80.
- Snyman S.L. (2012). *The role of tourism employment in poverty reduction and community perceptions of conservation and tourism in southern Africa*. *Journal of Sustainable Tourism*, 20, 3, 395-416, DOI: 10.1080/09669582.2012.657202.
- Stickler M.M., Huntington H., Haflett A., Petrova S. and Bouvier I. (2017). *Does de facto forest tenure affect forest condition? Community perceptions from Zambia*. *Forest Policy and Economics*, 85, 1, 32-45, DOI: 10.1016/j.forpol.2017.08.014.
- Stoian D., Donovan J., Elias M. and Blare T. (2018). *Fit for purpose? A review of guides for gender-equitable value chain development*. *Development in Practice*, 28, 4, 494-509, DOI: 10.1080/09614524.2018.1447550.
- Sunderlin W.D., Dewi S., Puntodewo A., Muller D., Angelsen A. and Epprecht M. (2008). *Why forests are important for global poverty alleviation: A spatial explanation*. *Ecology and Society*, 13, 2, 1-21.
- Sundström A. (2016). *Understanding illegality and corruption in forest governance*. *Journal of Environmental Management*, 181, 1, 779-790, DOI: 10.1016/j.jenvman.2016.07.020.

- Tata C.Y., Ickowitz A., Powell B. and Colecraft E.K. (2019). *Dietary intake, forest foods, and anaemia in Southwest Cameroon*. PLoS one 14, 4, DOI: 0215281.
- Tutuba N.B. and Vanhaverbeke W. (2018). *Beekeeping in Tanzania: why is beekeeping not commercially viable in Mvomero?* Afrika focus, 31, 1, 213-239, DOI: 10.21825/af.v31i1.9047.
- Tweheyo M., Hill C.M. and Obua J. (2005). *Patterns of crop raiding by primates around the Budongo Forest Reserve, Uganda*. Wildlife Biology, 11, 3, 237-247, DOI: 10.2981/0909-6396.
- UN (2015). *Sustainable Development Goals*. United Nations. Available at: <https://sustainabledevelopment.un.org/sdgs> [Accessed on 23 September 2020].
- UN (2021). *World population prospects 2019*. United Nations Department of Economic and Social Affairs. Available at: <https://population.un.org/wpp/DataQuery/> [Accessed on 9 June 2021].
- Unruh J.D. (2008). *Carbon sequestration in Africa: The land tenure problem*. Global environmental change, 18, 4, 700-707, DOI: 10.1016/j.gloenvcha.2008.07.008.
- Vinceti B., Termote C., Ickowitz A., Powell B., Kehlenbeck K. and Hunter D. (2013). *The contribution of forests and trees to sustainable diets*. Sustainability 5, 11, 4797-4824. DOI: 10.3390/su5114797.
- Weston P., Hong R., Kabor C. and Kull C.A. (2015). *Farmer-Managed Natural Regeneration Enhances Rural Livelihoods in Dryland West Africa*. Environmental Management, 55,6, 1402-1417, DOI: 10.1007/s00267-015-0469-1.
- WHO (2018). *Burden of disease from household air pollution for 2016*. World Health Organization: Geneva. Available at: https://www.who.int/airpollution/data/HAP_BoD_results_May2018_final.pdf [Accessed on 10 June 2021].
- Wilkie D.S., Starkey M., Abernethy K., Effa E.N., Telfer P. and Godoy R. (2005). *Role of prices and wealth in consumer demand for bushmeat in Gabon, Central Africa*. Conservation Biology, 19, 1-7, DOI: 10.1111/j.1523-1739.2005.00372.x
- World Bank (2015). *The Economic Impact of Ebola on Sub-Saharan Africa: Updated Estimates for 2015*. World Bank: Washington, D.C. pp. 17.
- World Bank (2021a). *PovcalNet: an online analysis tool for global poverty monitoring*. The World Bank. Available at: <http://iresearch.worldbank.org/PovcalNet/> [Accessed on 8 April 2021].
- World Bank (2021b). *Global Economic Prospects, January 2021*. World Bank: Washington, DC. ISBN 9781464816123
- World Data Lab (2021). *World Poverty Clock*. World Data Lab. Available at: <https://worldpoverty.io> [Accessed on 22 June 2021].
- WTTC (2019). *The economic impact of global wildlife tourism - Travel and tourism as an economic tool for the protection of wildlife*. World Travel and Tourism Council: London.
- Yemiru T., Roos A., Campbell B.M. and Bohlin F. (2010). *Forest incomes and poverty alleviation under participatory forest management in the Bale Highlands, Southern Ethiopia*. International Forestry Review, 12, 1, 66-77, DOI: 10.1505/ifer.12.1.66.
- Zhu A. (2018). *Hot money, cold beer: Navigating the vanilla and rosewood export economies*. American Ethnologist, 45, 2, 253-267, DOI: 10.1111/amet.12636.
- Zomer R.J., Trabucco A., Coe R., Place F., Van Noordwijk M. and Xu J.C. (2014). *Trees on farms: an update and reanalysis of agroforestry's global extent and socio-ecological characteristics*. World Agroforestry Centre (ICRAF) Working Paper 179: Bogor, Indonesia, DOI: 10.5716/WP14064.

APPENDIX: AUTHORS AND STAKEHOLDERS

Authors

Alemayehu Negassa Ayana

Ethiopian Environment and Forest Research Institute (EEFRI)
Addis Ababa, Ethiopia
E-mail: alemayehunayana@gmail.com

Ebby Chagala

Kenya Forestry Research Institute (KEFRI)
Nairobi, Kenya
E-mail: emchagala@yahoo.com

Mercy Afua Adutwumwaa Derkyi

University of Energy and Natural Resources
Sunyani, Ghana
E-mail: afuaderkyi@yahoo.com

Dikshya Devkota

International Union of Forest Research Organizations (IUFRO)
Vienna, Austria
E-mail: devkota@iufro.org

Markus Ihalainen

Center for International Forestry Research (CIFOR)
Dakar, Senegal
E-mail: M.Ihalainen@cgiar.org

Pamela A. Jagger

University of Michigan
Ann Arbor, Michigan, USA
E-mail: pjagger@umich.edu

Gillian Kabwe

The Copperbelt University
Kitwe, Zambia
E-mail: gillian.kabwe@cbu.ac.zm

Felix Kanungwe Kalaba

The Copperbelt University
Kitwe, Zambia
E-mail: kanungwe@gmail.com

Judith Kamoto

Lilongwe University of Agriculture and Natural Resources
Lilongwe, Malawi
E-mail: jkamoto@luanar.ac.mw

Jonathan Kamwi

Namibia University of Science and Technology
Windhoek, Namibia
E-mail: mutauk@yahoo.co.uk

Charles Joseph Kilawe

Sokoine University of Agriculture
Morogoro, Tanzania
E-mail: ckilawe@sua.ac.tz

Tonjock Rosemary Kinge

The University of Bamenda
Bamenda, Cameroon
E-mail: rosemary32us@yahoo.com

Stephy (Steve) David Makungwa

Lilongwe University of Agriculture and Natural Resources
Lilongwe, Malawi
E-mail: smakungwa@gmail.com

Stephanie Mansourian

Consultant, Environment and Development
Gingins, Switzerland
E-mail: smansourian@infomaniak.ch

Daniel C. Miller

University of Illinois at Urbana-Champaign
Urbana, Illinois, USA
E-mail: dcmiller@illinois.edu

Doris N. Mutta

The African Forest Forum (AFF)
Nairobi, Kenya
E-mail: D.Mutta@cgiar.org

Laura Vang Rasmussen

University of Copenhagen
Copenhagen, Denmark
E-mail: lr@ign.ku.dk

Etotépé A. Sogbohossou

University of Abomey-Calavi
Abomey-Calavi, Benin
E-mail: etotepe@gmail.com

Joleen Timko

Sylvae Research & Consulting
Vancouver, British Columbia, Canada
E-mail: joleen.timko@me.com

Christoph Wildburger

International Union of Forest Research Organizations
(IUFRO)
Vienna, Austria
E-mail: wildburger@iufro.org

Stakeholders

Note: This list is not exhaustive and only includes the stakeholders who agreed to be publicly acknowledged in the policy brief. The names of the stakeholders are listed alphabetically and as provided by the experts.

NAME	AFFILIATION
Benin	
Adjibi Razack	General Directorate in charge of Waters, Forests and Hunting
Aoudji Augustin	University of Abomey-Calavi
Assogbadjo Achille	University of Abomey-Calavi
Atiogbe Marceline	Private Forest Operator
Cakpo Tossou Yvonne	Researcher
Djatto Djaleni	Union of Associations of Local Populations around Pendjari Biosphere Reserve
Djodjouwin Laurent	Office National du Bois au Bénin
Djondo Maximin	Benin Environment and Education Society
Dossou Glehouenou Bernadette	Independent Consultant
Fandohan Bonou Alice	National University of Agriculture
Hedegbetan Georges	CREDI NGO
Hunhyet Ousman	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Idrissou Latifou	University of Parakou
Issa Aziz	Independent Consultant
Kouton Meryas	Independent Consultant
Kpenavoun Sylvain	University of Abomey-Calavi
Natta Armand	University of Parakou
Neuenschwander Peter	International institute of Tropical Agriculture
Phillip Butz	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Sinsin Brice	University of Abomey-Calavi
Cameroon	
Abdoul Karim Abel	Ministry of Forestry and Wildlife
Anguessin Benjamine	University of Maroua
Camille Sandjong Jepang	German KFW
Ekindi Moudingo	United Nations Environmental Programme
Fawa Guidawa	University of Ngaoundere
Fobane Jean Louise	Decolvenaere Timber Company
Hermine Tuekam Kouam	Independent Consultant
Kato Namuene	University of Buea
Litute Lyonga	Ministry of Forestry
Makueti Josephine	Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
Mawiya Kristine	Ministry of Secondary Education
Mendi Grace	The University of Bamenda
Mike Ngoh	Tropical Plant Exploration Group
Mokake Seraphine	University of Douala

Njoh Jean
Njombe Ewusi Bruno
Njoya Moses
Nnanga Laure
Ojong Ofundem Tataw
William Lawyer

Ministry of Forestry
National Forestry Parastatal
Apiculture and Nature Conservation
University of Yaounde
Programme for the Sustainable Management of Natural Resources
Forest Stewardship Council

Ethiopia

Abebe Damtew
Abera Tafesu
Alemtsehaye Eyasu
Asabeneh Alemayehu
Debela Tesfaye
Debisa Lamessa
Denebo Bilo
Dereje Bekele
Dinkinesh Geramo
Emiru Birhane
Getenesh Haile
Habtemariam Kassa
Mihiret Abera
Motuma Tafa
Rabia Bushira
Tefera Belay
Yemiru Tesfaye
Yiftusira Yitayehu
One representative
One representative
One representative
One representative

Policy Study Institute
Chairman of Chilimo-Gaji Forest Cooperative Union
Central Ethiopia Environment and Forest Research Center
Bahirdar Environment and Forest Research Center
Oromia REDD+ Investment Program
Ethiopian Biodiversity Institute
Wondo Genet College of Forestry and Natural Resources
Jimma University
Tula Wood Venders Association
Mekele University
Private Bamboo Manufacturing Firm
Centre for International Forestry Research (CIFOR)
Private Wood Vender in Southern Ethiopia
Private Consultant
Private Tree Grower in North Eastern Ethiopia
United Nations Development Programme (UNDP)
Hawassa University
Ministry of Agriculture and Natural Resources
Policy Maker
International Development Organisation
Civil Society
Interest Group

Ghana

Abena Owusu Agyapong
Alex Asare
Chris Furney-Nassah
Daniel Kofi Abu
David Atuobi
Elvis Oppong Mensah
Evelyn Afreh
Godfred Ohene-Gyan
Grace Gyabaah
Joann Ofori
Kofi Abban
Kwabena Asubonteng

Sunyani Technical University
Resource Management Support Centre, Forestry Commission
Wildlife Division, Forestry Commission
Tropenbos Ghana
Center for International Forestry Research (CIFOR), Ghana
Civic Response
FORM Ghana (Plantation developer)
Resource Management Support Centre, Forestry Commission
Forestry Services Division, Forestry Commission
Private Afforestation Development Organization
Timber Industry Development Division, Forestry Commission
University of Development Studies, Ghana

Kwame Sekyere
Michael Asigbaase
Peggy Somuah
Valerie Fumey-Nassah
18 Representatives

Tropenbos Ghana
University of Energy and Natural Resources
Kwame Nkrumah University of Science and Technology
Resource Management Support Centre, Forestry Commission
Local Communities

Kenya

Alfred Gichu
Alice Kaudia
Arafa Salim Baya
Balozi Bekuta
Bernard Opa
Caroline W. Kerichu
Dominic Walubengo
Esther Mutuma-Kaitan
Eva Kiseu
Festus M. Murithi
Gen. Humphrey Njoroge
Geoffrey Wanyama
Helidah Oyieke
James Kairo
Jan Van den Abeele
Jane Reuben
Jane Wamboi
Jeff Odera
Jennifer Wambua
John Olela
Jonathan Muriuki
Joseph Hitimana
Joshua Laichena
Mwajuma Abdi
Pakia Mohamed
Paul Matiku
T.T. Thenya

Ministry of Environment and Forestry
International Union for Conservation of Nature (IUCN)
Mangrove Conservation of Mida Creek
University of Eldoret
National Land Commission
Forestry Society of Kenya
Forest Action Network
Komaza Forestry Ltd.
Mwatate Charcoal Producers Group
Kenya Agricultural and Livestock Organization
Kenya Forest Growers Association
Farm Forestry Small Holder Producers Association of Kenya
National Museums of Kenya
Kenya Marine and Fisheries Institute
Better Globe Forestry Ltd.
Ministry of Agriculture and Livestock Development
Kenya Wildlife Services
Forestry Society of Kenya
Vi Agroforestry
Ministry of Environment and Forestry
World Agroforestry Centre (ICRAF)
University of Kabianga
Kenya Institute for Public Policy Research Analysis
National Alliance of Community Forest Associations
World Wide Fund for Nature (WWF), Kenya
Nature Kenya
Wangari Mathai Institute of Peace and Environmental Studies/
Green Belt Movement.
Bamboo Association of Kenya

Victor Mwanga

Malawi

Alfred Chioza
Bennet Mataya
Christopher Mwambene
Frighton Njolomole
Getrude Kambauwa
Henry Utila
Inkosi ya Makosi Gomani V

Lilongwe University of Agriculture and Natural Resources
Mzuzu University
Shire Valley Transformation Programme
Farmers Union of Malawi (FUM)
Department of Land Resources Conservation, Ministry of Agriculture
Forestry Research Institute of Malawi
The Ngoni Maseko Paramount Chief

Joyce Njoloma
Julius Ng'oma
Kenneth Nyasulu
Krishna Das
Maggie Kawalewale
Martha Phiri
Mathews Malata
Paulos Mwale
Robert Kafakoma
Stella Gama
Titus Zulu
Trinitas Senganimalunje
Weston Mwase

World Agroforestry Centre (ICRAF)
Civil Society Network on Climate Change, Lilongwe
Forestry Department, Government of Malawi
Raiply Malawi Limited, Mzimba
Lilongwe District, Government of Malawi
Jesuit Centre for Ecology and Development
Media Council of Malawi
Total Land Care Malawi
Training Support for Partners
Ministry of Forestry and Natural Resources
Forestry Department, Government of Malawi
College of Agriculture, Kasungu
Lilongwe University of Agriculture and Natural Resources

Namibia

Albertina Ndeinoma
Alfeus Shekunyenge
Chidi
Clarence Ntesa
Clemens von Doderer
Gillian Maggs-Kölling
Hanks Mukaya Saisai
Isack Kaholongu
Jonas Mwiikinghi
Joseph Hailwa
Kamuhelo Lisao
Lemmy Liswani
Lisias Tjaveondja
Meed Mbidzo
Miya Kabajani
Samson Mulonga
Natanael Amadhila
Ndapanda Kanime
Paxie Chirwa
Vilho Mtuleni

University of Namibia
Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH
SLU Artdatabanken
Namibia University of Science and Technology
Hanns-Seidel Foundation of Namibia
Gobabeb Research and Training Centre
Agribank
University of Namibia
Ministry of Environment, Forestry and Tourism
Ministry of Environment, Forestry and Tourism
Ministry of Environment, Forestry and Tourism
Sustainable Forestry Management Community
Ministry of Environment, Forestry and Tourism
Namibia University of Science and Technology
B2Gold Namibia
World Wildlife Fund for Nature (WWF), Namibia
Ministry of Urban and Rural Development
Ministry of Urban and Rural Development
University of Pretoria, South Africa
Desert Research Foundation of Namibia

Tanzania

Alex Njahani
Alpha Lamwai
Angela Nyaki
Charles K. Meshack
Collin Oyamo Opiyo
Ezekiel Edward Mwakalukwa
Glory Masao
Heini Maria Vihemaki

Forestry and Value Chains Development Programme, Dodoma
Tanzania Forestry Students Association
Mount Kilimanjaro National Park
Tanzania Forest Conservation Group
Sokoine University of Agriculture Student Organisation
Forestry and Beekeeping Division in Tanzania
Mpingo Conservation and Development Initiative
Embassy of Finland

Joseph S. Makero
Josiah Z. Katani
Juhani Härkönen
Jumma Mwita Mseti
Martin H. Kijazi
Mary Mkonyi
Raymond Kilenga
Siima Bakengesa
Suzana Augustino
Tuli S. Msuya
William S. Nambiza
One representative

Forest Industries Training Institute
Tanzania Association of Foresters
Forestry and Value Chains Development Programme, Dodoma
Sao-Hill Forest Plantation- Mafinga
The Forestry Development Trust, Iringa
Solidaridad, Tanzania
Eastern Arc Mountains Conservation Endowment Fund
Tanzania Forest Research Institute
Sokoine University of Agriculture
Tanzania Forest Fund
Embassy of Finland
Policy Maker

Zambia

Angel Makungu
Annie Sikanwe
Benious Ikachana
Biemba
Brian Kafula
Bridget Omar
Cecilia Banda
Charles Shackleton
Faides Lumbwe
Haggai Mulenga
Humphrey Kaoma
Jane Kwenye
Jerome Kasongo
Kafula Milambo Musonda
Katongo Nsofwa
Kelly Shabita
Kennedy Chipampe
Veronica Mweemba
Victor Chiiba
Vincent Ziba
Two representatives

Community Markets for Conservation
World Wildlife Fund for Nature (WWF), Zambia
Zambia Forestry College
Zambia Forest Commodities Association
CARE International
University of Zambia
Zambia Community Based Natural Resource Management Forum
Rhodes University
WeForest Zambia
WeForest Zambia
EnviroSMART Solutions
Copperbelt University
Muchinga Environment Pioneers
Wildlife Environment and Conservation Society
Forestry Department, Ministry of Lands and Natural Resources
Community Based Natural Resources Management Forum
SNV
Choma Tree Nursery Association
Forestry Department, Ministry of Lands and Natural Resources
Food and Agriculture Organisation
Civil Society

Financial support for this publication has been provided by the German Federal Ministry
for Economic Cooperation and Development



